

ICT Integrated Teaching: An Interpretive Inquiry of Teachers and Students' Perceptions on ICT based Teaching

Nirmal Raj Mishra

Lecturer (Curriculum and Evaluation), Dhankuta Multiple Campus, Dhankuta, Tribhuvan University, Nepal. E-mail: *nirmaltu@gmail.com*

DOI: <https://doi.org/10.3126/researcher.v4i2.34626>

Abstract

ICT based teaching is the most popular fashion of today's higher education in the world. Most of the teachers and students tried to habituate in ICT tools for their teaching and learning. Due to this fact scenario, I focused on to explore the perception of teachers and students towards ICT as teaching- learning tools. It has used the qualitative approach where phenomenology as the research method to explore the realities. The teachers and students were selected through the purposive sampling. The focus group discussion and in-depth interview were conducted with the selected informants to reach the rich and depth information. The major finding is that the teachers and students were highly positive to use the ICT tools in higher education teaching. It helped to create the motivating and entertaining classroom. It also facilitated in self-learning for teachers and students. It supported to the teachers and students to develop the collaborative learning culture, where they easily promoted the supported culture.

Keywords: ICT tools, interactive learning, self-paced learning, ICT friendly environment

Study Context

The ICT is an umbrella term that includes any communication device or application likewise, radio, television, cell phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. Information, communication and technology are often being spoken of in a particular context, such as, communication and technology in education, health care, or libraries (Tech Target, 2007, p.1). It is the most emerging phenomena that has created the new discourse for pedagogical transformation in education (UNESCO, 2014). It is the most important tools for student centered learning. It helps them by transforming the teacher centered and textbooks bounded classroom into the student centered and interactive as well as resourceful classroom environment. It helps to meet the global challenges and to improve the learning in schools and colleges. With the help of ICT tools, we

can promote the creation of own knowledge and self-paced learning to the teachers and students (UNESCO, 2005).

ICT has the several benefits such as academic, economic, psychological and sociological benefits. The academic benefits are enriched to get the new information, knowledge and idea of others, help to prepare the lesson for teachers; student can construct and get the new knowledge, can collect the materials from the sources of internet. It also helps reduce students' and faculty members cost of educational materials. The use of ICT fosters the interaction, social cohesion and mutual coexistence (Opati, 2013). It offers the unparalleled opportunities for information dissemination in low costs to the students (Amadi, 2012). In now days, ICT play important role to increased learner's motivation (Olteanu, Dumitrescu, Gorghiu & Gorghiu, 2007). The students who have prior experience of ICT skills and browse the internet frequently and confident with basic ICT skills, they can earn higher scientific scores (Luu, 2009). Similarly, ICT tools supports in cooperative learning and helps in attaining twenty first century skills. The today's generation of students demands a lot more than the traditional teaching and learning approach. Students are adopting to use of technology in their daily life where the conventional 'chalk and talk' method has rapidly lost its appeal to these youngsters (Ramali & Ramali, 2013). ICT is a pedagogical tool that assist to do several activities in the classroom (Ndibalema, 2014). It can help in meeting varying needs of students, make their work more organized, make teaching effective and help in lesson plan preparation too (Mingaine, 2013).

Information and communication technology in Nepali classroom

The information technology policy (2010), school sector reform plan (2009-15), three-year plan (2011-2013) have provided some policy and strategy for the development and integration of information communication technology in education in Nepal (Ministry of education (MOE, 2013, p. 11). Information technology policy (2010) has elaborated the provisions of expansion of access of the internet to all schools, coordination and collaboration with national and international institutions to develop skilled human resources for continuous, relevant and quality education, promotion of industry-academia collaboration and formulation and implementation of special program focusing on students, teachers and schools in order to develop competent human resources (MOE, 2013). The school sector reform plan (2009-2015) has set up the provision of development of ICT infrastructure in education and alternative modes of schooling through the use of ICT. It emphasized the implementation and expansion of ICT based teaching learning process in schools. Similarly, The SSDP (2016-2023) gives the credit to school sector reform program for increased access of the teachers to the computer and internet facilities. This is allowing for the scaling-up the use of it in school education.

In the past, the national curriculum framework (2014) had introduced the information communication technology as tools as well as subject matter in the teaching learning process. NCED (2072 B.S.) published the eight competencies of teachers. Among them, the one is ICT related competency that focused on the ICT integrated learning strategy, use and development of digital materials, promote the self-learning, use to provide feedback and evaluation. These competencies should be necessarily developed within the teachers. It proved that ICT integrated strategies in learning is necessary for the better teaching learning context. In other side, Tribhuvan University and other some universities have implemented the ICT as the subject matter. The faculty of education was also conducted ICT subjects in bachelor and masters' level. The faculty of education also responsible to develop the competent teachers for school education. Now a day, these institutions are trying to establish the ICT as the teaching tools for learning. The Tribhuvan University has also introduced the ICT in education as core course for the four years' bachelor degree program. Very recently, Faculty of Education/TU has been developing the school level's trained human power that directly connects with the national policy of education and ICT promoting policy of school level education.

The ICT in education master plan (2013) has incorporated the four fundamental components such as development of infrastructure including connectivity, development of human resources, and development of digital learning materials and enhancement of education system. This plan takes the aim to enabling the schools and teachers in ICT tools and their usages. Through this plan, the government of Nepal aims to promote the teacher and students in necessary skills in ICT for the improvement in classroom delivery, access to learning materials and effectiveness of educational management (MOE, 2013).

The rapid changes of society and way of people to communicate acquire and generate the knowledge; this demands new teaching learning paradigms (Mbangwana, 2008). The ICT has been creating the pressure on higher education institutions in Nepal to meet the social transformation and skills needs. It has also been instrumental in addressing the problems related to students' academic preparedness, large class sizes and multilingualism that have currently been experienced in these teaching and learning contexts. In others words it is the contextualized teaching and learning needs which ought to drive the ICT intervention, rather than the technology itself (Karrie & Jennifer, 2008). Similarly, the Tribhuvan University also focused on the ICT related subjects and ICT integrated teaching. In this context, this study provides the valuable information to improve the ICT based learning, pedagogy integration, materials production and ICT related training. It also helps to build the capacity of colleges and solves the problems of globalization in education.

Purpose of the Study

The main objective of this study is to explore the perception of teachers and students towards using ICT as teaching- learning tools. For the enhancement of main objective, I have formulated the following specific objectives.

1. To explore the perceptions of teachers and students in using ICT tools in teaching and learning.
2. To analyze the empowering ways for the use of ICT tools in teaching and learning.

Research Methods and Materials

The qualitative research design has used to explore the feelings, perception and beliefs on the use of ICT tools in teaching learning. This design searches the multiple realities considering with verbal information. According to Denzin and Lincoln (2005), qualitative research focuses on multi methods and techniques for gathering the information. This research is a naturalistic approach where the study conducting in naturally setting. Qualitative research also involves the collection of variety of empirical materials like interview, observation, case study, personal experience, introspective, life history etc. Based on the qualitative methodology, this research was to discover native's view of reality, which is often referred as the emic view. The qualitative research design requires flexibility and most use naturalistic inquiry (Best & Khan, 2006, p.249; Wiersma & Jurs, 2009, p. 234). I have selected the phenomenology as a research design. Phenomenological study describes the meaning of several individuals of their lived experiences of a concept or phenomena (Creswell, 2007, p. 57). It is based on the subjective and personal knowledge. I also took the ICT use as a phenomenon where I explored the common and individual perceptions of teachers and students.

For sampling selection, I have used the non-probability sampling strategies where ten teachers and sixteen students were selected through purposive sampling to rich the saturation of data. Students were selected from the master's level and teachers were selected from those who were involved in master's degree program in English, Math, Science and computer, Health and population, and core subjects. I selected two teachers from each subjects. Students were selected from the semester and annual program in master's degree. The eight students (four boys and four girls) were selected from the semester and eight (four boys and four girls) from annual system of education. Similarly, the qualitative data was collected through the primary sources. The primary sources provided the first hand data through the in-depth interview and focus group discussion. I formed the two groups of male and female students. I conducted the discussion with male and female students separately. The discussion was conducted in two

times during the study period. I only explored the perception/situation about ICT in first discussion. Then, after one month another discussion was conducted on integration of ICT in teaching. Likewise, I took the interview with teachers separately. I conducted it informally during the teashop, playground and department room. After and during information collection, the information has code and categories for theme generation through the reflective note. The thematic strategy was used to analyze the collected information.

Results and Discussions

The perceptions of my informants were varied regarding the use of ICT tools. The teaching staff and students of the institution had given the value of ICT tools. The teachers and students' perception had similar and varied that discussed in the different section.

Perception of teachers on the use of ICT Tools

The teacher said that it helped them to create more motivating, lively, entertaining, resourceful, comfortable teaching learning environment. Another side, they demanded the physical facilities like managing the classroom through ICT, ICT friendly environment, inadequate distribution of internet facilities with the campus authority. One of the teachers supported in this way;

“Here are sufficient internet capacities, computers and the financial resources but the administrators are reluctant to distribute these facilities in library, administration, classroom etc. It is not access to the teachers and students. They feel it as burdened work.”

Another teacher also saw ICT as tools of entertainment and those who played with it adequately, enjoyed in their academic life. According to them it developed the habit of self-study, group study through facebook, twitter, viber, blogs and even various types of virtual classes or presentations. Those teachers who used the ICT tools in their teaching and learning, in their views, ICT has created the effective learning environment and provide satisfaction for both the teachers and the students. Some of the teachers perceived it for providing guidance through online teaching. According to them ICT encouraged the student to learn, increase interaction through the mail and cell phone. It also increased the questioning skills with teachers and students through the tools like cell phone, mail and message.

Both the teachers and students believed that internet saved their time and could get quick information. It helped them to provide instruction through feedback easily for students. The students understood the facts and figures easily. It is where teachers suggested that internet must be available and used in higher level too. Some teaches hold the view that, before the use

of ICT, the teachers and students must be curious to learn new knowledge and skills. They further said that classroom should be ICT friendly, contextual materials should be developed, teachers and students must be competent. One of the teachers said, “We have recently started the use of ICT in the classroom, and should continue it as it has been proved as an effective tool of learning”. Quotes like this helped me understand that use of ICT should be continued for the effective learning.

The teachers also believed that ICT tools were always appealing and beneficial for students. It helped the students in access, store and record the information easily. Moreover, it created the learning environment funnier, more participatory, interactive, and foster the capabilities of learner’s in the interactive manner. It emphasized the personal instruction through the searching the different lectures, video and text materials and individualized teaching with care each student through the ICT tools. They valued the ICT for global competition, digitalization of idea of people and promote local wisdom through ICT tools. It was also found more beneficial for the teachers and students. According to them ICT had helped them to facilitate for learning through the facebook, twitter, Gmail, and Google explorer. Learner’s autonomy, self-study, group study and others various types of virtual classes or presentation contributed for the improvement of learning. They argued that these tools had promoted the learners to become more creative, inquiry oriented, and researcher. One teacher argued that “surely, by regularly linking ICT in the instruction, the teaching learning is more creative and inquiry based.”

One teacher frequently used the projector, Email, and computer program like PowerPoint. His experience to use the ICT tools was expressed in this way; “more motivating, livelier, more entertaining, more resourceful, more comfortable for teachers as well as to the students.” teacher used it to create the motivated the learners and resourceful environment. Another teacher shared his experience for using the ICT tools in this way; “it helps online teaching, to provide on line materials, encourage to student for learning.” he argued, ICT tools facilitated the online teaching and exchange the information. These tools replaced the teacher’s diary and note into the PowerPoint slide and word file through the use mobile and tablet. It changed their feeling and practices. One of the informants said, “I have felt so many differences before and after. Now I have become more confident. Before, I had to spend more time for preparation and delivery. Now I can prepare and deliver spending less time. Now students are also happy.” The ICT tools helped to promote the confidentiality of the teachers. It also preserved the time and expenditure to learn the new information.

Likely, one of the teachers shared his better experiences in this way; “for me, one of the better experience is time saving and it benefits to the visual learners. The next important

thing for students can do assignments through ICT.” One teacher perceived ICT tools differently in this way;

People enjoy playing ICT in their day to life... they are indirectly learning there too. Let's join this learning to our theory of learning. Learning for awareness, ICT is the best source/ media.... Sometimes it is good for others too.

The teacher said that it should be used for higher level education more effectively. Most of the young teachers who I consulted were aware to the use of ICT tools in the teaching and learning. The teachers expressed their idea for using the ICT tools as;

ICT must be used and also promote the learning. It has been necessary for the learning based projects in higher education. The nature of content/course and learners' willingness also demand such tools.

Teachers further said that they should use the ICT for the effective teaching. The government and Tribhuvan University's rules and regulations also affected in implementation. But they advocated for the need of mandatory rules for teachers to adopt ICT. They also asked for training which they think necessary for the teachers to implement ICT tools and to manage it in the classroom and library. They also emphasized the need of e-library for searching the information about related subject matter and research scenario in the campus.

The female teacher had different experience of ICT tools, she believed that it promotes the active participation of teachers and students and helps to promote the knowledge and skills globally. She added; "It makes teaching more effective; teacher and students can actively participate in teaching and learning process and developed the idea and skills to connect with global context".

In all the teachers viewed that ICT is the replacement of the copy and pencil. They said it has been going to take every aspect of our life. They mentioned that school education also focused on the computer education. Because of it they said it was necessary to promote ICT in our teaching. The next reason they gave was that new coming learners have become ICT friendly due to the technological advancement and global competition and hence the teachers should be updated in their ICT use.

Perception of students on the use of ICT Tools

The students perceived ICT tools as the self-learning tools for better achievement. They realized that most of the things were found in internet. One of the informants said “I can find and read anything of any discipline in the internet.” This shows that internet is helping them to find out new things even if it is of another discipline/faculty. Some of them I found

were sending and exchanging the documents/materials with teachers through internet. They realized that most important use of ICT had idea sharing and note sharing. They also focused on the need of ICT for replacement of traditional chalk and talk method. One informant expressed his feeling in this way;

I think all the teachers and students should use ICT in the classroom. The University and campus should train all the teachers for using ICT in the classroom. Similarly, the University and campus should manage environment and equipment in all the academic institutions.

One student told that the projector helped the teacher to make the lecturer method more effective. In contrary, one student focused on the limitation of the ICT tools in the classroom. He argued that the teachers used it when they are unable to complete the curricular tasks timely. They used power point slide for completion of course. These teachers, the students argued, showed the text materials and did not elaborate the content. Some of the teachers' occasionally used the multimedia projector as well he viewed. The students also charged that his teachers used ICT during the thesis orientation program and thesis presentation. Similarly, another student argued differently, the ICT tools helped them to collect the materials in a compatible form. It helped them in materials delivery easily and ensures access in information through internet.

The students believed that ICT friendly environment (traditional chalk and talk to modern ICT based) facilitated them for the improvement of their learning. They felt that it changed the teachers' roles as authoritative to facilitator/co-learner/collaborator and changed the learners' roles (active learner). They believed that ICT will be supportive to curriculum delivery, managing information dynamically, and collaborative work environment. Accordingly, they argued that it was always appealing and beneficial for the students and strengthened their understanding in the area of problem solving, investigating, and critical thinking and self-learning.

In another side, the administrative personnel argued that the teachers were reluctant to learn and use the ICT skill and they were habituated to use the traditional lecture method. They further added that here were sufficient ICT facilities like computer, projector, internet facilities but the teachers were not aware to use it. The youth's teachers were using ICT tools for their personal learning. They occasionally used it in the classroom. According to him, campus conducted the training for teachers but they only learned for their personal purpose and not used in the teaching learning. They mentioned that faculty of education had also conducted the training for open and distance learning teachers. They also mentioned that computer lab was

also established for open and distance learning teachers. The above interpretation of the perception above has been depicted in the following table.

Table 1

Perception on the use of ICT

Perceptions	Benefits of ICT tools in teaching
Teachers	Increase interactivity of learners, bring children closer together in learning outcome, improve the memory of students, easily explain the complex subject matter, create the interactive classes, help to improve students' attendance, make the lesson more enjoyable and increase the student's exposure.
Students	Increase the concentration in the classroom with the help of visual materials, make environment in the classroom funny and transform the traditional classroom into the learner centered classroom
My reflection	In teacher's side, it increases the interactive situations and developed the close learning environment between teachers and teachers, students and students. It also creates the enjoyable environment and helps to explain in easily. It promotes the inquiry based learning and more informative both teachers and students. Teachers have to get the more chance to create the materials in own way. Students' side, it helps to promote the informal learning and learn easily.

The table above makes clear that there are several benefits of ICT tools for both students and teachers. ICT tools have helped them to create the more informative teaching learning environment. It also supported their informal learning and access in information.

Based on the discussed information, I found that teachers perceived ICT tools for motivating students and creating resourceful classroom environment. It created the lively and entertaining classroom environment. It facilitated the teachers for self-learning. They believed that it improved the learning strategies and teachers' role through the supportive and collaborative way. It helped them to transform the authoritative role into the cooperative role. They also believed that it supported to the curriculum delivery, managing the classroom, searching the information, creating the collaborative environment. The new thing which I noticed was that it developed the self-study and group work habit of teachers and students. These group of the students, according to the teachers felt that it increased the questioning skill of students and regular interaction. It created more comfort way to provide the feedback for the

students. Another interesting finding was the ICT replaced the teachers' diary and note book into the power point and word file. They provided the materials through the mail and hard copy. The social media tools were not popular among the teachers to promote the learning. These tools were not commonly used among the teachers and used only for the entertainment rather than teaching and learning purposes. They used the ICT tools for personal purposes like communication, entertainment, and materials storage.

The students perceived it as the self-learning tools for the better achievement. But they felt the necessity of English language for the reading and searching the information. They believed it was the easiest way for sharing the idea and note sharing among students and teachers. They saw that it was necessary for the global competition. All students were agreed that it was more appealing and beneficial for improving their performance.

A few of the students had internet access at home and tools like computer/laptop. All of them used internet in the cell phone. The internet data was expensive and difficult to manage for the students. Another important finding was that the campus provided the limited internet facilities. The teachers and students could not use it sufficiently. It was provided for the semester and ICT related teachers and students in a limited manner. There were computer and multimedia facilities in campus but it was limited. I also found that learner's autonomy, self-study, group study and others various types of virtual classes or presentation contributed for improvement of learning. Both teachers and students agreed that these tools had promoted the learners to become more creative, inquiry oriented, and researcher. Mikis, (2004) also claimed that all students benefit from the ICT and it should be available in schools. In contrary, they only believed on it but not used in their practices. I claimed the new thing that it developed the self-study and group work habit of students and teachers. The major contribution of ICT as I found was that the teachers' diary and note books were replaced by the power point and word file. The teachers perceived it only for their easiness not for the learners' friendly task creation. However, they used it for the providing feedback and felt more comfort through the internet and cell phone. It developed questioning skills and interaction.

The social media tools were not popular tools for the teaching learning purpose but it used for communication and entertainment. There is no doubt that it increased the access in information and better achievement but the obstacles like the English language were crucial factors for the effective implementation. They felt that ICT tools were only the computer and multimedia projector, others tools like cell phone, Gmail and other social media were not the ICT tools. If we managed the proper facilities, learner's autonomy, self-study, group study practices could be increased. Similarly, Hennessy, Harrison and Wamakote (2010) saw the roles of teacher are completely critical. Despite of the readiness and confidence of teachers

affect for implementation, it is ultimately limited and inconsistent in quality. For taken the benefit of ICT, it is necessary to develop the ICT related facilities properly and conduct the training which create the readiness and confidence of teachers and students.

Empowering ways for the use of ICT in Teaching

It is generally accepted that ICT is the powerful tools for extending the educational opportunities. It can promote the asynchronous and synchronous learning to the students and teachers. The computer and internet related technologies have the greater influence to the teachers and students for their access and report the information. The effect of globalization and its led market created the several job opportunities for those who have the ICT skills.

Informants were in favor of empowering the usages of ICT. They felt the importance of ICT in their teaching and learning. Similarly, they emphasized the physical facilities like electricity, internet, multimedia projector, and computer/laptop. Moreover, the importance of psychological environment such as the cooperative and supportive behavior, imitative culture, sharing culture, adequately use of reward and punishment, motivation should be provided. In this scenario, the teacher said the empowering ways of ICT technology tools in the following narrative;

Nowadays, ICT has been accompanied with our life in each and every field, we cannot ignore it. If we try to ignore, it ignores us and we'd be far behind the 21st century of technological world.

Another teacher perceived the ICT use was not only applicable but also essential for those who wanted to become modern. For him it should have been used in teaching learning process as much as possible starting from nominal level to step by step. Likewise, teachers like him they also suggested using the ICT for the discouragement of traditional 'chalk and talk' approach. Another teacher supported the idea in this way;

ICT is use not only applicable but also essential for those who want to and says we are in modern age. We should have use ICT in our teaching learning process as much as possible starting from nominal level step by step.

The campus chief suggested that the policy should be change and then empower the teacher. By policy he meant the compulsory use of ICT. He also added, the teachers should be ICT friendly and aware to use it for competing in the global market. According to him, they have not ICT facilities and ICT friendly classroom. So, it was necessary to develop the ICT friendly classroom for the replacement of traditional chalk and talk method of teaching.

The students were believed the empowering way differently. They mentioned that the facilities of ICT were important aspect and should be mandatory to use ICT tools. They also believed that different classroom delivery practices like multimedia projector based teaching, discovery learning through internet, managing the e-library. If the campus manages it, we will simultaneously adopt these tools. The teaching learning environment for them plays the vital role to empower the students in ICT.

It cleared that electricity, internet, projector, and computer were foundation for ICT implementation. I found that the cooperative and supportive behavior, imitative culture, and sharing culture should be established in campus. I also found that ICT discouraged the traditional chalk and talk method through the technology based teaching. On this ground my informants also demanded the ICT training to gain the skills. The connectivity of internet facility could also empower the teachers and students through the use tools.

Conclusions

The teachers and students' perception were highly positive to use the ICT tools in classroom. They both of them perceived that ICT facilitate the collaborative and self-pace learning and transform the authoritative role of teachers into the cooperative role. The technological, organizational and pedagogical requirements are necessary and requires to support and training for ICT integration in classroom. The time allocation is the main factors to promote technology tools in classroom. Teachers believe that it can use in planning the lessons, conducting the instructional activities and assessment process.

Implications

The above discussed results, discussion and conclusion show the different implication of ICT in teaching and learning. The teachers and students can apply these tools for their betterment of learning progress. These tools forcefully influence our education system. So, the following implication can be drawn for the improvement.

1. The infrastructure can be developed for the initial development of ICT use. It can motivate the stakeholders for the use and application in the instruction.
2. Those people who develop the curriculum of different subjects, they can be made aware on how can we incorporate the ICT tools in our teaching through sharing learning; teachers to teachers' learning and students' to students' learning.
3. Policy level intervention is a necessary fact that it only creates the mandatory provision for the ICT use. The policy makers need to be aware on effective implementation of

information, communication and technology tools by reflecting upon the doings of their siblings and children.

4. The teachers and researchers can conduct the action research for the betterment of ICT integration in the teaching learning context by involving students and teachers as collaborators.

Further Research

The research problem does not cover the all aspects of areas of issues in education. It unable to cover all areas of the related research problem. Though, this study gives up the research area for further research. It has only covered the teachers and students' perceptions on ICT use in teaching. In the future studies, another study could be done in the areas such as ICT integrated pedagogy, blended model of teaching and its effectiveness in students' achievement. Similarly, any researcher can conduct in the another setting for verification and explores the contextual realities of a research problem.

References

- Amadi, P. N. (2012). Role of ICT in system development and quality delivery of vocational education in Nigeria: curriculum implications. *Journal of Educational and Social Research*, 2(8), 107-114.
- Best, J. W., & Kahn, J. V. (2006). *Research in education*. PHI learning Pvt. Ltd.
- Creswell, J. W. (2007). *Qualitative inquiry and research design: choosing among five approaches*. Sage Publication.
- Curriculum Development Center Nepal (2007). *National curriculum framework for school education in Nepal*. Authors.
- Denzin, N. K., & Lincoln, Y. S. (Eds.) (2005). *The sage handbook of qualitative research* (3rd ed.). Sage Publication.
- Karrie, A. J., & Jennifer. L. J. (2008). Making cooperative learning work in the college classroom: an application of the 'five pillars' of cooperative learning to post-secondary instruction. *The Journal of Effective Teaching*, 8(2), 61-76.
- Luu, K. (2009). *An analysis of the relationship between ICT and scientific literacy in Canada and Australia* [Unpublished Thesis]. Queen's University.
- Mbangwana, M. A. (2008). *Introduction of ICT in schools and classrooms in Cameroon*. Langaa, Bamako.

- Mingaine, L. (2013). Skill challenges in adoption and use of ICT in public secondary schools. *International Journal of Humanities and Social Science*, 3(13), 61-72.
- Ministry of Education Nepal (2009). *The school sector reform plan:2009-2015*. Author.
- Ministry of Education Nepal (2013). *ICT in education master plan2013-2017*. Author.
- Ministry of Education Nepal (2016). *School sector development plan, Nepal, 2016–2023*. Author.
- NCED Nepal (2012 B.S.). *Teacher competency framework-2012*. Author.
- Ndibalema, P. (2014). Teachers' attitudes towards the use of ICT as a pedagogical tool in secondary schools in Tanzania: the case of Kondo district. *International Journal of Education and Research*, 2 (2).
- Olteanu, R. L., Dumitrescu, C., Gorghiu, G., & Gorghiu, L. M. (2007). Pupils' perception concerning the implementation of ICT in the classroom. *ICT in education: reflections and perspectives*, Bucharest, June 14-16.
- Opati, O. D. (2013). *The use of ICT in teaching and learning; the case of college of education and external studies*. University of Oslo.
- Ramli, R., & Ramli, R. (2013). ICT supported cooperative learning: towards attaining twenty first century skills. *International Journal of Asian Social Science*, 3(9), 2026-2033.
- Tech Target (2007). *Definition of information communication technology*. Retrieved on August 10, 2007 from http://searchsmb.techtarget.com/sDefinition/0,,sid44_gci928405,00.html
- UNESCO, (2005). *Information and communication technologies (ICTs) for community empowerment through non formal education*. Author.
- UNESCO, (2014). *Information and communication technologies (ICT) in education in Asia: a comparative analysis of ICT integration and e-readiness in schools across Asia*. Author.
- Wiersma, W., & Jurs, S. G. (2009). *Research methods in education: an introduction*. Dorling Kindersley Pvt. Ltd.