

EFFECTIVE ICT IMPLEMENTATION AS A PRECONDITION FOR DEVELOPING GENERAL AND VOCATIONAL EDUCATION

*'No success can be achieved without
thoughtful planning and thorough preparation'*
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In the 21st century, the questions discussing background quality became crucial issues having a reflection in the international documents (the Barcelona Declaration, 2002, Lisbon Strategy Implementation Programme, EUROSCENE 2003 etc.) which draw up the guidelines for future education and decisive actions. The documents focus on the relevance of developing teaching methodology and technologies. Shortage of close attention prevents from the process of creating a competent public knowledgeable society (Strategy for Education for Sustainable Development, 2005) that is constructive and highly capable of building democracy in continuously changeable present and future life. Daily growing signs and impact of globalization show that individual steps require greater coordination in the international context. Formally, all the above mentioned subjects are highly relevant to us and closely relate to the dimensions of the Education for Democratic Citizenship in Europe (Education for Democratic Citizenship, 2001-2004).

Modern ICT definitely play a crucial role in developing the teaching/learning processes at all stages and improving the quality of education. Actively involved information/knowledge-based society offers new opportunities to effectively satisfy students' needs for teaching/learning. In addition to this, no new teaching/learning environments can be created without ICT. Technological progress and rapid development inevitably touches education sector. The breakthrough in education can be clearly noticed in the majority of European countries.

Educational advantages of ICT raise no doubts. The use of ICT substantially helps with introducing educational material in a more modern and vivid way. Applying ICT in the teaching/learning process does not object to the basic didactical principles such as visualization, systemization, links between theory and practice, knowledge consolidation, encouragement of student participation in different activities, individualization and differentiation of teaching etc. Recently, Lithuanian teachers have been deeply involved in the *Microsoft PowerPoint* program which is very useful for preparing lessons as well as for other educational activities. The teachers suppose that such lessons are much more purposeful, interesting and increases motivation for learning. It can be clearly stated that when using the above introduced program, the teachers of different subjects have already made suggestions on different topics which open wide possibilities of integrating various themes, presenting information contained in a few chapters, increasing visualization of teaching etc. The teachers notice that shortage of time is one of the major drawbacks. In order to put forward qualitative suggestions, enough time and appropriate computer literacy skills are required. Gained experience and prepared teaching/learning material are the subjects worth being emphasized. Legal requirements of copyright certainly must be satisfied. A series of recent expert surveys in Lithuania disclosed that some teachers including Lithuanian Association of Physics Teachers (LFMA, 2008) and Lithuanian Association of Geography Teachers (LGMA, 2008) found useful a possibility of using special databases where necessary didactic material should be accumulated (Lamanauskas, Vilkonis, 2006). However, at the moment, Lithuanian Associations of Chemistry and Biology Teachers are not very actively involved whereas Lithuanian Association of Informatics Teachers (LInMA, 2008) is working very effectively. The website of the latter association is particularly useful as it presents different information that embraces conference texts, methodical information, discussion notes, reviews etc.

Apart from the above mentioned program that focuses on making presentations, Lithuanian teachers widely and effectively use such general purpose software as *Microsoft Word*, *Microsoft Excel* etc. It is worth noticing that *Microsoft Excel* has a number of qualities, and therefore everyone learning to use a computer can find this software helpful. *Microsoft Paint* is rather frequently applied in educational practice due to its quality to produce computer graphics. Another virtue of ICT which is saving teacher's time must be emphasized. Using a computer is convenient as it helps with presenting and organizing different sorts of data whereas the Internet greatly assists in finding necessary information. Collaboration between teachers and students' parents is an important process of schooling. E-mail helps teachers with contacting learners' parents as well as the learners themselves. Lately, e-calendars are being widely implemented in Lithuanian schools which offer learners' parents possibilities of becoming acquainted with schoolchildren's achievements. The process of applying the Intranet in such educational institutions as comprehensive and vocational schools is slowly progressing. However, even in this case, a rapid development is taking place. The implementation of the Intranet occurs with increasing rapidity. The Intranet presents report forms, annual and long-term educational curricula and other required documents and references which facilitate manipulating information.

Another apparent quality of applying ICT is inter-cultural collaboration. Lithuanian comprehensive and vocational schools are active in joining international projects and programmes. In case of rejecting ICT, such collaboration should be barely accepted. The employment of ICT can help with organizing audiovisual conferences and expanding other methods of collaboration. For example, a number of Lithuanian comprehensive schools have been participating into the international project *ENO-Environment Online* (ENO-Environment Online, 2008).

School life is extensively attacked by virtual teaching and learning environments allowing easily and flexibly organize the processes of teaching and learning. The virtual teaching/learning environment *Moodle* (<http://moodle.org/>) is one of the most popular systems. Suchlike environment offers a lot of different teaching and learning activities. Moreover, teachers can introduce teaching/learning material using a simple text, references to different websites on the Internet or hypertexts created on individual basis. Other virtual learning environments including *Web CT*, *ATUTOR*, *First Class* etc. are also being used. It should be mentioned that the establishments of higher education were the institutions that first started implementing and using the above introduced environments. Nevertheless, at the moment, comprehensive and vocational schools are trying not to lag behind their colleagues from universities. In recent years, in order to adapt vocational training for the needs of labour market and to encourage collaboration between employers and institutions of vocational education, the system of Lithuanian vocational education has been improved. The use of the European Union funds designated for vocational training helps with a rapid implementation of ICT.

However, ICT implementation covers more than creation and development of virtual learning environments. Practising only a virtual environment is not the most efficient way. For example, taking into account teaching natural sciences, it is worth reminding that sciences are based on experimentation. Therefore, the process of science education requires a practical-experimental approach in real teaching/learning environment. In this case, a burning question how to combine modern ICT and the above mentioned approach arises. One of the methods is implementing teaching/learning technologies of augmented reality. At the moment, five countries of the European Union are participating in the international project *ARiSE* based on the innovations in the field of ICT. (<http://www.arise-project.org>). A group of Lithuanian scientists from Science Education Research Centre of the University of Siauliai are involved in the project. The ARiSE project will develop the AR platform and associated pedagogical scenarios of use, enabling teachers to promote new teaching practices for teaching scientific and cultural content in primary and secondary schools. The ARiSE project is carried on in a consortium of seven partners: Fraunhofer IAIS (Germany) – coordinator, Siauliai University (Lithuania), AccrossLimited (Malta) /until 30/06/2007, replaced by University of Brighton (UK), ICI București (Romania), Czech Technical University in Prague (Czech Republic), Siauliai City Juventa School (Lithuania) and Rabanus-Maurus Gymnasium Mainz (Germany). The first consumers' impression about the AR teaching/learning platform is positive. The product is evaluated as highly useful. The AR learning platform creates conditions for a better understanding, and therefore is acceptable for younger learners encountering difficulties with perceiving abstract,

invisible processes. The AR learning platform increases students' motivation for learning. The possibility of learning by doing, touching a real object with hands, monitoring and changing the place of the object has been positively evaluated. The learners' ability not only to monitor but also to control certain processes has been perfectly evaluated (Lamanauskas, Pribeanu, Vilkonis, Balog, Iordache, Klangauskas, 2007).

One of the most important requirements for applying ICT and innovative techniques of teaching is a qualified teacher able to professionally use technologies in practice. A modern teacher must know how to employ ICT and adapt them in order to achieve specific goals of teaching. If previous teachers were more focused on technical aspects of applying ICT, recently, educational aspects of employing ICT have gained more weight. Likewise in the majority of countries in Central and Eastern Europe, shortage of young teachers can be noticed in Lithuania. An effective use of modern ICT is difficult for aged teachers. Although they can increase their qualifications in teacher training institutions at different level, still, similar activities do not compensate substantial gaps in the field they are dealing with. An interesting point is that in the majority of cases, students' computer literacy remains higher than that of their teachers. Nevertheless, teachers' **computer literacy** becomes an essential professional work condition. The use of ICT in education offers many new possibilities but the necessary ones are only the latest knowledge and skills of teachers (Bilek, Zemanova, Turcani, 2007). It is likely that these fields of discussion will be paid closer attention.

Apart from effective implementation of ICT, it should be carefully considered possible negative outcomes of applying these technologies. For example, the premises equipped with a larger number of work stations must agree with certain hygiene standards established individually by every country. However, the standards themselves do not vary. A relevant fact is that in case of a larger number of computers in the classroom, a person might work in a strong electromagnetic field which negatively affects organism. A learner must sit in a comfortable work station that fulfils all possible hygiene requirements. The latter conditions are frequently ignored in schools due to various reasons. Electromagnetic radiation emitted by computers first of all, affect eyes, central nervous, reproduction and heart and vascular systems. It is extremely dangerous for younger learners. If a child spends too much time at a computer, one can start suffering from reduced eyesight sharpness. Though the rays sent out from computer do not cause any particular diseases, however, the human organism is definitely affected. Besides the above introduced valeologic and ergonomic problems, other disorders such as psychological dependence might occur. One of the Lithuanian websites discloses information that the findings of psychological research carried out by the scientists from the U.K. show concern that children under ten years old have nothing to do at computer! Even educational games might have a negative impact on younger children as in that case, maturity is decelerated, interest in child-focused games and communication with peers are decreased, attention is disturbed and imagination is poorly developed (Child Addiction to Computer / Vaikų priklausomybė nuo kompiuterio, 2007).

A short review reveals that in one or another case, ICT may cause negative outcomes. First of all, it might be users' health problems. The researchers underline that widespread using ICT has caused necessity to rise up questions about protection of students' health and other categories being taught, for example ergonomical problems (Jarinovskis, 1997, Gedrovics, Lamanauskas, 2006). Thus, the question *of the negative impact of ICT* is gaining more weight. It seems no answers are required. On the other hand, we are still suffering from shortage of information on different aspects having negative impact. When the answer is clear, we start feeling lack of required abilities and knowledge of *how to reduce the negative impact of ICT* or how to eliminate or at least to minimize it. Another important issue is *what the real impact of modernization on society in terms of ICT implementation is*. We are expecting that the coming years will bring us together to solve the above discussed problems and find positive decisions.

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