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Investigating the Effects of Technology Integration on Teaching and Learning in Higher Education: A study in a Public University of Afghanistan

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Abstract

This qualitative study explores the effects of technology integration on teaching and learning practices at a public university in Afghanistan. Through semi-structured interviews with faculty member, the research investigates how digital tools and platforms influence instructional methods, student engagement, and academic performance. According to the findings, technology enhances access to educational resources, supports flexible teaching strategies, and facilitates more interactive and student-centered learning experiences. However, challenges such as limited infrastructure, digital literacy gaps, and insufficient institutional support impede optimal use. To get the most out of technology in higher education, the study emphasizes the need for better technical infrastructure and specialized professional development. These insights help to comprehend the contextual realities of technology adoption in developing nations and guide Afghanistan's education quality improvement policies and practices.

Keywords: Technology, teaching, learning, software, teaching tools, digital aid.

Introduction

Higher education has undergone rapid change in the 21st century thanks to the integration of technology. Educational technologies are being implemented by institutions all over the world to prepare students for increasingly digitalized job markets and improve the quality of instruction and learning. In the context of Afghanistan, especially in public universities, the integration of educational technology is both an opportunity and a challenge. Even though it says it will make access, engagement, and academic performance better, its limited infrastructure and training still make it hard to use well. According to Kirkwood & Price (2014), the term "technology integration" in higher education refers to the efficient application of technological resources and tools—such as computers, mobile devices, internet platforms, learning management systems (LMS), virtual classrooms, and multimedia resources—in the course of instruction and learning. Rather than merely using technology for administrative convenience or as a replacement for traditional methods,

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meaningful technology integration supports student-centered, interactive, and flexible learning experiences.

In addition, universities are under pressure to adapt their teaching methods to meet global academic standards as the demand for higher education grows. This need is particularly urgent in public universities, where limited resources and outdated practices can restrict the effectiveness of instruction and the quality of student learning (UNESCO, 2022). Technology integration in Afghanistan's higher education faces numerous obstacles despite these advantages. According to Rahimi & Yadollahi (2017), these include a lack of teacher training, inadequate digital literacy among faculty and students, and cultural resistance to change. There is a dearth of comprehensive research in Afghanistan on how these tools impact teaching and learning, particularly in public universities, despite studies in developed nations demonstrating positive outcomes from technology integration, such as improved academic performance, increased engagement, and enhanced digital skills. A few pilot studies have reported increased student satisfaction and better access to learning materials in institutions where blended learning or online platforms were introduced (Sultani & Kakar, 2021).

However, these studies often lack empirical depth and fail to account for contextual challenges that uniquely affect Afghan universities. Therefore, this study aims to investigate the effects of technology integration on teaching practices and student learning outcomes in a public university in Afghanistan. This research will provide valuable insights for policymakers, educators, and institutional leaders attempting to modernize higher education in the country by examining how teachers and students interact with digital tools, the obstacles they face, and the strategies they find to be most effective. In the Afghan context, applying TPACK can help educators design more effective technology-integrated lessons and navigate challenges associated with limited infrastructure and professional development.

In conclusion, this study is timely and essential. It seeks to bridge the gap in local knowledge about the practical outcomes and limitations of technology integration in Afghan higher education. By conducting a case study in one public university, this study aims to provide evidence-based recommendations for improving teaching quality and enhancing student learning through the strategic use of educational technologies.

Literature Review

Teaching and learning methods around the world have changed as a result of the use of technology into higher education. According to Selwyn (2016), cutting-edge tools provided by technology enhance student engagement, active learning, and educational outcomes. This review of the existing research on the effects of technology integration in higher education focuses on how it affects teaching methods, student learning experiences, and the difficulties faced by developing

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nations, with Afghanistan as the focus. According to Ertmer & Ottenbreit-Leftwich (2010), technology integration is the purposeful use of digital resources and tools to support teaching and learning goals. Common technologies include Learning Management Systems (LMS), multimedia presentations, online collaboration platforms, and mobile learning applications. Research suggests that effective integration requires alignment with pedagogical goals and institutional support (Kirkwood & Price, 2014). Technology has been shown to improve instructional delivery by making learning environments that are more interactive and student-centered. For instance, a meta-analysis conducted by Tamim et al. (2011) found that students' achievement in a variety of subjects is generally improved when they use technology. The role of instructors shifts significantly with technology integration. Teachers move from traditional lecturing to facilitators of learning who design activities that leverage technology's interactive capabilities (Mishra & Koehler, 2006). Students' collaboration, critical thinking, and problem-solving abilities are enhanced by this pedagogical shift (Laurillard, 2013). However, research also reveals that a lot of educators have trouble adjusting to new technologies. Factors such as lack of training, resistance to change, and insufficient technical support impede effective technology use (Ertmer, 1999). In Afghanistan, studies by Rahimi and Yadollahi (2021) report that faculty members often struggle with limited access to resources and a lack of professional development opportunities, limiting the potential benefits of technology in classrooms.

Student motivation and engagement can be enhanced by technology-enhanced learning environments. Online discussion forums, interactive simulations, and multimedia content offer a variety of learning options to suit a variety of learning styles (Mayer, 2009). Additionally, students have more opportunities for self-directed learning when they have access to online resources and digital libraries (Bates, 2015). Several studies conducted in developing countries indicate that technology positively influences students' academic performance when adequately supported. Al-Shammari and Al-Khalifa (2010) found, for instance, that incorporating LMS into Saudi universities enhanced student satisfaction and achievement. However, barriers to equitable access include the digital divide, a lack of infrastructure, and language barriers (UNESCO, 2018). Wazir (2020) emphasizes that, in the context of higher education in Afghanistan, despite students' enthusiasm for technology use, ineffective learning is hindered by insufficient digital skills and infrastructure. Many digital tools are difficult to use due to the lack of native-language local content. Developing countries face distinct obstacles in technology adoption in higher education. According to Sife, Lwoga, & Sanga (2007), these include socio-cultural barriers, insufficient funding, inadequate faculty training, and inadequate internet connectivity. World Bank reports (2019) say that the lack of ICT infrastructure and inconsistent electricity supply in Afghan universities make technology-based learning less reliable. Moreover, cultural factors such as traditional teaching norms and skepticism towards new methods can slow down technology acceptance among educators and students (Tinio, 2002). In order to overcome these obstacles and foster sustainable technology integration, institutional policies and government support are essential (Guri-Rosenblit, 2009). Research advocates for comprehensive strategies to enhance technology use in higher education. It is essential to invest in ICT infrastructure, develop collaborative cultures, and provide faculty-specific

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professional development programs (Hsu, 2016). Blended learning models, combining face-to-face instruction with online activities, have shown promise in contexts with limited technological resources (Garrison & Kanuka, 2004). Including administrators, teachers, and students in planning and decision-making procedures also increases commitment to and ownership of ICT projects (Bates & Sangrà, 2011). Although pilot projects in Afghanistan that combine community-based digital resources and mobile learning have produced promising outcomes (Khan & Sadat, 2022), growing these initiatives calls for consistent funding and policy support.

All in all, by encouraging interactive, adaptable, and student-centered pedagogies, the literature indicates that technology integration has the potential to significantly enhance higher education teaching and learning. However, successful implementation depends on addressing infrastructural, technical, and human resource challenges. To get the most out of technology in education, contextualized strategies that emphasize capacity building, infrastructure development, and stakeholder engagement are essential for Afghanistan's public universities, where resources are scarce.

Methodology

This study employed a qualitative research design to explore in depth the effects of technology integration on teaching and learning within a public university in Afghanistan. Qualitative research is appropriate for understanding complex phenomena from the perspectives of participants, capturing their experiences, attitudes, and challenges (Creswell & Poth, 2018). This approach allowed the researcher to gain rich, contextual insights into how educators and students perceive and engage with technology in their academic environment. The study targeted faculty member from a public university to gather diverse perspectives on technology use in higher education. Purposive sampling was employed to select participants who have direct experience with technology integration in teaching and learning processes (Patton, 2015). A faculty member participated in the study. Faculty participant was selected based on their involvement in courses that incorporate digital tools, such as Higher Learning Management Systems (HLMS), multimedia resources, or online communication platforms. This selection ensured that the data collected reflected firsthand experiences with educational technology. Data was collected through semi-structured interview, which are common qualitative method for eliciting detailed and nuanced information (Kvale & Brinkmann, 2015). Thematic analysis was used to analyze the qualitative data, following the six-phase process outlined by Braun and Clarke (2006). This method involves familiarization with the data, coding, theme development, and interpretation, enabling the identification of patterns related to the effects of technology integration. The transcripts were read multiple times to ensure immersion in the data. Initial codes were generated systematically, focusing on participants' views on benefits, challenges, and impacts of technology use. To increase credibility, member checking was conducted by sharing preliminary findings with several participants for feedback and validation. Additionally, peer debriefing with colleagues helped refine themes and interpretations. This was finished by endeavoring to respond to the accompanying research questions:

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1. What has been your role in terms of teaching, learning, and higher education experience?
2. Describe the courses you teach along with the level of students' classes.
3. What technologies do you integrate in teaching e.g., LMS, multimedia tools, web platforms?
4. How often do you apply these tools into your work as a teacher?
5. What drove you to use these particular technologies in your instructional design?
6. In what ways have you changed your lesson preparation and delivery as a result of using technology?
7. How had technology impacted your ability to teach – both positively and negatively?
8. How effective are the technologies put in place to achieve set goals for teaching and learning?
9. Has there been any changes noted regarding student attitude towards learning and performance emerging from technology use?
10. Is the feedback from students encouraging arising from overcoming the obstacles posed by technology into lessons taught?
11. What issues has your integration of technology into teaching brought up?
12. What kind of technical or institutional support is available to assist you with the implementation of educational technology?
13. In what ways do you believe your department or institution could enhance effectiveness regarding use of technology in education?
14. How do you envision the use of educational technologies evolving and influencing teaching and learning processes in higher education?

Identified Themes

The study's findings provide a comprehensive explanation of the occurrences (Yin, 1994). Information obtained from the interview found that the informants had responded to the questions, which provided a detailed description of their experience in Effects of Technology Integration on Teaching and Learning in Higher Education. Based on the information obtained through the interview process, informants provide data as a guide for analysis.

Background Information

The data received from the respondent about his role and teaching experience in higher education. The respondent found that he is doing various jobs and programs. The respondent stated that:

> *"I have been a lecturer in the Department of IT at a public institution for the past seven years. Teaching strategies, computer courses, and giving instructors and students the chance to get ready for capacity building and teaching at the undergraduate level. In addition to teaching in the classroom, I also supervise student research projects, develop assessment tools, and participate in practical reviews.*

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The faculty member also stated about subjects or courses that he currently teaches, and level of students as follow:

> *"Currently, I instruct a number of foundational courses in the subject of computer science, such as software related subjects, undergraduate students in their second, third, and fourth years of study are the main recipients of these courses. In addition, I occasionally supervise students throughout my teaching practicum and oversee final-year research projects of department of software ".*

Technology Usage

The data revealed by the respondent about the types of types of technology do you currently use in your teaching. The respondent found that he used various types of technology in the classroom. The respondent revealed that:

> *"I employ a range of technology in my instruction to boost learning and increase student engagement. To make lectures more engaging, I frequently employ multimedia resources including audio recordings, instructional films, and PowerPoint presentations. I also share course materials, gather assignments, and give comments using Higher Learning Management Systems (HLMS) like Moodle and Google Classroom. Additionally, I occasionally take virtual classes using websites like Zoom or Google Meet, particularly when it is not feasible to attend in person or when reviewing for exams".*

The respondent also indicated to integrate these technologies into his teaching practice as:

> *"I frequently include these tools into my lessons. For instance, I use multimedia tools like PowerPoint and educational videos in almost every class to support visual learning. Every week, announcements, assignments, and resources are posted through the Learning Management System. I rely increasingly on online resources like Zoom or Google Meet to provide extra assistance sessions during specific weeks, particularly when students are finishing assignments or getting ready for tests. All things considered, technology is a constant in my teaching approach rather than a sporadic addition".*

The respondent added for information about to adopt these technologies in his classroom as follow:

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"My aim to make learning more dynamic, interesting, and accessible for students drove me to implement technology in the classroom. I found that conventional lecture techniques weren't always successful at sustaining students' attention or accommodating their various learning preferences. Furthermore, the necessity of remote instruction during the COVID-19 pandemic underscored the significance of digital tools, and I personally witnessed their ability to close communication and learning gaps. I've kept using these resources ever since to improve instruction and student involvement".

Perceived Impact on Teaching

The data indicated by the respondent about the technology changed the way you plan and deliver your lessons. The respondent found that impact of technology on teaching in the classroom. The respondent stated that:

"How I organize and present my classes has changed dramatically as a result of technology. To enhance the substance of my lessons, I now use digital resources including presentations, interactive materials, and internet articles throughout the planning stage. In order to better organize and monitor student progress, I also create tasks that can be shared and finished using Google Classroom and similar platforms. Technology allows me to deliver lessons in dynamic ways, such as by incorporating into slides or utilizing real-time polls to gauge student understanding. My instruction is now more student-centered as a result of this change, which also offers more flexibility, interaction, and immediate feedback".

The participant also declared that technology improved or hindered my ability to teach effectively as follow:

"In general, technology has made it easier for me to communicate with students, increase student involvement, and improve access to learning resources. Students can review online resources at their own pace, which promotes deeper learning, and it enables me to use multimedia assets to more easily explain complicated concepts. Additionally, it makes it possible to receive feedback on assignments or exams online more quickly. But there have also been difficulties. Lesson flow can be hampered by sporadic technological problems, limited internet connectivity, and certain students' lack of device access. Furthermore, some students lack motivation in virtual settings, so I have to come up with innovative strategies to keep them engaged and focused".

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The participant also stated I assess the effectiveness of technology in achieving my teaching goals as follow:

> *"I use student comments, classroom observations, and academic performance to gauge how well technology is helping me reach my teaching objectives. I frequently inquire informally, and occasionally via surveys, about how beneficial the digital tools and resources are to the students. I also keep an eye on how involved and involved they are in technology-infused classes. I also evaluate student outcomes before and after integrating specific technologies, such exam scores and assignment quality. I consider the technology effective if I observe higher performance, more engagement, and enhanced comprehension. An essential component of this assessment process is ongoing reflection and adaptation".*

Perceived Impact on Students

The data indicated by the respondent about the changes have he noticed in students' learning attitudes, engagement, or performance due to technology use. The respondent found that impact of technology on students in the classroom. The respondent stated that:

> *"Students' learning attitudes, engagement, and performance have improved in a number of ways since I started incorporating technology into my lessons. When multimedia and interactive tools are employed in the classroom, many students seem more engaged and driven. When information is delivered through films, simulations, or online tests, their curiosity grows and learning becomes more pleasurable. Through online discussion boards and group projects made possible by Google Classroom and other platforms, I have also seen an improvement in student collaboration. Due to increased resources and the freedom to learn at their own speed, students' performance has improved noticeably in terms of assignment quality and general comprehension of the course materials".*

The faculty member also revealed that students responded positively to the integration of technology in your classroom as follow:

> *"Yes, the use of technology in my classroom has received generally positive feedback from the kids. For instance, a lot of students have expressed gratitude for the use of instructional films and multimedia presentations, stating that they make it easier for them to understand complex ideas. Students' heightened engagement is shown in their*

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enthusiasm and higher participation during online polls and quizzes. Students have also appreciated how easy it is to access lecture materials and assignments via the Learning Management System, which gives them the flexibility to study after class. Additionally, some students have said that using discussion boards prompted them to engage with their peers more, creating a cooperative learning atmosphere".

Challenges and Support

The data collected from the respondent about the challenges he faced in integrating technology into your teaching. The respondent found that challenges and support of technology on students in the classroom. The respondent indicated that:

"Limited access to dependable internet and suitable gadgets for myself and some students is one of the biggest obstacles I have encountered when using technology into my instruction. This occasionally interferes with access to digital resources or online activity. Students also differ in their level of digital literacy, which necessitates more time for help and instruction. Lessons have occasionally been delayed due to technical problems like platform outages or program bugs. To keep all students interested, especially those who struggle with digital tools or prefer in-person interactions, it can be challenging to strike a balance between the use of technology and conventional teaching techniques".

The respondent also stated that the institutional or technical support is available to help me to implement educational technology as follow:

"The organization offers assistance in integrating educational technology, such as computer lab access and introductory workshops on the use of learning management systems and standard multimedia tools. The university's IT department also offers technical support, albeit personnel levels can occasionally cause response times to be slow. Colleagues also frequently exchange resources and advice informally, which aids in resolving technical difficulties. However, improved infrastructure and more thorough training would further improve the efficient use of technology in the classroom".

Suggestions and Improvements

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The data collected from the respondent about the improvements would he suggest to make technology integration more effective in his department. The respondent found the suggestions and improvement of technology on students in the classroom. The respondent declared that:

> *"I would recommend a few changes to improve the effectiveness of technology integration in our department. First, technical hurdles would be significantly reduced by investing in improved infrastructure, such as modern computer hardware and faster and more dependable internet connectivity. Second, regular, practical training sessions would increase students' and faculty members' digital literacy and comfort level with a range of educational technology. Third, having more technical support personnel on hand would help to minimize disruptions during instruction by resolving problems quickly. Lastly, a more creative and encouraging learning environment would result from faculty members working together to exchange best practices and create technology-enhanced instructional resources".*

The faculty member also suggested that in future role of technology in higher education teaching and learning as follow:

> *"Technology will, in my opinion, become more and more important to teaching and learning in higher education. By providing flexible and remote learning options, it will keep increasing access to education by permitting participation from students in a variety of locations and backgrounds. With the use of data-driven insights and adaptive learning systems, technology will also promote more individualized and student-centered learning experiences. Additionally, it will make it easier for students and teachers around the world to collaborate and communicate more. But in order for technology to realize its full potential, educational institutions need to make investments in training, infrastructure, and regulations that promote the fair and efficient use of digital tools".*

Conclusion

This study emphasizes how important it is to integrate technology into higher education settings in order to alter teaching and learning, especially in a public institution in Afghanistan. The results are consistent with international studies that show how technology can improve teaching strategies, boost student interest, and raise academic achievement (Tamim et al., 2011; Kirkwood &

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Price, 2014). Teachers can move toward more participatory and student-centered pedagogies that meet a variety of learning demands by implementing digital resources including learning management systems, multimedia content, and online collaboration platforms (Mishra & Koehler, 2006; Laurillard, 2013). But the study also highlights a number of enduring obstacles that prevent technology's full potential in the Afghan setting. Critical obstacles continue to be infrastructure limitations, such as erratic internet availability and restricted device access (World Bank, 2019). Effective implementation is further hampered by differences in staff and student digital literacy as well as a lack of institutional support and training opportunities (Rahimi & Yadollahi, 2021). These difficulties are indicative of more general problems that developing nations encounter when using instructional technology (Sife, Lwoga, & Sanga, 2007; UNESCO, 2018). Comprehensive measures are necessary to address these problems. Technology adoption can go more smoothly with investments in ICT infrastructure, ongoing professional development for teachers, and technical assistance. Additionally, sustainable integration will be supported by cultivating an institutional culture of collaboration that promotes innovation and knowledge exchange (Bates & Sangrà, 2011; Hsu, 2016). Ensuring inclusion and accessibility also requires adjusting technology use to local contexts, taking into account linguistic and cultural factors (Khan & Sadat, 2022). In conclusion, if systemic issues are recognized and resolved by concerted efforts by stakeholders, educators, and politicians, technology integration presents exciting opportunities to improve higher education in Afghanistan. Ongoing studies and pilot projects can help develop resilient educational ecosystems that can satisfy the demands of 21st-century learning and further inform best practices.

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