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Print ISSN: [3006-2497](#) Online ISSN: [3006-2500](#)Platform & Workflow by: [Open Journal Systems](#)**Relationship between Digital Literacy and Academic Performance of Students at the Higher Education Level****Abdul Aziz***

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Abstract

This study aimed to examine “Relationship between Digital Literacy and Academic Performance of Students at Higher Education Level”. In the current research a quantitative approach with a correlational research design was applied. There were 2022 undergraduate students from Namal University Mianwali (Private University) and University of Mianwali (Public University). The sample of 332 participants of different departments of Namal University Mianwali (Private University) and University of Mianwali (Public University) were selected through convenience sampling technique. Two self-developed questionnaires (Digital Literacy scale, Academic Performance Scale) were used to collect data. The data collected were analyzed using the SPSS software which applied inferential statistical technique namely Pearson correlation and linear regression. Positive but significant relationship between digital literacy and academic performance were shown in results. The regression analysis was conducted to verify the significance of digital literacy as a predictor of academic performance, and the results showed that digital literacy was a significant predictor. Based on the conclusion, it was recommended that the universities must carry out awareness workshops for the students to know about the positive and negative use of technology and make them digitally literate.

Keywords: Digital Literacy, Academic Performance, Undergraduate, Student

Introduction:

The swift progress of digital technologies has revolutionized education across the globe and changed its ways of accessing, sharing and building knowledge. Digital technologies such as digital platforms, learning management systems, virtual classrooms, electronic databases, online assessment systems, and communication technologies are now used more and more frequently by higher education institutions to improve the teaching and learning process. The skills needed to achieve academic success have also evolved with the new technologies and digital literacy is now a mandatory know-how for University students. As information is accessed, evaluated, produced, and communicated using digital technologies in modern technology-rich learning environments, students are expected to receive more than just disciplinary knowledge; they are expected to learn to access, evaluate, produce, and communicate information effectively using digital technologies (Bawden, 2008; Eshet-Alkalai, 2004).

Digital literacy is not just about being computer literate, it's about using digital technologies effectively, critically and responsibly, to manage information, to communicate, to solve problems, and to create knowledge. Digital literacy, as defined by Gilster (1997), is more than just technical skills; it is understanding and assessing information accessed from digital sources. In the same way, Bawden (2008) noted that digital literacy is about evaluating information, thinking critically, technological skills, and ethical involvement in digital domains. Ng (2012) also suggested digital literacy comprises technological, cognitive and social-emotional aspects which are more for using digital technologies and engaging in technology mediated learning.

The importance of digital literacy in higher education is growing because such learning activities are highly dependent on digital resources. Students at the university use scholarly databases and electronic journals, assess online information, complete digital assignments and assignments using virtual platforms, and use educational technologies. Along with the development of blended learning and online education, the need for digitally competent learners is growing even more. Students who have higher levels of digital literacy are more likely to successfully navigate an online learning environment, effectively engage with digital tools and participate in independent learning activities (Tang & Chaw, 2016).

The pandemic of COVID-19 has made digital literacy a pressing need especially as colleges all over the world moved quickly from the classroom to online learning platforms. Institutions used virtual classrooms, digital assessment systems and online communications to ensure the continuity of academic work. But this shift revealed the discrepancies in students' digital skills. Students with low digital competencies experienced difficulties in accessing learning materials, joining virtual classes, and doing academic work (Benedict et al., 2024), while the other students thrived in online learning environments. Hence, digital literacy has emerged as an important determinant of student success in today's learning context.

There are several international frameworks that have called attention to the multi-dimensionality of digital literacy. In 2013, Ferrari (2013) has developed the Digital Competence Framework (DIGCOMP), which includes five main areas of digital competence: information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving. Likewise, Martin (2006) suggested that digital literacy encompasses knowledge, interest, and skills needed to "navigate the digital world for learning and communication." The frameworks all show that digital literacy entails more than just technical skills; it's about critical examination of information, responsible digital use, and problem-solving with technology.

Educational researchers' interest in the connection between digital literacy and performance has grown. Digital competent students can seek appropriate academic sources, assess the credibility of the information, engage with others in collaborative learning and utilize technology as a means to enrich their learning experiences. The meta-analysis conducted by Siddiq and Scherer (2016) found that ICT literacy positively affects the learning outcomes, as ICT skills enhance information processing and problem-solving skills. Likewise, Li et al. (2025) also report that there was a significant positive correlation between digital literacy and academic performance in various educational settings.

The impact of digital literacy on academic achievement has been proven in empirical studies. Gui and Argentin (2011) found that variations in students' digital skills are correlated with variations in educational achievement. Park and Byun (2022) revealed that digital literacy has a significant effect on academic achievement of university students as it enhances the efficiency of learning, management of information, and autonomy of learners. Similarly, Holm (2024) found that digital literacy has a positive effect on students' learning performance in online learning environments.

This research demonstrates that digital literacy equips students with the necessary skills to be successful in higher educational environments that rely on technology.

The impact of digital literacy is also reflected in students' confidence and self-confidence in learning activities. Students that have better digital skills tend to be more confident in their ability to use educational technologies and manage their academic responsibilities independently. Hatlevik et al. (2015) concluded that, students' digital competence was positively correlated with their self-efficacy and strategic information use. Likewise, Supratman et al. (2025) found that digital informal learning, self-efficacy, and technological competence are the factors influencing academic achievement resulting from digital literacy. As such, digital literacy is not only associated with students' technological skills, but it also enhances students' sense of engagement in learning.

Information literacy is an important element of digital literacy because university students have to deal with a great amount of digital information in academic databases, web pages and online learning platforms. Pupils need to be able to recognise reliable sources, assess the reliability of information and use it appropriately. Uzma and Nasreen (2024) noted that digital information literacy helps the students assess online resources and use them appropriately for academic information.

Digital technologies have huge educational potential, but misuse of digital resources can have a detrimental effect on academic achievement. Using social media, entertainment media, and online activities that are unrelated to academic work may lead to decreased concentration and academic productivity (Pérez-Juárez et al., 2024). Thus, the concept of digital literacy also encompasses responsible use of technology and managing digital distractions effectively.

Digital literacy is a significant challenge in education in developing countries like Pakistan. The integration of ICT-based learning into Pakistani universities is gaining momentum, but the lack of access to technology, Internet connectivity, and digital training opportunities still has an impact on students' abilities. Ameen and Gorman (2009) recognized digital literacy as a key problem in the education systems in Pakistan, because there was limited technological resources and lack of training opportunities.

The previous studies conducted in Pakistan had shown positive relationship between digital literacy and academic performance. Abbas et al. (2019) revealed that university students' digital literacy has a significant contribution to the improvement of academic achievement. According to Khan (2023), students' academic performance is enhanced by digital literacy and highlighted the value of digital training programs. Likewise, Malik et al. (2024) validated that there was a significant relationship between ICT literacy and educational outcomes among university students in Pakistan. Most of the existing studies, however, have been general on the usage of ICTs or digital competence in general and very little research has been done on the specific effect of digital literacy on universities' academic performance in Mianwali.

Digital technologies are becoming more prevalent in academic activities of emerging Higher Education Institutions at University of Mianwali and Namal University Mianwali. Students should use the online learning resources, electronic resources, digital libraries, and virtual communication systems. Differences in students' digital competencies, however, could impact the successful integration and use of technology environments and successful learning outcomes. Although digital learning has become an important part of education, there is not much empirical research on the effect of digital literacy on learning outcomes in these institutions.

So, the purpose of the present study is to investigate the effect of digital literacy on academic performance of students of higher education institutions of University of Mianwali and Namal University Mianwali. The study aims to make a contribution to the understanding of digital literacy in higher education and to support universities, teachers and policy makers in designing effective digital literacy programs, which will support the academic success of students in technology-mediated learning environments.

1.2 Objectives of the study

Following were the objectives of the study:

1. To find out the relationship between students' digital literacy and their academic performance.
2. To check the impact of digital literacy on the academic performance of higher education students.

1.3 Research hypothesis

1. H₁: The relationship between digital literacy and academic performance among higher education students was significant.
2. H₂: The effect of digital literacy on academic performance among higher education students was significant.

Literature Review:

Digital technologies have revolutionized higher education with respect to teaching, learning and engagement of students. Digital platforms, learning management systems, virtual classrooms, electronic databases and online assessment tools are increasingly being adopted in the field of education in universities across the world to help with the implementation of learning activities. This results in students having to acquire the skills of digital competence to access information, interact with digital resources and carry out academic work. Digital literacy has thus become a crucial skill for success in today's technology-rich learning environment.

Digital literacy is more than just computer literacy, it is the ability to use digital technologies effectively, critically and responsibly to access, evaluate, create and communicate information. Gilster (1997) said that digital literacy is "the understanding and use of information from various digital sources with emphasis on the critical analysis of the information, not just on the technology itself". Eshet-Alkalai (2004) also expanded on this idea and named it multi-literacies, which involves information literacy, reproduction literacy, branching literacy, photo-visual literacy and socio-emotional literacy. Likewise, Bawden (2008) noted that digital literacy is the combination of computer literacy, information literacy and media literacy, which allows people to manage and use digital information responsibly.

Ng (2012) defined digital literacy in three parts: technical, cognitive and social-emotional skills. Technical skills are the skills needed to use digital devices and digital applications, cognitive skills are the skills used to assess and process digital information, and social-emotional skills are the skills used in relation to responsible communication and ethical behavior in digital environments. The dimensions are relevant in higher education, where students are increasingly expected to learn online, to research online, to work collaboratively online and to create knowledge on their own.

Digital literacy has been adopted as a requirement for learning in higher education environments. Students will be required to use the academic databases, electronically evaluate, engage in virtual discussions, create digitally based assignments and utilize technology based learning tools. Tang and Chaw (2016) noted that digital literacy helps students to navigate through a blended and online learning context successfully in relation to their interactions with

digital systems and resources. Thus, digital literacy plays a role in students' technological skills, but also in their own learning and their participation in the education process.

There are several frameworks that have defined the development of digital competence. According to Martin (2006), digital literacy is the consciousness, attitudes and skills needed to use digital tools effectively for learning, communication and work. Calvani et al. (2010) suggested that technological, cognitive and ethical are the three dimensions of digital competence, with a focus on responsible and critical technology use. Likewise, Ferrari (2013) has created the Digital Competence Framework (DIGCOMP) which has five main areas: Information and Data Literacy, Communication and Collaboration, Digital Content Creation, Digital Safety, and Problem Solving. These frameworks illustrate that digital literacy is a multifaceted skill set comprised of technical, critical thinking, information management, and responsible digital participation skills.

There is an increasing amount of research that has investigated the connection between digital literacy and academic achievement. Digital competent students are better able to access academic resources, assess information, solve learning-related problems and use technology to learn. In the research conducted by Gui and Argentin (2011) it was found that students' success in learning depends on their digital skills. Likewise, Aesaert and van Braak (2015) found that ICT competences are significantly related to academic performance, but that socioeconomic differences may impact how students are able to acquire digital skills. A meta-analysis done by Siddiq and Scherer (2016) found a positive correlation between ICT literacy and academic achievement, meaning that students with positive ICT skills have more information processing and problem-solving skills.

New research has also shown that digital literacy has a positive impact on learning. According to Park and Byun (2022), digital literacy has a positive relationship with academic achievement, and it enhances the efficiency of learning, information management, and learner autonomy. According to Holm (2024), students with higher levels of digital literacy had better results in online learning environments, and Muammar et al. (2024) found that students who had high digital literacy had better academic outcomes because of their greater access to information and their increased confidence in technology. Moreover, Li et al. (2025) proved the impact of digital literacy on academic outcomes of students through the evidence of meta-analysis in various educational settings.

The importance of digital literacy becomes more relevant in developing countries like Pakistan, where universities are working towards incorporating digital learning systems. But technology access, training opportunities for students in the digital field and differences in students' technical background are still huge problems. In Pakistan, due to lack of technological resources and limited opportunities for skill development, Ameen and Gorman (2009) identified Digital Literacy as an important Educational problem.

The studies carried out in the Pakistani Higher Education Institutions have shown that digital literacy has a positive connection with academic achievement. Abbas et al., (2019) concluded that the students who possess more digital skills obtained better learning results due to their ability to access learning resources and finish their academic work well. The study of Khan (2023) revealed that digital literacy had significant impact on university students' academic performance and showed that there is a need for digital training initiatives. In the same way, Malik et al. (2024) found that there was a significant relationship between ICT literacy and academic achievement among university students of Pakistan. Additionally, Qureshi and Khan (2023) emphasized digital information literacy (DIL) as a tool to enhance students' information evaluation and utilization skills.

An important aspect of digital literacy is digital information literacy, as students are presented with a lot of information through online sources. Success in school depends on the ability to determine the credibility of information, assess its reliability and apply appropriate knowledge. Lau and Yuen (2014) pointed out that the enhancement of information literacy is conducive to academic performance because it helps students to find and utilize information that is suitable for their learning. Uzma and Nasreen (2024) also reported that students who are more confident in their digital information literacy have a better academic performance because they can manage digital academic resources effectively. In the higher education context, students need to have a range of skills to thrive in technology-enhanced learning systems. Research has shown that the academic achievement of students is linked to their ability to have generic competence, emotional intelligence and learning skills (Yasmeen et al., 2023a). In addition, the effect of teacher support and classroom relationships has also been demonstrated to foster students' emotional intelligence and academic achievement (Shah et al., 2023; Yasmeen et al., 2023b). Digital literacy can be viewed as a necessary competence for digital learning in higher education due to the active engagement, communication, and self-regulation practices that are needed. With the advent of Artificial Intelligence (AI) and sophisticated education technologies, digital literacy has become more significant than ever. Institutions are implementing AI-powered learning platforms, adaptive technologies, and automated assessment systems. AI-based learning systems, adaptive technologies, and automated assessment tools are being incorporated into educational institutions. The digital literacy is found to mediate the relationship between the use of AI-based learning tools and academic performance, and AI literacy and digital competence are considered important for success in higher education (Hossain et al., 2025). While the use of technology can be beneficial, its ineffectiveness has also emerged as an educational challenge since excessive social media use and digital distractions have been shown to have a negative impact on students' concentration and productivity (Pérez-Juárez et al., 2024).

While there is evidence in the literature that digital literacy is linked with learning outcomes, there are still research gaps. Although studies on ICT usage or digital competence exist in Pakistan, few studies have explored how digital competence directly contributes to academic performance in specific institutional settings. In particular, there is a lack of evidence on the performance of students from emerging institutions like the University of Mianwali and the Namal University Mianwali. Hence, the present study focused on the effects of digital literacy on academic achievement of higher education learners.

Digital Literacy Theory and Constructivist Learning Theory are used to support the study. Eshet-Alkalai (2004) describes Digital Literacy as the theory of digital literacy as a cognitive and technical skill needed for effective engagement in digital environments. Constructivist Learning Theory implies that knowledge is actively built by the learner by interacting with information, environment and technology (Ng, 2012). Therefore, a digitally literate student will be able to interact more effectively with the digital resources, will enrich learning experiences, and will experience improved academic achievement.

Methodology

The present study involved quantitative research based on correlational research design that was used to investigate the relationship between digital literacy and academic achievement of higher education students. The population was those students enrolled at University of Mianwali (public sector) and Namal University Mianwali (private sector). The sample consisted of 2,022 undergraduate students of various academic departments and semesters of both universities.

The sample size was determined by Krejcie and Morgan's formula for finite populations at 95% confidence level and 5% margin of error that gave a sample size of 332 students.

Participants came from different undergraduate, such as Computer Science, Electrical Engineering, Business Administration, Mathematics, Education, Psychology, and Software Engineering. Students in 2nd, 4th, 6th and 8th semesters were included to cover different academic levels.

Two self-developed questionnaires, the Digital Literacy Scale (DLS) and the Academic Performance Scale (APS), were used to collect data. The Digital Literacy Scale consisted of 15 items covering four dimensions: technical skills, information literacy, digital communication and collaboration, and digital safety and ethics. The scale was formulated according to the concepts of Eshet-Alkalai (2004), Ng (2012) and Calvani et al. (2010). The Academic Performance Scale comprised 10 items which assessed students' perceptions of their academic performance. Moreover, academic achievement was assessed by means of a student's CGPA obtained from the Learning Management Systems (LMS) of the concerned Universities so as to derive an objective assessment of it. Both instruments used a five point Likert scale of Strongly Agree to Strongly Disagree. Demographic data such as gender, university, department, semester and CGPA were also gathered.

A pilot study was carried out with 60 undergraduate students and instruments to evaluate their reliability. The Digital Literacy Scale had a Cronbach's alpha of .939, and the Academic Performance Scale had a Cronbach's alpha value of .862, which indicated excellent internal consistency and good internal reliability, respectively. The values showed that both instruments were reliable instruments for measuring the intended constructs.

Data gathered using online and offline method. Google Forms were used for online responses and after permission was granted from the university authorities, printed questionnaires were given out via departmental visits. The data collected were analyzed with inferential statistics. To assess the relationship among digital literacy and academic performance, Pearson Product Moment Correlation was used while regression analysis was used to investigate the predictive power of digital literacy on academic performance of the students.

Data Analysis

Correlation Analysis

Table 4.1: Relationship among digital literacy and academic performance of students

Variable	Academic Performance
Digital Literacy	.896**

Note. $p < .001$

In table 4.1 the Relationship between digital literacy and academic performance of students was presented. The result of Digital Literacy and academic performance was significant ($r = .896$; $p = .001$) which was an acceptance to the alternate hypothesis. The outcome of the correlation shows that high scores of digital literacy of students are followed by good scores in academic subjects.

Linear Regression Analysis

Table 4.2: *Effect of Digital Literacy on Academic Performance of Students*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. E	Beta		
(Constant)	1.125	0.103		10.92	.000
DLS	0.719	0.020	.896	36.73	.000

F = 1349.09

To explore the predictive effect of digital literacy on academic performance, regression analysis was performed. The result showed that academic performance was significantly predicted by digital literacy with $\beta = .896$, $t(330) = 36.73$ and $p < .001$. The regression model was statistically significant, $F(1, 330) = 1349.09$, $p < .001$, explaining 80.3% of the variance in academic performance ($R^2 = .803$, adjusted $R^2 = .802$). The unstandardized coefficient ($B = .719$) showed that for a change of one unit in digital literacy, academic performance changed by 0.719 units. Results of the findings indicated that “Digital literacy is a significant positive predictor of students' academic performance” was supported by the results of the study, where the alternative hypothesis was accepted.

Conclusion

The present study has concentrated on the relationship between digital literacy and academic performance of Higher Education Students at University of Mianwali and NAMAL University. The results showed that there was a positive correlation between digital literacy and academic achievement. The students with a higher level of digital competency had positive academic outcomes when compared to students with a lower level of digital competency. The regression analysis also showed that digital literacy is a significant predictor of academic performance. Digital literacy accounts for a large amount of variance, suggesting its role as a factor in academic achievement in higher education environments.

Discussion

This study aimed primarily at examining the relationship between digital literacy and academic success of higher education students. The findings indicated that digital literacy was found to be statistically significantly related to academic performance with positive and strong correlations. The present research was in line with previous studies in the significance of digital literacy in higher education. Abbas et al. (2019), found that digital literacy can be seen to have a positive relationship with students' academic achievement in terms of being able to access information and use digital learning resources effectively. Similarly, Siddiq and Scherer (2016), found a significant relationship between ICT literacy and academic success due to its ability to enhance the information processing, critical thinking and problem solving skills of students. The results also support the conceptual framework used by Ng (2012), which states that digital literacy consists of the following three types: Technical, cognitive and social-emotional, each of which is part of the student's learning experience. A digitally literate student can evaluate information sources, interact digitally, collaborate with others and independently use information. As a result, they will be more likely to meet academic success.

The strong predictive capability of digital literacy found in this study is in line with current educational theories, which consider digital competence as a major factor in students' success in learning environments where technology is an important part. Ahmed (2025), identifies digital literacy as one of these essential components that enable students to participate in AI-enhanced

education. Similarly, according to Du (2026), in the context of contemporary education, students need to be endowed with the ability of digital literacy and AI literacy. Students who are proficient in digital skills can benefit more from intelligent tutoring systems, adaptive learning platforms, and AI-driven research tools. The intelligent tutoring systems, adaptive learning platforms and AI research tools are available for students with higher-level digital skills.

Recommendations

Based on the results of the study, following recommendations are put forward:

1. Higher education institutions may provide training and workshops on information literacy and digital research skills, cybersecurity awareness, and digital applications of AI and responsible digital citizenship.
2. The educational policy makers may formulate policies that would allow digital literacy skills to be integrated in higher education curriculum.
3. Future studies should employ a mixed methods and longitudinal design to fully uncover the impact of digital literacy over time on academic achievement.
4. Other studies in different Universities and provinces of Pakistan may be undertaken to improve the generalizability of the results of the study.

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