



# IMPACT OF ICT ADOPTION ON ACADEMIC PERFORMANCE OF STUDENTS: EVIDENCE FROM THE UNIVERSITIES OF BALOCHISTAN

TARIQ HUSSAIN

MAZEDAN COMPUTER  
ENGINEERING TRANSACTIONS

e-ISSN: 2583-0414

Article id: MCET0301004

Vol.-3, Issue-1

Received: 5 Feb 2022

Revised: 20 Mar 2022

Accepted: 30 Mar 2022

**Citation:** Hussain, T. (2022). Impact of ICT Adoption on Academic Performance of Students: Evidence from The Universities of Balochistan. *Mazedan Computer Engineering Transactions*, 3(1), 20-24.

## Abstract

Because of universities' usage of ICT, students' academic achievement is assessed. There are a number of variables that influence the relationship between ICT use at school and academic achievement, including students' GPA and gender. In three Balochistan universities, quantitative research methodologies and a sample of 500 students were used to examine the relationship between ICT use and student performance. Structural equation modelling was used to test the validity of the research model. Structured equation modelling and route analysis were carried out using AMOS, a tool built expressly for this purpose. In a conservative society, the correlation between ICT usage and academic success is clear. According to an additional research, women's academic performance was also increased by the usage of ICT. IT degrees have minimal influence on student academic achievement, though. The study's conclusions, limitations, and suggestions for further research are all included. Finally, the outcomes of this investigation have implications for the current body of knowledge.

**Keywords:** ICT, academic performance, University student, Adoption

## 1. INTRODUCTION

Telecommunications-based “information and communication technology,” or “ICT,” is a field of study. Instead of information technology, it focuses on communication tools as IT does (IT). It encompasses the internet, Wi-Fi, mobile phones, and other communication devices” (Shamim Talukder, 2015).

When it comes to the new global economic system, information and communications technology (ICT) plays a critical role. The developing countries were left behind in order to keep up with the wealthier nations. You may find out more about ICT by visiting this page (UNESCO, 2002). Students' comprehension of difficult subjects improves when simulations are included into the lesson plan. It functions as a dynamic learning facilitator in order to foster higher-order thinking (Alexander, 1999). Prior knowledge of and proficiency in these important technologies is required before students may benefit from this breakthrough (Trpkovska, 2010). Traditional teaching methods must be rethought in order to help students succeed in school. It is possible for students to complete computer-assisted instruction (CAI) at their own pace from the comfort of their own homes or on their own computers. Learners of all levels may benefit from CAI since beginners may be able to study at the same pace as more experienced pupils. Standardization in the field of information and communications technology (ICT) benefits everyone, including students (Hussain, Suleman, Din & Shafique, 2017). Because of this, the effect and usage of ICT in all sectors of IT, notably education, has become a hot subject. Increasingly, educational institutions

throughout the globe are using ICT-based teaching methods and related educational programmes (Shamim Talukder, 2015). Students may get to know one another better thanks to the advent of cutting-edge technological tools like these. Students may also benefit from the extensive use of ICT in the classroom by having access to high-tech classrooms equipped with projectors, TVs, radios, smart communication panels/screens, and teleconferencing systems (KURSUN). Technology in the classroom has been encouraged under the National Education Policy 1998-2010. ICTs may be utilised in a variety of ways to help instructors and students from diverse backgrounds, according to NEP 1998-2010. Teaching and learning may be improved by the use of ICTs (Shaheen and Khatoon, 2017). As a result of globalisation, we now live in an interconnected world. They have a greater capacity for innovation and a greater desire to learn about new technologies. Increasingly, ICT's implications and practises are being examined in IT, notably in the field of education. Instructors using ICT to help students improve their grades. Educators are incorporating ICT-based teaching methods and programmes for student teachers. Students access ICT services via their smartphones and the internet. Since ICT services and their impact on classroom performance must be evaluated, it is imperative to do so (Shamim Talukder, 2015). Thus, the current study will examine the impact of ICTs on the academic performance of university students. Balochistan institutions, including Sardar Bahadur Khan

University Quetta (SBKWU), Balochistan university of engineering and management BUITEMS, and University of Balochistan (UoB), have all fully incorporated ICT into their instructional procedures. This study is based on this data.' in terms of size, location, number of students, educational offerings, and IT infrastructure. It is important to build a model that can be used to a wide range of situations.

On the basis of the issue description, it is deemed that a study of the use of ICT in university education programmes and its impact on student performance is warranted. As a result of this, the proposed study will examine how and to what extent universities have embraced the use of ICT and how this acceptance has affected student performance. It is also hoped that this research will uncover important qualities of university students and how these elements are affected by information and communication technologies., In this study, our researcher aims to accomplish the following goals:

- a. To assess the degree to which the institutions have adopted ICT
- b. To identify the link between ICT adoption and the performance of the university students\
- c. To find out the influence of ICT adoption on universities, in general, and on students' performance, in particular

## 2. REVIEW OF THE LITERATURE

During the previous two decades, ICT has become more prominent. The global knowledge boom and information explosion has been hastened by the internet's enormous data and resource availability, developments in ICT, and more organisational and corporate flexibility (Hasan & Sajid, 2013). One of the foundations of contemporary civilization is ICT, as stated by Daniels (2002). The acquisition of fundamental skills, including as reading, writing, and mathematics, is seen in many countries as being facilitated by the use of ICT. But a prevalent misperception is that ICT means "computers and related sports." While computers and software play an important part in today's data management, the phenomenon known as ICTs may also be seen in other technologies and structures. RAI, IAI, CAI, and TAI are only a few examples of computer-assisted instruction (UNESCO, 2014).

The impact of information and communication technologies (ICTs) on educational practice and research cannot be overstated. Many studies have shown that ICTs may assist students acquire skills, encourage and engage with them so they can utilise their knowledge in practical sectors, build financial capabilities for future workers, and enhance teaching and learning experiences (Okoro&Ekpo, 2016).

They argue that the use of ICTs has boosted student attention. Education has been transformed and expanded by ICTs in recent years. Most European countries have seen an increase in the use of ICT in education during the last decade.

Teachers use ICT to guide conventional learning strategies, such as information collecting, in which

students are 'submissive' to information rather than 'active producers' who may participate in the learning process.

What it says is that ICT can make education better. There are two basic reasons why ICTs are employed in education in the United Kingdom.

ICTs are being used by children as a means of enhancing their abilities and talents.

Many students in the United Kingdom are interested in learning about new technologies that might enhance educational settings in terms of teaching and learning quality, which could help newcomers achieve better results (Lawsent& Vincent, 1995).

Students' grades suffer as a result of the extensive use of information and communication technologies (ICTs). Learning more and applying it better in a virtual workplace is made easier by the use of ICTs.

Using ICTs in schools and other academic contexts throughout the world has shown their educational potential and usefulness (Valasidou & Bousiou, 2005).

When it comes to creating a better and brighter future for the country, investing in its youth is the best and most rewarding option (HEC, Pakistan, 2016). Over the past two decades, universities have made significant investments in information and communication technologies (ICTs) (Youssef & Dahmani, 2008). (Balasubramanian and colleagues, 2009) As a result, many Asian countries' educational systems include or place a high value on the acquisition of basic computer skills as a prerequisite for further education and career advancement (UNESCO, 2014). IT is becoming a requirement in Pakistan, according to Ali et al (2014). Educators in Pakistan are being encouraged to use ICTs in their work. Humanitarian aid and infrastructure improvements are the primary beneficiaries of this massive investment, which amounts to hundreds of millions of dollars annually. To improve the country's infrastructure, human resources, and public and commercial sectors, the Pakistani government is pushing hard for a technological revolution. We're just beginning to see the benefits of using ICTs in education (Balasubramanian et al., 2009). The cost of building an ICT-enabled institution in less developed countries is significantly higher than in industrialised countries. High costs of purchasing, connecting, operating, maintaining and replacing ICT systems; non-licensed applications; outdated hardware and software; and a lack of systematic system support were the main issues (Balasubramanian et al., 2009). ICT in education in Pakistan's rural areas is difficult because of a lack of infrastructure (UNESCO, 2014). Quantitative research frequently focuses on the relationship between an independent (X) and a dependent (Y) (Y). Correlation, odds ratios, and regression coefficients all have statistical effects on the relationship between X and Y. In addition to X and Y, the current study examines three moderating variables, namely students' GPA, gender, and major in information technology, expanding the number of possible connections between the variables.

## 3. THE STUDY'S HYPOTHESES

These are the hypotheses:

Students' academic performance and administrative efficiency have both benefited from the usage of ICT at the chosen institutions. There has been a significant increase in communication between educators and students with the introduction of the online learning management system (LMS), Blackboard Improvements have been made in course study, evaluation, and learning in general.

As a result, hypothesis 1 (H1) frames H1: The use of ICTs by students has an impact on their academic performance.

Online learning management system Blackboard allows instructors to design instructional aids, online exercises and even midterm examinations. Students' GPAs have risen as a result of this. Increased advantages and new capabilities, such as posting class lectures, audios, and videos, have resulted in an increase in ICT use on average for students. According to H2, the association between ICT adoption and academic success is positively affected by GPA.

Males and females are free to study together at any university in Balochistan. All lectures, seminars, and other academic activities are open to female students. However, the usage of ICT has its limits. This means that females are increasingly dependent on ICT services. The LMS is more popular with girls than with boys. The implementation of ICTs necessitates additional services and procedures for women. Running H3 as a hypothesis: ICT adoption and academic accomplishment are linked by gender, according to hypothesis H3.

There are a lot of students at colleges who are studying IT and have access to the most up-to-date computer gear, software, and resources. Many of these young people want to enter the IT industry as a career. Because of this, the university has a responsibility to put in extra effort to integrate ICT into the educational process in order to assist these aspiring IT professionals.

As a result, hypothesis 4 (H4) reads: H4: Significant impacts ICT use and academic accomplishment.

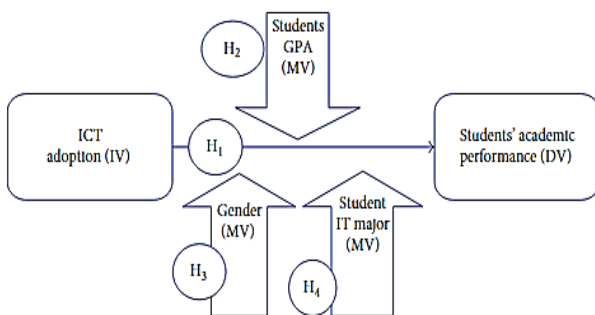


Figure 1 Research Model

#### 4. METHODOLOGY

Based on Basri and Suliman 2012's proposals for quantitative data collection techniques such as questionnaires, the study's strategy was based on that. To get a more precise idea of the findings, the researcher may use a data analysis application to plug in the survey's statistical findings. Tables and columns of data would greatly enhance and widen the study analysis if they were used as essential quantitative instruments or software (V. Venkatesh, B. Sue, and H. Bala, 2013). Statistical data analysis, on the other hand, is proven and reliable since it

is free from human bias and evidence of objective investigation.

Survey participants were drawn from four institutions, two of which were adopting ICT: BUITEMS, SBKWU, and UOB. In order to make data processing easier, the survey included 500 participants, 125 from each of the participating institutions. Because the respondents voluntarily agreed to participate in the study, the results were devoid of personal bias. Due to the short turnaround times and considerable distances between the universities, administering the surveys and conducting the faculty interviews proved challenging.

Use of a closed-ended questionnaire to gather data from selected university students who had access to ICT applications was employed in this study. Questionnaire content validity was evaluated by two experts in the field. Open-ended and closed-ended data were gathered via on-site interviews with instructors.

After the conclusion of data collecting, the researcher analysed the data to see whether there were any flaws, discrepancies, or incompleteness that may have been discovered. SEM was utilised to determine the extent to which universities are using information and communications technology (ICT) and the effect that this adoption has had on students' academic performance. The AMOS-SPSS software tool was used to detect the significant changes in the moderating factors that influenced students' academic performance in each responder group (Z. Awang, 2012). One of SEM's many applications is in the field of multivariate statistics and, more specifically, in regression and factor analyses. SEM also provides a useful framework for the study of discriminant analysis, path analysis, path modelling, and canonical correlation (JJ Hox and TMBechge 1998).

#### 5. RECOMMENDATION AND CONCLUSION

University administrators and others involved in ICT policy development will find the findings of this study useful. If a university has a high level of ICT integration, students may use this study as a guide when deciding whether or not to enrol in a university course. Other researchers may now build off of this work and investigate this topic in more depth. In the last several years, ICT has had a significant impact on many sectors throughout the globe. Using this study, we can see how students see ICT as a part of their educational programme. The results of the study demonstrate that the vast majority of respondents had a positive view of ICT and feel that they should be able to use it to its full potential. According to the results of the poll, many students do not have access to smartphones and laptops because of the high cost and limited availability of wireless internet. It is difficult to utilise ICT platforms often since public servers are pricey and slow. Using a mobile phone or laptop to access information technology (ICT) and the internet is vital. More than half of students have social media accounts, according to a new study. The majority of college students don't only utilise technology for school. Because of this, ICT has a significant impact on university students' academic achievement. Academic interactions and comments from professors, seniors, and classmates may be facilitated by the use of ICT, which aids in the development of students' study and research skills.

Students with higher GPAs are more interested in ICT than those with lower GPAs, according to a poll. This is likely due to the fact that embracing ICT requires a foundational knowledge base. Pupils who score higher on standardised tests are more likely to use technology in the classroom. Using ICT also helps people concentrate, which raises their level of alertness. In part, this is due to their emphasis on social networking and ICT's role in managing interpersonal interactions. For ICT, through social networking, breaks down geographical borders, social sciences bring people closer together. People are increasingly turning to the internet to do research, according to a recent poll. More than two-thirds of university students spend at least two hours a day using ICT. As a result, if pupils are to improve their grades, they need full access to ICT. Furthermore, our findings support those of Sanchez et AL (A. S. Sanchez, V. Cortijo, and U. Javed.,2014) in that the majority of students who use ICT for academic purposes also use social media extensively. These students must strike a balance between effective ICT use and social networking (A. S. Sanchez, V. Cortijo and U. Javed, 2014). The study also found that girls are more likely than boys to embrace ICT, which suggests that female students are better able to communicate via cell phone than their male counterparts. ICT has allowed female students in Saudi Arabia to participate in activities previously unavailable to them because of the restrictions placed on them. It's possible because all students who major in IT are constantly in contact with or work in ICT environments, so they see ICT as a course rather than a technology. It is true that IT majors are constantly in contact with technology; however, some may struggle academically due to the subject's difficulty. Social media is another way that people use ICT to stay in touch with loved ones and coworkers. Because of this, a student's major may not be the only factor in determining their use of technology. Non-ICT students' perspectives and conduct should be studied, according to this recommendation. IT is used by students even if they are not majoring in IT to do research for assignments or homework. If students don't have access to material in the library, they receive it via the internet. This is an example of how ICT may benefit students. In addition, the paper recommends gauging the opinions of university professors. ICT's worth in university education can only be shown by conducting surveys of university faculty and administrators. ICT may aid lecturers in the preparation of classroom lessons, which in turn can help students succeed in school. Finally, to fully grasp the significance of information and communications technology (ICT) in higher education, all divisions must be represented. All participants in the study seem to have an understanding of the ICT components that are relevant to their functional unit or department, according to the findings. Students' career development, campus–industry connection programmes, and on-the-job training were all excluded due to the study's time and geographic constraints. All of these issues need more investigation.

## 6. REFERENCES

- [1] Ali et al, (2014). Impact of Information Technology on Higher Education in Pakistan (A Study on People of Faisalabad, Pakistan). *International Journal of Business and Management Invention*, 3(2), 44-53.
- [2] Basri, W. S., Alandejani, J. A., & Almadani, F. M. (2018). ICT adoption impact on students' academic performance: Evidence from Saudi universities. *Education Research International*, 2018.
- [3] C. Y. Lin, C. K. Huang, and C. H. Chen, (2014) "Barriers to the adoption of ICT in teaching Chinese as a foreign language in university," *ReCALL*, vol. 26, no. 1, pp. 100–116
- [4] P. Wastiau, R. Blamire, C. Kearney, V. Quittre, E. Van dealer, and C. Monseur, (2013) "e use of ICT in education: a survey of schools in Europe," *European Journal of Education*, vol. 48, no. 1, pp. 11–27.
- [5] Hasan,T. and Sajid, A. R. (2013). ICTs in Learning: problem faced by Pakistan. *Journal of Research and Reflections in Education*, 54-64.
- [6] Hussain, I., Suleman, Q., Din, N. and Shafique, F. (2017). Effects of Information and Communication Technology (ICT) on Students' Academic Achievement and Retention in Chemistry at Secondary Level. *Journal of Education and Educational Development Vol. 4*(1).
- [7] Ishaq, K., Azan, N., Zin, M., Rosdi, F., Abid, A., & Ijaz, M. (2020). The impact of ICT on students' academic performance in public private sector universities of Pakistan. *International Journal of Innovative Technology and Exploring Engineering (IJITEE)*, 9(3), 1117-1121.
- [8] Khan, M. S. (2015). The impacts of ICT on the students' Performance: A Review of Access to Information. *Research on Humanities and Social Sciences*, 5(1).
- [9] KURIAN, J. A. (n.d.). The Role of Information Technology in Higher Education:
- [10] Lawsent, I., & Vincent, I. (1995). Impact of e-Learning on Tertiary Education (online) Retrieved December 14, 2017, from <http://www.info.gov.za/speeches/index.html>.
- [11] Sajid, T. and Hasan, H. (2013). ICTs in Learning: problem faced by Pakistan. *Journal of Research and Reflections in Education*, 54-64.
- [12] Siddiquah, A. and Salim, Z. (2017). The ICT Facilities, Skills, Usage, and the Problems Faced by the Students of Higher Education. *Journal of Mathematics Science and Technology Education* 13(8), 4987-4994.
- [13] Shamim Talukder, J. A. (2015). The Impact of Ict on Students' Performance: A Case Study on Undergraduate University Students. *Manarat International University Studies*, 4(1).
- [14] Shaheen, S and Khatoon, S. (2017). Impact of ICT Enriched Modular Approach on Academic Achievement of Biology Students. *Journal of Research and Reflections in Education*, Vol 11(1), 49-59.
- [15] Trpkovska, M. A. (2010). A Study of Information Technology Use Among Students at South East European University. *Conf. on Information Technology Interfaces*, 257-262. Croatia.

- [16] UNESCO. (2014). Information and communication technology (ICT) in education in Asia: A comparative analysis of ICT integration and readiness in schools across Asia. Montreal: UNESCO Institute for Statistics. Retrieved December 1, 2017, from <http://www.uis.unesco.org/Communication/Documents/ICT-asiaen.pdf>
- [17] UNESCO. (2014). Information and communication technology (ICT) in education in Asia: A comparative analysis of ICT integration and readiness in schools across Asia. Montreal: UNESCO Institute for Statistics. Retrieved April 18, 2017, from <http://www.uis.unesco.org/Communication/Documents/ICT-asiaen.pdf>
- [18] Valasidou A, Sidiropoulos D, Hatzis T, Bousiou-Makridou D (2005). "Guidelines for the Design and Implementation of E-Learning Programmes, Proceedings of the IADIS". International Conference IADIS E-Society, Qawra, Malta.
- [19] Youssef, A. B., & Dahmani, M. (2008). The impact of ICT on student performance in higher education: Direct effects, indirect effects, and organizational change. RUSC. Universities and Knowledge Society Journal, 5(1), 13.
- [20] V. Venkatesh, A. M. Croteau, and J. Rabah, (2014) "Perceptions of effectiveness of instructional uses of technology in higher education in an era of Web 2.0," in Proceedings of the 47th Hawaii International Conference on System Sciences (HICSS'2014), pp. 110–119, IEEE, Washington, DC, USA, January 2014.
- [21] J. K. Macharia and T. G. Pelsler, "Key factors that influence the diffusion and infusion of information and communication technologies in Kenyan higher education," Studies in Higher Education, vol. 39, no. 4, pp. 695–709, 2014.
- [22] W. Basri and M. Suliman, "Factors affecting information communication technology acceptance in public organizations in Saudi Arabia," International Journal of Computer Science and Information Security, vol. 10, no. 2, pp. 118–139, 2012.
- [23] V. Venkatesh, B. Sue, and H. Bala, "Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems," MIS Quarterly, vol. 37, no. 1, pp. 21–54, 2013.
- [24] Z. Awang, Structural Equation Modeling Using AMOS, Penerbit Universiti Teknologi MARA, Shah Alam, Selangor Darul Ehsan, Malaysia, 2012.
- [25] J. J. Hox and T. M. Bechger, "An introduction to structural equation modeling," Family Science Review, vol. 11, pp. 354–373, 1998.
- [26] P.-W. Lei and Q. Wu, "Introduction to structural equation modeling: issues and practical considerations," Educational Measurement Issues and Practice, vol. 26, no. 3, pp. 33–43, 2007.
- [27] L.-T. Hu and P. Bentler, "Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives," Structural Equation Modeling, vol. 6, pp. 1–55, 1999.
- [28] M. Hilbert and P. López, "e world's technological capacity to store, communicate, and compute information," Science, vol. 332, no. 6025, pp. 60–65, 2011. Education Research International