



## Effect of Digital Competence on Academic Self-Efficacy of Undergraduate Students

Rabia Jameel<sup>1</sup>, Dr. Ahmad Bilal<sup>2</sup> & Dr. Dullas Angelo<sup>3</sup>

<sup>1</sup>M.Phil Scholar, Institute of Education and Research, University of the Punjab, Lahore, Pakistan,  
Email: [rabiajameel2125@gmail.com](mailto:rabiajameel2125@gmail.com)

<sup>2</sup>Assistant Professor, Institute of Education and Research, University of the Punjab, Lahore, Pakistan,  
Email: [drahmadbilal.ier@pu.edu.pk](mailto:drahmadbilal.ier@pu.edu.pk)

<sup>3</sup>Associate Professor, Department of Psychology, Central Luzon State University, Philippines,  
Email: [dullasangelo@yahoo.com](mailto:dullasangelo@yahoo.com)

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#### Corresponding Author:

Rabia Jameel

#### Email:

[rabiajameel2125@gmail.com](mailto:rabiajameel2125@gmail.com)

### ABSTRACT

The growing need of the digital competence within the educational environment leads to the reflection of its projected effects on the academic experiences of students. In line with this predicted relationship, this research has investigated the relationship between digital competence and the academic self-efficacy of undergraduate students. The researchers evaluated the beliefs of undergraduate students regarding digital competence and academic self-efficacy and investigated whether or not academic self-efficacy is influenced by digital competence. The data were gathered on a cross-sectional survey with the help of a quantitative research design of Ex Post Facto type. The tools were a 5-point Likert scale in order to assess the digital competence of students and their academic self-efficacy. The sample employed was 300 randomly selected students of a university in the public-sector. In the study, the results showed that most of the students had positive perceptions regarding their academic confidence and their ability to handle the digital tools. The findings also established that the impact of digital competence on the academic self-efficacy of undergraduate students is positive with a significant implication. The research suggested the provision of projects and orientation to the students, concentrating on the digital and technological skills. It was also suggested that these competencies should be incorporated in the curriculum to increase the digital competencies of undergraduate students.



## **Introduction**

The accelerated development of technologies makes it necessary to implement digital technologies in all spheres of human activity. Sánchez-Caballé et al. (2020) argue that the so-called digital skills, which were initially demanded in the 20th century, have become the prerequisites of successful individuals in the 21st century. Technology can potentially be an agent that enhances creativity, so it is a fixed variable that becomes more and more important to humans (Belmonte et al., 2019). As technology becomes essential in nearly every profession, the world is growing increasingly digital. Technology significantly impacts education. As stated by the European Commission (2016), strong digital competence is necessary for academic success, as society becomes more digitally literate. According to Asad et al. (2020), people can better meet the demands of the current digital environment by enhancing their digital competence.

Matarazzo et al. (2021) argued that current internet and digital technology usage has transformed social life demands, lifestyles, and approaches to gaining knowledge. In every field, especially in education, technological and digital systems are being developed to help collect, store, and share knowledge. The European Commission has highlighted digital competence as a critical skill for responsible citizens. It defines it as the safe and responsible use of technology for educational, professional, and personal purposes (European Commission, 2016). Zhao et al. (2021) also argued that, to thrive in an information- and knowledge-based society, one must have digital competence. Shanmugasundaram and Tamilarasu (2023) stated that using digital tools can significantly influence the performance and cognitive and emotional states of the younger generation. Among cognitive variables, self-efficacy may be the most reliable indicator of academic success. According to Freire et al. (2020), self-efficacy predicts higher student engagement in academic activities; factors such as stress, anxiety, and lack of support contribute to lower engagement and motivation toward their academic goals.

A key factor influencing student motivation, learning styles, and academic success is academic self-efficacy. Higher self-efficacy enables students to actively engage in studying, remain in case of challenges and have improved performance in school. Mateovu (2020) suggests that academic self-efficacy can be used to predict academic achievement. Several studies have proved that academic self-confidence level is positively correlated with academic achievement.

Zimmerman and Tsikalas (2018) state that the students who experience stronger self-efficacy tend to accomplish effective self-regulation, in which they keep track of their progress and seek means to address challenges. This strategy makes them study better and achieve higher grades. Low self-efficacy students, in their turn, might not believe in their potential, which makes motivation and academic performance lower (Waddington, 2023; Ahmad, Sewani, and Channa, 2025).

Farooq et al. (2022) assumed that academic confidence might require an individual to be digital competent, or have the capacity to access digital technology with confidence, analytical, and creativity. Bandura and Hall (2018), also contended that the confidence of the student with regard to his/her capability to complete the academic assignments also plays a significant role in influencing student motivation, academic learning styles, and achievement as a whole. In the digital age, it is important to determine the effect of digital competence on academic self-efficacy. It is noteworthy to understand how their digital competence is associated with the sense of confidence in their academic competencies as technology is becoming increasingly an important part of the learning process (Ahmad et al., 2023; Ahmad, Sewani, and Fatima, 2025). Given the key role of digital learning and competence in education, this study aims to examine how digital competence affects undergraduate students' academic self-efficacy.

## **Research Objectives**

The objectives of the research are following:

1. To find out the digital competence of undergraduate students.
2. To determine academic self-efficacy of undergraduate students.
3. To assess the effect of digital competence on the academic self-efficacy of undergraduate students.

## **Research Questions**

In this study, the following research questions were answered:

1. What is the perceived digital competence of undergraduate students?
2. What do undergraduate students perceive about their academic self-efficacy?
3. Is there any significant effect of digital competence on the academic self-efficacy of undergraduate students?

## **Literature Review**

### **Digital Competence**

Digital competency is the ability to manage and create information using digital technologies, tools, and networks. People cannot function well in a community without this skill (Aldhaen, 2024). This ability includes digital literacy, cognitive and ethical considerations, and technical skills for effectively handling digital situations. Digital competency has become a crucial part of education as digital technologies are rapidly integrated across all levels of learning (Falloon, 2020; Faheem, Gulab, & Ahmad, 2025).

### **Academic Self-efficacy**

Academic self-efficacy is the belief in one's capacity to learn or complete tasks at certain levels within an academic setting. Schunk and DiBenedetto (2022) described it as students' confidence in their ability to plan and execute the steps needed to reach specific academic goals.

### **Effect of Digital Competence on Academic Self-Efficacy**

The literature widely discusses the importance of digital competencies as essential skills to be imparted to young minds to develop problem-solving competence (Burgos-Videla et al., 2021). Our education system needs new approaches to cultivate well-rounded minds to meet today's market demands. To participate in global development and meet those demands, one might need to be technically skilled (Lopez-Meneses et al., 2020).

Multiple studies have highlighted the link between digital competence and students' academic confidence, performance, and self-efficacy. Hatlevik et al. (2018) stated that students' digital skills can predict increased self-efficacy, as these skills help them complete tasks more efficiently. Individuals are expected to work hard to improve their performance and achieve high grades in any field they are enrolled in. Technological skills can help them become more effective by boosting their confidence in completing tasks. This is facilitated by Katsarou (2021), who identified that students with lesser computer anxiety and better digital skills are more likely to perform better and be active participants.

The significance of digital literacy has been stressed by Abbas et al. (2019). The researcher disclosed how communication, research skills, and academic confidence of students can be improved in case they are digitally literate. In support of the debate, Mehrverz et al. (2021) have demonstrated that digital competence has a positive impact on the academic performance of students and their confidence.

Pakistan is a developing nation and its educational system and students are striving to satisfy the requirements of the new digital world irrespective of the monetary constraints. As Ishaq et al. (2020) have pointed out, students who have access to technology and know how to use it are certain of their academic performances, implying that technology can bring significant improvements to the academic performances of students (Ahmad, Noorani, and Channa, 2025).

Self-efficacy is a valuable concept and self-regulation may be required of each student to develop trust in his/her academic studies. Rafiq and Ameen (2022) supposed that technical skills and competencies are used to assist learners to manage their time, do their tasks, and control their selves in regards to studying. This creates an implication that Pakistani students may be more assured when they are relying on online platforms to obtain an education. It also highlights the increased necessity to impart these skills to young people in Pakistan.

This study focuses on the Social Cognitive Theory by Bandura (2001), which suggests that human actions and behaviors are shaped by their personal and environmental interactions. An important concept in this theory is self-efficacy, which refers to an individual's belief in their ability to complete tasks and achieve goals (Bandura, 2023). As technological skills become essential for students to thrive in this high-demand society, they may significantly influence or predict students' academic confidence and self-efficacy.

## **Methodology**

The research paradigm of this study was positivism, which Creswell (2014) describes as the belief that only observable events can produce reliable data (Karupiah, 2022). Under this paradigm, the study adopted a quantitative approach. An Ex Post Facto research design was used to determine the existing effect of the independent variable on the dependent variable. Sharma (2019) has outlined Ex Post Facto as research in which the researcher does not create the treatment but analyzes the effects of an already-occurring treatment. This study identified Digital Competence as the independent variable and Academic Self-efficacy as the dependent variable. The impact was assessed through regression analysis. Demographic information included gender, faculty, and year of study. Two questionnaires created for this research were adapted after confirming their reliability and validity. The study focused on undergraduate students at a reputable public university in Lahore. All undergraduate students enrolled in 19 faculties of a public university were the population of this study, from which 6 faculties were randomly selected. Then, 6 departments from those chosen faculties were selected using a random sampling technique. After that, 50 students from each faculty were conveniently selected. The total sample size of this study was 300 undergraduate students. The list of faculties and departments was obtained from the official website of a public sector higher education institute. After randomly selecting departments, consent for data collection was obtained from those departments. The researcher visited the departments to collect all the data and gave clear instructions about the study's purpose to the participants. Data was collected from the selected sample after securing consent and permission from the chosen departments. Participants were provided with enough time to complete the questionnaire. He and Zhu (2017) adapted a Digital Competence Scale (DCS) with three factors: Technological Proficiency, Digital Literacy, and Ethical Knowledge. Academic Self-efficacy was

measured by adapting an Academic Self-Efficacy Scale (ASES) by Dullas (2018), which comprised Perceived Control, Persistence, Academic Competence, and Self-Regulated Learning.

In both questionnaires, expert opinions have been collected to make them valid. The reliability of the instruments was evaluated by pilot testing.

**Table 1: Reliability Coefficients for Scales**

Scale	No. of items	Alpha Reliability
Digital Competence Scale (DCS)	20	0.845
Academic Self-Efficacy Scale	18	0.840

### Data Analysis

In order to respond to the initial two questions, the descriptive statistics were applied to provide the factor-specific outcomes regarding the perceptions of digital competence and academic self-efficacy in students, indicating the mean and standard deviation. Inferential statistics were used to answer the third question. In this study, the researcher utilized linear regression to examine the relationship between digital competence and its sub-elements and the academic self-efficacy of students in a higher education institution.

**Table 2: Factor-wise Breakdown of Students' Perceived Digital Competence**

Sr. No.	Factor	Mean	Std. Deviation
1.	Technological Proficiency	3.74	0.67
2.	Digital Literacy	3.68	0.58
3.	Ethical Knowledge	3.76	0.80
4.	Overall Digital Competence	3.71	0.55

Table 2 shows the descriptive statistics of different determinants of digital competence in the case of undergraduate students. The average score of Technological Proficiency (3.74) gives good evidence that the majority of students are probably much proficient with digital tools. On the same note, the average of 3.68 in Digital Literacy measures high competency in the successful use of digital resources. Ethical Knowledge (3.76) had a high-mean score indicating that students are aware of ethical implications of digital activity. When it comes to the mean score of undergraduate students as a whole with respect to digital competence (M=3.71), most of the students concurred with diverse characteristics of digital competence. These results show that there is a high digital competence in students studying various undergraduate programs.

**Table 3: Factor-wise Description of Perceived Academic Self-Efficacy by Students**

Sr. No.	Factor	Mean	Std. Deviation
1.	Perceived Control	3.71	0.68
2.	Academic Competence	3.71	0.68
3.	Persistence	3.73	0.70
4.	Self-Regulated Learning	3.66	0.68
5.	Overall Academic Self-efficacy	3.70	0.54

Table 3 presents the means and standard deviation of four concepts, including Perceived Control (PC), Academic Competence (AC), Persistence (P), Self-Regulated Learning (SRL), and Overall Academic Self-efficacy (AS) among undergraduates. The average of PC (3.71) means that the majority of the students do not disagree with their capability to control and manage academic results. Similarly, the mean score for AC (3.71) suggests that most students maintain a consistent belief in their ability to sustain their academic performance over time. The mean score of 3.73 and a standard deviation of .70 for Persistence reflect that the majority of students believe their determination helps them overcome academic challenges. However, a slightly lower mean SRL score (M=3.66) indicates that most students may have a moderate belief in their ability to regulate their learning. A mean score of 3.70 and a standard deviation of 0.54 on the OAS suggest that undergraduate students have strong beliefs and confidence in their academic abilities.

**Table 4: Regression Analysis Summary for Digital Competence Predicting Academic Self-efficacy**

	<b>B</b>	<b>SE</b>	<b>B</b>	<b>t</b>	<b>Sig.</b>
(Constant)	1.16	.16		7.41	.000
Digital Competence	.68	.04	.69	16.29	.000
	.47				

A simple linear regression was performed in this study to analyze the impact of digital competence on undergraduate students' academic self-efficacy. The results show that digital competence may significantly positively influence academic self-efficacy (p=.000) and explain 47% of the variance in students' academic self-efficacy.

**Table 5: Regression Analysis Summary for Factor Technological Proficiency Predicting Academic Self-efficacy**

	<b>B</b>	<b>SE</b>	<b>B</b>	<b>t</b>	<b>Sig.</b>
(Constant)	2.22	.15		14.35	.000
Technological proficiency	.39	.04	.49	9.73	.000
	.24				

A simple linear regression analysis was performed to examine the effect of Technological Proficiency (TP) on students' Academic Self-efficacy. The p-value (.000) indicates a significant positive impact of TP on Academic Self-efficacy. The value (.24) suggests that approximately 24% of the variance in academic self-efficacy can be predicted by undergraduate students' technological proficiency.

**Table 6: Regression Analysis Summary for factor Digital Literacy Predicting Academic Self-efficacy**

	<b>B</b>	<b>SE</b>	<b>β</b>	<b>t</b>	<b>Sig.</b>
(Constant)	1.53	.16		9.70	.000
Digital Literacy	.58	.04	.62	13.86	.000
	.39				

To examine the impact of Digital Literacy (DL) on students' Academic Self-efficacy, a simple linear regression analysis was conducted. The results in table 6 indicate that digital literacy may significantly influence academic self-efficacy (p=.000), and the positive beta value suggests that

increasing digital literacy among undergraduate students could boost their academic self-efficacy by approximately 39%.

**Table 7: Regression Analysis Summary for factor Ethical Knowledge Predicting Academic Self-efficacy**

	<b>B</b>	<b>SE</b>	<b><math>\beta</math></b>	<b>t</b>	<b>Sig.</b>
(Constant)	2.18	.12		17.85	.000
Ethical Knowledge	.40	.03	.59	12.70	.000
	.35				

An examination of the effect of Ethical Knowledge on students' Academic Self-Efficacy was analyzed using a simple linear regression. The results showed that ethical knowledge has a significant positive effect on academic self-efficacy ( $p=.000$ ), and that academic self-efficacy can be predicted by about 35% based on ethical knowledge among undergraduate students.

The results of this research indicated that the digital competence of undergraduate students can be a powerful predictor of academic self-efficacy. The descriptive analysis showed that students have a high degree of digital competence, and TP, DL, and EK have a positive impact on their overall digital capabilities. It also showed that students had a positive attitude towards the overall academic self-efficacy. The regression analysis indicated that digital competence is a significant predictor of academic self-efficacy and explained 47 percent of the variance. Digital literacy was found as the strongest predictor of digital competence, with an approximation of 39 percent of the impact on academic self-efficacy, followed by the ethical knowledge (35 percent) and technological proficiency (24 percent).

## **Discussion**

The present research evidences the notion that digital competence may be a primary contributor to promoting the confidence, beliefs, and academic performance of undergraduate students. Hatlevik et al. (2018) confirmed such findings by concluding that digital competence, especially in information, skills, and digital responsibility, can have a positive impact on self-perceptions of academic abilities in students (Ahmad, Sewani, and Ali, 2024). Numerous scholars claim that effective digital proficiencies enhance student confidence to be able to cope with their studies successfully. According to Galindo-Dominguez and Bezanilla (2021), a high level of digital competence should also be considered one of the factors that can help university students to develop positive self-efficacy and enhance their time management abilities (Pirzada, Tabassum, and Ahmad, 2024).

On a similar note, Pinto and Leite (2020) explained that digital skills prepare students to efficiently cope with the educational problems and develop confidence in their academic competencies. This is consistent with the proposal put forward by Bandura (1997) that self-efficacy is possible through the ability in the relevant skills. In this study, it was possible to establish the effects of different factors on academic self-efficacy. Our dependent variable is the most affected by the digital literacy. It is a very important field to emphasize on in the study of the impacts of digital competence. Han (2024) claimed that the digital literacy of university students can be highly enhanced in terms of self-efficacy. Abbas et al. (2019) also highlighted the impact of digital literacy on the academic students, which is positive because it significantly impacts the confidence, communication, and research abilities of higher levels of students and positively influences their academic self-efficacy (Ahmad, Sewani & Khoso, 2024).

The second most significant predictor of academic self-efficacy among the undergraduate students is ethical knowledge. Digital ethics in education is also identified as an important issue in recent studies (Akram, Fatima & Ahmad, 2024). Mahmud et al. (2020) argue that ethical digital practices are becoming a more crucial element as students move into a digitized world where they need to make responsible choices about how they share information and engage with one another online.

## **Conclusion**

To sum up, the findings highlight the value of improving digital competence, particularly, digital literacy and digital ethical awareness as a means of strengthening academic self-efficacy among students. They suggest that developing students' digital skills can notably increase their academic self-efficacy at the undergraduate level.

## **Recommendations**

Based on the results, several recommendations were made. First, to improve students' digital literacy, teachers should assign projects or tasks that require using technology and encourage students to complete them with digital tools, helping develop practical skills at the undergraduate level. Second, to help students stay secure online, institutions could hold orientation sessions on online ethical considerations, which may boost academic self-efficacy. Third, institutions might revise their diploma and certificate programs to improve students' digital literacy across all departments. Fourth, training institutions can organize professional development programs for teaching staff to provide practical knowledge on integrating technology into existing course outlines, thereby enhancing digital competence and potentially increasing students' digital skills and knowledge. It is also recommended that future studies include a larger sample size from across the country.

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