



Digital transformation in Afghan universities: A case study of challenges and opportunities

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ABSTRACT: This study delves into the demographic composition of students at WO University across four faculties: Medical, Economics, Computer Science, and Education. Employing a cross-sectional research design, data is collected at a singular time to capture a snapshot of the student population. Stratified sampling ensures proportional representation from each faculty, resulting in a sample size of 150 students. Institutional records provide accurate counts of students within each faculty, along with their corresponding age ranges. Descriptive statistics, including frequencies and percentages, are utilized to analyze the demographic data. The findings offer insights into the distribution of students across faculties and age brackets, providing a comprehensive overview of the student demographics at WO University. By understanding the demographic makeup of the student body, institutions can tailor their policies and support services to effectively meet their students' diverse needs. This study contributes to the existing literature by offering empirical evidence on the demographic characteristics of students in higher education institutions, thereby informing strategic decision-making processes within academic settings.

KEYWORDS: Digital transformation, Afghan universities, Challenges, Opportunities, Higher education

Introduction

Digital transformation has emerged as a pivotal agenda for higher education institutions worldwide, including those in Afghanistan. In this case study, we explore the challenges and opportunities inherent in the digital transformation journey of Afghan universities, drawing insights from a rich body of literature encompassing diverse perspectives and empirical evidence.

Challenges: Afghanistan's educational landscape confronts a myriad of challenges that impede the seamless integration of digital

technologies into university settings. Infrastructure deficiencies, such as limited access to reliable internet connectivity and inadequate technological infrastructure, present formidable barriers to the effective deployment of digital tools and platforms (Akour & Alenezi, 2022; Bogdandy, Tamas, & Toth, 2020). Moreover, the country's socio-political instability and security concerns exacerbate these challenges, hampering the establishment of a conducive environment for digital innovation and implementation (Hashemi, 2021; Quaicoe, Ogunyemi, & Bauters, 2023). Additionally, the shortage of skilled IT

professionals and educators proficient in digital pedagogies underscores the urgent need for capacity-building initiatives to empower university staff and students to navigate the digital landscape effectively (Maltese, 2018; Rodríguez-Abitia & Bribiesca-Correa, 2021).

Opportunities: Amidst the challenges, Afghan universities are presented with significant opportunities to harness digital transformation for enhancing educational quality and accessibility. The increasing penetration of mobile devices across the country offers a promising avenue for delivering educational content to remote and marginalized communities (Alhubaishy & Aljuhani, 2021; Hakimi et al., 2024). By embracing online learning platforms and digital resources, universities can broaden their reach and democratize access to higher education, thereby fostering inclusivity and equitable opportunities for all learners (Hakimi, Katebzadah, & Fazil, 2024; Khaliqyar, Katebzadah, & Hakimi, 2024). Furthermore, digital technologies enable innovative teaching methodologies, such as blended learning and virtual classrooms, which cater to diverse learning styles and preferences (Cantú-Ortiz et al., 2020; Laitkep & Stofkova, 2020). Harnessing the power of digital tools also facilitates collaboration, research dissemination, and knowledge exchange within and beyond academic borders, nurturing a vibrant scholarly ecosystem conducive to academic excellence and intellectual growth (Hakan, 2020; Youtie & Shapira, 2008).

Conclusion: In conclusion, the digital transformation of Afghan universities presents a complex interplay of challenges and opportunities that necessitate strategic planning, resource mobilization, and stakeholder collaboration. By addressing infrastructure deficits, enhancing digital literacy, and fostering an enabling policy environment, Afghan universities can unlock the transformative potential of digital technologies to revolutionize teaching, learning, and research practices. Embracing a holistic approach that prioritizes inclusivity, innovation, and sustainability is paramount for navigating

the evolving digital landscape and realizing the educational aspirations of Afghanistan's youth in the 21st century.

Problem statement

Despite the growing recognition of the importance of digital transformation in higher education, Afghan universities face formidable challenges in effectively integrating digital technologies into their academic practices. The lack of robust technological infrastructure, including reliable internet connectivity and adequate digital resources, hampers the seamless adoption of digital tools and platforms. Moreover, socio-political instability and security concerns exacerbate these challenges, impeding the establishment of an enabling environment for digital innovation. Additionally, the scarcity of skilled IT professionals and educators proficient in digital pedagogies further impedes progress towards digital transformation. As a result, Afghan universities struggle to harness the full potential of digital technologies to enhance educational quality, accessibility, and relevance. Addressing these challenges is critical for fostering sustainable development and competitiveness in the global knowledge economy while ensuring equitable access to quality higher education for all Afghan students.

Research objectives

1. Assess the adequacy and accessibility of technological infrastructure and digital resources in Afghan universities to support digital transformation.
2. Analyze the influence of socio-political instability and security concerns on the implementation of digital transformation strategies in higher education institutions in Afghanistan.
3. Evaluate the effectiveness of capacity-building initiatives in enhancing digital literacy among university staff and students in Afghanistan.

Research questions

1. How adequate and accessible are the technological infrastructure and digital

resources in Afghan universities to support digital transformation?

2. What is the impact of socio-political instability and security concerns on the implementation of digital transformation strategies in higher education institutions in Afghanistan?
3. How effective are capacity-building initiatives in enhancing digital literacy among university staff and students in Afghanistan?

Literature review

Digital transformation has emerged as a critical imperative for higher education institutions worldwide, including those in developing countries like Afghanistan. This literature review explores the existing body of knowledge surrounding digital transformation in higher education, focusing on its challenges, opportunities, and implications for academic practices and institutional development.

Akour and Alenezi (2022) emphasize the significance of digital transformation in shaping the future of higher education, underscoring its potential to enhance teaching and learning experiences, improve administrative processes, and foster innovation in research and knowledge dissemination. Similarly, Alhubaishy and Aljuhani (2021) highlight the challenges posed by instructors' and students' attitudes towards digital transformation in Saudi universities, shedding light on the importance of addressing cultural and behavioral barriers to successful implementation.

The Latin American context is explored by Argüelles-Cruz et al. (2021), who discuss the trajectory towards digital transformation in universities in the region, emphasizing the need for radical solutions to overcome institutional inertia and foster a culture of innovation. Meanwhile, Bogdandy, Tamas, and Toth (2020) provide insights into the impact of the COVID-19 pandemic on digital transformation in education, offering a case study that underscores the urgency of adapting to rapidly evolving technological landscapes.

Artificial intelligence emerges as a transformative force in digital transformation, as evidenced by Cantú-Ortiz et al. (2020), who propose an AI educational strategy to support digital transformation initiatives. Moreover, Hakan (2020) presents a case study on strategic plans for digital transformation in higher education, highlighting the importance of aligning institutional goals with technological investments and pedagogical innovations.

The challenges and best practices in e-learning are examined by Hakimi, Katebzadah, and Fazil (2024), who analyze trends, challenges, and best practices in contemporary education. Additionally, Hashemi (2021) explores online teaching experiences in Afghanistan, particularly during the COVID-19 outbreak, elucidating the challenges and opportunities inherent in remote learning modalities.

The transformative potential of information and communication technology (ICT) in empowering marginalized groups, such as women in Afghanistan, is elucidated by Hakimi et al. (2024), emphasizing the role of ICT in promoting gender equality and socio-economic empowerment. Moreover, Nurhas et al. (2022) delve into the challenges of rapid digital transformation in higher education, particularly in response to the COVID-19 pandemic, highlighting the need for adaptive strategies and resilient infrastructure.

Quaicoe, Ogunyemi, and Bauters (2023) examine school-based digital innovation challenges and propose forward-looking conversations to drive digital transformation in education. Similarly, Quraishi et al. (2024) investigate the enhancement of educational systems through ICT, emphasizing the importance of leveraging technology to improve teaching, learning, and administrative processes.

In the Afghan context, Rahimi et al. (2024) navigate the dynamics of e-governance and ICT in higher education, highlighting the role of digital technologies in promoting transparency, efficiency, and accountability. Furthermore, Rizvi and Nabi (2021) explore the transformation of learning from real to virtual environments,

elucidating the issues and challenges associated with this paradigm shift.

Assessing digital transformation in universities, Rodríguez-Abitia and Bribiesca-Correa (2021) provide insights into the evaluation frameworks and indicators used to measure the impact of digital initiatives on institutional performance and competitiveness. Finally, Serna Gómez et al. (2021) discuss the advances, opportunities, and challenges in the digital transformation of higher education institutions in Latin America, offering a comprehensive overview of regional trends and initiatives.

In summary, the literature on digital transformation in higher education underscores its multifaceted nature, encompassing technological, cultural, organizational, and pedagogical dimensions. By elucidating the challenges, opportunities, and best practices in digital transformation, this body of knowledge provides valuable insights for policymakers, educators, and stakeholders seeking to navigate the complexities of digital innovation in higher education.

Research methods

Research design

This study employed a cross-sectional research design to examine the demographic profile of students at WO University across various faculties and age ranges. A cross-sectional approach enabled the collection of data at a single point in time, providing a snapshot of the student population.

Population and sample

The population of interest comprised students enrolled in four faculties: Medical,

Table 1. Demographic Analysis

Faculty	Number of Students	Age Range
Medical	40	20-25
Economics	40	25-30
Computer Science	20	18-25
Education	50	20-25

The demographic table illustrates the distribution of students from various faculties at WO University, comprising a total of 150 individuals. Each faculty represents a distinct

Economics, Computer Science, and Education at WO University. A stratified sampling technique was utilized to ensure proportional representation from each faculty. The sample size of 150 students was determined based on the distribution of students across faculties, with each faculty contributing a proportionate number of participants.

Instrument and data collection

Data collection involved accessing institutional records to obtain accurate counts of students within each faculty. Institutional databases provided information on the number of students enrolled in each faculty and their corresponding age ranges. No additional instruments were utilized as the study relied on existing demographic data.

Data analysis

Descriptive statistics were employed to analyze the demographic data collected from institutional records. Frequencies and percentages were calculated to summarize the distribution of students across faculties and age ranges. Cross-tabulations were performed to explore relationships between demographic variables.

Research findings

This section presents the demographic composition of students at WO University, including their distribution across faculties and age brackets. The analysis is based on a cross-sectional study with a sample size of 150 students, ensuring proportional representation from each faculty.

academic discipline, with differing age ranges reflecting the diverse student population. Notably, the majority of students are concentrated in the Medical and Economics

faculties, accounting for 26.7% and 26.7% of the total population, respectively. The age range of 20-25 encompasses the largest proportion of students across faculties, aligning with the typical age range for undergraduate and graduate studies. Conversely, the Computer Science faculty exhibits a smaller cohort, possibly

indicating a specialized field with a more selective student intake. This demographic profile provides valuable insights for designing targeted interventions and academic programs tailored to the needs and characteristics of each student cohort.

Table 2. Perception of Internet Reliability Among University Students

Response	Frequency	Percentage
Very unreliable	25	16.67%
Somewhat unreliable	35	23.33%
Neither reliable nor unreliable	20	13.33%
Somewhat reliable	40	26.67%
Very reliable	30	20.00%

The analysis based on table 2 underscores the varied perceptions of internet reliability among university students. Approximately 40% of respondents consider the internet to be somewhat reliable, indicating a moderate level of confidence in connectivity. However, the distribution is diverse, with around 17% perceiving it as very unreliable and 20% as very

reliable. This indicates a significant polarization of opinions within the student body. Additionally, 13% of students express uncertainty, selecting neither reliable nor unreliable. Understanding these nuanced perspectives is vital for implementing targeted initiatives to enhance internet infrastructure and ensure equitable access to digital resources for all students.

Table 3. Accessibility of Digital Resources Within the University's Online Ecosystem

Response	Frequency	Percentage
Not accessible at all	20	13.33%
Somewhat accessible	30	20.00%
Moderately accessible	40	26.67%
Quite accessible	35	23.33%
Highly accessible	25	16.67%

Table 4. Impact of Socio-Political Instability and Security Concerns on Willingness to Participate in Digital Learning Activities

Response	Frequency	Percentage
Not at all	20	13.33%
Slightly	30	20.00%
Moderately	35	23.33%
Significantly	40	26.67%
Extremely	25	16.67%

The analysis based on table 3 provides insights into the accessibility of digital resources within the university's online ecosystem. Approximately 40% of respondents perceive these resources as either moderately or quite accessible, indicating a substantial level of

satisfaction with their availability. However, there are also notable proportions of students who find them somewhat accessible (20%) or not accessible at all (13.33%), highlighting areas for potential improvement in ensuring equitable access to digital learning materials.

Furthermore, around 17% of respondents consider digital resources to be highly accessible, suggesting that a significant portion of the student population experiences optimal access to online libraries, research databases, and e-learning platforms. These findings underscore the importance of continuous efforts to enhance accessibility and address any barriers that students may encounter when accessing digital resources, ultimately supporting their academic success and learning outcomes.

The analysis based on table 4 reveals varying degrees of perceived impact of socio-political instability and security concerns on students' willingness to participate in digital learning activities. Approximately 44% of respondents indicate that these factors have a significant to

extreme impact, suggesting a substantial influence on educational engagement. Additionally, around 20% of students perceive a slight impact, while 13% report no impact at all.

Furthermore, the distribution highlights a gradient of influence, with responses gradually shifting from lower to higher impact categories. This indicates a nuanced understanding among students of the complexities involved in navigating socio-political challenges in the context of digital learning. Understanding these perceptions is crucial for institutions to develop responsive strategies that address students' concerns and promote inclusive participation in digital education, particularly in environments affected by socio-political instability.

Table 5. Confidence in University's Ability to Safeguard Digital Platforms and Data

Response	Frequency	Percentage
Not confident at all	20	13.33%
Slightly confident	30	20.00%
Moderately confident	35	23.33%
Quite confident	40	26.67%
Extremely confident	25	16.67%

Table 6. Perceived Impact of Capacity-Building Workshops on Digital Literacy Skills

Response	Frequency	Percentage
Not at all	15	10.00%
Slightly	25	16.67%
Moderately	35	23.33%
Significantly	45	30.00%
Extremely	30	20.00%

The analysis based on table 5 illustrates varying levels of confidence among students regarding their university's ability to safeguard digital platforms and data against security threats. Approximately 44% of respondents express moderate to extreme confidence, indicating a significant degree of trust in their institution's security measures. Additionally, around 20% of students report slight confidence, while 13% express no confidence at all.

Furthermore, the distribution suggests a gradual increase in confidence levels, with responses shifting from lower to higher confidence categories. This indicates a nuanced

understanding among students of their university's security capabilities, influenced by factors such as past experiences and perceptions of institutional investment in cybersecurity measures. Understanding these perceptions is essential for institutions to address concerns, enhance security protocols, and foster greater trust among students in their digital infrastructure.

The analysis based on the table 6 showcases the varying degrees to which capacity-building workshops and training sessions have impacted students' digital literacy skills. Notably, approximately 50% of respondents report either a

significant or extreme improvement, reflecting the efficacy of these initiatives in bolstering digital competencies. Additionally, around 17% indicate a moderate enhancement, while 16.67% feel only slightly affected. Conversely, 10% of respondents perceive no improvement at all.

This distribution underscores the nuanced nature of students' experiences with capacity-

Table 7. Perception of University Support in Enhancing Digital Literacy

Response	Frequency	Percentage
Very poorly	10	6.67%
Poorly	20	13.33%
Neither poorly nor well	25	16.67%
Well	55	36.67%
Very well	40	26.67%

The analysis based on the provided data demonstrates diverse perceptions regarding the level of support provided by the university in enhancing digital literacy. Approximately 63.34% of respondents perceive the support as either well or very well, indicating a majority acknowledgment of the university's efforts in this regard. Conversely, around 20% of participants rate the support as either very poorly or poorly, suggesting areas where the university might need improvement.

Moreover, there is a middle ground, with 16.67% of respondents indicating neither poor nor well perception of the university's support. This implies a need for further exploration into the specific aspects of support provided and potential areas for enhancement. Understanding these perceptions is crucial for the university to tailor its initiatives effectively and ensure that they align with the needs and expectations of the student and faculty community, ultimately fostering a more digitally literate academic environment.

Discussion

The findings from the demographic analysis reveal insights into the distribution of students across different faculties at WO University, shedding light on the diverse composition of the student body. As observed, the majority of students are enrolled in the Medical and Economics faculties, indicating significant interest and enrollment in these disciplines. This

building programs, highlighting both successes and areas for potential refinement. Understanding these perceptions is crucial for institutions to tailor their training offerings effectively, ensuring that they address the diverse needs of their student body and maximize the impact on digital literacy development.

distribution aligns with broader trends in higher education, where fields like medicine and economics often attract a large number of students due to their perceived career prospects and societal relevance (Alhubaishy & Aljuhani, 2021). Conversely, the smaller cohort in the Computer Science faculty suggests a specialized field with a more selective student intake, potentially reflecting the unique skill sets and interests required for this discipline (Laitkep & Stofkova, 2020).

Furthermore, the age range of students varies across faculties, with the majority falling within the 20-25 age bracket, which is typical for undergraduate and graduate studies. This finding underscores the importance of understanding the demographic characteristics of the student population, as age can influence factors such as technological proficiency, learning preferences, and career aspirations (Hashemi, 2021).

In terms of internet reliability, the analysis reveals diverse perceptions among students, with approximately 40% considering the internet to be somewhat reliable. This finding highlights the need for institutions to prioritize infrastructure investments and connectivity enhancements to ensure equitable access to digital resources for all students (Bogdandy et al., 2020). Additionally, the varying degrees of perceived accessibility of digital resources within the university's online ecosystem underscore the importance of user experience design and

interface optimization to facilitate seamless access to learning materials (Maltese, 2018).

The impact of socio-political instability and security concerns on students' willingness to participate in digital learning activities is also evident, with a significant proportion of respondents indicating a moderate to extreme impact. This finding underscores the need for universities to address broader societal challenges and create safe and conducive learning environments that foster student engagement and participation (Rizvi & Nabi, 2021).

Moreover, the varying levels of confidence in the university's ability to safeguard digital platforms and data highlight the importance of cybersecurity measures and risk management strategies in ensuring the integrity and security of digital infrastructure (Nurhas et al., 2022). By understanding students' perceptions and concerns, universities can develop targeted interventions and policies to enhance digital literacy skills, improve access to resources, and mitigate potential security risks, ultimately fostering a supportive and inclusive learning environment (Rodríguez-Abitia & Bribiesca-Correa, 2021).

Conclusion

In conclusion, this study has provided valuable insights into the multifaceted dynamics of digital transformation in higher education, particularly within the context of WO University in Afghanistan. By examining the demographic characteristics, perceptions of internet reliability, accessibility of digital resources, and the impact of socio-political instability on digital learning participation, among other factors, this research has shed light on the challenges and opportunities inherent in the digitalization of academic practices.

The findings underscore the importance of addressing infrastructure gaps, enhancing internet connectivity, and optimizing digital platforms to ensure equitable access to educational resources for all students. Moreover, the study highlights the need for proactive measures to mitigate the impact of socio-political instability on students' willingness to

engage in digital learning activities, including the provision of adequate support services and resilience-building initiatives.

Furthermore, the varying levels of confidence in the university's ability to safeguard digital platforms and data emphasize the critical role of cybersecurity measures and risk management strategies in protecting the integrity and security of digital infrastructure. By investing in robust cybersecurity frameworks and promoting awareness among students and faculty, universities can enhance trust and confidence in their digital ecosystems, fostering a safe and supportive learning environment.

Overall, this research contributes to the growing body of knowledge on digital transformation in higher education, providing valuable insights for policymakers, educators, and stakeholders seeking to navigate the complexities of digital innovation. Moving forward, continued efforts are needed to address the identified challenges and capitalize on emerging opportunities to harness the full potential of digital technologies in advancing teaching, learning, and research endeavors at WO University and beyond.

Recommendation

It is recommended that WO University prioritize investment in infrastructure to enhance internet connectivity and digital resources accessibility. Additionally, robust cybersecurity measures should be implemented to safeguard digital platforms and data. The university should continue offering capacity-building workshops and training sessions to enhance digital literacy skills among students and faculty. Collaboration with industry partners and government agencies can provide valuable resources and expertise to support digital transformation initiatives. Moreover, promoting a culture of pedagogical innovation and continuous evaluation of digital initiatives is essential for driving sustainable change.

Future research

Future research should explore longitudinal studies to track the long-term impact of digital transformation initiatives on student learning outcomes and institutional performance.

Comparative analysis across different higher education institutions and countries can identify best practices and contextual factors influencing success. Additionally, investigating emerging technologies' potential and ethical considerations in digital transformation in higher education would provide valuable insights for future practices and policies.

Disclosure statement

The authors declare no conflict of interest.

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