



DOI: 10.18427/iri-2016-0062

Training of the Teachers for the Application of ICT in the Teaching Process

Vera STOJANOVSKA, Aneta BARAKOSKA

University St. Cyril and Methodius, Skopje, Republic of Macedonia

veras@zsf.ukim.edu.mk, aneta@zsf.ukim.edu.mk

Increasingly emphasized need for the monitoring of the global development in the promotion of education and achievement of a greater competence and competitiveness, in accordance with the new global economy needs, imposed few key strategic documents to be prepared in R. Macedonia which defined the vision of the development of e-learning in the country in the time period from 2005 to 2015. It is emphasized that the education in the 21st century should accompany the development of the information society in order to intensify ICT education and training, the computer literacy and the empowerment of youth and adults.

Accordingly, a supportive educational infrastructure for ICT use in education has been recently created. Namely all primary schools were equipped with adequate IC Technology for the implementation of teaching, and series of teacher training for ICT in the teaching process were implemented. Particular emphasis was put on the training of the teachers how to use ICT in teaching process due to the fact that if teachers were not trained properly for the application of ICT in the teaching process it would result in non adequate and low frequent application of ICT.

Having considered the efforts that have been made in order to empower teachers to use ICT in the teaching process, this paper presents the results obtained from the survey of the attitudes and the opinions of the teachers considering the level of capability of use of the ICT in the teaching process. The research survey covers 100 teachers from five primary schools from different communities in the city of Skopje.

The results of the survey show that teachers do not share the same opinion about their level of competence in using ICT in the teaching process. We can draw some general conclusions based on empirical data obtained from this study. They would feature the recommendations in order to allow a full and successful use of ICT in the classroom by teachers who are employed in the primary schools.

Introduction

Development of the ICT society represent one of the priority tasks of the Government of all countries. There is no doubt that the education is one of the key segments of triggering and support of the development of the ICT society. Therefore in the last two decades in the Republic of Macedonia there is a greater accent on the need of implementing the ICT in all spheres of education. Strategic goals of the process of implementation of ICT in the primary education and dynamics of their realisation in the Republic of Macedonia are determined in the following documents: "*National Programme for the Development of Education in the Republic of Macedonia (2005-2015 years)*", "*National Strategy for the Development of Information Society and Action Plan of the Republic of Macedonia*" and "*Strategy for Development of E-Content 2010-2015*".

About reaching the goals, until now there are realized more project activities in the direction of providing the schools with the necessary infrastructure, computers, internet connections, training of the teachers of using ICT for the needs of the education, as well as providing of the computer educational softwares. As more important we would mention the projects of USAID: "*E-Schools*" and "*Primary Education Project (PEP)*", as well as the Government project "*A Computer for Each Child*" (2006-2012).

The E-Schools Project, was realized in the period from August 2003 till March 2008, in order to develop use of *Information and Communications Tehnology* (ICT) by the teachers and pupils and to create educational portal, in order to connect the schools as communities, in one mutual virtual reality environment. The Project, for his needs, had used donated computers from the Chines Government.¹ By the use of the Project E-Schools, following results are accomplished:

- The teachers in the secondary schools are trained with the basic skills of usage of ICT, foreign languages, in the framework of the training „Intergration of the teaching programme and technology",
- At the end of 2005, it was localised and adopted the first educational software in Macedonia, called ToolKid. This software is meant for usage by the Macedonian and Albanian teachers for the realization of the teaching from first till fourth grade in the primary education,
- It was made and given the first educational portal in Macedonia (www.schools.edu.mk) By the Ministry of Science in the year 2007 (Stojanovska, 2010, 2013).

In the framework of the "*E-School*" and "*Macedonia is Being Connected*" projects, are realized series of trainings of the teachers from the primary and secondary schools for the basic ICT skills, as well as trainings for integration of specific software solutions in the interactive teaching (Windows tools, Toolkid, etc.), trainings for making of web-pages (Mambo) and the usage of internet searches, cooperation and

¹ In the year 2002 a Chinese donation is granted with 5000 computers for the primary and secondary schools.

communication. As well as the project of the Ministry of Education and Science of R. Macedonia, for "*Modernisation of the Education*" (2004-2009), it was realized training for the usage of ICT in the education (The Usage..., 2010).

"*Primary Education Project (PEP)*"², was meant for all state primary schools in the Republic of Macedonia. It was realized in the period from the year 2006 till 2011. The goals of the project were: improvement of the quality of teaching; increasing of the working skills of the youngsters; increasing of the access to computers and integrating of the usage of the computer technologies in all teaching subjects; improvement of the education in Maths and Natural Science, improvement of the grading on the school level in order to trigger and improve the quality of learning and the component of development of working skills. This project also promotes the innovative usage of ICT, as well as the computer control, robotics, electronic music and recording of video and audio documents. With the same project are realized 43 EDUBUNTU applications.³

In the end of the year 2006, it began the realization of the government project for the computerization and digitalization of the education, "*A Computer for Each Child*" (2006-2012), who was realized together with "*Primary Education Project (PEP)*" (2006-2011).

The Project "*A Computer for Each Child*" is an investment of the Government of the Republic of Macedonia, and had a goal to provide computer for every child, software solutions and tools for every school subject, advanced ICT skills for the teachers and pupils, national system for testing the pupils and interactive on-line teaching (Andreeva, 2008). This project was realized in three phases: providing and installation of the equipment, maintenance, locally and internet connection of the equipment, as well as the development of digital educational contents and training of teachers for the realization of teaching with the help of computers.

The government for this project provided 165000 computers needed for completely accomplishing 93 secondary and 354 primary schools (personal computers, LCD-monitors, keyboards and mouses and tin-clients).⁴ With this project a change is made in the usage of the operating system. Namely, from the used Windows operating system, there is a passage to the use of Linux Edubuntu, which is a free and open operating system. Accordingly, from the school year 2008/2009, began the choice, translation and the localization of the educational Edubuntu tools, with the cooperation of the Bureau of the Development of the Education. The Educational software package is consisted of the operating system Edubuntu and 43 educational tools, mainly for the school subjects: Maths,

² The project for primary school (PEP) is realized by the Academy for the development of education (AED), which is an American non-government organization and is working under the name of USAID and in the partnership with the University of Indiana, Macedonian centre for civil society (MCGO) and other local non-government organizations and private firms, is managing his realisation.

³ www.pep.org.mk

⁴ <http://www.mio.gov.mk>

Chemistry, Science, Geography, Computers, Music and package for office work (Open Office).

In order to make it popular, the education of the operating system Edubuntu and to make it accessible to all, in the framework of the project "*A Computer for Each Child*" there were made a series of 40 educational stories which were shown in the two program services of the Macedonian radio television, on Macedonian and Albanian language, as well as program services A1 and A2, starting from September 2009.

For the primary schools, more exactly for the Grade 1 to Grade 3, there were provided 53.000 Classmate portable computers, product of the corporation for computer technology "Intel", as the best for the realization of the teaching in the lower grades of the primary schools.

In the year 2009, the project "*A Computer for Each Child*" began with the realization of the third component of the digitalization of the educational contents. Digital teaching contents have the goal of: stimulating the interest of the pupil for the school subject, helping the pupil more easily to remember the facts of the educational content, more easily to understand the educational matters and to stir a wish for individual investigation. For this purpose, programs were made with electronic contents in six school subjects in the primary and secondary education: History, Geography, Maths, Science, Chemistry and Biology, on four teaching languages (Macedonian, Albanian, Turkish and Serbian) (The Condition..., 2011:13-14).

For providing digital contents, its own contribution gives the corporation of computer technologies "Intel", with the donation of educational contents of four teaching programs- Maths, Chemistry, Science and Biology. A local adaptation is made of the donated Intel materials and a web-site is published (www.school.mk). For these digital contents, training was realized for teachers about integrating e-contents in the teaching process.

The Ministry of Informational Society, in the year 2010, promoted the project of free electronic books on the web page "e-ucebnici.mk". Up to now, this portal has published a great number of books in Macedonian, Albanian and Turkish language, which one can freely go through and search through its content.

As his complementary project the web-site "School.mk" is prepared by the Ministry of Informational Society and the Bureau of the Development of Education, which is a part of the network "school.com". The web-site gives tools and contents of teaching subjects as Maths, Science, Chemistry and Biology. The page contains interactive audio and video materials, which can be used in the teaching and gives a contribution in the creative closeness and uniformity of the teaching contents of these subjects and areas. The offered contents cover the teaching subjects of primary and secondary education, in the relation of the teaching programs of the Republic of Macedonia, according to which, the teaching is realized in the quoted subjects (The Condition..., 2011).

In relation with the already made investments and realized trainings for enabling teachers to use the ICT in the teaching, it is a special interest to

view the auto perception of the teachers of the primary schools, about their capability of this kind of teaching activity.

Research problem and method

Having in mind the efforts that are made so far, in the direction of training the teaching staff of using ICT in the teaching process, the aim of this research is to view, which are the attitudes and opinions of the teachers, of their capability to use the ICT in the realization of the teaching process. As a technical of gathering the necessary empirical data in the research, it was used the technical of questionnaires, and for the need of this, it was created a sheet of questions, with 12 questions, in which there were offered several alternative answers–questions of closed types. The questionnaire was anonymous, in order to get honest answers by the teachers, in relation to their capability to use ICT in the teaching process. In general, there were asked 100 teachers, from five primary schools, from different communities, of the area of the city of Skopje, of whom 50 teachers from lower classes (class teachers) and 50 teachers from upper classes (subject teachers)⁵.

Results and discussion

In this part of the work, there are Tables presented, analyzed and interpreted results, get from the realized empirical research of part of the questions in the sheet, which we taught are in the closest connection with the analyzed problem.

It was of special interest in the research, to recognize the attitudes of the teachers, in the relation of their training to use the ICT for the teaching needs.

Table 1. Attitudes of the teachers in relation to their capability to use ICT for the teaching needs

Category of answers	Class teachers		Subject teachers		Total	
	f	%	f	%	f	%
I'm capable enough	31	62,00	20	40,00	51	51,00
I'm partly capable	19	38,00	30	60,00	49	49,00
I'm not capable	0	0,00	0	0,00	0	0,00
	50	100,00	50	100,00	100	100,00

$$x^2 = 4,842 \quad df=1 \quad p < 0,05$$

According to this data, we can say that the teachers differently estimate the level of their capability to use the ICT in the teaching process. From

⁵ The research covered subject teachers who realised teaching of the school subjects: Maths, Science, Chemistry, Biology, Geography, History, Music, Macedonian and English language.

them, 51,00% consider that they are capable enough, and 49% that they are partly capable. Also it can be seen that between the class and subject teachers, there is a difference in the stated opinion upon this question, which can be seen from the Hi-square test. The given data, viewed from the aspect of the statements, given by the class and subject teachers upon this question, it can be noticed that a greater percent of the class teachers (62,00%) had stated that are capable enough, while greater percent of the subject teachers (60,00%) had stated that are partly capable of using ICT for the teaching needs. However remains the fact, that almost half of the teachers had stated that are partly capable for the realization of the etching process with the use of ICT. This data clearly points out, that there is a need of increasing the level of their capability of using the ICT for the teaching needs, which means to upgrade their competence on this field.

With the research we were inclined to learn the meaning of the teachers, whether they are enough trained in the initial education, so they can successfully use ICT in the teaching process.

Table 2. Attitudes of the teachers, whether in the course of initial education are trained enough to use ICT in the teaching process

Category of answers	Class teachers		Subject teachers		Total	
	f	%	f	%	f	%
Yes, quite enough	21	42,00	15	30,00	36	36,00
Partly	22	44,00	27	54,00	49	49,00
I wasn't trained	7	14,00	8	16,00	15	15,00
Total	50	100,00	50	100,00	100	100,00

$$x^2 = 1,576 \text{ df}=2 \text{ p}>0,05$$

According to the given results, it can be stated that the teachers have separated opinion in relation to this question. Namely, the biggest percent of the reviewed teachers (49,00%) consider that they are partly capable, 36,00% consider that they are capable enough, while 15,00% consider that they are not trained in the course of initial education, so that they are not able to use ICT in the teaching process. Between the class and subject teachers, there is no difference in the stated opinion in relation to this question, because the given value Hi-square test is not statistically important. Besides, the given results are extremely important, because they make us think that is necessary to make constructive critical review and analysis of the actual study and subject programs of the faculties which produce teaching personnel, from the aspect of teaching subjects and contents from which the future teachers are trained to use ICT in the teaching process. This analysis will lead to interventions in the actual study and subject programs, on order to enrich, upgrade the contents of the actual programs basis, in the function of getting the competences of the future teachers, needed for use of ICT in the teaching process.

In regard of the made interventions so far, in the direction of enabling the teachers to use the ICT in the teaching, with this research we wanted to know how many of the reviewed teachers have attended trainings in

their professional improvement to use ICT in the teaching. The results in regard to this question are represented in the following Table.

Table 3. Attitudes of the teachers whether they have attended training in the function of their professional improvement to use ICT in the teaching

Categories of answers	Class teachers		Subject teachers		Total	
	f	%	f	%	f	%
Yes, only once	19	38,00	21	42,00	40	40,00
Yes, many times	25	50,00	19	38,00	44	44,00
I haven't attended	6	12,00	10	20,00	16	16,00
Total	50	100,00	50	100,00	100	100,00

$$\chi^2 = 1,918 \text{ df}=2 \text{ p}>0,05$$

According to the answers of the teachers, it can be noticed that, 84,00% from them have attended trainings, but 16,00% didn't have attended trainings in the function of their professional improvement to use ICT in the teaching. When these answers were reviewed from the aspect of the length of the working years of the interviewers, we made a conclusion that these 16,00% of the teachers, are the ones with less working years, that is with less than 5 years of working experience as a teacher, which means that they were not employed as teachers, in the time period when more intensely are realized many kinds of trainings in the project activities with which were covered almost all the teachers from the primary education. It is evidently, that between the class and subject teachers, there is no difference in the stated opinion, in the relation to attending trainings in the function of their enabling to use the ICT in the teaching.

As an addition to this question, from the teachers who had trainings, were asked to state which kind of training they have attended. The teachers mostly said they attended the following trainings: basic training for use of ICT in the teaching, usage of applicative programs of Windows operating system and Linux Edubuntu (educational Edubuntu tools), trainings to make web-sites (Mambo) and usage of internet searches, creating an e-portfolio, asynchronies and synchronies communication, trainings for innovative usage of ICT, as computer control, robotics, electronic music and recording of video and audio documents.

The biggest number of the class teachers besides the above stated trainings, have mentioned the one in relation to their improvement to use the educational software ToolKid, training for the use of Classmate portable computers for the needs of teaching and educational software G-Comprise, while the subject teachers said the trainings for usage of Intel digital contents created for the needs of realization of teaching programs which they carry out in the primary schools.

It is interesting to know the opinion of the teachers, in regard to whether they were provided so far, with enough training for their improvement to qualitatively use ICT in the teaching.

Table 4. Attitudes of the teachers in regard to whether they were provided so far, with enough training for their improvement to qualitatively use ICT in the teaching

Categories of answers	Class teachers		Subject teachers		Total	
	f	%	f	%	f	%
Yes	24	48,00	18	36,00	42	42,00
No	26	52,00	32	64,00	58	58,00
Total	50	100,00	50	100,00	100	100,00

$$\chi^2 = 1,478 \text{ df}=1 \text{ p}>0,05$$

According to these results, it can be noticed that the biggest percent of the teachers (58,00%) have stated that so far they were not provided with enough training, and less percent of them (42,00%) have stated that so far were provided with enough training, for their enabling to qualitatively use ICT in the teaching. It is evidently that more than half of the reviewed class and subject teachers have stated that so far they were not provided with enough training for their improvement to qualitatively use ICT in the teaching. There is no difference between class and subject teachers in the stated opinion upon this question, because the given value of Hi-square test is not statistically important.

These empirical data make us think, that besides the recent years it is done enough on the field of the professional improvement of the teachers to use ICT in the teaching, however the teachers have opinion that it has not satisfied their needs, which means that there need to be made further activities which will enrich competencies of the teachers for more successful use of ICT in the teaching process.

Besides that, with this research we wanted to know whether the teachers have a need for organizing new trainings in the function of more qualitative use of ICT in the teaching.

Table 5. Attitudes of the teachers in whether they have a need for organizing of new trainings in the function of more qualitative use of ICT in the teaching

Categories of answers	Class teachers		Subject teachers		Total	
	f	%	F	%	f	%
Yes	40	80,00	41	82,00	81	81,00
No	10	20,00	9	18,00	19	19,00
Total	50	100,00	50	100,00	100	100,00

$$\chi^2 = 0,064 \text{ df}=1 \text{ p}>0,05$$

From the data in this Table, it can be stated that very high percent of the teachers (81,00%) have an opinion that there is a need for organizing of new trainings in the function of more qualitative use of ICT in the teaching, and very little percent of them (19,00%), have stated that there is no need of new trainings. Also, it can be stated that there is no difference in the attitudes of the class and subject teachers, about the need for organizing new trainings in the function of more qualitative use of ICT in the teaching, because the given value of the Hi-square test is not statistically important. These given data make a conclusion that, besides

the realized many kinds of trainings of the teachers in the function of their education, that is improvement of their competencies to use ICT in the teaching, still there is a need to continue with organizing and realizing of trainings, through which their needs will be satisfied for successful use of ICT of the teaching.

Conclusion

From the results of this research it can be stated several common conclusions:

- Although so far were organized many kinds of trainings for improvement of the teachers to use ICT in the teaching process, still the big percent of them consider themselves as not capable enough for this kind of teaching activities.
- Big percent of the teachers consider that they partly and insufficiently are improved in the course of the basic education, in order to use ICT in the teaching process.
- In the past period, the teachers have attended many kinds of trainings in the function of their professional improvement to use ICT in the teaching.
- Although the biggest percent of the teachers have stated that they attended trainings for use of ICT in the teaching, however they consider that so far, they were not provided with enough training for their improvement in the use of ICT in the teaching process.
- The biggest percent of the teachers have stated an opinion, that they have a need for organizing of new trainings for qualitative use of ICT in the teaching process.

From the results of this research, it is concluded that, in order to enable further successful use of ICT in the teaching, by the teachers in the primary schools, it would be needed: in the course of the initial education of the teachers, to enable them to get the needed competencies to use the ICT in the teaching process and according to the needs of the teachers, to be organized trainings for increasing the level of their capability to use ICT in the teaching process.

References

- Andreeva, B. (2008). *Computer for every child and voucher for students*. Fourth international conference E-society. ICT in the education. Skopje: Metamorphoses.
- Dede, C. (2010). Comparing frameworks for 21st century skills. In Bellanca J., Brandt R. (Eds.), *21st century skills: rethinking how students learn* (pp 51-76). Bloomington: Solution Tree Press.
- National Program for the Development of Education in the Republic of Macedonia 2005- 2015*. (2006). Skopje: Ministry of Education and Science of the Republic of Macedonia.
- National Strategy for the Development of Information Society and Action Plan of the Republic of Macedonia*. (2005). Skopje: Government of the Republic of Macedonia.
- Overview of the Priorities for Trainings in the Second Round of Grants and Trends*. (2010). Skopje: Ministry of Education and Science, Project for the Modernization of Education.
- Program for the Development of ICT in Education*. (2009). Skopje: Bureau for the Development of Education.
- Strategy for the Development of E-Content 2010-2015*. (2010). Skopje: Ministry of Information Society.
- Stojanovska, V. (2010). Implementation of ICT in the Education of the Republic of Macedonia. In *13th International Conference: ICT in the Education of the Balkan Countries*. Varna: Balkan Society for Pedagogy and Education, BASOPED.
- Stojanovska, V. (2013). A national strategy and project activities for implementation of ICT in primary education. In *International Scientific Symposium: Education between tradition and modernity*. Skopje: Faculty of Philosophy, University „SS. Cyril and Methodius“.
- The Condition of E-Learning in Macedonia*. (2011). Skopje: Metamorphosis.
- The Usage of the Computers and Internet in the Educational System of the Republic of Macedonia* (2010). Skopje: Institute for the Open Society Foundation – Macedonia; Metamorphosis.
- USAID Primary Education Project* (2010). Fourteenth Quarterly report, January-March 2010, Under Cooperative Agreement No.165-A-00-06-00101-00, Submitted by: Academy for Educational Development (AED) with Macedonia Civic Education Centre (MCEC) and Indiana University.