

Effects of Multimedia Technology on Learning Strategies of Learners

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Abstract

Currently, multimedia technology has been a frequent subject of research. Since it has been the question of research for many years, the countries that are using Information Technology have been studying the effects of the Information technology on the quality of learning process of learners and pedagogy of teachers and even they have had their own policies.

It has been 20 years since information communication technology started to be used for instruction in Mongolia. A number of foreign and domestic projects are being implemented in the field of using ICT in instruction. Nevertheless, the different ICT infrastructure in the country has had negative impacts on implementation of projects and programs. In this case, the School of Computer Science and Information Technology, Mongolian State University of Education has organized annual national contests under the topic as “Application and development of multimedia technology in instruction” for primary and secondary teachers since 2006 with the aims of revealing objective results and progress of the above mentioned projects and programs for instruction and providing possibilities of sharing and disseminating experiences for teachers. Many primary and secondary teachers of different subjects from urban and rural places participate in the contest.

In this article, we focus on multimedia technology’s support of learning process of learners and teaching methodology of teachers”, based on works and creations of the contest participants. The paper took a focus interview from primary and secondary teachers to reveal difficulties and problems when teachers design e-resources for lessons.

The paper has more practical advantages and it contains the following issues:

1. The study identifies the usage of multimedia technology in primary and secondary levels, based on surveys.
2. What can the didactic requirements be to design multimedia resources?

Key words: *Information technology, multimedia technology, teacher, learner, learning strategy, methodology of learning*

Policy on introducing ICT in instruction

In order to implement ICT in the education sector of Mongolia, the policy documents below have been developed and certain measures have been taken.

- The concept of development of ICT in Mongolia until 2010 (The appendix of the procedure 21 approved in 2000)
- Main guidelines of introducing ICT in the field of education until 2010 (Order # 151 approved by the Minister of Enlightenment June, 2000)
- National program on distance training
- E-Mongolia national program (2006)
- Main guidelines of introducing ICT in primary and secondary education until 2015 (Order # 450 approved by the Ministry of Education, Culture & Science 2006)
- Master plan on Development of Educational Sector of Mongolia from 2006-2015 (Order # 192 by the Government of Mongolia, 2006)
- Program on Development of National Innovation System of Mongolia (Order # 306 by the Government of Mongolia, 2007)
- Education National program (Order # 31 by the Government of Mongolia, 2010)
- Roadmap of Higher Education Reform (2012-2021)
- Policy on ICT in the field of Education (The appendix 1, order A 24 by Ministry of Education & Culture, 2012)

Issues on Teacher Education Reform

Different countries around the world have been gaining the experience in developing education in accordance with informative social concept. Educational state in the field of informative society has been considered as below: (Table 1)

Table 1. The state of education in informative society

	<i>Education in information based society (new concepts)</i>
School	- Schools as a one part of society are integrated to society. - Open information
Teacher	- Guides learning - Guides independent learning of learners - Helps learners to evaluate their learning (self-assessment) - Require more good communication skills
Learner	- learn actively - may study at schools and other environment - work in groups - propose issues - explore to answer questions and ask questions - have more interest for learning
Parents	- take part in instructional process actively - take part in management activities - are involved in life-long continuous education

The main force for the knowledge-based society is education but the core of the educational development is teacher development. Today’s teachers should have competencies of developing themselves continuously, receiving and using new information and technology, doing research on facing issues and using the results. In addition, knowledge, abilities, and communication skill for leading teaching and learning and team working skill are required for teachers in a modern society (Figure 1).

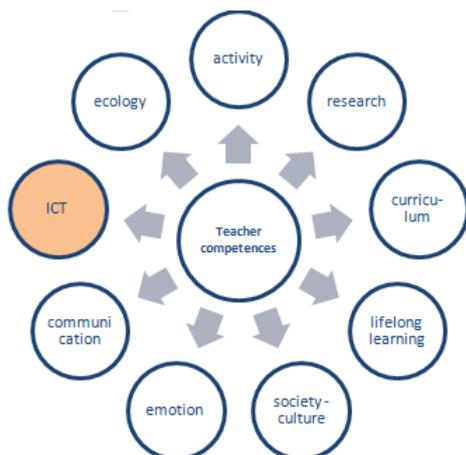


Figure 1 Components of teacher competences

ICT competency is based on the process of using ICT facilities and tools for knowledge transmission, dissemination and knowledge acquisition. A technology supports the process of creating, saving, using, transmitting and disseminating the information. ICT is significant to improve the process of teaching and learning. Teachers have possibilities of improving the student’s learning process by preparing and experimenting e-training materials, improving and updating them, using the web and blog for instructional purposes and introducing distance training system. As instructional software program, instructional games and instructional packaged program are used for the training, students’ learning style will be developed.

Teacher is a reformer and a developer of educational purpose, content, methodology and evaluation in accordance with social and learners’ needs and demands a person who

reforms the knowledge-based instruction to an action-based training; a developer who determines and encourages students' learning style and a facilitator of acquiring knowledge-based learning style. Therefore, the reform should be made by teachers at first.

ICT is able to transmit information regardless of capacity, type, content, time and distance. Therefore, we have had a possibility of organizing knowledge-based actions by using ICT.

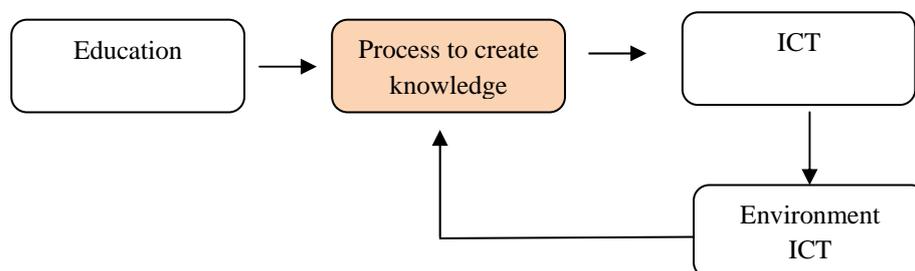


Figure 2. Framework on the research of ICT in education

Reform of instructional technology and multimedia technology

In the reform of instructional technology, multimedia technology is a tool for introducing methodology of teaching and learning, new content of subjects, practicing and establishing and improving cooperation between teachers, learners and parents. As for learners, ICT is a tool for presenting visual aids of information obtained as a result of creative and projects works. As well, it becomes a tool for self-assessment of learning and gives possibilities to evaluate knowledge and skills of learners.

In multimedia-based instruction, teachers have such responsibilities as providing a variety of information sources (website, e-textbooks, instructional programs etc), focus learners on topics being studied by motivating, teaching them methods of doing research, introducing products and assignments of learners to their peers and others, attracting them to discussion by questioning and answering and monitoring learning process. Moreover, they are responsible for directing learners to propose and solve issues, giving assignment guidelines and evaluating their teaching activities and process (participating in discussion and cooperating with professional teachers etc).

As well, learners have a variety of roles, namely, determining methods for doing assignments, constructing new knowledge by searching for and using specific information related to subjects, cooperating and exchanging ideas on issues being studied, making a real product by doing assignments (in the forms of file and print) and introducing their works and offering new information to teachers, their classmates and others.

Current situation, experience and recommendation on application of multimedia technology in instruction of primary and secondary schools.

It has been 20 years since information communication technology started to be used for instruction in Mongolia. A number of foreign and domestic projects are being implemented in the field of using ICT in instruction. Nevertheless, the introduction of ICT infrastructure in the country is different and this situation has had some impacts on implementation of projects and programs. In this case, the School of Computer Science and Information Technology, Mongolian State University of Education has organized annual national contests under the topic as "Application and development of multimedia technology in instruction" for primary and secondary teachers since 2006 with the aims of revealing objective results and progress of the above mentioned projects and programs for instruction and providing possibilities of sharing and disseminating experiences for teachers. Many primary and secondary teachers of different subjects from urban and rural places participate in the contest. The contest is organized with three stages. In this:

1. The contest is organized in 21 provinces and 9 districts of Ulaanbaatar city and creations of teachers who win are sent to the contest commission.
2. The contest commission selects 10 creations and gives permission to take part in 3rd stage.
3. The commission chooses "National best teacher as user of multimedia technology" among the selected 10 creations.

The study considers the support and help given for learning process of learners and teaching activities of teachers, based on 30 creations of the contest participants for last 3 years.

A. General information of the contest participants

Out of all participants, 47% are from Ulaanbaatar city and 53% are from rural areas. The contest creations are based on the content of subjects as informatics, mathematics, physics, chemistry, technology, geography, English, natural science and project-based learning. Teachers of natural science are involved in the contest more than teachers of other subjects. Teachers apply a variety of programs including MS office programs, Adobe Flash, Scratch, Lecture Maker, Gtk-record Mydesktop, Cisco binary game, 3D geo, MS Office Learning Suite, KSEG

and Articulate Quiz Maker in order to design multimedia resources for their lessons. It is seen that the instructional quality and learning process are supported by using e-textbooks, web based resources, blog and mobile phone based resources for lessons.

B. Providing creative teaching strategies and learning process

It studies about the support given to teaching methods and learning process when teachers who participate in the contests introduce multimedia technology. The analysis of the study data reveals that:

Table 2. Multimedia technology's support of learning strategies

Educational level	Supporting teaching activities	Supporting learning strategies
Primary education	<ul style="list-style-type: none"> - Teachers use computers to teach lessons using games in the subjects as mathematics, English and natural science of primary education. - Teachers use computers to design curricula, visual aids, handout materials and e-tests. - Teachers work with teachers of different subjects and teams of teachers in some cases. 	<ul style="list-style-type: none"> - Learners use instructional programs for providing practice and activities in the subjects as reading, grammar and mathematics. In this case, learners learn to use a computer and improve skills of creative and imaginative thinking.
Lower secondary education	<ul style="list-style-type: none"> - Teachers use Internet and have access to information for project and problem based learning. - They use computers to design educational documents and lesson materials. It includes processing and saving information, writing personal letters to parents, design a variety of certificates and appreciation and start data file for learners etc. 	<ul style="list-style-type: none"> - Learners improve their learning strategies using multimedia by calculating, studying grammar, using foreign dictionaries and know about historical time sequences. - As well, while they search for internet, learners are able to find maps of world countries and scripts of historical places, read works of other learners, news, current issues and fictional stories and travel through internet museum.
Higher secondary education	<ul style="list-style-type: none"> - Teachers design interactive, web based and mobile phone based instructional resources together with other teachers. - Teachers share their experiences and take suggestions IT person. 	<ul style="list-style-type: none"> - Learners are able to see process of experiments of lessons of natural science and study the way of doing experiments and do experiments. - Learners improve their communication skill using Internet. - Learners are prepared to use computers in the future, and identify development of hardware and software when they study specific subjects.

Conclusion

The study shows that organizing instructions using multimedia technology has brought many effects. Teachers emphasize that multimedia technology has become a tool for supporting intellectual development and developing creative thinking. The study involves 30 teachers who took part in the national contest named "Application and development of multimedia technology in instruction" for last 30 years. Teachers are exploring, experimenting and improving ways of supporting learning process by applying interactive games, instructional programs and doing experiments depending on subjects they teach. However, it seems that policy makers and school management should consider that there are some issues to design instructional resources using multimedia technology. In this:

- Improve ICT competency of teachers by organizing staged trainings. Organize trainings in regions and local cities or online trainings
- Support to improve infrastructural resources as computers for the use of teachers and schools
- Design and apply open instructional software and games in instruction

Multimedia technology can make big contribution to develop cognitive needs of learners, motivate their learning interests, improve learning strategies and enhance their knowledge and capabilities independently. On the other hand, it becomes a tool for improving instructional quality and results.

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