QLANTIC JOURNAL OF SOCIAL SCIENCES

Barriers to Educational Technology Adoption: Navigating Challenges in Integration

Marium Ansari [1]   Sonia Waris [2]   Chand Zara [3]

Abstract: *The major determinant in shaping the panorama of today's educational system is technology. The purpose of the study was to explore the potential challenges that affect the adoption of educational technology by female college teachers and to propose realistic recommendations to improve college-level instructional technology integration. The research was descriptive in nature, and to achieve the objectives of the study, a sample of seventy-three female college teachers was selected from the four Government Girl's Colleges located in District Lodhran, Punjab, Pakistan, using a convenience sampling technique. The findings reveal an intricate interaction of factors that affect educational technology adoption, which include lack of technological resources and infrastructure, collaboration, data security, accessibility, lack of training and lack of technological assistance. This study emphasizes the need for comprehensive policies, training, and infrastructure to address data security concerns and build teacher and student confidence in technology use in education and the need for educational institutions to examine and adapt their curriculum designs to allow time slots for technology integration to ensure balance and effectiveness.*

Introduction

The major determinant in shaping the panorama of today's educational system is technology. Technology has taken over all facets of our lives and will continue to do so in the coming future. In contemporary times, educational processes are constantly acquiring and incorporating new data, materials, and systematic technologies. Evidently, the expansion of technological tools demands a new and fresh outlook that can facilitate their augmentation. Further, Dele-Ajayi et al. (2021) have noticed a clear change in pedagogical domains of varying instructive milieu or groundbreaking practices whenever a new system or technological tool is introduced.

Moreover, the educational systems of all countries are working hard to ensure the presence of technological equipment and its support in classrooms of all levels. Malczyk (2018) has determined that they have seen the provision of different technological tools and gadgets from educational institutions to their students and faculty under the banner of increasing their digital literacy. The main aim of mechanization and automation of educational systems is for the progression and better training of students and teachers. Information and communication technologies (ICTs) are utilized in scholastic environments to advance the instruction and erudition processes in a variation of instructive perspectives. Abbasi et al. (2022) further add apart from augmenting access, excellence, and egalitarianism of instruction, ICTs might propose fresh and innovative means of assisting all the relevant stakeholders.

Furthermore, Anderson and Rivera Vargas (2020) highlight for many emerging nations, the utmost significant worth of ICTs is situated in its student-centred outlook, where the maximum involvement of individuals is encouraged in all learning activities. Yet the issues and challenges faced by teachers in

[1] Lecturer, Department of Education, The Women University, Multan, Punjab, Pakistan.
[2] M.Phil. Scholar, Department of Education, The Women University, Multan, Punjab, Pakistan.
Email: warissonia20@gmail.com
[3] Lecturer (Education), Govt.Graduate College (W), Jalal Pur Pir Wala, Punjab, Pakistan.
Email: chandzara21@gmail.com

incorporating these tools into their pedagogical practices cannot be denied. The socio-political pressures to incorporate these tools under the context of the betterment of educational systems and the campaigns for digitalizing education systems can also not be overlooked. Furthermore, Alalwan et al. (2020) have determined that the use of ICTs is an essential measure for numerous political enterprises to achieve the UN's Sustainable Development Goal 4, which falls under the domain of quality education.

Whereas Isnah and Subandiyah (2022) have listed a major advantage of using ICT is having access to various materials of all kinds, be it audio, video or written content, that permits its users to have and provide a personalized learning experience. Accessing content may seem easy, but choosing the right content and having access to it is not always a possibility. Another concern that annoys teachers is its implementation in real-time in classrooms. El Said (2021) describes how, through the merging of virtual and non-virtual actions, audiovisual aids, and group assignments, Edtech might offer assistance to its users in offering a blended learning approach. Instructors might produce and convey lectures that accommodate the numerous requests and penchants of their pupils by means of the abundant digital tools at their disposal.

However, the teaching community is facing numerous difficulties in regard to educational technology. Starks and Reich (2023) list some of these challenges as a deficit of assets, funds, tools, appropriate infrastructure, working wifi connections, lack of access to digital content, technical support, in-service teacher development opportunities and inadequate facilities. A pedagogical landscape that is created with such bumpy roads will lead to bumpier results, as one can imagine. The prerequisite for didactic improvement and revolution in pedagogy is also an obstacle to scholastic technological expertise.

Further, Ghavifekr et al. (2023) have found the incorporation of technology into educational settings is not only essential but also "inevitable and cannot be avoided." Yet, the implementation of educational technology in college classrooms presents a complex terrain, and despite the fact that it may have opportunities for improvement, there are still a number of obstacles to overcome. The landscape of educational technology is constantly shifting, and as a result, there is an urgent need to identify and thoroughly analyse these obstacles and challenges in order to provide recommendations that are applicable to the enhancement of technology integration at the college level. Therefore, in order to accomplish the successful, efficient, and productive application of educational technology, it is necessary to analyse and discover the barriers that stand in the way of integration and then counteract these obstacles with solutions that are practical.

Research Objectives

- To explore the potential challenges that impact the adoption of educational technology and integration from the perception of female college teachers.
- To analyze educational technology integration hurdles and potential adoption challenges on the basis of comparison between urban and rural areas.

Literature Review

Borgmann (2019) has found technology to have the ability to shape and transform culture, and it can be detrimental when it is utilized in an excessive or irresponsible manner. With this in mind, educational technology can be defined as the use of knowledge in a practical setting for instructional goals. Educational technology is defined as the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources (Januszewski & Molenda, 2022).

Even though Edtech might be tremendously beneficial in development of new, ingenious techniques that may augment instruction transversely throughout different educational domains. Teachers generally appreciate the benefits of educational technologies, they often find smooth and effective integration of new educational technologies challenging. From the acquisition of new technology equipment to adaptation of curricula and teaching techniques to incorporate new educational tools, technology integration presents significant challenges to educators at each level of educational systems.

Further, Razkane et al. (2021) have emphasized that the aptitude for Edtech to deliver scholars with the understanding, capabilities, and talents is more crucial now than ever. In addition, Johnson et al. (2016) have found educational technologies might be utilized by teachers to access, create, and disseminate knowledge as well as to expand their linguistic skills, creativity, reasoning, problem-solving, and critical thinking aptitudes. Whereas Will (2018) notes that it is challenging to convince teachers to accept new modifications to their teaching methods, particularly in situations when state and municipal legislation are in a state of flux.

Moreover, Mishra and Koehler (2009) highlight the intricacy of the pedagogical issues that teachers confront when seeking to employ technology in ways that are relevant and educationally sound. When it comes to the use of educational technology, one of the most significant challenges is the shortage of training for teachers on how to successfully incorporate technology into the classroom. Ertmer et al. (2012) stressed the significance of instructors participating in ongoing professional development in order to successfully integrate technology.

Moreover, Bower (2016) examined the monetary obstacles that are related to the implementation of technology in educational institutions. The expense of obtaining and maintaining hardware, software, and digital resources can put a strain on school finances, which is a significant obstacle that must be overcome in order to successfully integrate technology into the educational system. Also, educational institutions have a responsibility to provide top priority to the development of digital resources and technologies that are compliant with accessibilitystandards so that they can address accessibility and inclusion concerns. This includes offering documents in alternate formats, captioning videos, and making sure that they are compatible with assistive devices. It can be challenging to evaluate the quality and reliability associated with educational resources found online. Another concern highlighted by Ghavifekr et al. (2023) is the concern over one's privacy and safety, which takes precedence, as the gathering and storage of an individual's data can give rise to a variety of complicated ethical and legal difficulties. The cost of integrating new technology and continuing to support existing systems in educational settings can be significant.

Methodology

This research used a descriptive survey design to assess the current challenges and hurdles faced by college teachers in the Lodhran district. The study utilized a quantitative methodology. The population of the study consisted of 297 teachers from the four government colleges of district Lodhran. These colleges included Government College for Women, Lodhran, Government College for Women, Kharoor Pacca, Government College for Women, Dunyapur, and Government College for Women, Chak 365/WB. From the target population, a total of seventy-three female teachers were selected for the study sample using a convenience sampling technique. A self-constructed questionnaire with a five-point Likert scale was developed to analyze the perspectives of female teachers.

The research tool consisted of two sections. Section A consisted of demographic information, whilst section B consisted of twenty statements which focused on educational technology integration hurdles and potential challenges in the adoption of educational technology. The Likert scale ranged from strongly agree, agree, neutral, disagree, and strongly disagree. It was necessary to ensure the reliability of the tool, and the value of Cronbach's Alpha for all items was found to be 0.89. A group of senior teachers and field experts examined the questionnaire for clarity and effectiveness before its wide distribution. The researcher explained the purposes of this study to all female teachers of the participants to gain their confidence before the data collection. In addition, ethical issues are of the utmost importance in all research investigations. Adhering to ethical guidelines in research is crucial to ensuring the safety and well-being of participants. For this reason, the researcher prioritized ethical considerations throughout the entire research process, from designing the study to reporting findings. Moreover, in the data collection process, the participants were ensured that their identities would not be disclosed to protect their privacy and maintain respect for their confidentiality.

Table 1

Demographic information of teachers

Variable		Frequency	Percentage
Age	18-30 Year	22	30.1
	31-40 Year	28	38.4
	41-50 Year	23	31.5
Education	Bachelors	25	34.2
	Masters	26	35.6
	MPhil/PhD	22	30.1
Experience	1-5 Year	32	43.8
	6-15 Year	16	21.9
	16-25 Year	25	34.2
Locality	Rural	23	31.5
	Urban	50	68.5

Table 1 presents the demographic information of the teachers. From the total sample of 73 teachers, 22 teachers were from the age group of 18-30 years, 28 teachers were from the age group of 31-40 years, and 23 teachers were from the age group of 41-50 years. A total of 25 teachers had the education of bachelors, 26 had a masters, and 22 teachers had the education of MPhil/PhD. A total of 32 teachers had experience of 1-5 years, 16 teachers had experience of 6- 15 years, and 25 teachers had experience of 16-25 years. Based on locality, 50 teachers were from urban areas, and 23 were from rural areas.

Data Analysis

All the data collected by female college teachers was analyzed using both inferential and descriptive statistics. The data collected from the female educators was analyzed using SPSS version 25 (Statistical Package for the Social Sciences).In the present investigation, in order to provide an accurate depiction of the technology integration hurdles and potential challenges in the adoption of educational technology being faced by female college teachers, a number of statistical techniques, including t-test, mean and standard deviation, were used in order to perform data analysis.

Table 2

Descriptive statistics of educational technology integration hurdles

Statements	Mean	SD
Insufficient training and professional development opportunities hinder the effective use of educational technology.	3.1	1.8
The lack of technical support creates challenges in using educational technology.	2.5	.8
Limited financial resources impede the integration of advanced educational technology tools.	3.8	.7
Resistance from teachers towards adopting new technology is a significant hurdle.	2.8	.7
Inadequate infrastructure and resources (e.g., wifi, computer labs) pose challenges to educational technology integration.	4.5	.5
Lack of awareness about available educational technology tools hampers their effective use.	3.9	1.1
The complexity of educational technology tools makes them difficult to use.	2.1	.4
Educational technology tools are not aligned with the curriculum.	2.8	1.1
Concerns about data privacy and security impact the adoption of educational technology.	2.9	1.1
The lack of policies supporting the integration of educational technology creates challenges.	2.7	.7

Table 2 shows the descriptive statistics of educational technology integration hurdles from the perception of female college teachers. With a high mean of 4.5 and a standard deviation of 0.5 there is a strong

consensus amongst teachers that inadequate infrastructure and resources seems to be a major challenge for technology integration. With a low mean of 2.1 and standard deviation of 0.4, complexity of educational technology seems to be a minor issue for female college teachers.

Table 3

Descriptive statistics of potential challenges in the adoption of educational technology

Statements	Mean	SD
Teachers face challenges in integrating technology due to a lack of pedagogical training.	3.9	1.1
Limited support from educational institutions hampers teachers' adoption of educational technology.	2.5	.4
Teachers encounter difficulties in selecting appropriate educational technology tools for their subjects.	3.6	1.1
The need for constant updates and technological advancements poses challenges for teachers.	2.6	.8
Teachers encounter resistance from students when introducing new educational technology tools.	2.8	.7
The absence of incentives for teachers limits their motivation to adopt educational technology.	4.4	.5
Limited technical support for teachers impedes the adoption of educational technology.	2.6	.4
Teachers face challenges in managing classroom dynamics when integrating technology.	3.7	1.1
Teachers encounter difficulties in accessing educational technology tools outside the classroom.	2.7	.4
Inadequate recognition of the benefits of educational technology adoption hampers enthusiasm among teachers.	2.5	.8

Table 3 shows the descriptive statistics of potential challenges in adoption of educational technology from the perception of female college teachers. With a high mean of 4.4 and a standard deviation of 0.5 there is a strong consensus amongst teachers that the absence of incentives for teachers limits their motivation to adopt educational technology. With a low mean of 2.5 and standard deviation of 0.8, inadequate recognition of the benefits of educational technology adoption seems to be a minor issue for female college teachers.

Table 4

Inferential Statistics on Educational technology integration hurdles and potential adoption challenges on the basis of comparison between urban and rural areas

	Locality	N	Mean	Std. deviation	t	df	Sig.
Potential Adoption	Urban	50	36.2000	2.61081	.165	71	.004
Challenges	Rural	23	36.0870	2.93742	.158	38.606	
Educational Technology	Urban	50	37.4400	3.03826	.129	71	.005
Integration Hurdles	Rural	23	37.3478	2.30826	.143	55.277	

Table 4 shows an Inferential Statistic on Educational technology integration hurdles and potential adoption challenges on the basis of a comparison between urban and rural areas. A t-test is applied to determine the difference. The mean value of potential challenges faced by female college teachers in urban and rural areas are 36.2 and 36.08 respectively. As the value of standard deviation for rural female teachers is more than for urban female teachers, it shows that there is more variability in the responses of urban female teachers. The t-value suggests a significant difference in the perception of female college teachers regarding both potential adoption challenges and educational technology integration hurdles. The p-value for both potential adoption challenges and educational technology integration hurdles is less than 0.05. It

is determined that female college teachers from urban localities perceive more potential adoption challenges and educational technology integration hurdles than female college teachers from rural areas.

Conclusion

The study has identified various potential adoption challenges and educational technology integration hurdles based on the perception of female college teachers. The findings show the intricate interaction of factors that affect educational technology adoption. Infrastructure, collaboration, data security, accessibility, and training are included. Most (72.6%) believe educational technology is easily accessible. This discovery is significant. Unfortunately, many respondents cited inadequate training, underlining the necessity for professional development programs tailored to teachers' ability levels.

Furthermore, the lack of extensive technical assistance was found to be a major obstacle. A number of individuals recognize financial restrictions as difficulties. This study emphasizes strategic finances. To ensure seamless integration, teachers must be involved in curriculum creation. However, data privacy and security concerns, time constraints, and the lack of standardised procedures necessitate strategic and collaborative solutions. Educational technology tools' perceived complexity and incorporating modern technologies into teaching and learning was found to be difficult for teachers.

This study emphasises the need for comprehensive policies, training, and infrastructure to address data security concerns and build teacher and student confidence in technology use in education and the need for educational institutions to examine and adapt their curriculum designs to allow time slots for technology integration to ensure balance and effectiveness. It was further concluded female college teachers from urban areas perceive more potential hurdles and challenges as compared to female college teachers from rural areas suggesting that living in urban areas may present specific hurdles that are not as pronounced in rural settings.

Discussion

A multifaceted terrain of obstacles that both teachers and students must contend with is revealed by the discussion of the findings connected to the incorporation of educational technology in college classrooms. Many different aspects are included in these challenges. Some of these aspects include training and professional development, technical support, financial constraints, resistance, infrastructure, awareness, complexity, curriculum alignment, collaboration, data privacy, time constraints, institutional policies, device access, and student engagement, as also discussed by Borgmann (2019).

It becomes clear that the absence of technical help is a significant obstacle, which highlights the significance of putting in place effective technical support systems inside educational institutions. It is essential to guarantee a productive experience for teachers by providing a technical support infrastructure that is both responsive and efficient, as in line with El Said (2021). This will allow for the rapid resolution of any issues that may arise. It is important for organisations to make investments in specialized support teams, help desks, and online resources in order to provide users with assistance in overcoming technical issues and to create an atmosphere that is conducive to the successful adoption of educational technology, as discussed in Ertmer et al. (2012).

There are some individuals who acknowledge the difficulties associated with infrastructure and awareness; yet, the majority of participants appear to have a positive outlook regarding these issues. Institutions can continue to invest in solid infrastructure, such as computer laboratories and wifi accessibility, in order to provide a smooth technology experience for their students. Ayasrah (2020) has discussed how this will allow them to build on the good feelings that have been expressed.

Recommendations

1. Educational institutions should provide extensive support systems, including help desks and online resources, to recognize the importance of technology. Proactive technical support reduces disruptions and improves student and teacher user experience.

2. Educational institutions should plan technology investments strategically, considering their financial constraints. Grants and collaborations can help secure resources for educational technology initiatives while selecting expenditures that support the institution's educational goals.

3. Educational institutions should actively encourage technology adoption culture to overcome teacher and student resistance. Clear communication about technology's benefits, stakeholder involvement in decision-making, and fostering a collaborative and inclusive environment can reduce resistance and increase enthusiasm for educational technology.

4. Educational institutions must invest in resilient infrastructure to ensure uninterrupted access to instructional digital tools. During this time, awareness campaigns and training sessions should teach teachers and students about the tools, their benefits, and how to use them best.

   Technology providers should prioritize user-friendly interfaces due to the perceived complexity of educational technology solutions. Simplifying tools and giving clear documentation improves usability, learning curve, and user experience.

References

Abbasi, W. T., Ibrahim, A. H., & Ali, F. B. (2022). Perceptions about English as second language teachers' technology-based English language teaching in Pakistan: Attitudes, uses of technology and challenges. In *Proceedings of International Conference on Emerging Technologies and Intelligent Systems: ICETIS 2021 (Volume 1)* (pp. 314-325). Springer International Publishing.

Alalwan, N., Cheng, L., Al-Samarraie, H., Yousef, R., Ibrahim Alzahrani, A., & Sarsam, S. M. (2020). Challenges and prospects of virtual reality and augmented reality utilization among primary school teachers: A developing country perspective. *Studies in Educational Evaluation*, *66*(100876), 100876. https://doi.org/10.1016/j.stueduc.2020.100876

Anderson, T., & Rivera-Vargas, P. (2020). A critical look at educational technology from a distance education perspective. *Digital Education Review*, 37, 208–229. https://doi.org/10.1344/der.2020.37.208-229

Ayasrah, F. T. M. (2020). Challenging Factors and Opportunities of Technology in Education. *International Journal of Advanced Science and Technology*, *29*, 962-972.

Borgmann, A. (2006). Technology as a Cultural Force: For Alena and Griffin. *Cahiers Canadiens de Sociologie [Canadian Journal of Sociology]*, *31*(3), 351–360. https://doi.org/10.1353/cjs.2006.0050

Bower, M. (2008). Affordance analysis – matching learning tasks with learning technologies. *Educational Media International*, *45*(1), 3-15. https://doi.org/10.1080/09523980701847115

Dele-Ajayi, O., Fasae, O. D., & Okoli, A. (2021). Teachers' concerns about integrating information and communication technologies in the classrooms. *PLOS ONE*, *16*(5), e0249703. https://doi.org/10.1371/journal.pone.0249703

El-Said, G. R. (2021). How did the COVID-19 pandemic affect higher education learning experience? An empirical investigation of learners' academic performance at a University in a developing country. *Advances in Human-Computer Interaction*, *2021*, 1-10. https://doi.org/10.1155/2021/6649524

Ertmer, P. A., Ottenbreit-Leftwich, A. T., Sadik, O., Sendurur, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers & Education*, *59*(2), 423-435. https://doi.org/10.1016/j.compedu.2012.02.001

Ghavifekr, S., Afshari, M., & Amla Salleh, N. (2023). Management strategies for integrating educational technology into schools: An international perspective. *Journal of Educational Technology*, *12*(2), 45-66.

Isnah, E. S., & Subandiyah, H. (2022). The Effect of Digital Literacy on Language Ability in Higher Education: Experience From a Developing Country. *Journal of Higher Education Theory and Practice*, *22*(11), 215-222. https://doi.org/10.33423/jhetp.v22i11.5425

Januszewski, A., & Molenda, M. (Eds.). (2022). *Educational technology: A definition with commentary*. Routledge.

Johnson, A. M., Jacovina, M. E., Russell, D. E., & Soto, C. M. (2016). Challenges and solutions when using technologies in the classroom. In S. A. Crossley & D. S. McNamara (Eds.) *Adaptive educational technologies for literacy instruction* (pp. 13-29). New York: Taylor & Francis.

Malczyk, B. R. (2018). Multimodal instruction, the new hybrid: A student-centred approach to blended learning. *Journal of Nonprofit Education and Leadership*, *8*(1), 16–31. https://doi.org/10.18666/jnel-2018-v8-i1-8347

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record: The Voice of Scholarship in Education*, *108*(6), 1017–1054. https://doi.org/10.1177/016146810610800610

Razkane, H., Sayeh, A. Y., & Yeou, M. (2021). University teachers' attitudes towards distance learning during COVID-19 pandemic: Hurdles, challenges, and take-away lessons. *European Journal of Interactive Multimedia and Education*, *3*(1), e02201. https://doi.org/10.30935/ejimed/11436

Starks, A. C., & Reich, S. M. (2023). "What about special ed?": Barriers and enablers for teaching with technology in special education. *Computers & Education*, *193*, 104665. https://doi.org/10.1016/j.compedu.2022.104665

Will, M. (2018). *The difficulties of improving teaching effectiveness. Education Week.* https://www.edweek.org/teaching-learning/the-difficulties-of-improving-teaching-effectiveness/2018/09