ICT IN TEACHERS' CONTINUOUS EDUCATION – WORLDWIDE EXPERIENCE AND THE MACEDONIAN CASE[*]

Metodija Janceski

The paper consists of four general parts. After a brief review of the worldwide responsible institutions for teachers' trainings in the framework of their continuous education, the paper will discuss the characteristics of national teachers' training programmes. Some of the educational systems prefer pedagogical skills, some of them prefer ICT skills, but the best solution is in their integration. The ICT-enhanced skills are also recognized as synergy between, so called, soft skills and ICT skills. Follows examples of ICT support services in some European schools, as well as, the defined main roles, and actors.

The last part discusses the different experiences of assessment and evaluation the ICT competencies of teachers and the variety of teachers' ICT certification.

The paper includes the Macedonian experience in the field of teachers' continuous education which is on the main crossroad taking into account the current mass computerization of the Macedonian schools. In each chapter, the author gives some proposals for improvement the use of ICT in Macedonian schools, as well as, for increasing the teachers' ICT skills and their implementation.

1. The responsible institution for teachers' trainings. There is a variety of in-service teachers' training programmes (face-to-face, distance education or hybrid) in place across worldwide, which includes ICT related training to different extents. These programmes are responsibility of different institutions and organizations (Ministry of Education, Regional/ local authorities, National agency/ Board of Education, National / regional qualifications authority or council, National school network, Universities/ teacher training institutes, Inspectorates, special working groups, expertise centers, companies, schools, etc.). The most of the in-service teachers' trainings in Macedonia were result of close cooperation and coordination between international organizations and projects, from one side, and the Macedonian government, especially Ministry of education and science, and Bureau for development of education, from another side.

2. Characteristics of national teachers' training programmes. Various rapid technological innovations have opened up huge numbers of opportunities for pedagogical uses of ICT during the past decade. National and international investigations and their meta-analyses have supported the optimistic view that many difficulties in teaching and

---

learning can be erased or relieved by means of ICT [1, 4, 6, 11, 14]. The Internet, CD-ROMs, functionally versatile workstations with fast processors and information networks in particular, including digital platforms for web-based learning, launched a new era for educators. Despite the promising opportunities of e-Learning, m-Learning or u-Learning (electronic, mobile, and ubiquitous), the problems should also be kept in mind. The advantages of computers, open learning environments, digital materials or networking are sometimes overstressed. Teachers' IT skills are not always the best possible. Without proper basic computers skills, peripherals and network tools and without a clear vision of their pedagogical use, nothing important will occur in the classrooms. New ICT requirements are challenging, especially for the experienced teachers but there is remarkable variation in IT skills between teachers for all age groups, school subjects and educational levels.

As for the training programs, the authors recognize two main groups, a small number of courses which still purely focuses on teaching ICT proficiency, and a majority of courses which focuses on both technical skills and competencies of how to apply ICT in pedagogical settings. Eastern and Central European Countries pursue both approaches in parallel, set the basis of ICT use of teachers as well as to fulfill broader pedagogical objectives with ICT [2, 3, 7].

Developing pedagogical skills for teachers includes, in general, integration of ICT in pedagogical practices, the use of ICT in the classroom (for subject teaching) or, in general, the use of ICT for learning.

Follow some of the targets mentioned in national documents:
- "Combine ICT skills with pedagogical ICT skills";
- "Focus on the pedagogical use of ICT and digital competence for all teaching personnel";
- "Use ICT to learn and not learn to use ICT";
- "Standard defines professional qualifications for teachers when implementing ICT in the educational process and self-education";
- "Develop the ICT skills necessary for effective classroom use";
- "Integrate ICT in pedagogical practices".

As for the official national policy documents the importance is given to the development of:
- pedagogical skills (high importance in: Norway, Hungary, Switzerland, Denmark, France, Lithuania, Belgium-Flanish community, Israel, Malta, Greece and Finland; medium importance in: Estonia, Malta, Catalonia, Belgium French, Czech Republic);
- technical ICT skills (high importance in France, Lithuania, Malta, Hungary and Finland, medium importance in: Czech Republic, Belgium (French community), Switzerland, Denmark, Catalonia, Estonia, Greece, Israel).

It's worthy to mention the Chinese Taipei case where the Ministry of education announced in 2001 that it would no longer offer training courses focused on computer literacy. Rather, all future courses would emphasize integration of technology in instruction. It is also interesting that in Australia, different Australian states have established their own standards, frameworks for teachers in their respective jurisdictions.

A broad range of new skills needed for teachers in the knowledge-based and lifelong learning society have been identified in studies within the EC program *Education & Training 2010*. An important part of these skills refers to the competences and

abilities of teachers and trainers to design, develop, conduct, facilitate and access teaching and learning processes aimed at acquisition of productive soft skills enhanced by ICT. These skills include: knowledge presentation, working on projects, problem solving, and communications skills. In response to the demand of enhancing the ICT skills with such soft skills the *Leonardo da Vinci Innovative Teacher* (*I*Teach*) *project* has been launched [5]. The focus of this project is on developing a practical methodology and supporting tools for building ICT-enhanced skills – a concept coined to denote the synergy between soft skills and ICT skills. Through the collaborative efforts of partners from seven European countries (Bulgaria, Germany, Italy, Lithuania, the Netherlands, Poland, and Romania) the skills for: searching and selecting information, presenting information, working on a project, and working in a team, are identifies as ICT-enhanced skills. The *Innovative Teacher project* (*I*Teach*) develops a practical methodology, approaches and tools targeted at day-to-day utilization by the teacher trainers and teachers of these enhanced ICT skills in their work [13]. The Methodology Handbook on ICT-enhanced skills [12], prepared in frame and with support of this project, is intended for teachers and teacher trainers who would like to implement practical methods, methodological tools, and software instruments to support their students in building ICT-enhanced skills and competences.

The teachers have to be able to apply information technology in their work – teaching and learning. Therefore, teachers have to know perfectly the problems of usage of information technology (have to be aware with pedagogical-psychological, social, ethic, cognitive sides) and their impact on education. The four main qualification requirements for teachers in Lithuania were stated [10]:

1. To be able to use ICT in the educational process;
2. To improve systematically the information culture of students and oneself;
3. To know the methods for professional competence improvement by using ICT;
4. To know the main forms of educational information development and dissemination on the Internet and their importance as well.

As for the psychological point of view, learning: 'about', 'from', and 'with ICT' is discussed in literature. Learning 'about ICT' refers to ICT skills, not how ICT can support learning. Learning 'from ICT' refers mainly to a behaviourist view of learning, while learning 'with ICT' refers to a constructive view of learning.

A Report to the Commonwealth Department of Education, Science and Training from 2001 identified the following four different, but overlapping, dimensions of ICT use in schools. Here ICT is recognized as:

- a tool for use across the curriculum or in separate subjects where the emphasis is on the development of ICT-related skills, knowledge, processes and attitudes;
- a tool for enhancing students' learning outcomes within the existing curriculum and using existing learning processes;
- an integral component of broader curricular reforms, which will change not only *how* students learn but *what* they learn; and
- an integral component of the reforms, which will alter the organisation and structure of schooling itself.

According this report, these dimensions provide a way to contextualise the role and purpose of ICT use, and hence impact on the competence required by the educators who focus on particular dimensions.

As for Macedonia, in the "National Program for the development of education 2005 – 2015" [8], as well as, in some of the accompanying program documents (especially in: the Program for development of ICT in education, the Program for professional development of school staff, and the Strategy for adult education in the Republic of Macedonia in the context of lifelong learning) the ICT life-long teachers' trainings issues are seriously discussed with high level of importance. It is the same case with the "National Strategy for Information Society Development" [9] with accompanied "Action plan" from 2005. These documents are in fully compliance with the targets from other countries, cited above in this chapter. Unfortunately it is not a case with the process of implementation. Many things have to be done in this field. Taking into account worldwide and especially neighborhood positive practices mentioned in this paper, the characteristics of the national education system, as well as the current mass computerization of the Macedonian schools, we have to try to build well prepared and organized system for teachers' continuous education that will include the distance education courses with periodic face-to-face meetings. In parallel, the curricula of the Universities that produce future teachers have to be improved giving accent to the different uses of ICT in the process of education. In such way we will bridge the gap that exists.

3. Support services. Different type of support services (human resources and service providers) are now available in European schools and are common practice. The most known ICT support person in schools in most European countries is that of the ICT coordinator. His/her tasks have certainly changed throughout the years from purely technical support to the organization of ICT in schools and pedagogical ICT support in some countries. In other countries ICT related teacher training can be more differentiated towards the function of the person in the organization – pedagogical training for teachers, organizational for headmasters and technical for ICT coordinators.

For example, Switzerland has resource people in each school who are specialists of both ICT and didactics, and in Norway specialized personnel are engaged in all schools to strengthen education in basic skills. In Czech Republic each school is required to appoint amongst its teaching staff an ICT coordinator, who is expected to be very well qualified in the field of ICT. The coordinator is responsible for:

- supporting the acquisition of information literacy;
- the integration of ICT in his or her school in particular;
- cooperation with other teachers in regard to the didactics of using ICT in education;
- elaboration and implementation of the future ICT policy of the school;
- selection and purchase of ICT equipment for the school;
- all operational aspects of ICT in the school.

Follows a list of specific ICT life-long training programs for different actors in the process of education:

- ICT coordinators trainings in the technical and pedagogical use of ICT (Belgium – Flemish community);
- ICT coordinators trainings in specific knowledge and skills of ICT in schools (the Czech Republic);
- ICT counselors trainings in the pedagogical use of ICT (Denmark);
- Core group of teachers trainings (Catalonia, Switzerland and Germany) followed by dissemination;

- mentor training courses for expert teachers (recruited from the winning schools of ICT competitions and educators with experience in the field of using ICT in education) organized in networks (Hungary Sulinet).

Taking into account the experiences of developed countries, Macedonia has to make important educational and organizational changes in its schools. It has to be done very quickly in order to strengthen the current mass computerization of our schools. Among other things, there is evident need for ICT coordinators in schools. The IT teachers in Macedonia are the main "victims" of numerous requests related with ICT by principals, teachers – colleagues, and students. They are forced to play this role as volunteers besides their full educational engagement.

4. Assessment and evaluation. Most of the countries have several schemes to certify teachers' ICT competence, and tend to certify their teachers at the end of an in-service teacher training programme. The teacher's competence in information communication technologies (ICT competence) consists of knowledge, abilities, approaches, values and other personal qualities determining successful ICT use in educational practice. Competence in ICT is formed within studies at higher school, independent learning, collaboration and other activities. The preconditions for developing competence in ICT can be subdivided into two categories – formal (studying at higher/comprehensive school) and informal (studying through collaboration, independent studies).

The Czech Republic, Denmark, France, Hungary, Israel and Switzerland have developed their own national ICT certificates for teachers. The European Computer Driving License (ECDL) is used in Denmark, Estonia, Malta, Catalonia, Czech Republic, and Hungary. It's interesting to mention that the ECDL in Russia is considered to be somewhat unsuitable for teachers preparation because of its concentration on the technical side of ICT, and because it is not related to teachers' practice.

The Teachers' Computer Literacy Standard was prepared in Lithuania in 2001. This standard defines what knowledge and skills are required for teachers. The requirements of the standard are closely linked to the programme for obtaining the ECDL. In order to implement the educational part of this standard in 2002 a draft on teachers' distance learning was prepared. The Teachers' Computer Literacy Standard is not restricted by the content of ECDL. Attention is paid to the integration of information technology into education in respect of pedagogical, psychological and social aspects.

Denmark, with its Pedagogical ICT license (European Pedagogical ICT License – EPICT), covers a wide range of teacher audiences in 10 schools types and different subjects. This license with more than 50% of Danish teachers in four years involved, with participants from Norway and pilots in Hungary, Greece, Italy, Iceland, UK has two "sisters" in different continents: APICT – African Pedagogical ICT License with pilots in Ghana, Uganda, Cameroon, and AusPICT – Australian Pedagogical ICT License with pilot in Tasmania.

According the researchers from Finland, competence in ICT embraces two structural components – ICT literacy and ICT competence in didactics. ICT literacy can be treated as a dynamic rather than static component that requires renovation and expansion in order to reflect changes in the context. The didactic component of competence in ICT mainly implies the ability to adapt ICT in educational practice. The integrity of ICT literacy and the didactic component are ensured by the needs of a teacher.

While the most of the developed countries are on the way to define a common (ICT)

209

competence framework for all teachers in their country by developing certifications, setting standards or benchmarks, or highlighting best practice, Macedonia is on the start of this way. In the state of absence of standard for competences, the majority of the teachers who attended the trainings of ICT in education had received certificates that only certify attendance. In this moment, in Macedonia, there is no common schema to certify teachers' ICT competence. It still remains the authorities to decide between developing new licenses on national level, or to accept licenses on European, or international level. But, it is also important to stress that we have also to improve the process of auditing the proper implementation of ICT skills in the process of education for every teacher.

REFERENCES

[1] Assessment schemes for teachers' ICT competence – a policy analysis: Results from PIC/P2P Survey (2005). European Schoolnet 2005. `http://www.eun.org/insight-pdf /special_reports/PIC_Report_Assessment%20schemes_insightn.pdf`.

[2] P. ATJONEN. Finnish teachers and pupils as users of ICT, *Informatics in Education, Institute of mathematics and informatics, Lithuanian academy of sciences* **5**, No 2 (2006), 167–182. .

[3] V. DAGIENE, E. VALAVICIUS. Teacher training via Distance learning focussed on educational issues in information technology, *Informatics in Education, Institute of mathematics and informatics, Lithuanian academy of sciences*, **3**, No 2 (2004), 179–190.

[4] Department of Education, Science and Training (DEST). (2001) Making Better Connections Models of Teacher Professional Development for the Integration of Information and Communication Technology into Classroom Practice. Commonwealth Department of Education, Science and Training. Goanna Print: Canberra. Retrieved from the World Wide Web at `http://www.dest.gov.au/schools/publications/2002/MBC.pdf` on November 15, 2008.

[5] P. FORCHERI, M. T. MOLFINO, N. VAN DIEPEN, E. STEFANOVA, E. SENDOVA. Giving teachers a hand (book) to develop ICT-enhanced skills, Proceedings of the Third Balkan Conference in Informatics, BCI'2007, Sofia, Bulgaria, 301–312.

[6] M. JANCESKI, V. PACOVSKI. Macedonian experience, needs, challenges. *Olympiad in Informatics*, **1** (2007), 66–78.

[7] LEO HØJSHOLT-POULSEN. Current Trends in ICT Teacher Training: Pedagogical ICT Licences, UNIC, The Danish IT Centre for Education and Research Denmark; `www.epict/files/Pedagogical%20ICT%20Licences_LHP.ppt`.

[8] National Program for the development of education in the Republic of Macedonia, 2005–2015. `http://www.npro.edu.mk/english/index-en.htm`.

[9] National Strategy for Information Society Development in the Republic of Macedonia `http://www.kit.gov.mk/WBStorage/Files/Strategy%20and%20Action%20Plan%20ENG.pdf`

[10] P. PECIULIAUSKIEN, M. BARKAUSKAITE. Would-be teachers' competence in applying ICT: Exposition and preconditions for development, *Informatics in Education, Institute of mathematics and informatics, Lithuanian academy of sciences*, **3**, No 2 (2004), 397–410.

[11] J. RAUTOPURO, S. PONTINEN, J. KUKKONEN. Towards the information society – the case of Finnish teacher education, *Informatics in Education, Institute of mathematics and informatics, Lithuanian academy of sciences*, **5**, No 2 (2004), 297–312.

[12] E. SENDOVA, E. STEFANOVA, N. VAN DIEPEN (eds.). Methodology Handbook on ICT-enhanced skills, Leonardo da Vinci project: Innovative Teacher /I*Teach/, 2007.

[13] E. Sendova, E. Stefanova, N. Nikolova, E. Kovatcheva. Like a (School of) Fish in Water (or ICT-Enhanced Skills in Action), Proceedings of the Third International Conference on Informatics in Secondary schools – Evolution and perspectives, ISSEP, Torun, Poland, July 2008, 99–109.

[14] T. Townsend, R. Bates (eds). Handbook of teacher education, Globalization, Standards and profesionalism in times of change, Springer, 625–640.

Metodija Gjeorgjiev Janceski
Institute of Infomatics
Faculty of Natural Sciences and Mathematics
"Ss. Cyril and Methodius" University
Skopje, Macedonia
e-mail: meto@ii.edu.mk

ИКТ В ПРОДЪЛЖАВАЩО ОБУЧЕНИЕ НА УЧИТЕЛИ – СВЕТОВЕН ОПИТ И СЪСТОЯНИЕТО В МАКЕДОНИЯ

Методия Янчески

Статията се състои от четири основни части. След кратък преглед на световно известни институции за подготовка и преквалификация учители в рамките на непрекъснатото образование, се разглеждат четири национални програми за обучение на учители. При някои образователни системи се набляга на педагогическите умения, при други – на умения, свързани с информационните и комуникационните умения (ИКТ), но най-доброто решение се крие в тяхната интеграция. Обогатените с ИКТ-умения се определят като синергия между т. нар. (нетехнически) умения и ИКТ-умения. Следват примери на услуги за поддържане на ИКТ в някои европейски училища и се определят основните роли и актьори в този контекст. В последната част се дискутира разнообразието по отношение на оценяването на ИКТ-компетенциите на учителите и на сертификатите, които те получават. В доклада се разглежда македонския опит в областта на непрекъснатото образование на учителите, като се отчита настоящата масова компютризация на македонските училища. Във всяка част авторът предлага идеи за подобрение на използването на ИКТ в македонските училища, както и за повишаване на ИКТ-умения на учителите.