

Use of ICT in Collaborative Learning Activities: A Study on Digital Education and Student Engagement

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Abstract

Information and communication technologies (ICTs), the applications and tools for creation, storage and dissemination of information, have been widely exploited in the field of education in recent years. Though there are both positive and negative criticisms about the role of ICTs in education, many research studies claim that ICTs help improve the quality of education by increasing access to information, and by enhancing collaborative learning. This study makes an attempt to explore the use of ICTs in collaborative learning activities in the secondary school educational context in Nepal. The data were collected from the teachers and students from two ICT-resourced schools using interview and focus group discussion methods. It was found in the study that the ICT software tools such as Facebook, Email, and Viber were supportive for the students as they made distributed collaboration, group work, project work and peer feedback more convenient and more frequent. However, the way the students used ICTs for collaborative learning seemed to develop their communicative skills rather than their higher order thinking skills. The students rarely used more useful collaborative learning platforms such as Wiki, Blogs, Google docs, and Moodle due to the lack of pedagogical knowledge of using ICTs in education. Therefore, some pedagogical training about the integration of ICTs in education are essential in the secondary schools in Nepal.

Keywords: *collaborative learning, distributed collaboration, ICTs, ICT integration Moodle, pedagogical use*

Introduction

Information and communication technologies (ICTs) are the modern technologies for storage, manipulation, and dissemination of information. Many of the research studies claim that ICTs have brought a revolutionary movement in the field of education, particularly in information sharing, and collaborative learning (Atan, 2012; Hoppe, 2007).

Collaborative learning is working together in learning task between two or more individuals to achieve common goals. ICTs with support of the Internet, have leveraged several possibilities of interaction and collaboration in the educational activities (Fransen et al., 2011; Nechita, & Timofti, 2011). ICTs help create computer supported collaborative learning (CSCL) environment in which communication and collaboration are mediated through technologies such as e-mails, blogs, wikis, Facebook, Skype (audio-video conference) and so on using both synchronous and asynchronous computer mediated communication (CMC) (Piki, 2008; Repiso, Pablos et al., 2014). In this way, ICTs provide several opportunities of knowledge sharing and group work among the learners for e-collaboration. They help eliminate the barriers of time, place,

and resources; and promote learners' participation providing motivational component for collaborative activities.

Collaborative learning is a student-centered approach in which the learners learn together being involved in problem solving tasks. According to Hoppe (2007), collaborative learning needs a defined setting where the learners learn in a group with a high degree of interaction among the group members. He explains the role of ICTs in computer supported collaborative learning (CSCL) that they facilitate and enable known types of learning in new kinds of learning experiences and that they promote learning flow when integrated in learning activities. The multi-user tools have high interactivity and creative potential for creating synchronous co-constructive environment. According to Piki (2008), collaborative learning is an offspring of social constructivism which holds that individual learn as they engage in discussion, sharing information, meaning negotiation and interaction with others for knowledge construction. The use of the Internet and other ICTs has provided the individuals with the opportunities for communication, collaboration, and learning. ICTs inspire restructuring the learning environment where the teachers facilitate to empower the learners to become active participators (Piki, 2008).

According to Roschelle and Teasley (1995) collaboration is "... a coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem" (p. 70). The technologies are used as cognitive tools for learning that occurs socially through collaborative construction of new problem-solving knowledge. In collaborative learning environment the learners participate and collaborate about the shared knowledge. To Dillenbourg (1999), collaboration is not just sharing the goals, but it requires the mutual understanding of the shared goals between or among the participants in collaboration. Dillenbourg (1999) distinguishes between co-operation and collaboration that in former, the participants split the work, solve the sub-tasks individually, and then assemble the partial results whereas in latter, the partners work together. Collaborative learning is rather a group learning activity that includes individual learning as well. In collaboration, the individuals negotiate and share meanings relevant to problem solving and they learn by raising their queries, teaching each other and by seeing how others are learning. The social interaction and collaboration establish a learning community, which creates possibilities for fostering cognitive skills including both lower order thinking skills (LOTS) and higher order thinking skills (HOTS) through the process of co-construction of knowledge (Ada, 2009).

In the framework of the actions to be taken for the integration of ICT in education, Tapia and Leon (2013) highlight mainly two dimensions of the benefits: (i) ICTs enhance access to information for shaping and transformation of new knowledge; and (ii) ICTs facilitate communication connected with teamwork and collaboration. Likewise, discussing the role of technology, Kumar and Tammelin (2008, p. 5) point out three important advantages to teaching and learning of a foreign language that ICTs: (i) provide authentic language learning resources and contexts, (ii) create co-operative and collaborative environment, and (iii) provide opportunities for effective teaching and learning. Similarly, Jimoyiannis (2012, p. vii) highlights that ICTs can transform the learning context, they can provide multiple opportunities in the field of education

for: (i) accessing information and learning resources, (ii) collaborative learning, and (iii) self-directed lifelong learning. In this way, ICTs are considered to have a significant role to improve the quality of education by increasing access to information, and enhancing collaborative learning.

Many research studies as in the paragraph above claim that ICTs can offer creative activities and social interactions, and that they can have a greater contribution in collaborative learning. However, some studies have claimed that use of computers in the classroom is boring, anti-social, and inhumane form of training (Stahl et al., 2006). Alberts and Papp (1997) argue that computers and the Internet might help to know many people, but they doubt about the depth of the friendships with them in the wired world. Knowledge sharing is most essential requirement for collaborative learning. However, individuals are psychologically unwilling to share their knowledge or information because they perceive it as loss of power (Piki, 2008). Likewise, individuals might be disinclined to share knowledge due to lack of trust and incentives which hinders collaborative activities (Qureshi, & Zigurs, 2001). Moreover, interaction and sharing information in collaborative learning might not be effective due to the factors such as cultural and linguistic background of the participants (Schoonenboom, 2008).

As discussed in the paragraphs above, there are bewildering claims about ICTs and their role in collaborative learning in educational activities. Therefore, though several research studies have been carried out, the use of ICTs in collaborative learning in educational context is still an interesting and relevant issue to be explored. Moreover, studies about the use of ICTs in collaborative learning based on the educational context of Nepal are quite a few. Therefore, it is worthwhile to study about the use of ICTs in collaborative learning in the context of educational institutions in Nepal. The research question I have raised in this study is ‘how do the teachers and students in the secondary schools in Nepal use ICTs in collaborative learning activities?’

Review of Related Literature

Many research studies have concluded that one of the important advantages of ICTs is that they provide the learners with the environment for collaborative learning. Fransen et al., (2011) carried out research on the team effectiveness in collaborative learning, particularly computer supported collaborative learning (CSCL). They concluded that the shared mutual model was the main factor that influenced team effectiveness. In the same way some other factors like mutual performance monitoring, and inter-personal trust also influenced team effectiveness to some extent. In the study, they also found that the learning teams in higher education tend to focus primarily on task aspects rather than on team aspects.

In their theoretical discussion they explain that the shared mutual model refers the awareness of the team and task aspects in order to become effective. It greatly influences the collaborative learning which requires the learners’ involvement in the process of knowledge construction. Collaborative learning is a paradigm shift that is based on constructivists’ philosophy emphasizing on learners’ discussion, debate, or argumentation. Such meaningful interaction facilitates deep learning, deep understanding, and those results in conceptual change.

Web-based technologies are interactive in nature, and they can enhance students' collaboration, construction of knowledge, and deep learning. Atan (2012) presents a paper with a case study to explore the possibility of web-based technologies so as to promote collaborative learning for mother tongue learning programmes. Atan concluded that ICTs have capacities to create collaborative learning environment which can bring a change in the way that students learn. Children learn through knowledge construction process for which they require interaction and working with students from different backgrounds.

ICTs are very encouraging for the potentiality of collaboration that can raise the quality of learning. Repiso et al. (2014) carried out a study in Spain to explore the teachers' experience about the advantages and disadvantages of collaborative learning. They also aimed to discover the teachers' concept about the use of ICTs to support collaborative learning environment.

The result indicated that ICTs have potential capacity for enhancing collaborative activities and also for developing relevant generic skills. Some of the advantages of collaborative learning that the result showed were: (i) development of transversal learning skills, (ii) interaction among students, (iii) increasing students' attention and participation, (iv) increasing motivation and learning, (v) promoting personal satisfaction of students, (vi) improvement in teacher professional development. Likewise, some of the disadvantages were: (i) pressure from the educational system and the official curricula, (ii) school organization aspects, (iii) teacher practices (iv) expectation of families in favor of traditional methods. The conclusion was that ICTs do role to offer new possibilities to create collaborative learning environment that allows the students to carry out group activities in collaboration. It is better to insist on the practices on the school activities that promote the collaborative projects with ICTs.

Technologies can be used as the means of overcoming barriers to learning and enabling collaboration among the learners. Pima et al. (2016) carried out a research about collaborative learning environment, and availability of collaborative web technologies (CWTs) in Tanzania. It was a case study of six higher education institutes (HEIs) in mixed methods approach. Pima et al (2016) argued that a good ICT infrastructure is an essential element for the use and adoption of CWT-enabled blended learning (BL). CWT-enabled BL, a popular instructional model in higher education, offers lots of benefits to learners and the lecturers such as: (i) effective communication between the students and the lecturers, (ii) student centered generation of new knowledge and engagement, and (iii) appropriate mix of technologies and learning process. Their finding was that internet, power supply, computer literacy, wikis, blogs, social networking media, learning management information systems (LMIS) are some of the important ICT infrastructures that support CWT-enabled BL; and these are available in the HEIs in Tanzania.

This review of these past studies gives an insight that ICTs play significant role for making faster and easier interaction, sharing of knowledge and resources. Rich interaction, discussion, and sharing ideas and resources make collaboration efficient in solving a task. The interactive nature of web-based technologies helps make collaboration easier and effective, which facilitates knowledge construction of the learners.

Methods and Materials

This study was guided by interpretivism as its research paradigm. It adopted qualitative research approach for detail and in-depth study of the phenomenon ‘the teachers’ and students’ use of ICTs in collaborative learning activities in the school education context in Nepal. Two ICT-resourced schools were selected using convenient purposive sampling, and were given pseudonyms as School A and School B. The headmasters of those schools were requested for their permission to collect information for a research study was received from. As the informants, two English language teachers teaching compulsory English to grade XI students were selected purposively for semi-structured interview. The teachers were requested to give their consent for their participation as interviewee in the interview. Likewise, six students from compulsory English class of grade XI from each of the two selected schools were chosen for focus group discussion (FGD) using random sampling method. The questionnaires for the semi-structured interviews and FGDs were prepared carefully in such a way that they could be useful for obtaining required information from the informants. The interviews and FGDs were recorded using recording devices. The information recorded was transcribed, segmented, and categorized to generate themes, and the themes were analyzed and interpreted to get into conclusions.

Results and Discussion

In this research, an effort was made to study the teachers’ and students’ use of ICTs in collaborative learning activities in the school education context in Nepal. The findings in the study and discussion and interpretation of the relevant issues have been presented in the sub-headings to come.

Findings

All the participants in the School A were positive that ICTs could contribute a lot for collaborative works such as group/pair works, and project tasks. For conducting such collaborative activities, they most often used the ICT hardware tools like laptop/desktop, smart phones and projectors. Likewise, they used ICT software tools such as Facebook, Email and Messenger. One of the students in the FGD viewed, *“With the help of the ICT tools we could do our group work assignments and tasks very easily discussing and working together”* Another student expressed,

Idea sharing is the most important in collaborative group works. The interaction and communication are very easier and faster with the help of the ICT tools. In group assignment, we can communicate and exchange our messages and resources to all our group members in a single click in the computer.

The students opined that they could save their time and effort using the ICT tools in the collaborative group work activities. They could do discussion easily through video talking with a friend who lived in far distance. If they had not used ICT tools it would take long time to share their ideas, information, and resources with the friends. One of the student participants gave his opinion, *“For collaborative activities I use the tools like g-mail, chat, and Viber. They help me to*

communicate with friends and teachers for sharing various information; and make the group work easier and effective”

The class teacher agreed that the ICTs were very supportive tools for conducting collaborative activities. He said he emphasized on working his students collaboratively, and he often involved them in the tasks like pair work, group work or project works. His students utilized the ICT tools for making their works easier, faster and effective. In the interview, he put his view,

Communication and interaction are the main basics for collaboration. Then, the students involve in sharing their ideas or materials for doing the tasks. They need to make frequent interaction to get into conclusion and finalizing the given tasks. ICTs are useful for all these phases. Some months ago, I informed my students through G-suite to submit an article in group for a magazine. The students did well. They utilized the ICT tools for preparation and submitted it in time.

The teacher opined that the students felt more comfort while interacting, communicating or discussing about their queries with their friends than with their teachers. He also observed that the students who hesitated in direct face to face communication, could feel easy in communication with the ICTs. For him ICTs had been a good catalyst to encourage interaction and collaboration.

Likewise, the participants in School B opined that ICTs could contribute a lot for carrying out the tasks collaboratively. The tasks such as group work, pair work, project assignments could be much facilitated by the use of ICTs. The ICT tools such as email, Facebook, Skype, could help them in making interaction, discussing, and exchanging the resources that they needed to do in the process of collaborative work. One of the participants in the FGD viewed,

ICTs make the collaborative tasks efficient. They make communication easier, and discussion and sharing more frequent. ICTs help save our time and labor. A single click is enough to share the information or the resource among all the group members, no need to visit him or her personally.

ICTs helped them to organize the discussion or meeting between or among the friends for carrying out given collaborative activities. They did not need to wait any long to understand what other members view. In response to a question, one of the student participant shared, *“With the ICTs like laptop and Internet it is easy to communicate among the friends; and access the information. ICTs are very helpful for carrying out collaborative works by sharing ideas, and information and learning resources”*

The class teacher was quite confident about the role of ICTs for promoting collaborative activities. He had understood that collaborative activities could create a different environment of learning. With such activities the students could learn a lot because they were freer to make inquiry about their confusions and that they were more open to share their knowledge and ideas and take part in the discussions. They were free from the teacher’s dominant. The teacher said,

I often give my students project works in group. I find my students more confident about

the subject matter in the collaborative group work as they get an opportunity for open discussion to clarify their confusions. The ICTs have helped to conduct collaborative works making their ways of interaction and discussion easier.

The information collected show that the participants were positive towards the use of ICTs for collaborative learning. They agreed that ICTs were useful in their learning process for creating collaborative learning environment and carrying out the tasks in a collaborative way. The tools helped them for sharing ideas and resources, for doing discussion, and for performing the tasks together in pair and in group. ICTs enable the users for communication, interaction, and exchanging information, which are the basic components for collaborative activities.

Discussion

Providing learning environment for collaborative activities is one of the most important benefits of the use of ICTs. Studies have found that while working alone, the students spend their time on gathering and organizing information they look for whereas while they are working in group they go beyond these activities; they spend their time on higher order learning activities such as sharing, comparing, analyzing, criticizing ideas and information and finally applying those information and ideas for solving the problems or tasks (Clyde & Delohery, 2005).

In this study the findings show that the students took benefits of ICTs in their collaborative learning activities. In both School A and School B, the students were given the group works, pair works, and project works related to their text book exercises and the course contents, and the students were involved in collaborative activities to solve the given tasks. In solving the tasks, the students utilized the ICT tools such as laptops, smart phones, projectors, email, Facebook, Messenger, and Viber for carrying the collaborative activities. It was found that the students had developed some collaborative learning skills using ICTs and were able to solve the tasks given using interaction, discussion, and sharing information and resource materials. The teachers had their experiences that ICTs had been useful for engaging their students in group work activities and work in collaborative environments. They shared their experiences that their students were interested in such collaborative learning. Likewise, the students reported that they felt comfortable in the collaborative activities to share their ideas and information and taking part in discussion. It was found in this study that ICTs had made their collaboration easier and more effective mainly in four ways:

- (i) **Distributed collaboration:** Before ICTs were introduced in the educational activities, some collaborative activities in the form of group discussion in the classroom used to be carried out in traditional methods too. Such collaborative activities required fixed location and the physical attendance of the participants was obligatory. Due to such difficulties, collaborative activities used to be held in limited number. On the contrary, it was found that the use of ICTs had made collaborative activities much easier and more comfortable to students. Though they were physically distributed, collaboration was possible among the group members when the ICTs were utilized. A member from one place could easily be in touch with another member in another place, no matter how far they were. The ICTs helped their

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collaborative learning for initiating interaction, understanding the goals, discussing the ideas and information, sharing their knowledge and learning resources, and working together to solve the problem.

- (ii) Frequency of collaboration:** In the traditional methods the only situation for communication and exchange of information to take place is the classroom time. The teacher and the students can interact in the school time if both parties become able to manage their time. Revolutionary improvement in the frequency of interaction was found in the study with the use of technologies. The teacher and the students could communicate their ideas in both school time and school-off time. They used the tools such as email, Messenger, Skype, Viber, Facebook for exchanging information. The teacher could send the information any time s/he liked to whole class students in a single click wherever they were. Use of ICTs had revolutionized the ways of collaborative activities by making the sharing of ideas, information, and resource materials easier; and making collaborative work possible anytime anywhere. The participants did not need to attend physically to share and discuss on the topic and for the ideas needed for a problem to be solved. They could easily contact, interact and discuss with the group members about the tasks to be solved overcoming the distance, time and place barriers. This easiness had increased the possibility of the frequency of collaborative activities conducted in the teaching and learning process.
- (iii) Group work/project work outside the classroom:** In the traditional methods, the situations for collaborative activities are generally limited to classroom time, they cannot extend the interaction, ideas sharing or discussion once the class is over. It is often not easy for them to meet one another in school-off time so as to discuss and solve group work or project work. It is also that the students with shy nature like to express their ideas in small groups and time management for many groups is usually the problem when the number of the group increases. It was found in the study that by using technologies the students were able to carry out collaborative work in group and ICTs had helped them in many ways for their collaboration. They could interact and communicate about the tasks anytime anywhere. They could share their ideas and resource materials easily using the tools such as email, Facebook, Skype, Viber, Discussion forum. They could collect, organize the learning resources, and share their progress to edit or finalize their project work. They could use both synchronous and asynchronous form of communication while using the ICT tools.
- (iv) Fostering learning from peer and peer feedback:** In traditional methods, the peer who has better understanding of the subject matter may help others. For this the students need to spend their class/school time, or they need to spend their time in travelling to the peer's home, or other place where both parties can be available. Alternatively, there can be class or group discussion in the class where the participants express/present their ideas or opinions and others give their comments or feedback. In such activities, normally there is no time for all the students to take part and generally some students tend to dominate, and others lay back. With the use of technologies in this study, the students could extend their time and could be

involved in collaborative activities anytime they felt appropriate. Their interaction, sharing ideas, information, or resources, taking part in discussion, and commenting and giving their feedback were far easier and faster with the use of the ICT tools such as email, Facebook, Skype, Viber. The students were able to share their learning resources to the whole group members in a single click wherever they were in both school time and school-off time using ICTs. The easier ways for ideas sharing among all the participants could improve the quality of their collaboration.

Thus, it was found in the study that ICTs were significant for the students for assisting their collaborative learning activities. However, the use of ICTs developed the students' communication skills rather than their higher-order thinking skills. One of the possible causes of this was the lack of technological pedagogical knowledge (TPK) of the teachers, as discussed in Van Dijk (2013) and Koehler et al. (2013). As discussed in technological pedagogical and content knowledge (TPCK) framework (Mishra & Koehler, 2006), lack of confidence of the technological skills and pedagogical use of ICTs in the teachers, were some of the main barriers in the use of ICTs in collaborative learning in this study too. Internet fluctuations, irregular electric supply and lack of basic technological knowledge in the students were some of the other main barriers for smooth collaboration.

In fact, technology-based collaborative learning is rather a complex phenomenon. As the research scholars in the paragraph above claim, effective collaborative learning is possible only in appropriate learning environment that requires consideration of all social, psychological, cognitive, technological and pedagogical dimensions. For good collaboration, the use of ICTs with wide-ranging learning activities with appropriate pedagogy that integrates individual, group, and class learning can be beneficial for the learners (Dillenbourg, 1999). In this study, though the role of ICTs was significant for collaborative works, the students did not have good technological skills to utilize ICTs for more effective collaborative activities. More importantly, the ICTs used in the collaborative activities were of the types that they developed the students' communicative skills rather than their higher order thinking skills such as evaluating, criticizing, or problem solving. It was mainly due to the lack of pedagogical skills of the teachers for productive utilization of ICTs as they were not confident about how to make pedagogical use of ICTs. As Mishra and Koehler (2006) opined, lack of adequate TPK might have been one of the influencing factors affecting the effective utilization of ICTs for collaborative activities in this study too.

Conclusion

ICTs are considered to be useful to improve quality of education as they are supposed to increase the access to information and enhance collaborative learning. Collaborative learning activities are supposed to develop the higher order thinking skills of the students. In this study, ICTs have been found to have been supportive for collaborative learning for distributed collaboration, group work and project work, and peer feedback activities in the secondary schools in Nepal. The students commonly used the hardware ICT tools such as smart phones, laptops, and projector; and ICT software tools such as Facebook, Email, and Messenger for collaborative

learning activities. However, it was found that the ICT tools they used were more useful for improving their communicative skills rather than the higher order thinking skills such as evaluation, analysis, and problem solving. The learning platforms such as Blogs, Moodle, Wiki, and Google docs that are more useful for improving collaborative learning activities were rarely used by the students. It was due to the lack of the knowledge of the pedagogical use of ICTs in education. Therefore, the teachers and students in the secondary school in Nepal require some orientation programmes about the pedagogical integration of ICTs for their productive utilization inside and outside the classroom.

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