



Enhancement of Education 4.0 in Nepal: A Review from School Level Technology Change

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Abstract

Background: The transition in the education system was parallel to the humankind and the technological revolution has been increasing issues in the education system around the globe. The shift in education system tends to understand how learning styles of students affect education quality with completely different forms of e-learning. Education 4.0 tackles society's desire in the 'innovative age'. Such education training will demonstrate the ability of the learner to use the latest technology to help the learner adapt as per the changes in society. Students in education 4.0 become more self-reliant in their own education, pressuring educators to accept a new function as administrators who might influence the learners across their education process. This paper aims to explore pandemic as a driver of enhancement of Education 4.0 in Nepal in terms of school level technology change. The paper applies the thorough review of the literature on Education 4.0 in wider perspective as well as in Nepalese context.

Objective: This paper aims to analyze the enhancement of education 4.0 in Nepal in terms of review from school level technology change.

Results: It is observed that education 4.0 is a very necessary reform in the education system in Nepal. The major need of the time is the upliftment of the education sector from the traditional ones and makes the implementation of education 4.0. It helps in the improvement of digital competencies in all level, and the use of digital technologies for teaching and learning. The research regarding the changes in the education system has been conducted in various nations around the globe.

Conclusions: It is found that the learners mostly prefer those technologies with whom they are more familiar such as use audio/video conferencing technologies rather than any other tools. Education revolution is not an easy task for the developing countries as there is a lack of local research regarding the new technologies in educational sectors. Nepal has tremendous opportunities to drastically reform education in an offer to address deep structural inequalities.

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Introduction

The transition in the education system was parallel to the humankind as well as the technological revolution as there has been increasing issues in the education system around the globe (Frediani, Galietta, Mosci, & Ploedler, 2005). In this dynamic world, it is important to examine each instructor's and learners' perceptions of technological change, as a result of which it is assumed to affect the quality of learning and interaction between learners and teachers (Eyyam, Meneviş, & Dogruer, 2011). The shift in education system tends to understand how learning styles of students affect education quality with completely different forms of e-learning (Wang, 2013). In modern learning environments, the future of educational systems with the advancement of technology and the emergence as well as awareness of such forces influences new educational circumstances (Yamamoto & Karaman, 2011).

The modern education system helps to learn through the new environment of social media (Mourtzis, Vlachou, Dimitrakopoulos, & Zogopoulos, 2018). The world has become interactive where the internet affects the perception of people that somehow this technological change has affected not only people's lifestyle but also the education system (Paudel et al., 2018). The development of information and communication technologies (ICT) has resulted in the education system being digitized (Tîrziu & Vrabie, 2015). The technology giant embraces the demand provided by the \$10 trillion global education market and Asia, Africa and Latin America's emerging markets which transmit heavily on mobile internet access and make up most of the global learning market by number of participants (Holon IQ, 2018).

The effects on education of these developments pose enormous obstacles (Sabir et al., 2019) for online learning teachers and students. Teaching and learning occur differently in an e-learning setting than in a traditional school, which poses a new challenge for teachers and learners working in the online learning environment (Albion, 2008). A "one-size-fits-all" approach to education does not work in the ever-changing and evolving digital age game-like approaches to learning give educators the ability to tackle young people's learning needs in ways that are more exciting than conventional pedagogies, providing young people with opportunities to develop the kind of skills required in 21st century society, and that's more like how people learn in a digital age. (Bertram, 2016). The changes within the social economy are evolving steadily where the adoption of cyber-physical systems and industry 4.0 technologies, below the teaching factory paradigm, can re-shape manufacturing education, addressing the exaggerated need for highly skilled staff (Mourtzis et al., 2018).

The IT policy initiated by the Government of Nepal in 2000, was targeted at alleviating poverty by rising the country's employment opportunities (MoE, 2017). One of the key aspects of this program was to incorporate IT into educational institutions, record information from the government on a database, and disseminate information via websites. It also stressed the awareness of time. The virtual divide has made several educators who may have access to new technology, studying better, and others who have no access to new technology poorer. For the emerging and prompt need of the Education 4.0 to be applied in teaching-learning practices of Nepal, this study places wider significance. So, this paper tries to analyze the enhancement of education 4.0 in Nepal in terms of a review from school level technology change.

The structure of the paper as follows: the section 2 provides literature review with theoretical debate and discussion. Section 3 provides the discussion of the study and, section 4 draws the conclusion.

Review of Literature

Evolution of Education System

The education sector is experiencing a change right now in the accelerated scientific and technological developments, today's society has undergone an immediate increase in digital knowledge and

constantly changing and emerging technologies (Goldie, 2016). Digital technologies such as smart phones, mobile devices, platforms for creating and distributing digital media, video games and social networking sites are changing the way we think of school and studying. School systems based by age-grading, conventional curriculum scheduling, approved specialist certification and long-standing funding structures have struggled to adopt new technologies for learners (Issue, 2010). The development of the Internet from Web 1.0 to Web 2.0 to Web 3.0 and now Industry 4.0 can be used as a model for shifting, improving and transforming curriculum from Education 1.0 to Education 4.0 as well (Gerstein, 2014). Before discussing widely on Education 4.0, it is relevant to talk about other preceding education system: Education 1.0, Education 2.0 and Education 3.0. Education 1.0 was attributed with the early year's education practices that was confined to a few privileged people. The studying content material had been largely encouraged by using spiritual teachings and executed via very informal techniques (Sulaiman, Suid, & Mohd, 2019). The teachers were authoritarian whereas the passive beneficiary was the student. It is a teacher-centered system in which the teacher provides knowledge in the school environment making technology prohibited as the absolute leader (Makrides et al., 2019). Now, Education 2.0 emerged when the Internet 2.0 tools were used to improve existing learning methods. Education 2.0 encompasses the use of websites, podcasts, social browsing and associated technologies for inclusion, but the situations in which the innovations are used are still largely integrated in Education 1.0 (Keats, 2014). Education 3.0 dealt with the 'technology society' need. This develops awareness by promoting self-learning. During this era, education utilizes learning technologies in forms of instructional materials, physical media, and social media. It is tailored to collaborative learning (Puncreobutr, 2016).

Education 4.0

Education 4.0 tackles society's desire in the 'innovative age'. It is in line with improving society with the unique features of parallelism, connectivism, and visualization. Such education training will further demonstrate the ability of the learner to use the latest technology to help the learner adapt as per the changes in society Goldie (2016). Sinlarat (2016) claimed that this era's education system is a new learning system that allows learners to evolve across their lives with knowledge and skills, not just know how to read and write (Puncreobutr, 2016). It is a center for co-creation and innovation where learning is done at home or outside school, while learners develop skills in school. This aids in customized teaching and learning growth. The technology is free or/and easily accessible, but with continued growth and progress, the growing use of virtual reality and therefore a need for ongoing training and the development of new knowledge and skills by all. Planning for schooling is now labeled plans for creativity (Makrides et al., 2019). Students in education 4.0 become more self-reliant in their own education, pressuring educators to accept a new function as administrators who might influence the learners across their education process. This Education 4.0 trend transfers the primary academic obligations from the educators to the learners to help the change, teachers will play their positions, and should never find it a challenge to the traditional teaching profession (Hussin, 2018).

Education Revolution in Nepal

Traditionally geared towards the Indian method, the Nepalese education system was classified as the three-tier sixteen-year education system: 10 years of primary and secondary education, accompanied by 4 years of college-level studies and 2 years of master's study. (Nuffic, 2015). Throughout recent years, several government schools have embraced new technology to bring improvement to current teaching strategies throughout classroom teaching and learning. The Department of Education under the Ministry of Education is currently working with Open Learning Exchange (OLE) in a total of 225 primary schools in 34 districts since launching with two schools in 2008 (OLE, 2015).

There has been a long history of the community-driven school system in Nepal. The establishment of the first Rana prime minister at his palace of an elementary English school, now commonly known as

the Darbar School, started in 1853, but education in Darbar was largely restricted to the 21 members of the Rana dynasty, their relatives and the children of the bureaucratic class (Ministry of Education, 2016). Recently, Nepal's government initially launched a (Nepal Ministry of Education, 2015) School Sector Reform Plan (SSRP 2009-2015), a long-term plan of action to promote fair accessibility to and standard of school education, to improve the quality and importance of school education, and to enhance administrative ability to deliver educational services effectively. The SSRP puts emphasis on fundamental reform in four fields including education system composition, service quality, school administration, and investment management (Ministry of Education, 2016).

Status of Education System in Nepal

According to UNICEF (2018), the Nepalese School System composition is constructed in four different layers; the primary stage starts at class (1-5) and requires students from (5-9) years of age to achieve primary schooling. Lower secondary category varies from class (6-8) to (10-12) year old Secondary level applies to class (9-10) and Higher secondary level refers to class (11-12) of age range participants of (13-14) and (15-16) respectively. The society now accepts pre-primary and early childhood education (ECE), but they're not part of the structured school system.

The framework of the education system has been modified to ensure that the public has the right to education and to react in line with the country's regional distribution and settlement trends. According to this study, the standard of basic education is split into three parts: the level of the foundation school (class 1-3), the level of the primary school (class 1-5), and the level of the upper primary school. Additionally, secondary school will be split into two parts: secondary (Class 1-10) and upper secondary (Class 11-12 or 9-12). However, the school with classes 11 and 12 or 9-12 will be prevented while classes (1-10) will be motivated with the opportunities to pursue vocational education (Nepal Ministry of Education, 2015).

Content Review on Nepalese Education System

Education is the fundamental right of every human being. There are majorly two types of schools providing education in Nepal which are government schools and private schools. The debate in the education system is regarding the quality of education bring provided by these two institutions in Nepal (Parajuli, 2019). The debate on decentralization in Nepal has been going on for more than a decade now, especially about the education sector, with parents completely abandoning public schools in favor of private ones. In many academic and high-level policy debates, a decentralized approach to development has also been emphasized in education policies and their management. The rise of social media has made students outside the capital have a bitter realization that the gap between schools there and in the capital is far wider than they imagined. The gap is not limited to the level of education they have gained in their educational institutions: there is a massive lack of activities that can be embraced outside the school curriculum (Arjun Bhattarai, 2019).

Indeed, the government's decision to open a technical school at every local level to produce a competent workforce is commendable. Technical and vocational education must include less theoretical knowledge and more practical work. Further practical work will lead to more experience (Neupane, 2019; Maharjan et al., 2020). In the recent policy announced by Nepal government "Technical education for all" is one of the salient features of the policy. Under this concept, the government will provide technical and vocational education and skill development opportunities to all the interested ones by strengthening institutional capacity of agencies concerned (Himalayan News Service, 2019).

The major need of the time is the upliftment of the education sector from the traditional ones and makes the implementation of education 4.0. It helps in the improvement of digital competencies at all the level, and the use of digital technologies for teaching and learning. This education will be something unique where we can access from anywhere anytime. We can think about why/where instead of what/

how. Education 4.0 enables students to adopt real-world skills that are representative of their jobs (Gyawali, 2018).

Further, the major gap of our education system is that it never lets us think outside the box. As our education system ensures that we only gain paper knowledge and paper degrees, but nothing real. There is a huge gap in the system of capital and outside. Students who move to the Capital for higher education are not as exposed to the use of technologies and advancements like the ones in the capital which they often find challenging and a completely different academic culture (Arjun Bhattarai, 2019). It is due to the investment made by the government on teachers of community schools that has largely remained unproductive. The teachers in the community school should focus on the capacity building of the students than any other factors. Furthermore, Bidya Nath Koirala, an education expert, argues that the step taken by the government would have been more appreciable if they had emphasized technologies rather than teachers (Republica, 2019). Despite the efforts made in the past, there still is an absence of improvement in the quality of education that is currently being instructed. Moreover, the research and practical approaches to learning are completely missing from our education system (Ram Prasad Marasini, 2018). It is such that some courses included in the curriculum have been designed in such a way that it is hard for the instructors to teach the basic technical part because many basic things which should be known are missing (Neupane, 2019). In this context, the community schools and the private schools need to be maintained to the same level where the old technologies of community school need to be replaced and updated with the same level as any private schools (Service, 2019) as improving the government school education will put an end to the traditional way of producing students with two qualities (Parajuli, 2019).

Contextually, the government, education specialists and policy-makers should come under the same roof and work as a catalyst to implement Education 4.0 for Nepal. This is the next big opportunity of empowering young talented minds to develop fuller competencies, skills, and knowledge and of unleashing their creative potential which is the only we can imagine a better and innovative Nepal (Gyawali, 2018).

Theoretical and Conceptual Debate

The significance of the study in technology acceptance can be based on the human behavior and trend in the technique of decision making on the use of an innovation or technology (Otieno, Liyala, Odongo, & Abeka, 2016). The theories are based on the adoption of the technology in education system such as the theory of reasoned action, the theory of planned behavior, the decomposed theory of planned behavior, experiential learning theory.

Theory of Reasonable Action states that it helps to understand the statutory actions of an entity by evaluating the implicit fundamental motive for action. It specifies that even the purpose of an individual to achieve an action is the principal indicator of how they are performing that behavior (Lai, 2017). It considers adoption as a testable prediction that is essential to lead study of technological innovation's acceptance. The theory can be used to conceive the pattern of human behavior in the decision-making process involving the use of an invention or technology (Otieno et al., 2016).

Theory of planned behavior and the decomposed theory of planned behavior focuses on the identification of beliefs and factors that influence the 3 determinants of behavior, specifically attitudes, subjective norms, and perceived behavioral control. Forms alongside the behavioral actions and behaviors of an individual, a key aspect of the planned behavior method, is the aim of the participant to implement a defined behavior (Collins, Witkiewitz, & Larimer, 2011). Similarly, decomposed theory of planned behavior is designed to explain user behavior focused on the relation between values, perceptions, purpose, and behavior. According to this model, perceptions, social expectations and assumed behavioral influence are components that promote understanding of the causes or influences that justify individual actions, even if the motive is considered the best predictor of behavior (Sahli & Legohérel, 2014).

The experiential learning theory deals with learning through reflection. Experiential education could be a wider teaching concept, experiential learning recognizes the human form of education as such, opposed to experiential schooling, experiential learning is dealing with a number of practical learner-related problems. (Armstrong & Fukami, 2009). Experiential learning is the method of information development through the integration of experience and has been embraced in a growing number of fields (Lai, Yang, Chen, Ho, & Chan, 2007). Lastly, capabilities approach defines growth as "a way of increasing the essential freedoms enjoyed by individuals". This is often achieved by supplying people with greater capacities, described by Sen (1985) as 'alternative functioning,' which are essentially the varied possibilities or options that an individual has for himself (Saito, 2003).

The significance of the Theory of Reasoned Action for education research is that it enables an investigator to both predict behavior as well as explain the underlying motivation for its occurrence, provided that consistency is maintained in the level of specificity of the target behavior, behavioral intention, attitude, and subjective norm (Koballa, 1986). The theoretical structure linking these concepts is causal. Behavioral beliefs and evaluation of the outcomes influence the formation of an attitude about performing a behavior (AB). Normative beliefs (nbk) and motivation to comply (mck) shape the subjective norm (SN), i.e., social support for performing a behavior. Attitude toward the behavior and subjective norm mutually influence intention, though not necessarily to the same extent for each individual or behavior. Behavioral intention in turn is the best predictor of behavior. The Theory of Reasoned Action links beliefs with attitude toward the behavior (AB), beliefs with subjective norm (SN), attitude and subjective norm with behavioral intention (RI), and behavioral intention with behavior (B) through the following equation (Crawley & Coe, 1990).

Moreover, the given framework shows the relationship of all the factors associated with the adoption of the technology in education. It shows the relationship of dependent, independent and the mediating variable. The independent variable includes perceived usefulness, perceived ease of use and attitude. All these independent variables are used to know about the perception of the respondents to the acceptance of technology in education. There is a mediating variable called learning environment which has an impact on both dependent and independent variable. The learning environment is called as mediator as it helps to know whether the environment provided to the teachers and students impacts on the perception of respondent for the acceptance of technology in the education system. The dependent variable is the behavioral intention of the teachers and students regarding the acceptance of technology in learning process.

Discussion

From the literature review, it is observed that education 4.0 is a very necessary reform in the education system in Nepal. The major need of the time is the upliftment of the education sector from the traditional ones and makes the implementation of education 4.0. In this regard, Mourtzis et al. (2018) argues about the Education 4.0 for transferring traditional teaching practice to integrating Cyber- Physical Systems in line of Industry 4.0 technologies that help to serve as an introduction for the aspiring engineers to the newly developed and implemented technologies, so bringing new and experienced workforce. It helps in the improvement of digital competencies in all level, and the use of digital technologies for teaching and learning. This education will be something unique where we can access from anywhere anytime. We can think why/where instead of what/how. Education 4.0 enables students to adopt real-world skills that are representative of their jobs. There has been different national and international policies and guidelines made for the upliftment of the education sector. Some of the policies are SDGs, ICT Master Plan, IT Policy 2010, UNESCO Education Guidelines, UNICEF Guideline and many more.

The study conducted by (UNESCO, 2019) suggests that Open Mode / Open School / Open University and e-learning frameworks ultimately help intermittent students and students from remote areas as

well as staff willing to pursue Open and Distance Education (ODE) policy framework for higher education in Nepal (Distance learning policy, 2063) and the 10th Five-Year National Development Plan (Government of Nepal National Planning Commission, 2002) stressed the need for an Open University to enable maximum access to higher education. A study (Pangeni, 2017) reports that 29,841 students from Nepal enrolled in one or more courses and 296,031 sessions were conducted in Nepal and 750 courses were taught by Nepali students and Nepal ranks 31st out of 250 countries participating in the courses offered by the ALISON. In such scenario, Nair and Das (2012) have talked about their findings of research on teachers' perception about the usefulness of computers and software provided by the government for teaching mathematics is significantly affected by the perception about ease of use.

To solve or bridge the void, the government must base its efforts on the education system and begin to improve it from ground zero. It is necessary to maintain community schools and private schools at the same standard where the old community school systems need to be modified and upgraded at the same pace as the private schools are. State, education professionals, and policy-makers will come under the same roof and act as a catalyst for Nepal's adoption of Education 4.0. For such argument, Vululleh (2018) discussed that successful implementation of e-learning in Liberia is be popular among students and such popularity is based on behavioral and social factors. Therefore, it can be said that it is the next great opportunity to inspire young talented minds to learn more competencies, skills, and knowledge and to unlock their creative potential that is the only one we can see a stronger and inventive Nepal.

The major gap of our education system is that it never lets us think outside the box. As our education system ensures that we only gain paper knowledge and paper degree, but nothing real. The investment made by government on teachers of community schools has largely remained unproductive. There has been advancement in the technologies, but our educational institutions still focus on the theory classes rather than on practical knowledge. The government, education specialists and policy makers should come under the same roof and work as a catalyst to implement Education 4.0 for Nepal. This discussion is substantiated by Xing et al. (2015) contention about the Massive Open Online Courses (MOOC) that has raised the chances of increasing access to higher education and learning, which, in turn, has increased the motivations to student's learning activities. In this regard, this is the next big opportunity of empowering young talented minds to develop a fuller competencies, skills, and knowledge and of unleashing their creative potential which is the only we can imagine a better and innovative Nepal.

Conclusion

The research regarding the changes in the education system has been conducted in various nations around the globe. It is found that the learners mostly prefer those technology with whom they are more familiar such as use audio/video conferencing technologies rather than any other tools. Similarly, it is concluded that the use of most technologies is not considered due to the limitation or no information about those technologies (Eyyam et al., 2011). The changed and the advancement in the technologies needs to be updated and proper information regarding these factors needs to be given to the learners because, a study (Rosen & Nelson, 2008) has revealed that the advancement of technologies can be transformed into the constructivist classroom which is interactive, participatory, adapting, living organism of learning and generating content. These sorts of transformation can be a positive impact on students' satisfaction which will have an impact on the grades of student (Martin Ebner, 2011).

It is believed that new technology-based education system helps to develop a personalized integrated educational system (PIES) which will facilitate in implementation of new paradigm, learners centered approaches. It encourages open source and distributed development that reduces costs, but the developed technologies and its push will require funding. Similarly, a study conducted on Education 3.0 indicated that most college students in standard shared very similar mastering possibilities to this

study based at the characteristics of those mastering patterns, it indicated that the diverge students are those who are interested in people. Eventually, students strongly agreed or agreed that they have been delight with new coaching once they discovered at school(Wang, 2013).

Education revolution is not an easy task for the developing countries as there is a lack of local research regarding the new technologies in educational sectors. The developing countries fail to catch up with paradigm shift and system compabilities (Kundi & Nawaz, 2014). According to (Pherali, 2013) Nepal has tremendous opportunities to drastically reform education in an offer to address deep structural inequalities. The technologies are advancing in a quick phase which has additionally added revolution in industries and so that you can cope up with the changing demand in marketplace the training device has additionally modified in phrases of connectivity and data control, new environment for information sharing and training with a view to help to deliver a modern-day and experienced employees on top of things with the modern proposals of Industry 4.0, creating a sustainable environment with the intention to accelerate its adoption in manufacturing (Mourtzis et al., 2018).

Conflict of Interest

Author(s) declares no conflict of interest.

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