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Competency of Teachers and Application of ICT in the Instructional Processes: A Case of Community Schools of Nepal

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Abstract

This study explores the competency of teachers from community schools of Nepal for the adaptation of Information and Community Technology in the instructional processes. The use of technological tools i.e. computer, mobile, projector, printer, learning apps, e-library etc. in the instructional process has critically been analyzed in this study. I used case study method and interpretative inquiry for this study. The study explored that there is the ICT-friendly policies and programs in Nepal but teachers' competency seems to be improved to extend opportunity for students to access ICT-instructed teaching and learning.

Keywords: Community Schools, ICT, Instructional Process, Teachers' Competency, Technological Tools,

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Introduction

Setting the Scene

The belief of the people in my community was that technology in Education is only the skills of computer operation. It is still fresh in my mind that I got an opportunity to put my fingertips on the key board of computer in 2006. One of my friends and I myself went to a newly established privately run computer institute to learn computer in Melamchi, the local market of Sindhupalchok district. I should have paid NRs. 3000 per month which was 50% of my monthly salary. I should have worked 90 hours to earn the same amount of money that the institute used to charge for 15 hours. The general mindset that I made at the time that technical education was more important.

The very first day, the instruction of facilitator to place fingers on the keys of the keyboard and practice to move fingers in different keys He used to move fingers in different keys in such a speed and type the letters that it was beyond my imagination. The sound of the keyboard while moving the fingers made the feeling that the typing speed was even faster. *Typeshala* was installed in the computer. The class began with the finger placement and typing practices on *Typeshala.*

The basic course was designed for three months. After practicing *Typeshala* for around 15 days, I kept thinking that I know much about computer as the speed of my typing was gradually increasing. The instant result of the speed of the typing per minute used to appear in the screen of the desktop of a big white computer that used to encourage me more to practice. This was the beginning of learning computer in my life. Similarly, mobile phone, internet that time was beyond my imagination. Few of the people used to have mobile phone, the old version. I was overwhelmed when I had Nokia 3310 for the first time. It was around 12 years back. The cassette players and radio were very much popular in the community as an electronic media. The community schools hardly used to have computers when I used to teach in the school in around a decade back. Teachers didn't have cell phone. Schools used to have big cassette players and some cassettes of songs, English listening text. However, they were in minimal practices. The cassette mostly allowed to use for practicing the singing and dancing in the schools.

There is a revolution in Information and Communication Technology (ICT) in a decade. Smartphones are in the hands of more than 75% of people in Nepal. People have the access of 3G and 4G services. MIS report (2018) of Nepal Telecom Authority status that around 10 million people in Nepal use 3G and 2 million people have access of 4G services. 63% population of Nepal have internet access and Internet is available at home, community and many schools. The data of Center of Education and Human Resource Development (CEHRD, 2018) shows that around 10,000 community schools have computer lab which comprises 28% of total schools in Nepal. Similarly, around 12% of the schools have internet access Department of Education (2016) presented that there are ample of online-offline teaching and learning resources are designed and developed which is open and free. Online classes, virtual classes and many other advance technologies are available in the market. In terms of accessibilities of technologies, the students these days have access to technological tools at home as well as in school. However, application of them in the teaching learning processes and the dimensions such as accessibility of ICT-friendly infra-structure, ICT tools, learning resources, confidence and confident of teachers, adaptation of ICT etc. are to be explored in the researches. The schools those were selected as my case for study had separate computer lab, two of them had internet connection (although unstable) as well as other learning resources. There was the schedule for teaching and learning computer skills as well as teaching through the application of ICT tools. As my study was concentrated to explore the teachers' competency and application of the technological tools, those schools were selected so that I could get answer of my research questions.

Technological Advancement

Technology advancement has influenced the day to life of people. Technologies have been the part of the people in every sector. To talk to the day to life, smartphones are accessible to many people. Urban and Semi – urban setting has the internet access. 3G and 4G services has being expanded. MIS Report of Nepal Telecom Authority (2017) shows that there is tremendous growth of internet service and reached upto 52% from 2.5% within 7%. The mobile phones are in hand of more than 75% of Nepali people. There is increasing access to internet and e-resources in the education sectors. Smart board, virtual classroom, distance learnings are also in practices. The changes and improvement are quite remarkable, and the trend seems to be expanded more.

Government of Nepal has prioritized the integration of Information and Communication Technology (ICT) in Education. It has been expressed through different policies and Program; National IT policy (2010, 2015), 10th plan (2002-2007), Three Years Interim Plan (TYIP, 2007-2010, 2010-2013), School Sector Reform Plan (SSRP, 2009-2015). ICT Education Master plan (2013-2017). Most importantly, the recent education programme School Sector Development Programme (SSDP, 2016-2023) has incorporated 'application of ICT' as a cross cutting theme which further added the values of the ICT in education.

As students, we ourselves have also experienced that technology has already changed the educators' world. The demands of the society have also been advanced and more competitive. Therefore, it is not easy to avoid the competitiveness of the students. Technology helps to teacher's transition to new role as an instructional manager. The education technology can be considered as a way of improving the teaching and learning process. The use of technology with the embedded aspects such as psychology, sociology, linguistics, communication etc. helps to brings effectiveness and efficiency in learning. Sampath, Panneersebrm and Sonthanam (2009) presented that education technology is the development application evolution system techniques and aids to improve the human learning. The idea is further substantiated by Roblyer (2003) that educational technology is the combination of the process and tools involve in addressing educational need and problem with an emphasis on applying the most current tools i.e. computer and other related technologies. The view of the scholars is associated with the application of the technology in education in different ways that make the learning easier, faster and more effective.

Technology has unique capabilities, it is helpful to link the learning to information and education, help the learners to visualize the problem, link the learner to learning tools and track the progress. Technology helps to increase the productivity of teachers in terms of time management, acquire the accurate information quickly, produce materials and keep the record. This study came to be a focused area for me to examine the understanding and practices of the teachers on the application of ICT, specifically, in the teaching and learning process.

Importance of ICT in School Education

ICT brings liveliness in teaching and learning by adding elements of vitality to learning environments including virtual environments for the purpose. ICT is a potentially powerful tool for offering educational opportunities. Jhao and Cziko (2001) further give importance of the integration in different conditions as teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology. In this regards, students these days are very demanding which is even hiked by the rapidly growing technologies.

The field of education has been influenced by ICTs, which have undoubtedly affected

teaching, learning and research (Yusuf, 2005). ICTs have the potential to accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Davis and Tearle, 1999; Lemke and Coughlin, 1998; as cited in Yusuf, 2005). UNESCO (2014) says ICT in education has a multiplier effect throughout the education system, by enhancing learning and providing students with new sets of skills; by reaching students with poor or no access (especially those in rural and remote regions); by facilitating and improving the training of teachers; and by minimizing costs associated with the delivery of traditional instruction.

ICT helps to improve and develop the quality of education by providing curricular support in difficult subject areas. To achieve these objectives, teachers need to be involved in collaborative projects and development of intervention change strategies, which would include teaching partnerships with ICT as a tool. Jhao and Cziko (2001) further give importance of the integration in different conditions as teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology.

The importance of ICT in education is further highlighted by Assche, Rifon, Griffiths, Liwin and McNicol (2015) that pedagogical innovation exists only when the approaches in teaching and learning is modified; this could be the introduction of new approaches in the existing approach. The integration of ICT in teaching learning process is an approach that gives students opportunity for discovery learning. The use of technology is in education can be seen from broad perspective. We use technology for motivating the learners, Planning, linking the learners to information and education sources, explore the solution of the problems, make the leaning participatory and interactive, increase teachers' productivity, evaluation, data collection record and analysis. Hence, the appropriate use of technology helps to achieve the goal of education. Despite the fact of realizing the importance of ICT in education, technological tools in the classrooms of community schools of Nepal are not visibly reflected.

Conventional teaching and learning practices has extensive practices in the classrooms of Nepal. Teachers have taught through lectures and presentations interspersed with tutorials and learning activities designed to consolidate and rehearse the content. The extensive benefits that information and communication technologies bring to education are undeniable. The School Sector Reform Programme (SSRP) that was implemented from 2009 to 2016 mentioned ICT in education or ICT-based education, briefly, but it failed to provide direction whatsoever on what should be the plan and how the education mechanism should address the issue. The newly introduced education programme, School Sector Development Programme (SSDP, 2016-2023) has further prioritized ICT in education as one of the major components in education system. The newly introduced education policy, School Sector Development Plan (SSDP, 2016-2023) has further prioritized ICT in education as one of the major components in school education system.

Purpose of the Study

The purpose of this study is to explore the understanding and competency of teachers about ICT and the application of the technologies in the teaching learning process. To make the study more specific, this study was centered on how teachers understand and apply ICT in instructional processes.

Theoretical Framework for the Study

I employed Technology Acceptance Model (TAM) developed by Davis (1989) in this study which explains and predicts the acceptance of particular technologies across a range of populations. TAM is one of the most widely used model of user acceptance and usage. TAM evolved from the

TRA with the goal to provide an explanation of the determinates of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified (Davis 1989). I have used TAM to study the adoption of various technologies by the teachers during the teaching leaning processes. The Technology Acceptance Model further explains that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are beliefs about a new technology that influence an individual's attitude towards and use of that technology (Davis 1989; Lai, 2017 & Mugo, Njagi, Chemwei and Motanya, 2017). Therefore, along with the adaptation of technology in instructional processes, my study had the basis of the teachers' perception about the usefulness of the technology.

Application of ICT is an innovation in educational practices which positively influences the professionalism of teachers. The competency of teachers to adapt the ICT is an essential factor. Le Bothert and Perrenond (1997 & 2000) state that processing a competence means that one not only possesses the component resource but is also able to mobilize such resources properly and at appropriate time. Ewaul (1994) opines that competence is a wide concept which embodies the ability to transfer skills and knowledge to new situations within the occupational areas. It includes those qualities of personal effectiveness that are required in the workplace to deal with the stakeholders.

The application of ICT tools in the instructional processes has been identified as an important dimension, there are various areas associated with it. The understanding of teachers, their competency and acceptance of the needs of ICT in Education is equally importance to take the ICT tools in the classroom so that the students get access to learn thorough the new innovation and practices Education. The understanding of teachers on ICT, realization of the usefulness of ICT tools in teaching learning processes and adaptation of them are major areas covered in this study so that the Technology Acceptance Model has been selected as a theoretical lens.

Methods

I employed interpretative inquiry for this study in which I analyzed and interpreted the information in the explanatory way rather than numerical. I used the devices as interviews, documents, to understand and explain the understanding and application of ICT in the instructional processes. I selected the case of competency of the teachers to adapt ICT in the instructional processes and did an in-depth analysis. Although, the predetermined case was competence of teachers, during the study I came to generate some other important areas as I considered them equally important in terms of technology adaptation in the classroom.

Selection of Participants

Participants is one of the major aspects of an entire research. It is not possible to study the whole population so that we select some participants and the participants will represent the total population. Keeping the very fact in my mind, I selected the participants for my study. Once participant was interviewed face-to-face. I interviewed this participant through telephone while transcribing the data and making meaning because I thought I could receive rich data/information answer my research question.

Participants (Pseudonyms)	Sex	Profession	Experience
Ramesh	Male	Trainer cum expert in developing and digitizing e-learning resources	18 years
Hem	Male	Principal, ICT educator	12 years
Arun	Male	Principal	5 Years
Pawan	Male	Teacher	8 Years
Uma	Female	Teacher	22 years
Sabina	Female	Government Official	6 years

A set of interview guide was prepared before conducting the interview. The interview scheduled was translated into Nepali language and Nepali language was used to do the interview. I conducted one round face-to-face interview with two of the participants and three of them were interviewed through telephone. I took interview through telephone because I could not physically approach them because of time and resource constraints. One participant was interviewed face-to-face as well as through telephone because I had thought I could receive rich data to answer my research question but while I started transcribing the data and making meaning, I felt to get more information.

I transcribed the entire recorded interview under the name of each participant. After transcription, I clustered the answer of each participant under different questions so that it was easier for me to draw the findings in each category. I interpret the data gathered through the in-depth interview and observation of the teachers. I also did the analysis, presented the finding in some themes and made the discussion on the basis of data like Smith (1992) says interpretative inquiry employs observation of social groups, in-depth interviews keeping the personal journal. He further added, the interpretative inquiry includes not only the interpretation but also the discussion.

Results

Understanding of Teachers about Technology in Education

The understanding of ICT in Education in Nepal is different. Many of the teachers, students and parents consider computer lab is only the technology to be used in teaching learning processes. Pawan, expressed, *"ICT is very important in education. we have computer lab so that teachers teach computer skills and students will get opportunity to learn computer"*. The opinion of Hem was similar as he said, *"We teach students the computer skills twice a week as we have well equipped computer lab. Furthermore, we sometimes bring nursery children and show them audio-visual materials"*.

Arun is found to have better understanding of ICT to be applied in Education. He opined, *"Computer lab, these days is considered as ICT infrastructure. ICT in education include a lot more than computers. The TV, e-learning resources, learning app, online work sheet, internet are the technologies or tools we can use in teaching learning processes"*. Ramesh, the trainer and expert to design and develop e-resources is found to have in-depth understanding of the ICT. He argued, *"ICT is unlimited but we are confined into a computer. The e-learning resources both in online and offline mode, learning moodle, online training, online network, e-library, virtual classroom, sensory devices, mobile phones, mobile app and many more are there"*.

The data shows that teachers and teacher educator understand ICT in education as teaching computer skills as well as application of ICT in academic, administrative and school governance/management. Many of the teachers still have limited their understanding on ICT within the computer lab and computer programming, although, they accept that ICT plays an important role

in entire education system. They believe that teaching computer programs is the goal of ICT. But some teachers are very familiar about the ICT-infra, ICT tools, importance of ICT, e-learning resources, ways to incorporate ICT in teaching learning activities and other areas. However, the majority of teachers do have limited understanding of ICT and its adaptation in education. Because they don't have adequate understanding of ICT tools and usefulness, they are accepting the ICT in their day to day teaching and learning. The teachers of community schools need to understand the ICT, technological tools and their usefulness, ways to adapt them in the teaching learning processes. The better the teachers realize the importance of ICT tools in Education the more they adapt them in the teaching leaning processes. Therefore, teachers still need to broaden the horizon of understanding of ICT and usefulness of ICT in instructional processes and internalize that ICT tools makes their job easier, faster and more effective.

Competency of Teachers to Adapt ICT in Instructional Processes

Adaptation of ICT in Education is not satisfactory in the community schools of Nepal and it is still in grey area. Teachers' competency is one of the essential factors to integrate ICT in teaching learning processes. Teachers' competence and confidence are pivotal to particularly imply the technology in education (Beajer & Riel, 2000 & Williams, 1993). The study explored that the technology has not effectively been adapted in the schools. Arun shared his experience of visiting school sin Kavre and Dhading district that the head teachers and teachers had limited knowledge and competency of even operating computers.

The experience of Arun is true that the competency of teachers is not as good as it is supposed to be. Hem also shared the same kind of view, *"First of all, we don't have financial resource to manage computer, internet and buy internet materials. Sometimes, some donors support us. We have five computers and even a smart board but we are not much familiar on using the equipment because the teachers are not well-trained".* It is true that when the teachers are not familiar about ICT tools, ability to operate them, the adaptability of technology in education is very difficult*".*

Uma also highlighted the objective of the integration of ICT in education and the real practice in the community schools in Nepal, *"the expectation of curriculum is far beyond the ability of teacher i.e. for grade 6-8, the objective is make the learners able to design website, create MS data base, programming but the available teachers are not well trained, they just know the basic skills*. The skills affected the adaptation other tools and resources. Sabina also added, *"Integrating of ICT is not only teaching computer skills, technology should be used for teaching learning process. The English, Mathematics, Science, Social Studies, Nepali and all the teachers should be able to apply ICT in teaching learning processes but the teachers lack the knowledge and skills".*

The responses of the participants clearly signify the importance of capacity development of teachers in terms of technology adaptation so that they are competent and the personal, behavioural and environmental determinants of self-efficiency strongly predictive and achieved for the application of ICT in instructional processes. The meaning that I made from the interpretation of the data is that the teachers are reluctant to adapt ICT because they are not competent enough. They are not confident to choose appropriate tools and blend them with their regular teaching and learning practices that is the reason why they are not easily accepting the ICT. The capacity building opportunities that the teachers are receiving are not focused on capacitating the teachers on application of ICT in the teaching and learning processes.

Challenges of the application of ICT in the Instructional Processes and Ways to Overcome

The implementation of ICT policy and programs are not encouraging in Nepal which resulted the inability to adaptation ICT in Education. Sabina as a representative of government also agreed and

told, *"There is policy provision of adaptation ICT in Education is encouraging but implementation is still below average".* The ICT education Master Plan, ICT policy, New Education Sector Plan are encouraging in terms of vitalizing the integration of ICT in Education but the policies are to implemented appropriately.

Lack of human resources (teachers with knowledge and skills of computers and other technological tools) as well as the less priority of training on application of ICT in education are the challenges in ICT adaptation. Arun said, *"many teachers in the community school are not well trained on using the technology in teaching learning processes. Similarly, the expectation of the course is not achieved by the teachers because they are not confident and competent".* Sabina, being the government official confessed that the government has brought policies but there are very few teachers those are trained on computer skills and adapting ICT. Ramesh added, *"some teachers have got computer training but very small scale of participants which is also a challenge of access to ICT in community schools in Nepal".*

The participants gave some suggestions to improve the situation of adaptation ICT in Education. Ramesh said, *"we have different geographical location which is not in our control but we can customize the product and take light weighted and less power consuming computer sets. In addition, all the teachers should be trained on technology education which is the most essential area to achieve the goal".* Arun also articulated the same as, *"Not only a single teacher should know the computer and teach computer skills but all the teachers should be well trained so that technology can be adapted for teaching learning processes".* Pawan highlighted, *"It is essential to train the head teachers and SMC and PTA on the importance of ICT so that the SMC can manage computer and other technological tools to use".*

The interpretation from the above data can be made that Nepal has good education policies and programs as well as ICT has been a priority are in Education but the major challenges of ICT adaptation are found to be the week enforcement of policy and inadequate implementation of the programs. To overcome the challenges of ICT adaptation, appropriate implementation of programs, investment in ICT infra-structure, extensive training (computer skill training and use of ICT tools in teaching and learning activities) are to be addressed. In addition, the governing body of schools have to realize the importance of ICT adaptation to improve students' learning and manage the required infra-structural facilities, ICT tools, equipment and learning resources.

Findings and Discussion

The initiatives of the ICT in education was taken by the government from some decades ago. The government incorporated the concern of ICT in parodic planning. Adaptation of ICT was reflected in the national planning of government of Nepal. The priority of ICT hiked once it was institutionalized in 1980 through the radio program. ICT Education Master Plan (2013) stats that ICT was introduced in the 5^{th} plan of government in 1956. However, it was institutionalized in 1980 with the beginning of teacher training through radio. Similarly, Ministry of Education (2013) states that there are some remarkable initiatives of currently national plan in Education to adapt ICT. They are Education for All (EFA), National Plan of Action (NPA, 2001-2015), Three-year plan (2011-2013) and School Sector Reform Programme (SSRP, 2009-2016). The ICT Education Master Plan has been prepared with the foundations of such initiatives. The current Education programme of government of Nepal has vitalized the application of ICT in Education through putting the application of ICT as a cross cutting theme.

Although, majority of the people are found to have the understanding of ICT as computer lab, people's perception and understanding is being changed. Some people go beyond the computer lab

and perceive ICT as the combination of hardware and software attributes. Blurton (1999) as cited in Kinaanath (2013) defined ICT as diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony. In addition to the knowledge of ICT, people believe that ICT has great impact to bring quality in education. ICT is even helpful to improve access to education, make the educational services and teaching learning activities more effective and ultimately improve the learning achievement of students; UNESCO (2014) says ICT in education has a multiplier effect throughout the education system, by enhancing learning and providing students with new sets of skills; by reaching students with poor or no access (especially those in rural and remote regions); by facilitating and improving the training of teachers; and by minimizing costs associated with the delivery of traditional instruction.

The adaptation of ICT in the school education in the community schools has not been found adequate because of various reasons. In spite of realizing the importance of ICT to bring quality education, it is not adapted as expected. There are five major characteristics that determine the rate of adoption of innovation are relative advantage, compatibility, complexity, trial ability, and observability (Rodger, 2003). The application of ICT is affected because of the less understanding of people on its advantages, complexity in terms of location and operation and capacity of the people.

SSDP (2016-2023) brings some strategies to improve the application of ICT in Education. The suggested strategies are training to the teachers on the use of ICT in teaching and learning. Similarly, develop online and offline training courses and materials, prepare ICT teaching and learning materials, develop and distribute subject-wise e-learning resources for students and teachers and establish a repository of them, strengthen school governance and management through a strengthened EMIS and enhanced use of ICT to improve the EMIS and implement a unified accounting software. Public Private Partnership is another way to increase the use of ICT through strengthening the infrastructure development as well as other components of the plan. Private sectors can be encouraged for infrastructure development and training. Mustonen-Ollila & Lyytinen, 2003 suggested that social side is important in order to understand the process of ICT adoption in school education, more specifically to explore the access to ICT and the challenges to adapt ICT in the schools.

The study was carried out with the theoretical ground of Technological Acceptance Model (TAM) which talks about acceptance of technology and mostly explains the behavior of user. I strived to explore the behavior of teachers to adapt technology in teaching learning processes. I found that the limited understanding of teachers on ICT. In addition, the competency of teachers on identifying, selecting appropriate technological tools and applying them in instructional processes is not as effective as expected. The teachers have not adequately adapted ICT tools in instructional processes is because they are not accepting ICT And more importantly they are not confident and competent to explore, select use technological tools and resources in the teaching learning processes.

Conclusion

Based on the findings of the study has sought to explore the role of ICT in education in the techno-driven world. In particular, ICTs have influenced educational practice in education to date in quite small ways in the context of Nepal but that the impact will grow considerably in years to come and that ICT will become a strong area for the improvement of many educational practices. Generalizing current activities and practices, the continued use and development of ICTs within education will have a strong impact on: ICT and teaching learning process; access to and participation, quality and relevance, school management which is also associated with learning motivation, learning environment and academic performance.

The adoption and use of ICTs in education have a positive impact on teaching, learning, and research. ICT can affect the delivery of education and enable wider access to the same. In addition, it will increase flexibility so that learners can access the education regardless of time and geographical barriers. It can influence the way students are taught and how they learn. ICTs provide the rich environment and motivation for teaching learning process by offering new possibilities for learners and teachers. These possibilities can have an impact on student performance and achievement but the competences of teachers which is considered as one of the prominent factors should be taken into consideration. Acceptance of ICT is not only the realization of the importance but it's the adaptation of technological tools. The teachers' competency is one of the essential factors have significant role. The capacity building of teachers on application of ICT, their commitment and determination of being competent teachers helps them to perceive the usefulness of ICT and adapt them effectively in the teaching leaching learning practices in the classroom.

References

Betz, N.E. & Hackett, G. (1981). The relationship of career-related self-efficiency expectations to perceived career options in college women and men. *Journal of Counselling Psychology, 28*, 399-410.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340

DOE, (2016) *FLASH Report II 2015-2016*. Kathmandu: Author

DOE, (2016*). A Study on the use of information and communication technology (ICT) and its sustainability in school education*. Kathmandu: Author

Doh, S., & Stough, R. R. (2010). Analysis of the impact of the perceived usefulness of ICT in the digital divide between disabled and non-disabled people in South Korea. *International Review of Public Administration*, 4(3), 53-70

Elligton, H., Percival, F., & Race, P. (2003). *Handbook of educational technology*. New Delhi: Kegan Page India Private Limited

Government of Nepal (1971). *Education Act*. Kathmandu: Author

Johnson, B., & Christensen, L. (2008). *Educational research: Quantitative and qualitative, and mixed approaches (3rd ed.)*. Thousand Oaks, CA: Sage Publication Limited

Khan, S. H., Hasan, M., & Clement, C. K. (2012). Barriers to the introduction of ICT into education in developing countries: the example of Bangladesh. *International Journal of Instruction*. 5(2), 61-80.

Kinnanath, M. (2013). *The use of information and communication technology in teaching and learning within higher education sector of a small island developing state:*

The case of the Maldives. An unpublished dissertation submitted to Victoria University of Willington, New Zealand.

Lai, P. (2017). The literature review of technology adoption models and theories for the novelty technology, *Journal of Information System and Technology Management*, 14(1), 21-28

Punie, Y. (2007). Learning Spaces: An ICT-enabled model of future learning in the knowledge-based society, *European Journal of Education*, 42(2), 185-199

Meenakshi (2013) Importance of ICT in Education. *IOSR Journal of Research & Method in Education*, 1(4)

MOE (2013). *ICT education master plan 2013-2017*. Kathmandu: Author

MOE (2016). *School Sector Development Plan (SSDP), 2016-2023:* Kathmandu: Author

MOE (2016). *School Sector Reform Plan (SSRPP), 2009-2014:* Kathmandu: Author

MOE, Malaysia (2003). *Integrating ICT in teaching and learning: Country report*: Kwalalmpur: Author

Mogu, D.G, Njagi, K, Chemwei, C.B & Motaya, J.O. (2017). The Technology Acceptance Model (TAM) and its Application to the Utilization of Mobile Learning Technologies, *British Journal of Mathematics and Computer Science*, 20(4), 1-8.

Mou, S. (2016). Possibilities and challenges of ICT integration in the Bangladesh education system. *Educational Technology*, 56(2), 50-53

Mustonen-Ollila, E., & Lyytinen, K. (2003). Why organizations adopt information system process innovations: A longitudinal study using Diffusion of Innovation theory, *Information Systems Journal*. 13(3), 275-297

National Assessment of Students Achievement (2013) *Assessment Report*: Kathmandu: Author

Nepal Telecom Authority (2018). *MIS Report.* Authors

Roblyer M.D.(2003). *Integrating educational technology into teaching*: New Jersey: Merrill Prantice Hall

Sampath .K.Pannerselavam .A Santhanam .S. (2009). *Introduction to educational technology* New Delhi: sterling publication private limited

Smith, J.K. (1992). Interpretative inquiry. *Theory into Practice, Qualitative Issue in Educational Research,* 21(2), 100-106

Vanaja, M.& Rajshekher.S.(2010). *Education technology and computer education.* Hyderabad: Neelkamal Publication private limited.

UNESCO (2014) *Information and communication technology (ICT) in education in Asia: A comparative analysis of ICT integration and readiness in schools across Asia*. Bangkok: Author

Ul-Amin, S.N. (2013). An effective use of ICT for education and learning by drawing on worldwide knowledge, research and experience: ICT as a change agent for education

(A Literature review*). Scholarly Journal of Education* Vol. 2(4), pp. 38-45

Wills, J.W. (2007). *Foundation of qualitative of qualitative research: Interpretive and critical approaches*. Thousand Oaks: Sage

Walsham, G. (2006). Doing interpretive research, *European Journal of Information Systems*, 15, 320-330.