Impact of Computer Application in Teaching and Learning at Higher Education in Nepal

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Abstract

This paper analyzes the role of computer as a technology in accelerating the efficiency and effectiveness of teaching and learning activities accomplished in the undergraduate and postgraduate educations. The article has employed the secondary data to assess the impact of the computer application in the Nepalese education system. The research done by exploring the pervasiveness of the technologies especially the computer—the latest advancement in science and information-will examine the other relevant elements as used in the higher education. With ICT, things may be created, processed, stored, shown, and shared. Numerous technologies exist, including computers, televisions, and mobile phones, data via electronic media etc., but videoconferencing, blogs, and email are seen as technology-related tools and services.

Introduction

This paper analyzes the impact of computer application in the higher education of Nepal by using the secondary data available in e-libraries and print libraries. By employing the qualitative research design, the paper is constructed in order for demonstrating the relationship between computer application and higher education in Nepal. Due to the flow of students in the colleges and universities in Nepal, the education has been inaccessible to those who cannot afford the expenses. Besides, the state does not invest the required amount of resources for the higher education, a great number of youths seem deprived of the university degrees (Upadhayay, 2018, p. 97). Meanwhile, the colleges do not seem capable of managing the facilities including infrastructure and technologies as they are costly. That is why the advancement and effectiveness of teaching and learning in colleges have not been obvious and widely pervasive in the absence of technologies particularly computer-based learning and teaching approach. The management can be effective as much as the educational institutions are backed up with technologies particularly the PowerPoint and smartboard that generally enhance the efficiency of the teachers' performance and students' engagement. Upadhayay highlights the significance of higher in the development process of Nepal. In his view:

higher education is the sign of economic and social development in the country. It helps in preserving and developing the historical and cultural heritage of the nation. Similarly it helps in producing competent manpower in the global context and it encourages and promotes research in the different areas of education. (2018, p. 96)

As the development of any kind depends on the education, particularly higher educated stated in the extract, students without the computer literacy are considered uneducated and incompetent for the job market. Therefore, the higher education must incorporate the larger portion of the syllabus about the computer application. The validity of modern education relies on the quality education that is induced with computer and technology. The computer literate human resources are sought after everywhere in the global market in almost every profession ranging from corporate world to manufacturing companies. The importance of interaction for learning is widely acknowledged and there is an increasing literature on both the benefits of computer conferencing to learners in practice and on the processes involved in online discussion and the part this plays in the joint creation of common knowledge (Mercer, 1995). Mercer's categorization of talk has most often been applied to classroom situations.

The virtual space created by shared simulations and video communication tools help to support collaborative work between people at a distance. They report on an experiment where subjects use a virtual space to work on a difficult statistics problem, establishing that the virtual space is effective and report on the subjects' understanding of statistical and experimental concepts which they display while working in the distributed environment. The UNESCO report in 2012 about Education for Sustainable Development shows that:

- It is based on the principles and values that underlie sustainable development.
- Deals with the well-being of all three realms of sustainability – environment, society and economy
- Promotes lifelong learning
- It is locally relevant and culturally appropriate
- It is based on local needs, perceptions and conditions, but acknowledges that fulfilling local needs often has international effects and consequences
- Engages formal, non-formal and informal education
- Accommodates the evolving nature of the concept of sustainability
- Addresses content, taking into account context, global issues and local priorities
- Builds civil capacity for community-based decision-making, social tolerance, environmental stewardship, adaptable workforce and quality of life
- It is interdisciplinary: no one discipline can claim ESD as its own, but all disciplines can contribute to ESD
- Uses a variety of pedagogical techniques that promote participatory learning and higher-order thinking skills (Aleandria, 2015)

Discussion

This article has brought multiple sources of information on computer application and higher education and has put them into a perspective that computer application commends the quality of higher education in universities and colleges of Nepal. Marina Papastergiou (2009) has mentioned that data analyses show that the gaming approach is both more effective in promoting students' knowledge of computer memory concepts and more motivational than the non-gaming approach. Despite boys' greater involvement with, liking of and experience in computer gaming, and their greater initial computer memory knowledge, the learning gains that boys and girls achieve through the use of the game do not differ significantly, and the game is found to be equally motivational for boys and girls. The results suggest that within high school CS, educational computer games can be exploited as effective and motivational learning environments, regardless of students' gender (Papastergiou, 2009). Computerized games hold significant positions in students' education. When the students learn things through games and plays, they find them fun to learn. They can easily grasp things intensively and their knowledge on diverse topics expands dramatically.

Games play a central role in young people's lives outside school holding a special fascination and provoking a deep sense of engagement in them. Essential game characteristics that contribute to this engagement are challenge, fantasy and curiosity. Young students' intrinsic motivation towards games contrasts with their often noted lack of interest in curricular contents. The challenging world of games shapes students' cognitive abilities and expectations about learning, making scholastic content and practices seem tedious and meaningless, and creating a dissonance between formal education and the digital, informal learning environments that students experience outside school. However, the motivation of games can be combined with curricular contents into Digital Game-Based Learning (DGBL).

Games that encompass educational objectives and subject matter are believed to hold the potential to render learning of academic subjects more learner-centered, easier, more enjoyable, more interesting, and more effective. Particularly games constitute potentially powerful learning environments for a number of reasons: i) they can support multi-sensory, active, experiential, problem-based learning ii) they favor activation of prior knowledge given that players must use previously learned information to advance iii) they provide immediate feedback enabling players to test hypotheses and learn from their actions iv) they encompass opportunities for self-assessment through the mechanisms of scoring and reaching different levels, and v) they increasingly become social environments involving communities of players. New modes of learning based on information and communication technologies have emerged in recent years and become increasingly used in schools. DGBL is motivational and effective with students not only compared to traditional educational practices, but also compared to those modes.

Shazia Mumtaz (2001) mentioned that the findings indicate that children tend to use computers at home more often than at school. The activity that all children liked the most on their home computers was gaming. At school, the activity that was most common but considered dull by students was word processing. Out of five primary schools, only one uses information technology less than twice a week in lessons. This means that students in these classes get minimal exposure to IT education and not enough time to apply what they've learned in other areas. The computer that many children at home use is a gaming console, and they find school computer use less engaging. In school, computers are mainly used for basic drills and practice programs, which students find lengthy and uninteresting. Research has shown that while secondary school students have more access to computers at home than they do at school, the educational benefits they get from home computers can be influenced by social inequality.

Studies have revealed that students have more access to technology at home than their teachers might think, and more than what schools provide. Hollingsworth and Eastman (1997) discovered that many children not only have home computers, with 60% of UK children owning one (Timmins, 1997), but also a variety of other technologies like graphics software, scanners, fax machines, and email, which are more readily available at home than at school. Schools have made efforts to keep up with technology, but access remains restricted. Further research has shown that although children have greater access to home computers, social inequality can affect how often they use them at home and how they use them, which in turn can impact the educational advantages they gain from home computing.

Schools have shared data on students' test scores, and parents have provided details on their family's income, job etc. Students were questioned about their grades, how often they talk with their parents about school, their understanding of educational topics, and the presence of educational materials at home. Through statistical analyses, it was determined that owning a home computer is linked to higher scores in math and reading, even after considering family income and cultural/social background. However, children from wealthier families saw greater educational benefits from home computers than those from less affluent backgrounds. Boys showed a greater advantage in academic performance than girls. The few students who used computers for educational purposes had parents who were highly involved, helping to select suitable software, guiding their child with the computer, working together on assignments, and offering both praise and practical help. In the majority of families, this kind of parental support was missing, and children focused solely on playing computer games.

Kids in grades 3–5 created artworks depicting the computer as a device for work. These youngsters positioned their computers in settings related to work and school rather than home, with the most common use of the computer, as seen in their art, being word processing. The younger kids in kindergarten through second grade viewed the computer more as a gaming device and placed their drawings in either a home or school environment. Teachers also vary in their views and applications of computers in the classroom. This study looks into how children see and use computers in primary schools and at home;

understanding children's views could influence teachers' strategies for effectively using computers in the classroom.

Xiujuan Yuan and Qiang Zheng (2024) have explored how technology impacts students both in school and at home. Using theories on gamified machine learning and interactive feedback, their study thoroughly examines how the gamified interactive intelligence model improves over time, offering both theoretical and practical insights for studying the effects of gamified learning on student engagement and behavior in online courses. The findings indicate: (1) as the number of gamified learning examples increases, the iterative loss function's value decreases, recognition accuracy improves, and it converges and stabilizes after 500 training iterations; 800 examples can fully satisfy the network's training needs. (2) The gamified machine learning model, built with the suggested joint algorithm, reduces training error and introduces a significant change function to enhance data processing.

Through gamified machine learning theory and interactive feedback theory, the study delves into the procedural enhancement of the gamified interactive intelligence model, providing theoretical and practical foundations for analyzing the interactive impact and student behavior in online courses that incorporate gamified learning. The results show: (1) with more gamified learning examples, the iterative loss function's value decreases, recognition accuracy improves, and it converges and stabilizes after 500 training iterations; 800 examples can fully meet the network's training requirements. (2) The gamified machine learning model, constructed with the proposed joint algorithm, reduces error during training and introduces a significant change function to enhance data processing.

The game enables students to examine the process of identifying compound names through a novel educational approach, and studies have demonstrated that this method enhances students' learning performance, increases their knowledge retention, and improves the game's role as a supplementary educational tool, leading to a more effective teaching approach. Furthermore, students' engagement in learning chemistry has seen a notable boost. Research on the 3D Neural Learning Network Learning System has revealed that the game's immersive and conceptual aspects, particularly VR technology, aid in understanding chemical compounds and enhance perceived usefulness and ease of use, which in turn influences students' intentions to utilize the VR educational system.

Steffi Domagk et al. (2010, September) explored the connection between human actions and computer behavior. The Integrated Model of Multimedia Interactivity (INTERACT), developed by Domagk and colleagues, is composed of six main components that together form a comprehensive system: the learning environment, behavioral activities, cognitive and metacognitive activities, motivation and emotion, factors related to the learner, and the learner's mental model (which includes learning outcomes). The INTERACT model, by proposing a network of interconnected elements that make up interactivity, helps to organize current research findings and guide future studies. Research findings can be categorized based on the model's six components, making it easier to

compare which components are addressed in a specific study. The use of the model offers a structure for in-depth comparisons that underscore the similarities and differences between them.

Computer Application in Education of Nepal

The status of computer application in education of Nepal as accorded by Shailendra Giri (2020, November) has its relevance to the COVID-19 pandemic when most of Nepalese students were deprived of onsite education due to the home confinement obligation imposed by the government of Nepal. During the pandemic, the use of Information and Computer Technology (ICT) rapidly increased. It still continues to expand its scope particularly in educational institutions. Most of the people have taken advantage of the ICT tools and applications. Teachers and students have started teaching and learning since then. The role of ICT tools and application in refining the quality and quantity of teaching and learning process has become vital and pervasive. There has been a shift from traditional mode of teaching and learning to the modern one.

Numerous studies show that during COVID-19, the ICT tools and applications have played an important role in online education. The students who could have been deprived of quality education have benefited from the online classes, exams, and results processing and evaluation. Most of the students use ICT tools to accomplish their assignments, reports, project work, and share with their teachers through social media including Viber, Messenger, Whatapps etc. According to Giri (2020), technologies both software and hardware pique the interest of educators and learners. Modern technologies offer a lot of potential to enhance educational procedures. Technology helps teachers and students in the teaching and learning process. ICT has fundamentally altered education by transforming how learning is processed through technological means. Communication between instructors and colleges in the classroom is now possible because to modern computer technologies.

Following the Covid-19 pandemic's effects on the nation, online learning has become incredibly popular in Nepal. All academic institutions are required by law to stop allowing students and professors to physically attend classes. The only option available to continue the teaching-learning process in this scenario is online education. Teachers are instructing students who are remaining at home from their place of abode. Various online technologies such as Zoom Cloud Meeting, Google Meet, Google Classroom, Microsoft Team, Skype, and others have been utilized for remote education. Teachers utilize desktop and laptop computers for instruction, while students use the same devices—desktop, laptop, or smartphone—for online learning in real-time while receiving instruction from the teachers.

Conclusion

This article has investigated into the important and application of computer in education sector of Nepal. How ICT has contributed to the education system especially the post pandemic education in Nepal has been the focus of the paper. By employing the

qualitative research design, the paper has explored the multiple uses of ICT in education ranging from online classes, to the examination conduct. The paper has been written based on the secondary data from print and electronic libraries to assess the effects of computer applications on Nepal's higher education system. The article has been designed to illustrate the connection between computer applications and higher education in Nepal by utilizing a qualitative research approach. Those who cannot pay the costs have not been able to obtain education because of the influx of students into Nepal's colleges and universities. In addition, many young people appear to be denied access to university degrees because the state does not provide the necessary funding for higher education.

It has been shown that learners tend to choose technology that they are more accustomed to using, such audio/video conferencing tools, over other types of tools. Due to a dearth of indigenous research on new technologies in the educational sector, underdeveloped nations including Nepal have found it difficult to implement the education revolution. Nepal has a great chance to alleviate profound structural inequality by implementing a radical reform of education.

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