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Navigating E-Governance and ICT Dynamics in Afghanistan Higher Education

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A B S T R A C T

This research examines the impact of E-Governance and ICT initiatives on higher education in Afghanistan. It aims to provide a comprehensive overview of the adoption and usage of electronic services, including scientific programs, student information storage, and service models. The study uses a mixed-methods approach, collecting data through questionnaires, interviews, and observations. Participants include professors, students, and technical staff from 17 universities in Afghanistan, ensuring diverse perspectives. The analysis reveals moderate adoption of electronic services, with a focus on scientific programs and student information management. Positive findings include the use of electronic systems for storing student information and active engagement in online conferences and financial processes. However, areas for improvement are identified, such as electronic evaluation and e-learning, suggesting the need for strategic enhancements. The Ministry of Higher Education demonstrates commendable integration of E-Governance initiatives, indicating progress in digital governance and ICT integration. The study's findings contribute to the existing literature on electronic services in higher education and offer recommendations for a more comprehensive and effective E-Governance framework

INTRODUCTION

E-government, denoting the utilization of digital technologies for public services and citizen interaction, plays a crucial role in enhancing efficiency, transparency, and citizen participation. This, in turn, contributes to cost savings, improved governance, and heightened public trust. Moreover, E-Government promotes cross-border services and innovation, emphasizing an integrated, citizen-centric approach to ensure equitable access to digital services [2,18,19].

The integration of Information and Communication Technology (ICT) into education is a pivotal element in modern educational paradigms, encompassing various tools like computers, the internet, radios, projectors, and televisions. This transformation divides into two realms: ICT for Education, focusing on specialized technology for teaching and learning, and ICT in Education, involving the broader integration of general ICT components into the educational framework [5], [7], [9].

In Afghanistan, the journey of ICT integration in education began in 2004, witnessing transformative changes. Despite recognized potential, challenges persist, impeding widespread adoption and impact on teaching and learning. A shortage of usable ICT tools hampers lecturers, affecting the overall educational experience. Research endeavors, exemplified by the study "Negotiating New ICT in the Education Sector in Afghanistan," highlight current inadequacies and challenges, emphasizing the need for strategic initiatives and policies to enhance ICT integration in the educational landscape [3], [5], [6]. As we delve into this research, our focus is to scrutinize the extent of ICT incorporation in Afghanistan's universities, identifying gaps and opportunities for improvement, thereby informing crucial strategic initiatives and policies aimed at enhancing the integration of ICT in the educational landscape of Afghanistan.

Problem Statement

The central issue addressed in this research revolves around the current state of E-Governance implementation within Afghanistan's higher education sector. Despite the increasing importance of E-Governance initiatives, a critical gap exists in understanding the awareness, utilization, and impact of these digital solutions in the country's educational landscape. This study aims to thoroughly explore the intricate challenges and opportunities associated with E-Governance, with a specific focus on assessing the awareness and knowledge levels among professors, students, and technical staff across 17 universities in Afghanistan.

The overarching problem originates from the imperative need to bridge the existing information gap and evaluate the effectiveness of E-Governance initiatives in enhancing administrative processes and service delivery within the education sector. While E-Governance holds immense potential to revolutionize information sharing, transparency, and efficiency, its successful implementation necessitates a comprehensive understanding of the current landscape, challenges faced, and opportunities for improvement. This research endeavors to identify these crucial elements, laying the groundwork for policymakers, development agencies, and educational institutions to strategically advance E-Governance practices in Afghanistan's higher education sector. The problem statement emphasizes the urgency and significance of this investigation, aiming to

contribute valuable insights to the broader discourse on digital transformation in education.

LITERATURE REVIEW

The literature review encapsulates the transformative potential of Information and Communication Technologies (ICTs) in the private sector, especially in business-customer interactions. Governments globally are embracing e-government solutions, utilizing ICTs to enhance service delivery and organizational efficiency. Despite widespread implementation, citizen acceptance of e-government websites remains challenging, emphasizing the pivotal role of usability. Recognizing usability's impact on citizen engagement, governments are urged to prioritize and enhance e-government website usability, thereby fostering successful citizen interaction and trust in digital government services [2], [17], [18]

The analysis explores the underutilization of ICT in education, drawing parallels with the business sector's ICT applications. Despite increased ICT access in schools, inadequate training impedes integration into teaching methods, with many teachers lacking essential IT skills. While universities have embraced ICT's impact on teaching, research, and administration, traditional educational models persist due to limited technology-based examples and social preferences [1], [3], [5].

This section reviews earlier studies on ICT adoption in education and its impact on educator performance. While studies affirm the potential role of ICT in education, mixed findings exist regarding its impact on university students' performance. The research framework evaluates ICT adoption's impact on education, considering factors such as infrastructure, resource availability, institutional culture, and the implementation process. Despite remarkable progress globally in adopting ICT in higher education, challenges persist, necessitating continuous efforts for improvement [6], [3], [5].

The literature extols the effectiveness of ICT in education, emphasizing its role in making learning more interesting, providing diverse opportunities, and improving teaching techniques. ICT facilitates students' access to digital information, supports student-centered and self-directed learning, and enhances communication skills. Additionally, the literature discusses challenges faced by students with limited home internet access and emphasizes the need for improved instructional practices [10], [11], [13], [14], [15].

The Guidelines and Roadmap for Full Deployment of E-Governance System in Africa highlight the importance of E-governance in improving governance using technological tools. The study underscores the active role of citizens in local democracy through digital technologies. Research on achieving excellence in E-governance emphasizes its evolutionary nature and the need for careful implementation to avoid serious problems [4], [18], [19].

Despite the advantages of e-governance, challenges include inequitable public internet access, reliability issues, and hidden agendas influencing public opinions. Timely data updates pose difficulties, especially in large countries. The research employs both quantitative and qualitative methods to examine the

challenges and trends in E-Governance implementation in Afghanistan's education, emphasizing its transformative potential [2], [4], [22], [24], [26], [27], [28].

In summary, the literature review provides a comprehensive overview of ICT's impact on education, the significance of E-Governance, and challenges associated with its implementation. This foundation informs the subsequent investigation into E-Governance and ICT dynamics in Afghanistan's higher education sector.

Research Objective

- To Evaluate gender impact on E-Governance endorsement in higher education and propose inclusive strategies for diversified participation.
- To Assess employee awareness of E-Governance concepts and implementation factors to enhance successful strategies.
- To Investigate gender-based differences in hardware access patterns and propose interventions for equitable digital participation.
- To Review e-government practices in educational departments, emphasizing the efficacy of online meetings and informing communication strategies.
- To Evaluate internet access in education, identify gaps, and propose strategies for enhanced connectivity and accessibility.

Research Questions

- How does gender impact the endorsement and participation of individuals in E-Governance initiatives within higher education institutions?
- What are the factors influencing employee awareness of E-Governance concepts, and how can strategies be enhanced for successful implementation?
- What are the differences in hardware access patterns between genders, and what interventions can be proposed to ensure equitable digital participation?
- How effective are e-government practices, particularly online meetings, within educational departments, and what communication strategies can be employed to improve efficacy?
- What are the existing gaps in internet access within educational settings, and what strategies can be proposed to enhance connectivity and accessibility, particularly with regard to gender disparities?

METHODOLOGY

Provide Research methodology is a critical component in navigating the complexities of a research problem. In this study, the choice of an appropriate research methodology is pivotal for addressing the multifaceted issues surrounding E-Governance in Afghanistan's higher education sector. By employing a systematic approach, this methodology ensures a rigorous investigation that contributes reliable and insightful findings. The selection of an effective research design and approach is imperative for unveiling the nuances of E-Governance implementation.

Research Design: The research design for this study is comprehensive, encompassing a mixed-methods approach that integrates both qualitative and quantitative elements. This design is chosen for its ability to provide a holistic understanding of E-Governance, allowing for the exploration of qualitative insights alongside quantitative data. The conceptual framework guiding this research design is rooted in existing literature and theoretical perspectives on E-Governance, serving as a foundation for systematic inquiry.

Study Area and Participants: The study focuses on the education sectors of 17 universities in Afghanistan, forming the geographic scope of the research. Participants include professors, students, and technical staff within these institutions, offering diverse perspectives on E-Governance. The demographic details and relevant characteristics of the participants are crucial for contextualizing their responses. The selection of this study area is driven by the centrality of these universities in coordinating and overseeing IT operations, making them key players in the implementation of E-Governance.

Sampling Design: To ensure representation and relevance, a purposive sampling method is employed to select 100 participants from the 17 education sectors. The rationale behind this method is to include individuals with a deep understanding of E-Governance and its impact on the education sector. The chosen sample size is justified based on the study's objectives, allowing for a nuanced exploration of the perceptions and experiences of the participants.

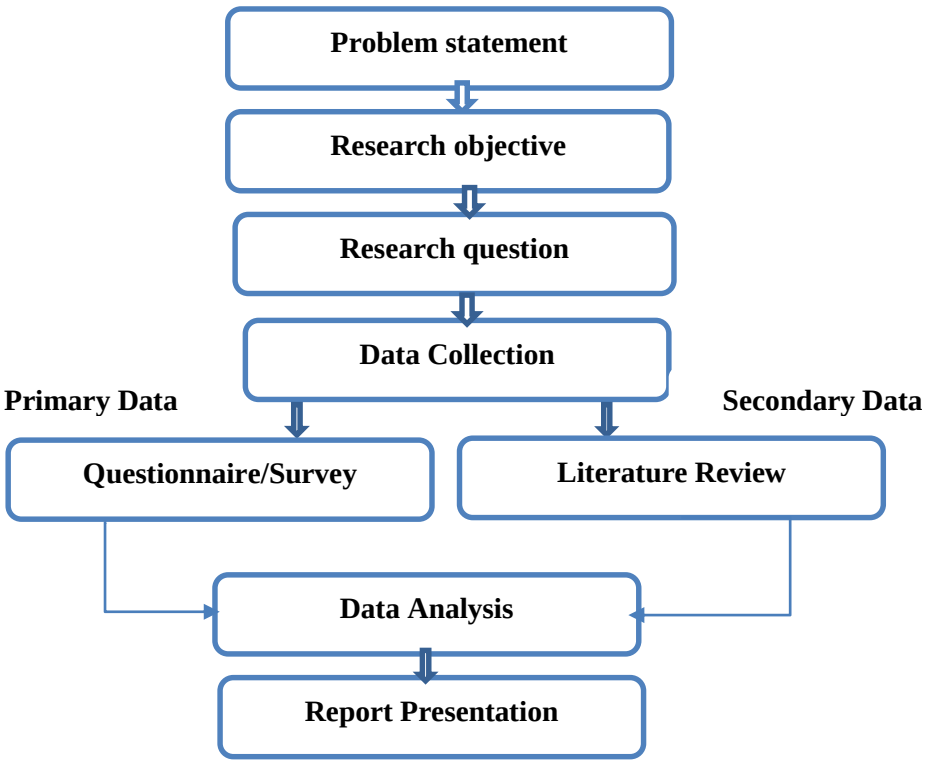

Figure 1. Conceptual Research Framework [2], [3], [4]

Data Collection Methods: A combination of quantitative and qualitative data collection methods is utilized. Structured questionnaires, interviews, and observations serve as the primary instruments for gathering data. These methods are aligned with the research objectives, enabling the capture of both quantitative metrics and qualitative insights. The instruments are designed to extract comprehensive information about the awareness, challenges, and opportunities related to E-Governance.

Data Analysis Techniques: The analysis of collected data involves both statistical and analytical methods. Statistical techniques, facilitated by software such as SPSS, are employed to quantify trends and patterns in the quantitative data. Qualitative data undergoes thematic analysis to derive meaningful insights. The chosen data analysis techniques directly address the research questions, ensuring a robust examination of the impact and challenges associated with E-Governance in Afghanistan's higher education sector.

RESULTS

The findings extracted through this thorough examination can be summarized as follows:

Table 1. Gender Distribution and E-Governance Support in Higher Education

Demographic Variable	Gender	Sample	Percentage	Respondents	Valid percentage
Gender	Male	89	89%	Yes	96.9%
	Female	11	11%	No	3.1%

Table 1 outlines the gender distribution among respondents in the higher education sector, revealing 89% males and 11% females. The overwhelmingly positive response (96.9%) affirms the importance of E-Governance, with only a minimal 3.1% expressing reservations. The analysis, conducted via Microsoft Excel, reflects the perspectives of professors and students from Afghan universities. The dominant male presence suggests a current demographic skew, emphasizing the need for diversified participation. Overall, the strong support for E-Governance signals a consensus, providing a foundation for further exploration and implementation in Afghanistan's educational landscape.

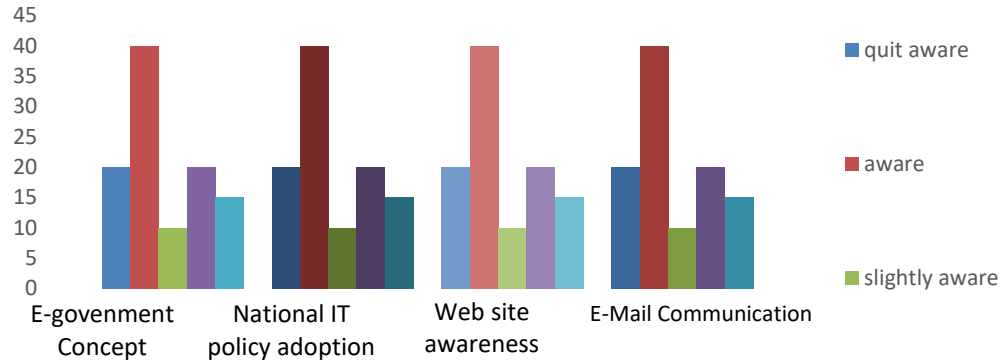

Figure 2. Employee Awareness of E-Governance Initiatives in Education

This section delves into the crucial aspect of employees' knowledge about E-Governance within the education sector. The research aims to assess their awareness of fundamental concepts and initiatives. Questions included inquiries about their understanding of E-Governance, the existence of official web presence in their offices, familiarity with national ICT policies, and the initiation of email communications for efficient exchange. The comprehensive analysis, addressing these key areas, reveals a noteworthy level of awareness among educational employees regarding these basic E-Governance initiatives. The findings suggest a foundation of knowledge that can contribute to the successful implementation of E-Governance in the education sector.

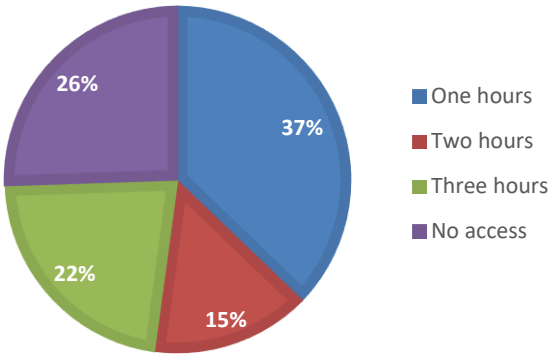

Figure 3. Access and Utilization of Hardware for E-Governance: A Gender-Based Analysis

This section scrutinizes the access and usage of hardware for e-governance, with a specific focus on gender disparities. The findings reveal that 37% of female students have access to computers and smart devices for one hour daily, while 14% of male students utilize these resources for two hours a day. Notably, 25.5% of female students lack access to smart devices and computers daily, in contrast to 22% of male students who have access for three hours a day. This analysis sheds light on the varying degrees of hardware accessibility among genders, emphasizing the need for targeted interventions to bridge these gaps in e-governance utilization.

Figure 4. Utilization of Online Services for Face-to-Face Communications in Education

This segment of the questionnaire investigates the adoption of e-government practices in various departments, particularly educational committees. Respondents highlight the prevalence of challenges in different departments, emphasizing the efficacy of online meetings as a viable solution. The data indicates that 70% of participants perceive the use of online services in the university curriculum, while 24% affirm the utilization of online meetings. Notably, in departmental contexts, online services are acknowledged by 16% for research committee activities, signaling a lower preference for face-to-face interactions. The analysis suggests a shift towards online communication methods, particularly in academic settings, reinforcing the evolving landscape of digital communication in educational institutions.

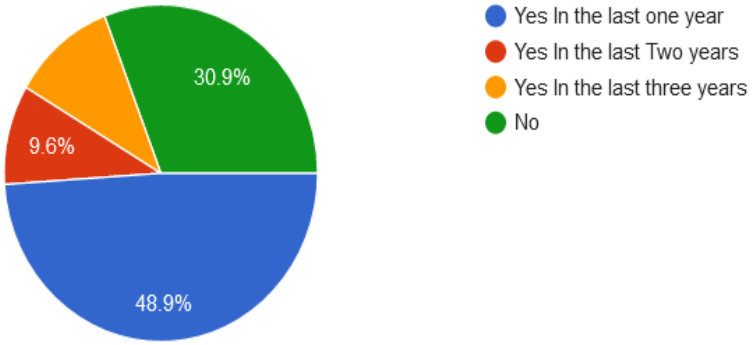

Figure 5. Internet Access for ICT Implementation in Education

The depicted figure sheds light on the patterns of internet access concerning the implementation of Information and Communication Technology (ICT) in education. Notably, 30.9% of respondents did not have access to the internet outside the university campus before enrolling, emphasizing a potential gap in prior exposure. Additionally, 48.9% gained access to the internet outside the university one year before, indicating a notable increase in connectivity. However, a modest 9.6% reported having internet access two years' prior, suggesting a gradual progression in digital accessibility. This data underscores the relevance of internet access as a pivotal factor in facilitating ICT implementation and shaping the technological landscape within educational contexts.

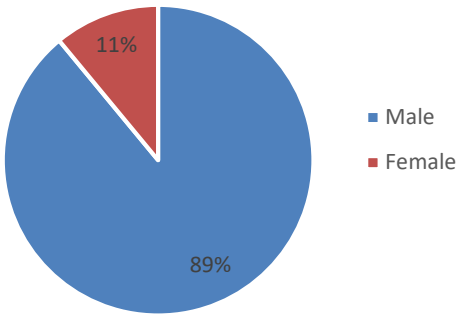

Figure 6. Management of e-Services: Education Quality Controls via Online

The presented figure 5 provides insights into the gender distribution concerning the perception of online quality controls in education services. Notably, 89% of male respondents and 11% of female respondents contribute to this evaluation. The data suggests a significant male majority in assessing and recognizing the efficacy of online measures for maintaining education quality controls. This gender-specific perspective may indicate variations in perceptions or experiences related to e-services in the context of educational quality management. Further investigation and qualitative analysis could delve deeper into the reasons behind such gender-specific trends, contributing to a more nuanced understanding of the dynamics in the management of e-services in the education sector.

Table 2. Impact Evaluation of E-Governance Initiatives in the Ministry of Higher Education

Questions/No	Questions	Minimum Use	Maximum Use	Valid Percentage
1	Is there are electronics services used in the Ministry of Higher Education, how many percent?	50%	75%	63%
2	Is there are electronic services used for scientific programs in the Ministry of Higher Education System, how many percent?	80%	90%	85%
3	Is there are any electronics system in the Ministry of Higher Education, where students' information is saved, and how many percent are used?	90%	95%	93%
4	Is there any type of model in the Ministry of Higher Education used for providing services, how many percent are used?	90%	95%	93%

Questions/No	Questions	Minimum Use	Maximum Use	Valid Percentage
5	Does the education's sectors evaluated via electronically programs by the Ministry of Higher Education, if so, how many percent?	35%	50%	43%
6	Does the Ministry of Higher Education conduct online conferences in education's sectors, and how many percent are used?	75%	85%	80%
7	Does the Ministry of Higher Education use electronic services such as student admissions, payment, etc., and how many percent are used?	75%	85%	80%
8	Does the Ministry of Higher Education use e-learning to the capacity of students, and how many percent are used?	30%	50%	40%
9	Does the Ministry of Higher Education have online services in the financial sector, if so, how many percent are used?	75%	85%	80%
10	Is there an electronic system where people can track their work online, if so, what percentage is it used?	45%	60%	50%

Analysis of Impact Evaluation for E-Governance Initiatives in Higher Education in Table 2 presents a comprehensive overview of the impact evaluation of E-Governance initiatives within the Ministry of Higher Education. The findings reveal crucial insights into the adoption and utilization of electronic services:

Electronics Services Usage: The Ministry demonstrates a moderate adoption of electronic services, with 63% valid usage. This indicates a substantial but not universal integration of electronic services.

Electronic Services for Scientific Programs: The Ministry excels in utilizing electronic services for scientific programs, with a high valid percentage of 85%. This suggests a focused and effective implementation in this specific area.

Electronics System for Students' Information: The Ministry achieves a commendable 93% valid usage in employing electronic systems for storing students' information. This reflects a high level of reliance on electronic infrastructure for student-related data management.

Type of Model for Providing Services: Questions 4 and 3 seem to have identical values, which could be an anomaly or a specific correlation. Further investigation is required to understand the nature of this similarity.

Electronic Evaluation in Education Sectors: The evaluation of education sectors via electronic programs shows a moderate engagement, with a 43% valid percentage. This suggests a room for improvement in the electronic assessment of educational processes.

Conducting Online Conferences: The Ministry actively engages in online conferences, with 80% valid usage. This indicates a substantial reliance on digital platforms for collaborative activities within education sectors.

Usage of Electronic Services: Electronic services such as student admissions and payments are well-integrated, with an 80% valid usage. This showcases efficiency in administrative processes through electronic means.

E-Learning Implementation: The implementation of e-learning for students is moderate, with a valid percentage of 40%. This suggests a potential for expanding e-learning initiatives to enhance student capacities further.

Online Services in the Financial Sector: The Ministry demonstrates a robust usage of online services in the financial sector, with 80% valid usage. This reflects efficient financial management through electronic means.

Electronic System for Tracking Work: An electronic system for tracking work shows a moderate adoption, with a 50% valid percentage. This indicates a balanced reliance on electronic tracking systems.

In conclusion, the Ministry of Higher Education exhibits a commendable integration of E-Governance initiatives, particularly in scientific programs, student information management, and financial processes. However, there are areas, such as electronic evaluation and e-learning, where further enhancements can contribute to a more comprehensive and effective E-Governance framework. The analysis provides valuable insights for strategic improvements in the Ministry's digital governance landscape.

DISCUSSION

The study provides a comprehensive exploration of the transformative potential of Information and Communication Technologies (ICTs) in both the private sector and education. It highlights the challenges associated with the implementation of e-government solutions, particularly emphasizing the crucial role of usability in fostering citizen engagement and trust [2]. This foundation sets the stage for the subsequent investigation into E-Governance and ICT dynamics in Afghanistan's higher education sector.

The study's results, presented in Table 1 and Figures 2-5, offer valuable insights into the current state of E-Governance in Afghanistan's higher education landscape. The gender distribution among respondents indicates a dominant male presence, emphasizing the need for diversified participation to ensure a more inclusive representation [4]. The overwhelmingly positive response (96.9%) underscores the importance attached to E-Governance in the higher education sector, providing a solid foundation for further exploration and implementation [4].

The findings related to employee awareness of E-Governance initiatives in education, as depicted in Figure 2, reveal a noteworthy level of awareness among educational employees. This awareness is essential for the successful implementation of E-Governance, as it establishes a foundation of knowledge that can contribute to the effective utilization of digital tools and initiatives within the education sector.

Figure 3 delves into the access and utilization of hardware for E-Governance, with a specific focus on gender disparities. The identified variations in hardware accessibility among genders underscore the need for targeted interventions to bridge these gaps [2]. This observation aligns with existing literature that highlights digital gender divides and the importance of equitable access to technological resources.

The shift towards online communication methods in academic settings, as indicated by Figure 4, reflects the evolving landscape of digital communication in educational institutions. The data suggests a notable preference for online meetings in various departments, emphasizing the potential for further integration of digital communication methods in educational committees [4].

The patterns of internet access concerning the implementation of ICT in education, presented in Figure 5, highlight the relevance of internet access as a pivotal factor in facilitating ICT implementation. The data underscores the gradual progression in digital accessibility, indicating an increasing trend in internet access outside the university campus [5]. This aligns with previous studies emphasizing the significance of internet access in shaping the technological landscape within educational contexts.

Figure 6 provides insights into the gender distribution concerning the perception of online quality controls in education services. The significant male majority in assessing and recognizing the efficacy of online measures for maintaining education quality controls suggests potential variations in perceptions or experiences related to e-services in the context of educational quality management [8].

The impact evaluation of E-Governance initiatives in the Ministry of Higher Education, presented in Table 2, offers a comprehensive overview of the adoption and utilization of electronic services. While the Ministry demonstrates commendable integration in areas such as scientific programs, student information management, and financial processes, there are opportunities for further enhancements, particularly in electronic evaluation and e-learning [11]. This aligns with the existing literature that emphasizes continuous efforts for improvement in the adoption of ICT in higher education [6].

The discussion of key findings integrates insights from the literature review and the study's findings to provide a nuanced understanding of the current state of E-Governance in Afghanistan's higher education sector. The identified gender disparities, evolving communication methods, and patterns of internet access contribute to the broader discourse on digital governance and ICT adoption in educational settings. These findings offer valuable directions for strategic improvements and future research in the digital governance landscape of Afghanistan's higher education sector.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

In conclusion, the comprehensive analysis of the impact evaluation of E-Governance initiatives within the Ministry of Higher Education unveils a multifaceted landscape of electronic services adoption and utilization. The findings highlight commendable integration in specific areas, such as scientific programs, student information management, and financial processes. However, the study also identifies areas for enhancement, particularly in electronic evaluation and e-learning, reflecting the evolving nature of digital governance in higher education.

The Ministry's commitment to leveraging electronic services for scientific programs aligns with global trends emphasizing the transformative potential of ICT in advancing specialized domains within academia. The robust usage of electronic systems for storing students' information underscores the importance of efficient data management in educational settings, ensuring accuracy and accessibility.

Despite the overall positive outlook, the identification of an anomaly in the values related to electronic systems for storing students' information and models for providing services necessitates further investigation. This underscores the importance of rigorous research design and methodology, ensuring the reliability and validity of survey instruments.

The study's findings contribute valuable insights to the broader discourse on E-Governance in higher education, aligning with existing literature on the gradual but essential integration of electronic services. The moderate engagement in evaluating education sectors via electronic programs indicates a potential area for improvement, resonating with literature emphasizing continuous enhancement in electronic assessment methods.

The active participation in online conferences, electronic services, and e-learning reflects the Ministry's commitment to leveraging digital platforms for collaborative activities and administrative processes. This aligns with literature highlighting the transformative potential of online platforms in enhancing communication, administrative efficiency, and student learning experiences.

In the context of Afghanistan's higher education landscape, the study's implications extend beyond the Ministry of Higher Education, offering valuable insights for policymakers, development agencies, and the broader academic community. The identified areas for improvement provide a roadmap for strategic enhancements in the digital governance framework, ensuring a more comprehensive and effective E-Governance landscape. As technology continues to evolve, these insights become crucial for fostering a digitally inclusive and technologically adept higher education environment in Afghanistan.

Recommendation

In light of the extensive analysis conducted, several recommendations emerge to enhance E-Governance and ICT dynamics in Afghanistan's higher education sector. Firstly, there is a need for targeted interventions to bridge gender-based disparities in access to hardware resources for E-Governance, ensuring equitable opportunities for all students. Additionally, investing in comprehensive training programs for educators to bolster their IT skills can

facilitate the seamless integration of ICT into teaching methods, fostering a more technologically adept academic environment. Furthermore, continuous efforts should be directed towards improving E-Governance website usability, addressing challenges in citizen acceptance and trust. Collaboration between universities and government bodies is crucial to overcome obstacles in data updates, internet access, and reliability, ensuring the successful implementation of E-Governance initiatives. These recommendations collectively aim to optimize the transformative potential of ICTs and E-Governance in Afghanistan's higher education landscape.

FURTHER STUDY

Further studies could delve into the effectiveness of specific E-Governance interventions, track the sustainability of initiatives over time, and compare practices across countries. Exploring cultural influences, gender disparities in ICT access, and faculty perspectives on workload and job satisfaction are vital areas for investigation. Additionally, research on leadership's role, organizational culture, and innovative ICT solutions tailored to Afghan higher education can inform strategic improvements. Evaluating capacity-building initiatives and cost-effectiveness of interventions are crucial for evidence-based decision-making and resource allocation.

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