Effects of ICTs on the Academic Performances of Students

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Abstract

Information and Communication Technology (ICT) has emerged as a dominant force significantly influencing various aspects of human activities. Its profound impact has brought about a revolution in the methods of teaching and learning, fundamentally altering the way people engage in education, work, and leisure. This research delves into the repercussions of ICTs on students' academic performance. To attain this objective, a survey approach was employed to collect primary data from students attending six universities in Lahore: LC, GC, PU, FC, UMT, and Comsats. The data collection instrument utilized was an online questionnaire survey. With the inclusion of both male and female students, the findings were generalized to encompass both genders. The outcomes reveal a conspicuous disparity in the utilization of ICTs between public and private sector universities. Additionally, it highlights a detrimental impact on the academic pursuits of students attending public sector universities when adequate ICT resources are lacking. These findings emphasize the importance of incorporating ICT tools and resources into educational settings to enhance learning outcomes, particularly in the public sector, where access to such technologies may be limited.

Keywords: *ICTs, academic performance, private sector, public sector*

Introduction

The term ICT stands for "information and communication technology", which refers to technologies that enable remote access to information through telecommunications. Information and communication technology is one of the leading emerging technologies that play an important role in every sphere of human work. Over the years, it has witnessed a massive transformation that makes teaching and learning easier and more enjoyable and has changed the way people live, learn, work, and play (Talukder, 2015).

Consequently, the Internet is a vital tool of today's information society, and a world without the Internet is unimaginable (Abe, 2007). In educational institutions around the world, information and communication technology (ICT) has also changed

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the educational landscape and is now an essential part of the teaching and learning process (Selwyn, 2011).

It should be noted the continuing influence of information and communication technologies on virtually every area of life, including education. Along with assessment and evaluation in the school environment, this has brought various modifications to the teaching and learning process. Most people agree that ICT has increased the effectiveness of education. The use of numerous technologies in education has expanded the scope of education by making learning easier. To illustrate, it has significantly increased the prevalence of mobile and inclusive education (Madhuri V. Tikam, 2013).

A study of academic performance about ICT adoption is warranted to demonstrate a substantial correlation between the two variables (Vineeth, 2021). ICT has a positive and negative impact on students' academic performance, but the positive effects exceed the negative effects. There is a pervasive belief that ICT can and will empower teachers and students by shifting the focus of learning and teaching from being heavily teacher-centered to student-centered, and that this change will result in greater learning benefits for kids by generating and opening up opportunities for them. Increase your capacity for critical thinking, informational reasoning, communication, and other higher-order thinking processes. (Bomah, 2014).

Significance of the Study

Due to the existence of the ICT divide in Pakistan, we need to analyze how the ICT divide is affecting the academic performance of university students. This study aids in assessing how and to what extent universities have embraced the usage of ICT and how such acceptance has consequently affected students' academic performance. The results of this study are intended to give higher education a direction for developing approaches that can close the ICT gap between universities in the public and private sectors.

Over the years, the usage of ICT has become significant in higher education institutions across the globe. It provides an opportunity for students to explore beyond their limits with improved access to educational resources. However, there is a need to explore how the usage of ICTs affects the academic performances of students between public and private sectors and this research solely aims to focus on that.

On the one hand, we see public universities facing many challenges related to funding and limited resources. Meanwhile on the other hand private universities have been able to invest more in ICTs and offer its better access to students. Thus, this research aims to provide insight into how these differences affect students' academic performance.

Objectives of the Study

- To explore the effects of information and communication divide on the academic performances of students at the university level

- To compare the ICTs, divide among the students of public and private sector universities
- To identify the link between student's use of ICT and academic success.

Hypothesis

H_1: Students in Pakistan's private sector institutions perform better academically than those in public sector universities because of the use of ICTs.

Literature Review

A study by Franklin D. Gaillard was done to see the result of ICT on student performance and found out strong positive effect between the two. He originated that computer skills influence the grades of pupils as well as their presentation in the projects whereas, there was a considerable difference among those students who were deprived of digital information specifically in the public sector of universities and distant areas with a lack of internet accessibility. He also argued that mainly women are affected by ICT in the less privileged areas due to inequality present in them (Gaillard, 2001)

Spiezia came to the further conclusion that among other advantages, ICT has made it possible to save time and money, provide results more quickly, assess student achievement remotely, and monitor classroom development. He stated that ICTs have enabled students to have faster and better access to information, reduced the level of information uselessness, and made the use of various information resources available online more effective, resulting in great progress in students' academic performance, while those with limited access to ICT and material resources (Spiezia, 2010)

Ishaq presented his research on the relationship between ICT use and academic achievement in 2020. A questionnaire was used to collect data from 300 pupils. The findings indicated that the majority of students at universities owned laptops and personal computers and had access to the Internet. The study concluded that many students use ICT to enhance their fundamental abilities and complete highly engaging learning. Additionally, it was discovered that pupils benefited significantly from the effective usage of ICT (Ishaq, 2020).

Ashley presented that technology helps educators prepare students for real-world environments, emphasizing that as our country gradually becomes more dependent on technology, it is increasingly important for children to learn how to be ICT literate in order to be responsible. The use of ICT in the classroom has been and will continue to be an effective way to educate students while enhancing their learning and equipping them with the necessary skills for the workplace (Ashley, 2016).

According to Semenov, one advantage of ICT training for instructors is having access to a wide range of educational resources. A variety of knowledge and resources for their courses are readily available to teachers thanks to technology, which also makes it simple for them to access online databases, instructional websites, and digital libraries. His investigation indicated that doing so allowed lecturers to

create more interesting and varied lessons that catered to the various learning styles and aptitudes of their students

. In addition, technology has given teachers the opportunity to collaborate with other educators and share resources and ideas, which has improved their teaching practices and improved the overall quality of education (Semenov, 2005).

ICT improves education standards by inspiring studying by dialogue, scheduled time discussion, practice, self-studying, crucial questioning, facts seeking and evaluation said Yusuf in his research where he studied the effect of ICT and standard of education. He also said that ICT can enhance outcomes, practice, and administration and create vital competencies inside underprivileged companies and at the same time will have an effect on instructional guidance and research systems (Yusuf, 2005)

Chandra claims that ICT improves student achievement when teachers employ excessive amounts of technology. He further explored that ICTs had an impact on the instructing and adapting process when learners and instructors were provided with ICT resources (Chandra, 2008).

In the teaching and learning process in the classroom, the use of ICT was absolutely essential because it provided opportunities for instructors and students to control, store, manage, and retrieve data other than to support self-regulated and active learning, concluded Ali in his recent research on ICT and its effects on learning in class (Ali, 2016)

The impact of ICT has turned into a developing area of debate particularly in the schooling and educational sector. Educational organizations are embracing the techniques for screening which comprises ICT and its contribution to related instructive projects. Study halls and offices, for example, projectors, television, and radio sending and getting gadgets, brilliant correspondence boards, screens, and video chatting frameworks, are all the consequences of ICTs (Shamim, 2016). She further concluded that educational organization that is a part of ICT has been succeeding in line more than those institutes that lack modern technology.

Every element of life, including education, has been greatly impacted by information and communication technology (ICT). ICT has an impact on many facets of education, including instruction, assessment, and evaluation. Information is now available through a variety of media, such as a website or an app, which is a good thing because it is thought that this accessibility would promote independent learning. It also made remote and mobile learning possible. While researching the effects of ICT on the education sector, Madhuri stated that ICT has been used to enhance teaching and learning quality as well as research and scientific communication. She added that educational institutions without access to ICT are still falling behind in terms of development (Mudhuri, 2015).

The digital divide between urban and rural distance education students in South Africa was explored in a study by Lembani, Gunter, Breines, and Dalu (2020). The goals of this study were to identify the lack of higher education in many African countries and to highlight the connection between education and success. Its significance is not only for nations but also for individuals, to highlight how technology could be used as a tool for distance learning by making course materials available online, and to examine how students' access to ICT affects their ability to pursue higher education.

An online survey was used to obtain demographic information from 230 local UNISA undergraduates as part of the mixed-method study approach. Additionally, in-depth one-on-one internet interviews were done. Using 239 Vivo software, the 238 interviews were transcribed, tagged, and arranged into themes and sub-themes. The survey revealed that pupils of various ages possess a wide range of material resources. The high percentage of students in ODL who are 28 years of age and older helps to explain this in part.

Helpper looked at the second-level digital gap, which explains how different groups use ICT differently because of underlying social disparities. He claimed that material availability, ICT abilities, and diversity of use are strongly correlated with one's gender, income, education, and literacy level. He emphasized the worry that the introduction of ICT will create "winners" and "losers" since those who have equitable access to ICT will become winners and vice versa (Helsper, 2010).

According to Khan, ICTs have expanded students' attention spans. It examined academic performance in the public and private sectors of education and concluded that. In most countries in Europe, ICT and its use in education have reached the highest importance in the last decade (Khan, 2015).

Okoro went on to say that ICTs have the power to create, develop, enhance, and deepen skills. They can also inspire and engage students to apply their knowledge to real-world situations, build financial capacity for future workers, and improve teaching and learning processes. (Okoro, 2016)

Ismail contended that the accessibility of ICT in offices, particularly in distressed networks, can possibly foster social capital and engage people and the local area at large. Nonetheless, accomplishing that potential appears to be subtle, taking into account that schools, for example, those evoked for this review are persistently denied ICT assets. He further added that educating on the benefits of ICT is the only key to proper in such areas (Ismail, 2020)

Singh, Kumar (2018) conducted a study in North India called "Women and ICT: A Study of Access and Perception." Ramjas College, University of Delhi, New Delhi, India, Department of Commerce This study aimed to provide a solution that would equalize access for women to infrastructure, resources, and services like banking, healthcare, education, and water. This essay seeks to examine how Indian women access, use, and benefit from ICT technology. For the study, a cross-sectional

survey of female respondents who lived in rural and urban areas of six Indian states—Haryana, Uttarakhand, Rajasthan, Punjab, Himachal Pradesh, and Uttar Pradesh—was conducted.

'Digital by Default' and 'Hard to Reach': Exploring Solutions to Digital Exclusion in Remote Rural Areas' was a study by Williams, Philip, Farrington, and Fairhurst published in 2016. In order to help the UK's commercially hard-to-reach areas of provision of broadband overcome digital exclusion, this study intends to make a concrete policy contribution. The choices for "the last few" under the successful open management system of "Digital by Default" are examined in this study. The study demonstrated that high-speed broadband and flexible telephone networks are significantly less common in rural areas than in urban areas due to the topography of the data and communications innovation (ICT) infrastructure needed for a web network in the UK.

The article describes an expansion of the Country Open Get to WiFi Administrations, a study aimed at enhancing internet access for commercially "hard-to-reach" rural areas in the UK. 8 findings from a pilot roll-out of broadband services to households in a far-off rural location that may be categorized as "digitally excluded" are reviewed before launching the experiment and the concept of public access rural wifi services. As a means of overcoming the various barriers to digital interest exhibited in urban-rural isolation, the study at this point comments on field research and the potential contribution of provincial Open Get to wifi Administrations.

Manen concluded that lack of planning, lack of funding, and lack of academic appreciation are the main external reasons that limit the implementation of ICT in schools. The Millennium Development Goals and Education for All (EFA) provide ICT issues to many developing countries, including Pakistan. Pakistan should make every effort to equip itself with the technology necessary to create a society where high-quality teaching and education are widely available.

In 2011, Kajee and Balfourv conducted research on South African students in the educational sector to determine their level of digital proficiency. They discovered that while most of the students' courses required digital learning, very few of them had access to computers. Because many students had virtually no computer literacy, they had to hire someone else to type their papers (Kajee, 2011).

Kanwal, Rehman, and Asif studied the subtle impacts of gender and experience on e-learning acceptance and adoption in Pakistan in 2020. Based on the technology acceptance model, the goal of this study was to comprehend and assess the crucial elements of technology acceptance, including acceptance with regard to the moderating impact of individual characteristics. 356 respondents from the Virtual University of Pakistan participated in the survey, which the researcher conducted using a quantitative methodology. The research models were examined using structural equation modeling. The results demonstrate that gender and prior

experience with e-learning systems have a significant impact on one's impression of and intention to adopt new technology.

Hussain, Wang, and Rahim did a 2013 investigation into e-learning services for rural communities. This study's objective is to assess how well ICT centers have helped rural communities in western Iran build e-governance, and it makes the case that these centers would be able to offer more services to boost rural development efforts.

The researchers presented a model for the development of e-learning centers in rural areas based on an open-source learning management system (LMS) with a technical overview and features. By providing students with the latest educational tools and increasing their interest in e-learning, the project can help advance education in remote areas.

Theoretical Framework

When we apply the Knowledge Gap Theory to the topic of "The Impact of Information and Communication Technologies (ICTs) on Students' Academic Performance," several pertinent insights emerge. Firstly, the Knowledge Gap Theory posits that students from lower socioeconomic backgrounds often encounter difficulties in accessing modern technology, leading to a disparity between students from higher and lower socioeconomic classes. Secondly, students whom lack exposure and familiarity with ICTs may struggle to keep pace with their peers who have greater experience and knowledge in this area. This knowledge gap can create disparities in academic performance. Lastly, the Knowledge Gap Theory offers a valuable conceptual framework for understanding how ICTs affect students' academic achievements. It underscores the potential disparities in access to ICT infrastructure. By recognizing and addressing these gaps, it becomes possible to harness ICTs to improve academic performance and ensure equal educational opportunities for all students.

Methodology

The researcher used the survey method to get the actual findings The population of this study comprises 300 university students of the Public & Private sector of Lahore, Pakistan. 6 universities have been taken under consideration for this purpose. In the present study, purposive sampling has been used because it is an appropriate technique for drawing samples from a specific group of people. A questionnaire consisting of 36 questions was distributed online to 300 students of public and private sector universities in Lahore, Pakistan. In the private sector, the researcher took 50 respondents from Comsats University Lahore, 50 Respondents from the University of Management & Technology, Lahore, and 51 respondents from Forman Christian College, Lahore. In the public sector, the researcher took 50 Respondents from Government College University, Lahore, 51 Respondents from

Lahore College from Women University, and 48 Respondents from the University of the Punjab, Lahore.

Statistical Analysis

Regression Analysis

H_1: Students in Pakistan's private sector institutions perform better academically than those in public sector universities because of the use of ICTs.

i. Level of significance

$$\alpha = 0.05$$

ii. Test Statistic

$$Regression\ Analysis$$

iii. Calculations

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.468[a]	.219	.144	.842

Anova[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	54.144	26	2.082	2.938	.000[b]
Residual	193.523	273	.709		
Total	247.667	299			

iv. Rejection region

$$Reject\ Ho, if\ p - value\ is\ < \alpha(0.05)$$

Conclusion

The value for the R^2 comes out to be 0.219 and can interpret our results as that 2.19% of the variability is explained by the dependent variable i.e., academic achievements. The p-value for Analysis of Variance comes out to be 0.000. Therefore, the hypothesis is accepted and it is concluded that the Students in Pakistan's private sector institutions perform better academically than those in public sector universities because of the use of ICTs.

Discussion & Analysis

This study's primary goal was to ascertain how ICT impacts students' learning results. The hypothesis was discussed in this section in light of the body of previous research.

From the viewpoint of the existing literature, this chapter covers the key findings of this investigation. It also includes limitations and consequences. It was stated that the students in Pakistan's private sector institutions perform better academically than those in public sector universities because of the use of ICTs. The results showed that 46 % of the respondents from the private sector had access to a

laptop in their university whereas only 24.33% of the respondents from the public sector had access to a laptop in their university.

The results also showed that 45.00% of the respondents from the private sector had access to the Internet in their university while only 34.33% of the respondents from the public sector had access to the Internet in their university. The results also exhibited that 36% of the respondents from the private sector often used the Internet for doing assignments and projects while only 31.33% of the respondents from the public sector often used the Internet for doing assignments. It created a significant difference between them proving our hypothesis that private institutions perform better academically than those in public ones because they have abundant use of ICT for educational purposes.

The findings were consistent with the study of Mclaren as she proposed a strong association between high academic performances in students who had the privilege of information technology. In general, the research suggested that students from high socio-economic backgrounds who had greater access to ICT were excelling in the educational sector whereas; those from lower backgrounds even lacked the basic knowledge and skills. She emphasized making policies and programs that provide the appropriate amount of access to the Internet (Mclaren, 2002).

The findings of this study were further supported by the findings of another study. Tarman argued that digital technology has led to the commercialization of education, resulting in ICT in access to online learning between advantaged and disadvantaged communities or sectors in many countries. He concluded that there is a higher performance rate of students in communities where there is access to digital information and the internet than those in public sectors because there is no sufficient access to technology resources (Tarman, 2003) and it resides with our result findings.

The findings are consistent with the Knowledge Gap Theory, which holds that populations from higher socioeconomic classes typically pick up new information more quickly than those from lower socioeconomic ranks due to the less amount of resources. The theory stated that there is a wider disparity in knowledge, and those from higher socioeconomic classes profit, which was supported by our findings, as there was a higher access to ICT use in private institutions as compared to public ones.

Another hypothesis was proposed that ICTs' effects on academic achievement vary between Pakistan's public and private universities depending on things like the infrastructure's quality and the availability of ICT resources. Our findings showed a significant relationship between these variables.

According to the above results, 35.67% of the respondents from the private sector often used up-to-date ICT at university, while only a small ratio of 29.67% of the respondents from the public sector often used modern ICT, which includes laptops, etc., and 4.00% of them never used it.

The results also displayed that 35% of the respondents from the private sector often used video lectures for academics, while only 24.33% of the respondents from the public sector used video lectures for academics, and 11.33% of them never even used them. It created an enormous breach and proved our hypothesis true that ICTs' effects on academic achievement vary between Pakistan's public and private universities depending on things like the infrastructure's quality and the availability of ICT resources as the students in the public sectors have limited resources and some of them have not even heard or used it.

The results were in line with those of Ishaq, who found that pupils having access to ICT had better basic skills and engaged themselves more fully in their studies. It was also discovered that students' ability to execute tasks including preparing assignments, participating in class activities, and better lesson planning increased when ICT was used productively. The usage of ICT, he continued boosted students' competencies and computer abilities, which aided in the development of their organizational behavior in real-world situations. This is relevant to our main findings. (Ishaq, 2020)

The findings aligned with the Knowledge Gap Theory which states that the full impact of the new technology is being felt, as the world becomes more technologically advanced and costs rise, it increasingly moves out of the reach of the underprivileged due to which the ICT resources remain out of reach of the public sector.

In sum, all of these findings lend support that there is a major effect of ICT on the academic performance of the students. This shows that with an increase in usage of ICT and related resources, there will be a higher academic performance in the students as compared to those who have limited access to ICT usage.

Conclusion

The present study concluded that the findings obtained because of testing the model indicate that ICT does have many contributions to the model. ICT has a huge effect on the student's academic performance. Our findings showed that there was a great use of ICT in private sectors as compared to public sectors, which created a huge gap between the two. The more there was the use and availability of ICT resources were present, the more successful the academic rate of the students whereas there was a decline in those areas where it was hardly present. Many factors like cost, socioeconomic aspects, etc. hinder the availability of ICT, which can be improved in the future by taking the right measures and improving the standard of education in the public sector.

The majority of students stated that they utilize ICT for a variety of tasks, including project preparation, classroom activities, and better lesson planning. The usage of ICT enhances students' computing skills, which can be highly beneficial in enhancing their administrative conduct in real-world situations. Additionally, the efficient integration of ICT into teaching and learning methods increased student

interest, reinforcement, and passion, which aided in their better data processing and enhanced their knowledge and recall. The outcomes of student education have been significantly and favorably impacted by ICT, according to the findings of continuing study.

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