Student Learning through Information Communication Technology: A Review

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Abstract:

The study focuses on exploring the role of information communication technology (ICT) in enhancing student learning within Nepal's higher education system. It reviews several studies on factors influencing the global adoption of ICT and highlights its significance for academic growth and development. The study concludes that ICT can significantly boost academic achievement among university students. However, the successful deployment of this technology depends on user acceptance. The research found that factors such as social influence, accessibility, computer self-efficacy, infrastructure, and enjoyment significantly impact the perceived ease of use of ICT systems. Effective use of ICT in the teaching-learning process requires support and knowledge from experts and peers. Students utilize ICT to enhance their education in both virtual and physical classrooms. The findings highlight the potential of ICT to transform the teaching-learning process, promoting a more interactive and engaging educational experience.

Key Words: Information Communication Technology (ICT), Higher Education, Academic Achievement, User Acceptance.

1. Introduction:

Information and communication technology (ICT) has changed the traditional learning approaches to modern and interactive environment. ICT is central to the educational revolution, driving essential advancements in modern education practices. This means that education is changing every day (Al-Ansi et al., 2019). ICT in education refers to using computers to enhance the teaching-learning process, often requiring assistance from colleagues or professionals. Students utilize ICT to improve their learning both within and outside of the classroom (Capodieci et al., 2020; Chance et al., 2007 ; Leidner and Jarvenpaa, 1995).

In the modern world, integrating ICT in education is receiving more attention from all nations globally. Technology occupies a significant role in the teaching process, enhancing informatics as a separate area of study. Since, the internet revolution, technology has significantly influenced teaching and learning abilities. This influence might vary widely depending on the study level and can be either positive or negative depending on how it is used.

Technology in classrooms has not been entirely effective, similar to many attempts at educational reform. There have been many waves of large-scale technological invest-ment to enhance education during the past century, but none of them have had a discernible, long-term effect (Al-Ansi et al., 2019).

In Nepal, e-government has gradually progressed beyond computerizing government agencies to include programs that capture the finer aspects of governance, such as openness, citizen centricity, and service orientation (Pandey and Malla, 2023). Information and communication technologies (ICTs) use electronic means to transfer, modify, and store data. This includes platforms for text messages, emails, video chats, and social networking.

ICTs are used in many devices, such as desktop computers, laptops, smartphones, speakers, recorders, headphones, and others to perform communication and informational tasks (Pandey and Malla, 2023; Shakya and Rauniar, 2002). The Nepalese education system continues to emphasize the use of digitalization in education. The nascent usage of information and communication technology in education has left several faculty members and students feeling uneasy when utilizing the new tools. ICT not only changes the methods of instruction and learning, but it also develops the skill set necessary to succeed in the technological era of today and the future (Bhattarai and Maharjan, 2020).

ICTs are widely used in developed countries and are seen to be essential for fostering social, political, and economic participation in developing countries (Pandey and Malla, 2023). The IT service export market requires a variety of educational backgrounds to meet the diverse needs and demands of the sector. The lack of a trained workforce is one of the biggest barriers to Nepal's IT sector's growth and development. There is a glaring disparity between the knowledge of the industry and the educational system.Furthermore, there's a good chance that early-stage investment in IT businesses would help Nepal's IT sectors flourish. This kind of financing has the potential to significantly improve Nepal's digital ecosystem (IIDS, 2023).

In Nepal, employees who work overseas as IT service providers often have a bachelor's degree. A wide range of educational backgrounds are beneficial to the IT service export business, varied viewpoints and knowledge together, which is essential to the sector's growth and success (IIDS, 2023). There are currently 110 academic institutions in the nation that offer bachelor's and master's degree programs in IT, such as the Bachelor of Information Technology, Bachelor of Computer Science and Information Technology, Bachelor of Cyber Security and Digital Forensics, Master of e-Governance, and Master of Information Technology Management. In a similar vein, numerous training facilities provide IT-related courses (IIDS, 2023).

The 2019 Digital Nepal Framework states that one of the top development targets in higher education is greater digital integration, which is a positive trend. One way to accomplish this is through the use of smart classrooms. In Tribhuvan University, the Open and Distance Education Center (ODEC) has been undertaking similar initiatives through its mobile learning centers, exam management information system (EMIS), online learning platform, and other initiatives.

Several planning documents and policies highlight the focus on digitalizing education in Nepal. These include the Open Education and Distance Learning Policy 2007, the Directives on Distance Education/Open Learning Program 2007 with its third amendment (2014), the Information and Communication Technology (ICT) in Education Master Plan 2013-2017 (Government of Nepal, Ministry of Education, Science and Technology MoEST), and the Higher Education Policy Framework – 2018 (IIDS, 2023).

A recent Education Policy Document (2020) emphasizes the need to enhance the current model of teacher education by focusing on pedagogical experience and emphasizing ICT and 21st-century skills at all educational levels ((ITP), 2023).

Institutions are recognizing the need for IT education in Nepal. The Open and Distance Education Centre (ODEC, TU) is an autonomous academic institution under Tribhuvan University, established in 2015 by an Executive

Council resolution. ODEC aims to provide open and remote learning to ensure that the majority of Nepalese students can have access to high-quality higher education. Additionally, by
utilizing open and remote learning modes, it hopes to provide top-notch higher education to a wide range of individuals in Nepal and beyond (Ghimire, 2020).

It is the responsibility of ODEC to arrange and conduct postsecondary education programs on all subjects, approved by the university. Several factors justify the establishment of the Open and Distance Education Center, including the growing demand for distance education both locally and globally, the challenges faced by working professionals with conflicting schedules to attend traditional face-to-face education, the incorporation of information and communication technology (ICT) in teaching methods, and TU's policy to offer dual-mode programs, including blended learning, to cater to a larger population (Ghimire, 2020; Jha, 2020).

Numerous studies worldwide have explored information communication technology (ICT). This study tries to provide a concise overview of review findings related to the use of ICT in Nepal's higher education system. It gives attentions on the current state of research on ICT in global education systems and its importance in assessing research progress. This study primarily examines the work of several studies to underscore the significance of ICT in national and global educational frameworks. This study aims to address several key concerns: What is the current status of research on information and communication technologies in education systems worldwide? Is information communication technology pivotal for evaluating the state of research? It seeks to underscore the significance of information and communication technology (ICT) within both national and global educational frameworks.

2. Literature Review:
Thomas and Allen conducted a study examining the perceptions of potential students entering tertiary education regarding IT as a career at the Australian Catholic University (ACU) National in Melbourne, specifically focusing on those pursuing bachelor's degrees in business and information systems (Thomas and Allen, 2006). The study explored the differences in perceptions between men and women, the similarities in their views, and how these perceptions are formed. According to the report, by the time they reached year 10, most pupils had decided not to continue with IT as a subject.

In 2011, the University of Nagasaki developed a new Web-based course evaluation system (Chatvichienchai, 2011). This paper introduced WCourEva, a novel Web-based course evaluation system designed to fulfill the needs of different university academic units. These needs included customizable surveys for academic units and instructors, improved feedback quality, accurate statistics, and affordable system development and maintenance costs. Furthermore, Parkin et al. (2012) explored the influence of learning technology on students' engagement

with feedback,aiming to assess how a variety of technical interventions could inspire students to engage with feedback and develop activities to improve future learning.

There is a dearth of empirical research, particularly in sub-Saharan Africa, on the relationship between students' experiences using ICT (information and communications technology) devices and applications and their academic achievement (Nketiah-Amponsah et al., 2017). The study reported that ICT could be leveraged to improve academic performance among university students. It is recommended that students use email more regularly for academic purposes to fully appreciate its potential as a tool for improving academic attainment.

Hussain et al. (2017) investigated how information and communication technology affects students' academic achievement and retention in chemistry. Fifty ninth-grade pupils were randomly selected from Kohsar Public School and College Latamber Karak, Pakistan. Sapkota et al. (2018) reported that organizations in both the public and private sectors have been eager to leverage the power of ICT to improve administrative, managerial, and therapeutic outcomes. The new technology's successful adoption was depended on its acceptability by organizational member targets as end users. Ramdoss et al. (2020) also suggested that computer-assisted literacy training improves reading skills in students with intellectual disabilities, despite problems in determining efficacy. The Twenty-six individuals were randomly allocated to either the intervention group or the wait-list control group. The control group received standard reading instruction, while the intervention group received Headsprout Early Reading (HER) intervention instead of further formal reading training.

The rising availability of technologies and web-based resources can be very useful tools, both in the educational and clinical fields, for developing training activities that can also be completed remotely. There are studies in the current literature that investigate the usefulness of internet-based reading comprehension programs for children with reading comprehension impairments, but nearly none of them address distance rehabilitation programs (Capodieci et al., 2020).

In Nepal, Bhattarai and Maharjan (2020) conducted research on students' attitudes towards digital transformation in teaching and learning activities at various levels in the Kathmandu Valley. The findings of the study demonstrated that social influence, accessibility, computer self-efficacy, infrastructure, and enjoyment all had a significant impact on the perceived ease of use of the digital learning system. The digital learning system leverages technology and innovation to transform
traditional learning practices. The study found that integrating digital tools into education made academic activities more engaging, accessible, creative, effective, and productive.

In the twenty-first century, mathematics teachers must be cognizant of digital technology, and ethical, cultural, leadership, and policy issues. The purpose of the study by Khanal et al. (2021) was to investigate the relationship between mathematics teachers' digital awareness and students' achievement at both school and higher education levels in Nepal. They reported that organizations in both the public and private sectors have been eager to leverage the power of ICT to improve administrative, managerial, and therapeutic outcomes. The successful adoption of new technology depended on its acceptability by organizational members as end users.

Information Communication Technology (ICT) in education has made significant contributions to student learning for capacity development. However, Hamza (2021) found that students in Nigerian universities encounter significant hurdles when using ICT to improve their success rates. These hurdles include a lack of internet connectivity, internet facilities, and practical hands-on training on how to use computers, among other things.

Technology integration into teaching and learning activities is crucial for educators and learners to thrive in the information age. A mixed-method approach was used in a study by Mensah et al. (2023) to investigate the impact of ICT use on academic performance among students in second-cycle schools (SCS) in Ghana. The results showed that some teachers' attitudes towards incorporating Information & Communication Technology (ICT) in the classroom as well as students' limited access to internet connections, pose obstacles for to students utilizing ICT capabilities in their learning processes. The success of ICT in SCS education depends on the availability of ICT resources both at schools and occasionally in households. Outside of the classroom, the majority of students utilize printers, digital cameras, social media, laptops, smartphones, and internet/modems.

Information and communication technologies played a crucial role during the pandemic by facilitating advancements in the teaching-learning process. However, some occupations in the health domain continue to oppose this technology, especially at higher levels before graduation. They emphasize the importance of learning acquired through face-to-face interactions and practice (Salinas et al., 2023).

E-Governance in Nepal has evolved beyond the mere computerization of government departments to encompass programs that focus on key governance principles, such as citizen centricity, service orientation, and transparency. This progressive approach to e-Governance has been greately influenced by lessons learned from earlier e-Government initiatives, as reported by Pandey and Malla (2023). Information Technology (IT) can help institutions improve their teaching and learning processes in a variety of ways. It enables active participation from both teachers and students by allowing them to interact with ChatGPT for asking questions, receiving answers, improving efficiency, and providing feedback (Sah et al., 2024).

According to several research studies, postgraduate students' ICT aspects substantially and positively impact the learning process at both the undergraduate and postgraduate levels. The only exception is ICT equipment and tools, which had a minimal and negative effect at the undergraduate level. Moreover, undergraduate approaches and processes were helpful, even when the infrastructure of higher education was lacking.

3. Materials And Methods:

The present work has been grounded in comprehensive review of literature, serving as the basis for the entire investigation. A wide array of literature was systematically examined, incorporating diverse sources from both national and international contexts. By carefully selecting materials from various geographical regions, including South and East Asia, Australia, Africa, and several other countries, the study aimed to capture a global perspective on the topic under investigation. This approach allowed for a global perspective on the topic, with a chronological analysis of reports to track developments over time. The review ensured relevance and depth, incorporating the latest findings to support the research aims.

The study examined the role of information and communication technology (ICT) in education, particularly how it affects student engagement and learning. By integrating literature from multiple regions and considering the latest advancements in ICT, the research provided key insights into the educational processes and dynamics in various contexts, strengthening its overall conclusions.

3. Result And Discussion:

The objective of the research was to explore how various technical interventions could motivate students to engage with feedback and develop projects that would improve their future learning experiences. Nketiah-Amponsah et al. (2017) discovered that information and communication technology (ICT) could be employed to assist university students in enhancing their academic performance. However, Thomas and Allen (2006) noted that a significant number of students had opted against pursuing information technology as a field of study by that time. Additionally, Hamza (2021) identified several challenges faced by Nigerian university students in leveraging ICT to improve their success rates.

Despite the difficulties in evaluating its effectiveness, Ramdoss et al. (2020) suggested that computer-assisted

literacy training can aid students with intellectual disabilities in becoming more proficient readers. Bhattarai and Maharjan (2020) reported that incorporating digital tools in the classroom improved the effectiveness, productivity, creativity, accessibility, and engagement in academic activities.

Pandey and Malla (2023) highlighted that information technology could benefit educational institutions by enhancing their teaching and learning processes. In this context, ChatGPT, as described by Sah et al. (2024), facilitates communication between teachers and students by enabling them to pose questions, receive prompt answers, obtain feedback, and gain insights into their work.

4. Conclusion:

The study found that successful use of information communication technology in the higher education sector has an impact on students' learning quality both domestically and internationally. The majority of the research findings showed that social influence, accessibility, computer self-efficacy, infrastructure, and enjoyment all had a significant impact on the digital learning system using information communication technology.

Information Communication Technology can assist teachers and students enhance their teaching and learning processes in a variety of ways. It encourages teachers and students to participate by allowing them to connect with advanced technology and ask questions, receive responses, efficiency improvements, and feedback. The influence of learning by information communication technology on students' engagement with feedback attempted to analyze how a variety of technical interventions could encourage students to engage with feedback and generate activities to promote future learning.

5. Funding Statement:

6. Completing Interest:

The authors confirm that they have no competing interests to declare.

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