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Policy versus Reality: Challenges of Implementing ICT in Higher Education in Nepal

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Abstract

This paper discusses the challenges of implementing information and communication technology (ICT) in higher education, comparing policy with reality in Nepal. Education is a socially oriented activity traditionally associated with strong teachers and personal contact with learners. ICT has become an integral part of today's teaching and learning process. The efficient utilization of ICT can enhance student motivation, enhance class dynamics, and boost teacher enthusiasm as they acquire new skills and techniques. ICT in education significantly enhance teaching, learning, and research, preparing future generations for future careers and lives. However, the policy and reality of ICT use in higher education are increasingly crucial in the 1st century for enhancing teaching and learning by incorporating digital environment. This paper, based on reviews of secondary data from government and UGC sources, reveals disparities in the practical implementation of these policies. The findings revealed that the government of Nepal has implemented various ICT policies since the 1990s, including the ICT in education Master Plan, Higher Education Policy, Digital Nepal Framework, and NEHEP. All these policies initiatives aim to improve educational quality by integrating ICT into teaching, learning and administrative processes. Despite the implementation of comprehensive policies, significant challenges persist, including inadequate funding, inadequate infrastructure, and a lack of teacher training. This paper concludes that there is a need for a coordinated strategy, continuous investment, and robust monitoring to maximize the potential of ICT in higher education in Nepal.

Keywords: *Higher education, ICT policies, implementation challenges, secondary data*

Introduction

Information and Communication Technology (ICT) policies in higher education are guidelines, rules, and strategies that govern the use, implementation, and management of digital technologies within educational institutions. These policies aim to ensure the efficient and ethical use of technology in teaching, learning, research, and administrative processes. ICT policy plays a crucial role in improving the quality of higher education Adarkwah and Huang (2023) assert that ICT policy significantly enhances the quality of higher education. They argued that ICT policies promote interactive, student-centered learning environments by incorporating digital tools like e-learning platforms and digital libraries, allowing flexible access to materials, and fostering continuous learning beyond the classroom. The policy has been significantly influenced by socially oriented activities involving strong teachers and personal contact with learners, integrating ICT into the modern teaching and learning process (Abedi, 2023a; Adarkwah & Huang, 2023). For example, e-learning platforms and digital libraries provide students with flexible access to materials, fostering continuous learning beyond the classroom.

The evolution of ICT policies in higher education in Nepal reflects the country's commitment to integrating technology to enhance educational quality and accessibility. The development of these policies has been influenced by various national and international factor, leading to significant advancements over the past few decades.

The introduction of ICT in Nepalese higher education began in the early 1990s (Karki, 2019). During this period, the focus was primarily on basic computer literacy and the establishment of computer labs in universities. The use of ICT was limited and largely confined to administrative tasks and basic educational purposes. In the year 2000, the Government of Nepal introduced its first comprehensive national ICT policy, which aimed to create an ICT friendly environment in various sectors, including education. This policy emphasize the need for developing ICT infrastructure, promoting digital literacy, and integrating ICT into the education system (Ministry of Science and Technology, 2000).

The ministry of education launched the ICT in education master plan 2013-2017 to systematically integrate ICT into the education sector. The plan outlined strategic goals such as developing ICT infrastructure in educational institutions, training teachers in ICT, and incorporating ICT into curriculum. The plan also focused on providing equitable access to ICT resources for students in remote areas(Ministry of Education, 2013). Similarly in 2014, the University grants commission of Nepal developed an ICT strategy specifically for higher education. This strategy aimed to enhance the quality of teaching-learning through ICT, promote research and innovation, and improve administrative efficiency. The UGC's ICT strategy included initiatives such as establishing digital libraries, e-learning platforms, and promoting ICT-based research activities(University Grants Commission, 2014).

Similarly, the higher education policy 2015 explicitly emphasized the integration of ICT to improve the quality of higher education. It highlighted the importance of ICT in enhancing teaching-learning processes, administrative management, and research capabilities. The policy ensure that all higher education institutions had access to adequate ICT infrastructure and resources(Ministry of Education, 2015). Furthermore, the national education policy 2019 seeks to transform Nepal's educational landscape by emphasizing the integration of science and technology at all educational levels(Ministry of Education Science and Technology, 2019). Furthermore UGC, Nepal formulated nurturing excellence in higher education program 2021/22-2025/26 to address the digitalization issues of higher education(University Grants Commission, 2022). However the government and concerning authorities formulated the ICT policies related to higher education, there are several challenges in the integration of ICT in Nepal's higher education(Kesh Rana & Rana, 2020). Several studies revealed the challenges to use ICT and less using in real ground in the context of Nepal's higher education (Ghimire et al., 2022; B. M. Joshi, 2022a, 2022b; Mukti et al., 2024). In this context, this study aims to review the ICT policies of Nepal that are related to higher education.

In the context of Nepal, this study is crucial because it addresses the gap between policy formation and real-world implementation in the use of ICT in higher education. While the Nepalese government has introduced numerous ICT-related policies, including the ICT in Education Master Plan, Higher Education Policy, and the Digital Nepal Framework, the actual application of these policies faces significant challenges. This study will provide insights into the specific obstacles such as insufficient funding, infrastructure deficiencies, and inadequate teacher training that impede ICT integration in higher education. By highlighting these issues, the research will inform policymakers, educators, and institutional administrators about the areas needing improvement to ensure that digital transformation in education is fully realized. This, in turn, has the potential to elevate the quality of teaching, learning, and research across Nepal, enhancing the country's overall educational outcomes.

Moreover, the study adds to the growing body of research on the challenges of ICT integration in education, particularly in developing countries. While many nations have embraced ICT as a critical element for advancing educational systems, the study shows how policy and ground realities often diverge, particularly in resource-constrained environments like Nepal. By comparing the Nepalese experience with global trends, this research will offer valuable lessons for other countries facing similar challenges in ICT policy implementation. It contributes to the broader discourse on how ICT can be effectively implemented in higher education to improve access, inclusivity, and quality, thereby preparing future generations for the digital world. Moreover, the study can serve as a reference for international organizations and donors that are supporting ICT initiatives in developing countries, helping them tailor their support to address practical barriers.

Methods

This study adopts a systematic review approach to identify and analyze the relevant ICT policies related to higher education in Nepal. The systematic approach was employed to ensure that the policies reviewed

explicitly mentioned the integration and use of ICT in educational contexts. The review process followed three key steps: Data Collection: Researchers conducted a comprehensive search of secondary data sources, including educational acts, policies, plans, programs, journals, and reports from the Government of Nepal and the University Grants Commission (UGC). The search included online databases, official websites of the Nepal Government, and UGC, focusing on documents published from the 1990s onwards to capture the evolution of ICT policies.

Policy Selection: After gathering a broad range of policy documents, researchers carefully screened them to ensure they explicitly mentioned the use or integration of ICT in education. Policies that met this criterion were selected for further review. This process aimed to ensure that only policies with a clear focus on ICT integration in education were included in the analysis.

Policy Analysis: The selected policies were thoroughly reviewed to extract information related to their goals, strategies, and implementation measures for integrating ICT in higher education. Specific attention was given to policies like the "Information Technology Policy 2000", "Information and Communication Technology (ICT) in Education Master Plan 2013-2-17", **"**Higher Education Policy 2015", **"**2019 Digital Nepal Framework", **"**National Education Policy 2019(2076)" and "Nurturing Excellence in Higher Education Program (NEHEP) (UGC) 2021/22-2025/26". The analysis focused on understanding how these policies aimed to enhance the teaching, learning, and administrative processes through ICT.

By following this systematic review approach, the study ensured a comprehensive analysis of Nepal's ICT policies, highlighting the gap between policy intentions and their practical implementation. This method enabled a detailed examination of the progress and challenges associated with integrating ICT into higher education, providing insights into the alignment between policy objectives and real-world outcomes.

Results

The reality of ICT policies in higher education in Nepal

We have analyzed the use of information and communication technology (ICT) policies in higher education in Nepal. The policy priorities reflected diverse conditions for adopting learning management systems (LMS) like Moodle for online assessments and sharing course materials. The policy also suggested the use of digital libraries and digitizing resources for providing online access to academic journals. The policy initiatives for the implementation of distance and online education with MOOCs, however, show that in reality, there is a significant urban-rural divide, with better-equipped institutions concentrated in major cities like Kathmandu. Infrastructure challenges, such as limited internet bandwidth, persist, and capacity-building needs are ongoing. Policy implementation remains challenging, with a lack of standardized guidelines and financial constraints. Emerging trends include blended learning approaches, social media, and messaging apps. Quality assurance is a challenge, with ongoing challenges in ensuring the quality of online and ICT-based education.

Information Technology Policy (2000)

The Information Technology policy 2000 of Nepal laid the groundwork for integrating ICT into the education sector. This policy was revised in 2010.This policy aimed to harness the potential of information technology to drive socio-economic development across various sectors, including education. The policy emphasized the need to incorporate ICT into the education system at all levels. This included the introduction of computer education in schools and the promotion of ICT related courses in higher education. One of the primary goals was to develop the necessary ICT infrastructure to support educational institutions. This involved establishing computer labs, internet connectivity, and other technological resources in schools and universities. It proposed various programs to enhance the ICT skills of educators, enabling them to integrate technology into their curriculum and teaching methods. Updating the curriculum to include ICT related subjects was another key aspects. The policy advocated for the promotion of e-learning and distance education to expand access to education, particularly in remote and rural areas(Ministry of Science and Technology, 2000).

The policy led to some initial progress in integrating ICT into the education sector. Several schools and universities began to establish computer labs and offer IT courses. Despite these advancements, the policy faced several challenges. Funding constraints limited the widespread establishment of ICT infrastructure. The unequal distribution of resources resulted in a digital divide within the country(B. M. Joshi, 2023). Limited

internet connectivity and lack of awareness about e-learning platforms hindered the widespread implementation of distance education programs. Moving forward, more comprehensive and dynamic policies are required to fully realize the potential of ICT in enhancing the quality and accessibility of education in Nepal.

Information and Communication Technology (ICT) in Education Master Plan 2013-2-17

The ICT master plan 2013-2017 was a significant initiative by the government of Nepal aimed at systematically integrating IC into the education sector to improve accessibility, quality, and efficiency. This plan was comprehensive, outlining strategic goals, specific objectives, and implementation frameworks to enhance the ICT landscapes in Nepal's educational institutions. This master plan facilitated the use of digital tools and resources in higher education, making learning more interactive and engaging. E-learning platforms and online resources provided students with flexible access to educational content, supporting self-paced learning. Moreover, the plan emphasized the need for continuous professional development for teachers, ensuring they were equipped with the necessary ICT skills. ICT facilitated greater collaboration among researchers, both within Nepal and internationally.

The implementation of the ICT master plan faced challenges, particularly in infrastructure development. The digital divide persisted, with disparities in access to technology among teachers and students(B. M. Joshi, 2022b, 2023). However, the promotion of e-learning under the ICT master plan gained momentum, especially during crises such as the COVID-19 pandemic.

Higher Education Policy (2015)

The Higher Education Policy 2015 of Nepal marked a significant milestone in the country's efforts to modernize and enhance the higher education sector. This policy placed a strong emphasis on integrating ICT to improve educational quality, accessibility, and efficiency. It encouraged higher education institutions to develop and offer courses specifically focused on ICT skills and digital literacy. Moreover it focused to establish computer labs, ensuring high-speed internet connectivity, and providing necessary hardware and software resources. The policy promoted the use of ICT to expand access to higher education through distance learning. Professional development initiatives were planned to continually update the ICT competencies of faculty and administrative staff. Additionally, it encouraged the use of ICT in research activities, promoting digital tools for data collection, analysis, and dissemination. Despite the policy's comprehensive approach, challenges in implementation were notable, especially under-resourced institutions. Limited funding continued to hinder the full realization of ICT integration.

Digital Nepal Framework (2019)

Digital Nepal Framework is an aspiring strategic plan by the government of Nepal to harness the power of digital technology to drive socio-economic development across various sectors including education. The framework aims to transform Nepal into a digitally empowered society and knowledge economy. The framework emphasizes the creation of a robust digital infrastructure including high-speed internet connectivity and reliable ICT infrastructure across educational institutions. It focused to promote e-learning platforms and distance education to expand access to higher education. Moreover this framework aimed to enhance digital literacy among students and faculty by integrating ICT skills into the curriculum. It promoted digital repositories, e-learning, and online journals to support research activities and collaboration.

Digital Nepal Framework helped to develop the smart classrooms and the availability of digital content which made learning more interactive and engaging. Distance education have significantly expanded access to higher education, especially for students in remote area and working students. Furthermore the establishment of digital repositories and e-libraries has provided researchers with access to a vast array of academic resources enhancing the scope and quality of research. However, the fully realize the benefits of this framework is difficult due to the infrastructures inadequacy and inequality.

National Education Policy (2019)

The national education policy 2019 of Nepal represents a significant step towards modernizing the educational landscape, addressing contemporary challenges, and improving the overall quality of education. The policy emphasizes the integration of science and technology across all levels of education, including higher education.

It aimed to inclusion of advanced technological tools and resources to enhance teaching-learning experiences. It aimed to enhance access to higher education through open and distance learning modes.

The integration of science and technology has facilitated the use of digital tools, making learning more interactive and engaging. Online and distance learning modes have expanded access, allowing students from various backgrounds to pursue higher education. This policy focused to continuous professional development programs which enhanced the skills of faculty and staff, ensuring they can effectively integrate new technology and teaching methods. This has led to more innovative and effective teaching practices, benefiting students.

However the policy focused to improve the quality of education through the integration of ICT, adequate funding and infrastructure development are crucial for the success of open and distance learning programs. Similarly, the unequal access of ICT tools to students and teachers also hinder to successfully implement this policy. With sustained efforts and investments, the higher education sector in Nepal can significantly benefit from the provision of the integrations of ICT which are focused in national education policy 2019 of Nepal.

Nurturing Excellence in Higher Education Program (NEHEP) (UGC) 2021/22-2025/26

The Nurturing Excellence in Higher Education Program (NEHEP) is a strategic initiative by the UGC, Nepal to improve the quality and relevance of higher education. NEHEP aimed to establish robust ICT infrastructure in higher education institutions. It planned to include the provision of high-speed internet, modern computer labs, and necessary software and hardware resources. The plan promoted the development and use of digital learning platforms to facilitate online and blended learning. Encouraged the adoption of Learning Management System (LMS) to support course delivery, student engagement. and assessments. It emphasized enhancing digital literacy among students, faculty, and administrative staff. It focused to provide training programs and workshops to improve ICT competencies, enabling effective use of digital tools in teaching, learning, and administration. This program aimed to support research initiatives that leverage ICT for academic purposes, including data analysis, artificial intelligence, and educational technology. There were provision to collaborate between higher education institutions and the tech industry to foster innovation and practical application of ICT. Furthermore, this program encouraged the use of digital platforms for accreditation, monitoring, and evaluation of academic programs.

Despite the program's objectives, resource limitations have posed challenges in fully implementing ICT initiatives across all higher education institutions. Ensuring sustained funding and investment in ICT infrastructure and resources is crucial. However the disparities in access to technology between the institutions remain a significant challenges. Developing comprehensive ICT policies at the institutional level requires effective coordination and strategic planning. Institutions need to align their ICT policies with national frameworks and ensure consistent implementation.

The implementation of Information and Communication Technology (ICT) in education has been guided by various theoretical perspectives, one of which is the Technological Pedagogical Content Knowledge (TPACK) framework. TPACK emphasizes the complex interplay between technology, pedagogy, and content knowledge, underscoring the need for teachers to integrate digital tools effectively into their teaching practices. This framework helps understand the role of ICT policies in facilitating such integration, aiming to enhance the quality of teaching, learning, and administrative processes (Mishra & Koehler, 2006). Adarkwah and Huang (2023) have emphasized that ICT policies foster student-centered learning environments by promoting the use of e-learning platforms and digital libraries, which align with the TPACK approach by enabling teachers to blend digital tools with their pedagogical strategies. The introduction of ICT in education is aimed at creating flexible learning opportunities, enhancing student engagement, and fostering continuous learning outside of traditional classrooms.

Discussion

ICT is a current issue in the field of education that enhances teaching-learning by making it more meaningful, creative, and engaging. It encourages learners to pursue self-learning and provides access to a wealth of educational resources (D. R. Joshi, 2017). So, the government of Nepal has formulated ICT-related policies in the education sector to address several critical objectives and challenges facing the country's educational landscape(Lim et al., 2020).

We are also ICT users in blended learning in the master in social studies education (MSSED), and post

graduate diploma in education (PGDE) program in Nepal. In our experience, ICT enhances education by making teaching more meaningful, creative, and engaging, encouraging self-learning, and providing access to extensive educational resources. The Nepali government has implemented ICT-related policies in the education sector to tackle the country's educational challenges and objectives. Our experiences show that a well-defined ICT policy is essential for effective uses of ICT in education. The policy is important for strategic direction, resource allocation, standardization, and digital equity in many developing countries like Nepal. It provides a roadmap for integrating technology, guides budget decisions, promotes consistency and interoperability, and addresses the digital divide, ensuring equal access to technology and digital resources for all teachers and students. The government of Nepal has implemented ICT-related policies to modernize and enhance education, but there is a gap between ICT policies and the actual use of ICT in higher education. Although the educational policies on ICT stresses the integration of digital technology in higher education, there is no clear strategy from the government and universities to equip universities with ICT infrastructures and train teachers in the use of ICT(Kesh Rana & Rana, 2020).

By integrating ICT, the government aims to bridge the gap between rural and urban education facilities. ICT enables the delivery of educational resources, online learning platforms, and digital libraries, thereby democratizing access to knowledge and education across the country. ICT facilitates innovative teaching methods and interactive learning experiences that can significantly enhance the quality of education(Anastasopoulou et al., 2024). In today's digital age, proficiency in ICT skills is essential for both students and teachers(Abedi, 2023b; Yadav, 2023). Nepal's ICT policies aim to equip learners with digital literacy skills from an early age, preparing them for the demands of the modern workforce.

ICT policies in Nepal's education sector also promote research and innovation(Carm, 2019). By providing access to digital research database, e-libraries, and collaboration tools, these policies facilitate academic research and knowledge creation. Universities and research institutions are encouraged to leverage ICT to enhance their research capabilities, leading to advancements in various fields and contributing to national development goals. Effective management and administration are crucial for the smooth operation of educational institutions. These policies aim to streamline administrative processes through the implementation of Management Information System (MIS), automation of workflows, and digital record-keeping. As part of the global trend towards digital transformation in education, Nepal's ICT policies align with international standards and best practices(Nahakul, 2023; Shrestha). By keeping pace with global advancements in educational technology, the government aims to position Nepal as a competitive player in the global knowledge economy(Maharjan, 2024).

The COVID-19 pandemic highlighted the need for resilient and flexible education systems that can adapt to disruptions(Naidu, 2021; Raghunathan et al., 2022). ICT has proven to be a vital tool in ensuring the continuity of education during schools and campuses closures and lockdowns(Çaldağ et al., 2021; Usmani et al., 2023). The pandemic underscored the importance of having robust ICT infrastructures and policies in place to support remote learning and maintain educational activities under any circumstances(Government of Nepal, 2020).

The implementation of ICT policies in education in Nepal faces numerous challenges that undermine their effectiveness and practicality. These challenges arise from systematic issues, resource constraints, and socio-economic disparities. One of the most significant challenges is the lack of sufficient financial and infrastructural resources. Many campuses especially in rural areas, lack basic ICT infrastructure such as computers, reliable internet access, and electricity (Bhattarai, 2021; Gyawali & Mehndroo, 2024). There is a pronounced digital divide between higher education institutions (Baral, 2022; Ghimire et al., 2022). This disparity creates unequal opportunities for students and teachers, undermining the goal of equitable access to quality education.

Effective implementation of ICT policies requires teachers who are not only trained in using digital tools but also motivated into their teaching practices (Sharma & Srivastava, 2020). However, many teachers lack the necessary ICT skills and professional development opportunities. Continuous training and support are essential but often missing due to limited resources and organizational focus. Moreover, integrating ICT into the curriculum requires well-developed digital content and resources that align with educational standards (Wahidha & Kardena, 2024). In Nepal, there is often a lack of high-quality digital educational content tailored to the national curriculum(Gyawali & Mehndroo, 2024). Developing and maintaining such content requires ongoing investment and expertise, which are currently insufficient.

While ICT policies set aspiring goals, their implementation often lacks a clear, coordinated strategy. There is a need for robust monitoring and evaluation mechanisms to assess progress and make necessary adjustments. However policies lack these mechanisms, resulting in gaps between policy intentions and on-the ground realities (Karna Rana et al., 2020). Socio-economic factors also play a significant role in hindering the implementation of ICT policies(Bhattarai, 2021). Many students come from low-income families that cannot afford personal digital devices or internet access at home. This economic barriers limits the ability of students to engage with ICT-enhanced education outside the classroom(Ghimire et al., 2022). Similarly, there is often resistance to change among educators and administrators who are accustomed to traditional teaching methods. This resistance can stem from a lack of understanding of the benefits of ICT. Overcoming this resistance requires effective change management strategies and continuous advocacy.

Here, all ICT policies are aspiring but are not backed by adequate funding. Without sufficient financial resources, it is challenging to develop infrastructure, provide training, and create digital content(Karna Rana et al., 2020). Funding constraint limit the scope and effectiveness of policy implementation. Similarly these policies often lack detailed implementation plan with specific timelines, roles, and responsibilities. This vagueness leads to inconsistencies and delays in execution. A clear roadmap is essential for translating policy into practice, but many policies fall short in this area(Saha, 2023). Moreover, ICT policies do not have robust monitoring and evaluation frameworks, leading to gaps in accountability and effectiveness(Kesh Rana & Rana, 2020). Often, efforts to implement ICT in education are fragmented and lack coordination between various government bodies, educational institutions, and private sector partners. This fragmentation leads to duplicated efforts, inefficiencies, and missed opportunities for synergies.

Conclusion

The integration of ICT in higher education in Nepal, while guided by comprehensive policies and strategic plans, faces significant implementation challenges that undermine its effectiveness. These challenges include inadequate financial and infrastructural resources, a pronounced digital divide, insufficient teacher training, and a lack of high quality digital educational content. Moreover, the absence of clear implementation strategies, robust monitoring and evaluation mechanisms, and effective coordination among stakeholders further hinders the practical application of these policies. Addressing these issues requires sustained efforts, investments, and a cohesive approach to bridge the gap between policy aspirations and ground realities, thereby enhancing the quality and accessibility of higher education through ICT.

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