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## COMPUTER LITERACY AND ACADEMIC PERFORMANCE IN UNIVERSITIES OF SOUTHERN KHYBER PAKHTUNKHWA PAKISTAN

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KEYWORDS	ABSTRACT
<p>Computer Literacy, Digital Skills, Students' Academic Performance, University</p>	<p>Computer literacy is ability to understand &amp; utilize computer technologies. After COVID-19 pandemic the role of computer technologies immensely increased. Findings from the recent research suggest that computer literacy can positively affect the academic performance of students. However, most of such research has been conducted in the western countries with less studies in Pakistan, keeping this in view this study has examined dynamic linkages amid computer literacy and academic performance in universities of southern Khyber Pakhtunkhwa Pakistan. For this purpose, a web-based survey was conducted among the students in three universities. Data was analysed by descriptive and inferential statistics. Data analyses revealed a positive link between computer literacy and academic performance. Based on such findings this study suggests positive linking between the computer literacy and academic performance in Pakistan. The results offered valuable information in reaching the desired conclusion. In this connection, it is thus recommended that further research is needed to fully comprehend the nature of the linkages amid computer literacy and academic performance in Pakistan.</p>
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### INTRODUCTION

Computer literacy is the capacity to utilize and understand computer hardware, software, and digital technologies is referred to as computer literacy. Computer literacy requires fundamental understanding of computer operation, common apps, internet navigation, and digital security and privacy problems (Blokdyk, 2020). As computer technology continues to play a key part in many aspects of the modern life, including communication, education, business, entertainment and even healthcare, the computer literacy has become increasingly important. Individuals who are computer literate are better able to handle these facets of life and exploit on opportunities

provided by technology (Farias, Aguaded, & Ramirez, 2022). Computer literacy has become an essential ability for the academic success of the university students. Students who understand how to utilize the computers successfully for their research work, and other academic tasks are expected to perform better than those who do not use computers. Findings of recent research studies, like e.g., Simoes, Oliveira and Nunes, (2022), Iglesias, Hernández, Chaparro and Prieto (2021) and Arsyad and Villia (2022) support this claim and researchers have found that the computer literacy has a very positive effects on the overall academic performance of concerned students.

It means that computer literacy is directly associated with student's ability to handle various task in their academic life, including doing assignments, appearing in tests and exams, using library, etc. furthermore, students with the increased computer literacy are able to use computer technologies like video conferencing, internet surfing and other online technologies. The status of the computer literacy has tremendously increased after the COVID-19 pandemic. One of the most noticeable changes brought about by COVID-19 epidemic is the way we work and learn. During the epidemic, all the students began working remotely and taking classes online. As a result, computer literacy is more crucial now than ever (Salem, Alsyed, & Elshaer, 2022). It was discovered that all students in these three countries had scored high on computer literacy assessments, notably in areas relating to software applications in different academic activities. Since, the pandemic has yet not officially ended therefore it is expected that the computers and other online technologies will continue to play significant role in the academic lives of students around the world. Computer literacy among Pakistani students has been on the rise in recent years, especially after the advent of COVID-19 pandemic, however, but still there are significant barriers in access to computer technologies across the country, especially in the remote areas, where there are lack of the electricity and other required facilities (Batool, Rehman, & Sulehri, 2022).

Despite these challenges and barriers, the Government of Pakistan is doing efforts to promote computer literacy and digital skills among students and teachers in Pakistan. The Government of Pakistan has launched initiatives like Prime Minister's National Laptop Scheme that aimed to enhance the computer skills of students by providing them laptops (Qazi, Mustafa, & Sheikh, 2022). Also, Digital Initiative of Pakistan is seeking to improve access to digital technologies, so that overall computer skills of Pakistani increases (Jamil, 2021). Despite these efforts by the Government of Pakistan, computer literacy among students in Pakistan is not that much high. Moreover, except few studies like e.g., Ahmad and Rafiq (2016), (Ahmad (2018), Anwar, Khan and Sultan (2020) and Khan, Anwar and Jan (2021) there are less empirical research studies conducted on effects of computer literacy in Pakistan universities, particularly in the southern Khyber Pakhtunkhwa province of Pakistan. This show a considerable research gap. The lack of empirical research on computer literacy among students studying in the universities of Khyber Pakhtunkhwa Pakistan motivates future researchers to conduct research on this topic. Keeping this in view, current study aims at investigating linkages amid computer literacy and academic performance of students studying in the selected universities situated in Khyber Pakhtunkhwa Pakistan.

## LITERATURE REVIEW

Computer literacy is the capacity to utilize and understand computer hardware, software, and digital technologies is referred to as computer literacy. Computer literacy requires fundamental understanding of computer operation, common apps, internet navigation, and digital security

and privacy problems (Blokdyk, 2022). The computer literacy has grown in importance in today culture as computers have become indispensable tool for communication, education, business, and entertainment. Many parts of our life have been transformed by the internet and computer technology, including education, healthcare, business & entertainment (Martynov, Shavaleeva, & Zaytseva, 2020). The importance of the computer technologies can be realized by the fact that findings from recent studies revealed that 90% adults in United States use internet, 77% adults own tablets or smartphones & 93% adults internet (Pew Research Center, 2021; Pew Research Center, 2021a). The rising use of computers and their associated technologies have motivated researchers around the world and several research studies have been conducted in this area. Review of these studies revealed interesting findings. Study by Tejedor, Cervi, Pérez and Jumbo (2022) compared the computer literacy abilities of university students in Spain, Ecuador and Italy.

It was discovered that all students in these three countries had scored high on computer literacy assessments, notably in areas relating to software applications in different academic activities. Another study by Martin, Hunt, Wang, and Brooks (2020) on middle school students in United States revealed that most students had basic computer abilities, many lacked awareness about online safety and privacy. It is noteworthy that computer literacy is crucial not only for normal students but also for students with disabilities. A study conducted by Arslantas and Gul (2022) examined the digital literacy skills of visually impaired university students in Turkey. It found a high level of self-reported technical and cognitive skills, but lower levels in social skills. The study provided insights for researchers and practitioners about computer skills among disabled students. Finally, study conducted in Pakistan by Zakar, Iqbal, Zakar and Fischer (2021) looked at how a Computer Literacy Programmes may affect computer and internet use in Pakistan. The researchers discovered that such programmes in the country has resulted in considerable gains in computer literacy as well as increased usage of the internet for information-seeking. Computer literacy among students has been on rise in recent years, especially after advent of COVID-19 pandemic, and students have inevitably learned computer so to attend their online education.

It is believed by researchers that higher involvement by the students in computer technologies have greatly enhanced their academic performance. Still, it should be noted that accessibility to computer technologies is a crucial factor, therefore student residing in such areas where there is lack of access to computer or other digital technologies then academic performance might also get negatively affected. Let's examine findings from recent research studies that examine the connection between the computer literacy and academic performance both during and after COVID-19 pandemic. A recent study by Abuhassna et al., (2021) on exploring various aspects that are likely to impact students' academic accomplishments and performance when utilizing online learning platforms in Malaysia. This study found that students who had more computer skills were in better position to perform well as compared to those who has fewer digital skills. Another recent study by Udeogalanya (2022) found that during COVID-19 pandemic, computer literacy abilities were shown to be favorably associated with the academic performance among the university students in the United States. This study found that that those students who were more at ease with the computer technology were likely to engage in online learning and perform better.

Similarly, Ben Youssef, Dahmani, and Ragni (2022) conducted study in France, that examined the influence of information and computer technologies on student's academic performance.

The findings of this study revealed that insufficient investments in information and computer technologies led to limited training and engagement with these tools. However, the study also highlighted that those students who possessed computer skills demonstrated higher academic performance. These results emphasize significance of information and computer technologies as essential components of academic life, highlighting the need to prioritize their importance. Finally in contrast to results of other studies, research study by [Adeyeye et al \(2022\)](#) in Nigerian academic institutions found that there was no link between computer literacy and academic performance among university students in Nigeria during pandemic. It found a high level of self-reported technical and cognitive skills, but lower levels in social skills. The study provided insights for scholars and practitioners about computer skills in disabled students. The authors mentioned reason for it, and it was lack of accessibility to computer and digital technologies, specially in remote areas. Socio-economic status had greater impact on academic performance, since poor students were less likely to use digital technologies so academic performance was not high.

## RESEARCH METHODOLOGY

This study was a web-based online survey, and data were online collected at one-time point, therefore a quantitative research design was adopted with cross-sectional approach. This kind of research designs are widely used in the social science research because it saves time and cost ([Silva, 2012](#)).

### Population & Participants

The participants of this study included students (undergraduate and postgraduate) enrolled three universities located in the southern part of Khyber Pakhtunkhwa Pakistan province Pakistan: KKKUK, KUST and USTB. Since this was a web-based online survey and student participation was purely on volunteer basis therefore the link was share on social media websites like groups of Facebook and students were requested to fill it out. As a result, present study's population comprised students (undergraduate & postgraduate) who were studying at these three selected universities and had utilized Facebook to get an online link. After two months, a considerable number of students participated in the online survey by filling out the online questionnaire. According to filled response data, a total of 378 students took part in this online survey. Since 378 is a good sample size, thus data gathering procedure was stopped and analysis were carried out.

### Data Collection and Scales

1. Computer Literacy was assessed by five items of computer literacy questionnaire by [Son, Robb, and Charismiadji \(2011\)](#) and five items of computer literacy survey questionnaire by [Cartmill, Wall, Ward, Hill, and Porceddu \(2016\)](#).
2. Academic Performance was assessed by thirteen items of the academic success inventory developed by [Festa-Dreher \(2018\)](#).

### Data Analysis Techniques

1. In the first step missing data analysis were performed by using Little's Test for Missing Data Completely at Random ([Little, 1988](#)).
2. In the second step the reliability of data were determined by calculating the Cronbach's Alpha Coefficients.
3. In third step the validity was determined by running the principal components analysis ([Kaiser, 1974](#)).

- The hierarchical linear multiple regression analysis (Hair, Black, Babin, Anderson, & Tatham, 2016) was run to know relationship between computer literacy and academic performance of the students.

## RESULTS OF STUDY

Results obtained from Little’s Test for the Missing Data Completely at Random (Little, 1988) revealed that out of total 378 filled questionnaires, 13 questionnaires had the missing data exceeding 10% threshold, so these questionnaires were deleted according to procedure given by Hair et al. (2016). In this way sample dropped to 365, analyses were performed on this sample size.

### Reliability Analysis

Cronbach’s Alpha Coefficients are given in Table 1. All Cronbach’s Alpha Coefficients are within acceptable range of >0.50 (Heck, Thomas, & Tabata, 2013). Data had no problems of internal consistency.

**Table 1**  
*Values of Cronbach’s Alpha Coefficients*

Variables	Cronbach's Alphas Values
Computer Literacy	0.87
Academic Performance	0.81

### Construct Validity Analysis

Results of of Exploratory Factor Analysis through Principal Components Analysis are shown in Table 2. It is clear that KMO values, Communalities and Factor Loadings are within acceptable range of >0.50 (Tabachnick & Fidell, 2007). It means that data has no issues related to construct validity.

**Table 2**  
*Values of Principal Component Analysis for Construct Validity*

Variables of Study	Factor Loadings	KMO Values	Communalities
Computer Literacy	0.69 to 0.86	0.85	0.58 to 0.77
Academic Performance	0.78 to 0.81	0.78	0.59 to 0.76

### Computer Literacy & Academic Performance

Finally, results obtained from Hierarchical Linear Multiple Regression Analysis revealed that there was positive significant association amid Computer Literacy and Academic Performance. The Computer Literacy as an independent variable had brought 43% of variance (change) in the dependent variable of Academic Performance with F-test value of 134.79, significance level 0.000. The results offered important information as the standardized beta coefficient value of ( $\beta=0.66$ ) was also significant at 0.000 level with T-test value of 11.69, as clear from Table 3. It means that the significant positive link exists between the Computer Literacy and Academic Performance.

**Table 3**  
*Results on Link Between Computer Literacy and Academic Performance*

R-Square	Adjusted R-Square	Standard Error of Estimates	Variance R-2 change	Statistics F-TV	Sig F-TC
0.444	0.430	0.17993	0.434	134.779	0.000
Regression Model (Constant)		Standardized $\beta$ V	T-Test Values	10.567	Sig-Level 0.000
01	Computer Literacy	0.659	11.609		0.000

Note: Dependent variable is Academic Performance

## DISCUSSION

This study aimed at investigating linkages between computer literacy & academic performance of students studying in the selected universities situated in the Khyber Pakhtunkhwa Pakistan. Results of this study revealed that there was positive significant association between Computer Literacy and Academic Performance. Results of study are in concurrence with results of previous studies on dynamic links between computer literacy and academic performance in universities. These studies were mostly conducted in western developed countries and few in Pakistan. The studies include studies by [Simoes et al \(2022\)](#) conducted in Portugal; [Ben Youssef, Dahmani, and Ragni \(2022\)](#) in France; and [Feraco, Resnati, Fregonese, Spoto, and Meneghetti \(2023\)](#) in Italy. Also, studies conducted in Pakistan include studies by [Zakar, Iqbal, Zakar, and Fischer \(2021\)](#) and [Abbas, Hussain, and Rasool \(2020\)](#). Findings obtained from all these western as well as Pakistani studies revealed that the computer literacy and the academic performance are positively associated. Also, computer literacy has a positive effect on academic performance of students.

Since computer literacy refers to capacity to properly utilize computers and related technology, it has become a key skill that all students must acquire today, where computers are an integral part of daily life. Computer literacy has favorable influence on students' academic achievement as technology is integrated into instructional settings. Let us discuss how computer literacy can help the students in their academic performance:

1. Computer literacy teaches students how to look for, analyze, and evaluate information from a variety of sources. Students may swiftly and readily access substantial amounts of knowledge with the assistance of computer technologies. Moreover, the capacity to do research and analyze data is a necessary skill for academic achievement, and this skill can be improved by computer literacy.
2. The handling of computer technology can help students to enhance communication skills and abilities. Students may connect with friends and teachers more effectively by using email and social media.
3. Computer literacy encourages students' creativity and innovation. Students can utilize computer technology to generate digital material such as films, as well as the visual presentations.
4. Students can keep track of their academic activities like e.g., assignments, timetables, and deadlines more easily with the use of computer technology. This enables them to keep on top of their work and successfully manage their time.
5. Computer literacy aids students in development of technical abilities such as computer programming, web development, and software competency. It can help students get a competitive advantage in the employment market.

## **CONCLUSION**

The current study was conducted in Pakistani universities. It has established a significant link between computer literacy and academic performance. Findings revealed that students with strong computer knowledge and skills were more likely to excel in academic courses, especially those that involve computer technology. However, the relationship between computer literacy and academic performance is complex and influenced by factors such as socioeconomic status and access to technology. While this study indicates a positive association between computer literacy and academic performance in Pakistan, it emphasizes the need for further research to fully understand these linkages. The findings shed light on the benefits of computer literacy in enhancing students' academic achievements. The proficiency in the computer skills has become essential as technology continues to be integrated into education. Thus, in this connection, the students with a solid foundation in computer literacy are better equipped to conduct research, analyze data, and present their findings, all of which significantly contribute towards academic success.

Still, it should be noted that computer literacy alone does not guarantee academic excellence. Socioeconomic background and access to technology resources play crucial role. Students from disadvantaged backgrounds may face barriers in accessing computers or acquiring necessary skills, which can impact academic outcomes. Further research is needed to gain comprehensive understanding of dynamics between computer literacy and academic performance in Pakistan. This research should explore specific mechanisms through which computer literacy influences academic achievement and consider interventions to bridge the digital divide. Deeper insights into these linkages will enable policymakers and educators to develop targeted strategies to enhance computer literacy and improve academic outcomes nationwide. This study highlights the significant association between computer literacy and academic performance of Pakistani university students. Strong computer knowledge and skills are useful for academic success, but other factors must be considered. Continued research is vital for better understanding of these linkages, leading to informed policies and interventions to promote educational excellence in Pakistan.

## **Implications of Study**

1. Findings of this study will be significant at individual level to create awareness among students and teachers about importance of computer literacy. Also, it will highlight the importance of computer literacy to administrators of universities and policy makers in higher education sector of Pakistan.
2. Findings of this study will encourage students in the universities of Pakistan to learn computer literacy skills. So, students with the high computer literacy skills can become more competitive in the job market, improve their research abilities, and increase their productivity.
3. Similarly, findings of this study will encourage teachers in universities of Pakistan to include computer technology into their classroom lessons so to assist students in their learning and improve their learning experience.
4. Finally, at policy level, the policy makers can get awareness about the importance of computer literacy, which in return will motivate them to make plans for the curriculum development on computer literacy, train teachers about computer technologies, and develop an infrastructure for the digital age.

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