

TEACHERS IN PRIMARY SCHOOLS AND THEIR ABILITIES FOR USING ICT IN THE TEACHING PROCESS

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Abstract - We live in the society where the knowledge is power, knowledge is authority.....Changes is everywhere, at economy, society, local authority, schools. Modern trends in education require changes at teachers prepares, teachers abilities, teachers competences, teacher qualification, reforms in the educational curriculum, in the defining teacher's profile The most important field of changes in the teacher profile are: promotion of new results from studying; reorganization of a classroom work (in the frame of the school, the surrounding area and social partners); integration of information technology in education in all fields of professional practice, increase of professionalism and individual responsibility for the professional development. Integration of ICT in teaching process requires specific teacher's abilities which they acquire in their initial education and someone of them in other forms (seminars, training) of organized education. So, for that we put the question does this knowledge for ICT are enough for her implementation in the teaching process, what we must to do to strengthening their abilities for her implementation, which are their suggestions for improving this process at schools? The purpose of this article is to point out the need of ICT implementation in all subjects from the first to the fourth grade in the elementary schools. We also present the result from the research for the teaching experience and the practical function of ICT in the subjects: introduction of the environment, nature in the classroom, language, mathematics, art...

In this paper we try to answer this and the other questions about ICT implementation in the teaching process and we present the result from investigation for teacher's abilities in the primary schools.

Key words: teacher's abilities, competences, ICT implementation

“Teachers and educators around the world are in the confrontation with the fact that the aim of pupil’s odds enhancement – may be achievement on different way than before. This new way move the educators to see the teaching process like special activity rating for each teacher. It moves the teacher to understand teaching process like professional activity open for collective observing, study and enhancement. It moves teachers to recognizing and accepting their responsibility not only for its self but and for their practice. For getting away this road we must to open school doors, to evaluate themselves, to scrutinize his self practice like part of his professional responsibility.”

(Hilbert, Gallimore and Stigler, 2003)

We live in time when we need to understand euphoric statement from Toynbee "Education or catastrophe"...

Cardinal question in this modern world is actually the quantity and quality of relationships (interaction) between permanent process and advance production (material and spiritual) in the society and change the man for the acceptance of critical, creative and efficient application and at the same time new material and spiritual products. And how will it enable? Understand the changes in the process of education is required revolution in thinking about changes in education after the study, as an imperative of time in which we live and which undoubtedly shows that each development is determined from the development of knowledge. The education system still produces classic experts (qualified workers, technicians, doctors, teachers, lawyers, etc.). This does not match reconstitution and economy and the expansion of services those societies presenting services. Therefore, educational institutions, must respond to this lack of reality that becomes more and more in our society. But, first we must to start in their frame, in the frame of teacher education.

Known Distervag thought that school is worth as much as it is the teacher in the days to come more and more expressive. Nature of teachers call is a specific, especially in the days when initiating fundamental changes in the function, position and role of teachers, contemporary role of the teacher is directed to developmental and independent student work and creativity.

K. Ninisto (1996) looks at today's teachers as initiators of change, as a man who comes to pupils learning, teachers who are caring for their professional refinement, teachers as part of a development school organization.

In the analysis prepared from service Eurydice (2003) has identified five areas of competencies that are expected of teachers like:

- learning for the use of modern technology for education
- integration of children of special educational needs
- work with a group of children and multicultural children groups
- management in schools and various administrative activities
- conflict management

During the initial education teachers gained at the teachers' training faculty a number of *generic competencies* in the general frame which included: ability to problem solve, to be able to informally assess the skills a student needs (rather than relying solely on standardized curriculum); abilities for communication, collaboration and team work; flexible knowledge using in practice; etc., and *particular competences* which consist from: knowing the contents and methods of concrete educational area; understanding and using the programs theory and common and didactical knowledge from the subject area; interdisciplinary correlation between different subject contents; using special pedagogy knowledge for work with child with special needs; pedagogical leads of the group; collaboration with parents; understanding the relation between educational institution and social environment- systematical looking and work.

As can be seen from the frame of competences which need to have teachers in primary school is the competence: the teaching how to use modern educational technology?

In this way, set the key question in this effort, how teachers in primary schools are trained to implement and to use contemporary educational technology (ICT).

First we will give an answer to a question what we mean about notion ICT, why for us is important using of ICT in teaching process, which competences teachers need to use ICT in the teaching process, what is the real situation, how many qualified teachers for the implementation of ICT in the teaching process?

How we define educational technology, information technology or ICT?

In literature we find different definition about educational technology information technology or ICT like:

Information and Communication Technologies (ICT) is an umbrella term that covers all advanced technologies in manipulating and communicating information. The term is sometimes used in preference to Information Technology (IT), particularly on these two communities: education and government. The common usage ICT is synonymous assumed the fact that IT or ICT encompasses all mediums, to record information (magnetic disk/tape, optical disks (CD/DVD), flash memory etc. and arguably also paper records); technology for broadcasting information - radio, television; and technology for communicating through voice and sound or images - microphone, camera, loudspeaker, telephone to cellular phones. It includes the wide varieties of computing hardware (PCs, servers, mainframes, networked storage). Rapidly it develops personal hardware market the comprises mobile phones, personal devices, (MP3, MP4, MP5 and MP6) players, and so much more.”

(http://en.wikipedia.org/wiki/Information_and_Communication_Technology)

Information technology (IT), as defined by the Information Technology Association of America (ITAA), is "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware."
(http://en.wikipedia.org/wiki/Information_technology)

Educational technology is most simply and comfortably defined as an array of tools that might prove helpful in advancing student learning. Educational Technology relies on a broad definition of the word "technology".

We can use the term ICT like a concept Informatics Technology (ICT) which is closely connected with the concepts: Informatics, Technology, Art and Computer studies. Today the concept ICT is most frequently used and represents (Information Communication Technology) When the Computer studies are studied the methods, the principles and the concepts of the machines which process the information are actually learnt.

The modern technology used in the education enables communication, usage, creating, processing and storage of the data and their further application.

Why ICT implementation is important for us?

We live in the time when each citizen uses the utility from the computers and communication technology. Internet is the tool for communication for each person without the differences. In that context we present why ICT is important for us:

- enables learning in any time;
- enables easier arrival of material for learning;
- significantly influence of the teachers relic and teachers practice;
- influence to the pupils, and influence to the educational reform implementation;
- it has influence on teacher connections like: strengthening team work and collaboration in the classroom, between schools on local, national level and broadly;
- it has influence on changes directed to the methods, forms and strategy in teaching process;
- it has influence to the position and role of subjective factors in teaching process
- more opportunity faster accumulation of knowledge and feedback
- greater possibility of communication, the existence of sound and video, animation, simulation;
- a wide range of interactivity that allows the student feedback about his progress.

What we do about IT teacher competences in our schools?

The moment condition of the employment teachers in the schools, in the ratio with their abilities for ICT using in the educational work, is subsequent:

1. Teachers who in the flow of their basic education generally not acquire with knowledge necessary for ICT application, but not and in the flow of their further professional development;
2. Teachers who in the flow of their basic education, generally not acquire with knowledge necessary for ICT application, but in the flow of their continuing education through curses, seminars, acquire some knowledge necessarily to use ICT in education process;

3. Teachers who in the flow of their basic education acquire necessarily knowledge for ICT application (that are the teachers who finished their studies upon study programs in which have subject with informatics contents, last few years);

According that, we must to intervene in basic teacher training but also in the professional teacher improvement, to organized different forms of training in sense of rising in or enrichment content, which will gave opportunities to teachers for successfully ICT application, because they must to have knowledge to use it, and to have successful results in the teaching process. For ICT using many of them acquire necessarily knowledge, but are that knowledge enough for ICT application and for successful and effectiveness teaching process. This is the problem not just for the primary schools and his teachers but and in the other level of education, especially today, when in R. Macedonia a campaign is present “Computer for each child” introduced by our Government and each school is equipped with appropriate technology for application of ICT and the teachers are in situation to fulfill the tuition with these technology. This is the reason why they should have appropriate knowledge and should have successful results in the teaching process. For the application of ICT many of them have appropriate education, but is that knowledge enough for successful application of ICT? This problem is equally included in the elementary and secondary schools and the results given by the questioned teachers points that out.

Because of that, we realize this investigation in primary school in R. Macedonia to see the real situation and to accent teacher’s problems and their real requirement for their professional training and for successfully ICT application in the teaching process, especially for using graphic program Paint in some subject?

First we try to answer the question why to study and use this program in primary school and after that the other question in relation whit it.

Why to study and use the graphic program (PAINT) in primary school?

It is obvious that with the studying and the application of the graphic programs (Paint) the students are given many opportunities:

- The studying is given a chance to be interesting, close, creative.

- The students are qualified for using the graphic information in the function of the subjects.

- An interest and desire is developed with the students for approaching of new realizations and applying different sources for studying.

- Creative, esthetic skills and abilities are kindled.

- The students are helped to develop positive picture of themselves and self-assurance.

- They are motivated to detect their interests and to nurture them.

- They are kindled to develop graph-motive power.

- They develop and gain self-criticism and criticism toward their own results and the results of the others.

On the compulsory classes with the students from first to third grade the application programs can be worked out (the following subjects Mother tongue, Mathematics, Introduction of the environment, Nature, Art and Music) according the prearranged, planned topics, contents, aims and tasks as a new work approach and resolving the placed tasks in separate subjects. While on the projects activities (with the students from the higher grades) the gained knowledge is used and projects are prepared, introducing the techniques, skills and the procedures for realization the project task from different fields which require work with different types of data and different structures of their presenting and connecting in final content (task with text, picture, graph, diagram, multimedia presentations, formula, function, chart, symbol and so on).

The graphic editors are often used in realization of these teaching programs. The Graphic editors are programs which help in creating graphic pictures. **Paint** is simple graphic editor which is integral part of the standard package of the operating system **Windows XP**. This editor can help on creating wide pallet of drawings or pictures, from simple to perfect.

From day to day drawing with the computers becomes more frequently used owing to the fact that the newer generation of computers consist of drawing programs. Drawing is present with the young who make their first steps in the computer using as well as with the adults who accomplish considerable graphic realizations. Many types of programs are used from the most simply but with opportunities designed for younger, to improved enough with considerable opportunities for professional drawing by adult users.

The didactic and methodical aspects of the graphic information

- By using the computer as modern tool for realization of the teaching contents in the elementary school, the youngest students are enabled to gain basic knowledge from the field of the informatics.

- Clarity and transparency in the working are enabled and a standard for assessment of the results is created.

- Imaginative, creative and critical view-point is promoted.

- The need of professional, permanent improvement of the teaching staff is required.

- The most included forms of work are: individual form, working in small groups, pair work.

- The use of different teaching methods in the work (method of overlooking, graphic method, method of presentation, demonstration, simulations)

- A choice of suitable strategy is made on monitoring and evaluating of students' achievements (diagnostic, formative, summarily estimating).

- The graphic information finds integrated use in contents of the teaching subjects which are adapted to the age characteristics.

- The working environment is open, dynamic, attractive, reach with opportunities, ideas where positive thinking and experiences are promoted, approachable, interesting, visual approach on the material, contents and realization of the goals are enabled to the young children.

Goals and tasks

The students to gain basic knowledge for the new technologies and communications (information literacy)

- To be qualified for performing operational and technical activities when using the computer's graphic (resolving problem situations).

- With the new approach of the content presentation, improving of the work in separate subjects is enabled.

- To get acquainted with the opportunities and the tools of the drawing program (computer using).
- To be qualified for creating and arranging drawings (creative abilities).
- To develop skills, knowledge, understandings (patience, accuracy, responsibility, meticulousness, logic creativity).
- To present creating procedures and arranging the drawings (exploratory and individual work).

Necessary teaching means

- Computer using
- Using information science work room
- Using prepared application program **Paint**
- Using educational software **Tool kid**

In that context in this work we will present facts gathered from the exploring which was realized with the teachers in elementary schools.

The purpose of this exploring was to check the teachers' opinions and ideas about the present conditions in the teaching practice - the abilities, the means of using and adoption of ICT application from the aspect of improvement of the quality of the educational process.

Subject of research - Emphasizing the necessity and the indispensability of application and use of ICT in the teaching process, the subject of this research is the integrated application of information and communication technology in the teaching subjects and its importance as modern way of work oriented towards improvement of the quality of the teaching process.

Purpose of research - Purpose of research is to get data for teachers' ideas and opinions and for the possibility of the use and integration of the Graphic application in the teaching subjects from first to fourth grade.

Task of research

1. To examine teachers' ideas and opinions for their competences on the field of ICT which are essential and important for the teaching process.

2. To examine teachers' ideas and opinions for their previous training realization from ICT area.

3. To examine teachers' ideas and opinions for the conditions in the school and the possibilities of ICT application in the established teaching practice.

4. To examine teachers' ideas and opinions for the importance of the didactic and methodical elements from the ICT application in the teaching process.

5. To examine teachers' ideas and opinions for the importance of the Graphic application PAINT used in the teaching process.

6. To examine teachers' ideas and opinions for the possibilities of integrated use of the Graphic application PAINT in the teaching subjects from first to fourth grade.

Hypothesis

Common/General hypothesis - We assume that the integrated use of the Graphic application PAINT in the teaching subjects from first to fourth grade in the elementary schools has an important impact on the improvement of the quality of the teaching process.

Subsidiary/Individual hypothesis

1. We assume that teachers' permanent professional specialization in ICT using is necessary.

2. We assume that the teachers have negative opinions and attitude for the previous training realization for ICT application in the teaching process.

3. We assume that the conditions in the elementary school do not satisfy the needs for ICT application in the teaching process.

4. We assume that the teachers have positive attitude towards the didactic and methodical elements in ICT in the teaching process.

5. We assume that the use of the Graphic application PAINT has significant part in the improvement of the quality of the teaching process.

6. We assume that the Graphic application PAINT is used in the following subjects from first to fourth grade: Mother tongue, Mathematics, Introduction of the environment, Nature, Art and Music.

Methods, techniques and instruments of research

Perceptive-explicative method will be used. From the research techniques inquiry will be used. Inquiry with the instrument inquiry list composed of 17 questions by open and closed type.

Population and exemplar

It is a random sample, made of units of population which are free use to the explorer. It has 105 respondents from Berovo, Bitola, Veles, Vinica, Delcevo, Kocani, Sv. Nikole, Radovis, Strumica, Stip, villages Crnoliste, Dragobrastet, Vasilevo, Umlena, Skolarci, Dobrusevo.

Processing data

Processing data is done with the following methods: using %, Hi-square test, test, qualitative-INTERIM analysis.

Analysis and interpretation of results

Interpretation of results in this research will be presented in order by groups of questions as they were shown in the inquiry list.

The inquiry took place during 2009, 105 teachers from elementary schools in many municipalities from R. Macedonia were ranged. The results from the examined population of teachers follow.

With the first questions we have got general data for the teachers in elementary schools the number, sex, work experience, grade where they have implemented the teaching programs.

Examinees	Sex	
		F
105		9 7

Table 1

As we can see from table number 1 we can come to a conclusion that there are more females included in the teaching process in the elementary schools. From the tested 74% (78 tested) work in urban environment while 26% (27 tested) implement tuition in rural environment. From the first grade are included 15% (16 tested), in the second grade 48% (51 tested) , third grade 17 % (18 tested) and from the fourth grade 16% (17 tested) implement tuition.

How long is your work experience with students in elementary schools?

Choice	f	%
1-5 year	3	2.85

5-10	8	7.62
10-20	63	60
20-30	25	23.80
30-35	6	5.71
Total	105	100

Table 2

The table results show that 60% from the teachers are with 10-20 years work experience. That says to us that in the elementary schools we have teachers who have good work experience and they are in years when they may learn and to take new abilities for using ICT in the educational process.

The received data from the questions (8, 9, 10, 11) from the inquiry list which refer to the need of permanent and professional improvement of the teachers in the elementary schools and their negative attitude towards the previous trainings in the teaching process for realization of ICT applications are in favor of the erected hypothesis. Namely 95% (100 tested) answered that took part in projects for improvement of the ICT application in the tuition, while only 5% (5 tested) did not take part. On the question **“Is the previous training enough for successful implementation of this tutoring in the accomplishment of the teaching contents in specific subjects?”** 11% answered positive, 89% answered negative. On the question **“How often do you use the ICT applications for accomplishments of the teaching contents in the compulsory subjects?”** According the results most of the tested chose the answer c) not enough, namely 83% (87tested); while for the answer b) enough there were 14% (15 tested). For the answer d) generally just 2% (2 tested); and for the answer a) a lot only 1% (1 tested).

The analysis of the data and the qualitative analysis of the teachers’ opinions show that only with organizing formal seminars, workshops and putting them across from the teachers who are chosen without particular professionalism and previous forms of training as the mentioned projects “Modernization of the education“, “e-school “, “Tool kid ” - component from the project e-school are not enough for successful integration of ICT in the teaching process as one important precondition for improving the quality of the teaching process.

On the questions number 6 and 7 opinion was asked from the tested about the technological support in the classroom environment in the elementary schools for use of ICT applications.

Question 6. Taking into consideration the campaign Computer for every child of the Government of R. Macedonia. **“Does your school possess the necessary computer equipment ?”**

Choice	F	%
Yes	19	18
No	86	82
Total	105	100

Table 3

Question 7. Spacious and technical condition in the schools for application of ICT are as follow:

Choice	F	%
One classroom with computers	93	88.57
Computers in each classroom	/	/
Internet connected classroom	5	4.76
Internet in each classroom	/	/
No computers	7	6.67
Total	105	100

Table 4

Data from the tables show that 82% from the tested think that the elementary schools do not possess the necessary equipment even though the current campaign of the Government, while 88.57% think that the current material and technical support for work is not enough for the use of ICT application in the elementary schools.

In addition of the analysis on the inquiry list the received lists follow for the importance and the characteristics of the didactic and methodical elements which allow the application of ICT in the teaching process in the lower grades in elementary school. (Table 5)

Didactic and methodical elements	1		2		3	
	F	%		%		%
1. The students gain basic informatics literacy	5	4.8	25	23.8	75	71.4
2. ITC using develops and stimulates the intellectual, social, emotional abilities on the students	5	4.8	88	83.8	12	11.4
3. Preparing the students for life and work in 21 st century	3	2.9	15	14.3	87	82.8
4. Improving the students' motivation for studying	2	1.9	82	78.1	21	80
5. Developing aesthetic, creative skills and abilities with the students	1	0.9	75	71.4	29	27.7
6. Improving of the teaching process	1	0.9	19	18.1	85	81
7. Gives better opportunities for integration and correlation of the teaching contents	5	4.8	44	41.9	56	53.3
8. Changing the teacher' role, increasing his demands in the teaching process	4	3.8	29	27.6	72	68.6
9. Communication and learning foreign languages	4	3.8	26	24.8	74	70.4
10. Approaching the high standards of UNESKO	5	4.8	29	27.6	72	68.6
11. Supplementing the existing organizational teaching components	16	15.2	35	33.3	54	51.5
12. Allows more quality planning of the teaching class	12	11.4	75	71.4	18	17.2

13. New, modern approach of the work	6	5.7	26	24.8	73	69.5
14. Application of ICT in the teaching process makes the students alienated, isolated and uncommunicative	2	1.9	90	85.7	13	12.4

Table number 5 Answers from the teachers from elementary schools

According to the answers of the tested we concluded that the following exponents as 1, 3, 4, 6, 7, 8, 9, 10, 11, 13 have approximately same points and they are ranked as very important characteristics which are enabled by ICT. The identification of these exponents should present basic paradigm in the use and application of ICT in the teaching process. From the received data is concluded that the inquired teachers consider that according to its significant all the characteristics are approximately essential, basic for the teaching process which initiates, suggests the necessity from the use and application of ICT in the tuition.

The analysis of the following group of questions refers to the abilities and application of the graphic information in the tuition in the elementary schools.

Choice	F	%
Yes	30	28.57%
No	75	71.43%
Total	105	100

Table number 6. Teachers' opinions for the use of the graphic program PAINT in implementation of the teaching contents

The data from the table No 6 show that 71.43% (75 tested) still do not use graphic application in the implementation of the teaching contents in separate teaching subjects, while there is small per sent of teachers who use the graphic application in the implementation of the teaching contents 28.57% (30 tested). According to the opinion of the tested the graphic information finds integrated application in the following subjects from 1st to 4th grade: The child and the surroundings, Nature, Art, Mathematics, Mother tongue, Music. As tuition topics they mention: "I am part of the nature"; "traffic"; "I explore the nature"; "language"; "media culture"; "shapes in the space"; "design and visual communication"...

However the tested realize and emphasize the necessity of the application, use and integration of ICT in the teaching process as modern way of work, pointed towards the improvement of the quality of the teaching process. The previous analysis on the last questions give sufficient base for conclusion that the opinions, views, suggestions of the tested are that with the use of the graphic application bigger effectiveness in the tuition is enabled and with the students using, application and improvement of new knowledge, the students are introduced in informatics literacy, students' motivation in higher degree, ability for individual learning, skills for practical work are developed, new, interesting, creative way of learning will introduce and develop skills and abilities and also habits are gained. The tested consider that the application of ICT in the tuition makes the students alienated, isolated and uncommunicative.

On the last question oriented for suggestions and aims all the teachers suggest that for integration of ICT in the teaching process technological support is essential more computer classrooms, preparing special applicative programs and educational software, effective seminars, workshops with expertise and challenge in the lectures, application of the ideas from the seminars in the classroom, lowering the high level classes, defined models of permanent improvement of the teachers, more flexible teaching programs, manuals for teachers with practical examples.

Conclusions

From the elaboration and the analysis of the received data through inquiry of the teachers' opinions and judgments, qualitative analysis on the pedagogical documentation, inquiry, participation in the teaching practice the following conclusions can be drawn:

1. The questions that were asked previously, in the introduction, during examine, had found their answer in the theoretical discussion and in the data as a result of exam.
2. The conclusions in this examine should not be accepted as categorical because they refer to a concrete example, in actual time. Meanwhile the same should be regarded in a direction of finding approachable ways of realizing lifelong education.
3. The application, use of ICT in the teaching process in the elementary schools presents necessity the students from the earliest ages to gain quality and functional knowledge, on the field of information technology which will provide base for further use, application, improvement

of new knowledge, skills, abilities and the students will be enabled to continue their education readiness for accepting the challenges of the new millennium.

4. The started process of changes in the education is pointed towards bigger effectiveness and quality in the educational process. The effectiveness presents process of continued development, application and use of ICT which presents new, modern approach of effectiveness in teacher - student work.

5. Analyses of the teachers' role and function in our schools points out that today the teachers are put in front of more complex tasks and problems which brings to excelling the previous way of work and accepting new didactic and methodical approach. The previous years by introducing new, modern models of work the teachers are asked to use permanent professional education in each area. The teachers from the elementary schools think that they have necessity from permanent education from the area of ICT for their preparation and training for teaching realization of ICT application. They emphasize the need of organizing the effective seminars, workshops, putting the ideas across from the seminars in the classroom, from the teachers with high expertise. They need manuals made from educational centers, they need empiric experience in the classroom by information in topics and teaching contents, they need complete approach in the computer classroom and lowering the high level of classes.

6. The integration of the graphic information in the teaching contents demands implementation of current didactic and methodical solutions in program's basis.

Emphasizing the need of working on all opportunities for organized work with graphic information on program's basis is pointed towards defining the contents, aims, tasks, topics, choice of learning experience, and experience in organization of all operative stages of learning appraisal. The teachers from elementary schools think that they have necessity of technical support, current material and technical condition for work are not enough stimulating to work with ICT application.

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NASTAVNICI U OSNOVNIH SKOLA I NJIHOVE SPOSOSBNOSTI ZA KORISTENJE IKT U NASTAVNOM PROCESU

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Sažetak - Živimo u društvu u kojem je znanje moć, znanje je autoritet Promjene je posvuda, na gospodarstvo, društvo, lokalne vlasti, škole. Suvremeni trendovi u obrazovanju zahtijevaju promjene u priprema učitelja, nastavnikove sposobnosti, kompetencije nastavnika, nastavničkih kvalifikacija, reforme u nastavnom planu i programu, u definisanju nastavničkog profila. Najvažnije polje promjena u profilu nastavnika je: promocija novih rezultata iz proučavanja; reorganizacija u učionici rada (u okviru škole, okolica i socijalne partnere), integracija informacionih tehnologija u obrazovanju na svim područjima profesionalne prakse, povećanje profesionalizma i individualnu odgovornost za profesionalni razvoj. Integracija IKT-a u nastavnom procesu zahtijeva specifične nastavnikove sposobnosti koje su oni stekli u svojem inicijalnom obrazovanju a netko od njih i kroz druge oblike (seminari, obuka) organizovanog obrazovanja. Dakle, postavili smo pitanje dali je to znanje od IKT-a dovoljno za njezinu primjenu u nastavnom procesu, šta moramo učiniti za jačanju njihove sposobnosti za njezinu provedbu, što su njihovi prijedlozi za poboljšanje ovog procesa u školama? Svrha ovog članka je ukazati na potrebu primjene IKT-a u svim predmetima od prvog do četvrtog razreda u osnovnim školama. Također smo prikazali rezultate istraživanja oko praktične funkcije ICT-a u predmetima: poznavanje prirode i društva, jezik, matematiku, umjetnost...

U ovom radu ćemo pokušati odgovoriti na ova i druga pitanja u vezi primjene IKT-a u nastavnom procesu, a predstaviti ćemo i rezultate iz istrage za nastavnikove sposobnosti za njezinoj primeni pri realizaciju nastavne aktivnosti u osnovnim školama.

Ključne riječi: nastavnikove sposobnosti, kompetencije, implementacija IKT