Innovations in Modern Education and Teachers Competences

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ABSTRACT— *We live in information society where production, processing, storage and using of knowledge are important factors of modern development, interpersonal relationships as well as relationships among states and nations. Traditional teaching is most often criticized for insufficient activity of students, inadequate teaching intuition and dynamism, the impossibility of individualisation of teaching, lack of continuous feedback on the achievements of students and others. Intensive development of telecommunications technology and computer systems, permanent connection to the Internet and WEB based learning systems enabled better use of computer technology in teaching. Computer based knowledge systems provide flexible organization of activities, lectures and study materials and a complex evaluation of students. Interactivity and quality of presented materials, using multimedia and hypertext, offer considerably richer contents compared with teaching carried out in traditional classroom. Managing changes in education requires particular educated leaders. Managing innovations is very complex, because the teacher's resistance occurs due to insufficient capability and inadequate equipment in schools. Overcoming this problem involves active participation in seminars for teacher training. Education, as a rule, slowly opens the new technologies in relation to production, transport, services. et al. However, young people at home and out of school live in a technologically rich environment expected changes in education in accordance with the imperatives of education for 21 century.*
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1. INTRODUCTION

Science and technique are developing very fast, same as culture and arts, new knowledges and spaces are explored; when there is mass introduction, in production and other organizations, of microelectronics, robotics, laser technology and new materials technology; when man, due to use of electronics and kybernetics, is being liberated of routine work, hard jobs and directs his activity to more complex jobs of control and management. While technology was developing fast in other fields, school, to a certain extent, stayed at the level of classic work organization. It mostly kept older educational technology and for that reason there is danger (if it would not be changing faster) to stay considerably behind the happenings in production and social relations. Lagging behind of modern school is not so much evident in the field of education contents as it is evident in technique and technology of teaching. For that reason in our time serious critics can be heard about schools, about work organization as well as about number and manner of teaching aids application. Specially frequent are critics concerning number, quality and way of teaching aids use in primary and secondary schools,

The traditional teaching is well known by frontal form of work with remarkable teachers teaching function which does not provide sufficient interaction with the students. They don't leave enough time for independent activities of students in the qualitative function of learning. In last ten years there was strong will to develop and improve of didactic media, teaching methods and forms in function of raising the efficiency and effectiveness of the teaching process. The current organization of teaching is created as a comprehensive cognitive system. As a rule, feedback is lacking. After completion of hours students do not know how they successfully overcame the curricula or teacher has full knowledge picture of their students. Feedback should follow the course every step of the teaching process in which current practice is not the case. Teaching is more based on the entropic than systematic approach. One reason for this situation is poor didactic-technical environment in which teaching takes place. The process of modernization of existing technologies is taking place much faster in production areas, and is rightly expected that schools and faculties follow the innovative processes and to educate young professionals in accordance with the needs of society and economy. The world is made important steps towards equipping schools with modern didactic media, but the school expects to adequately equip them to apply new methods and forms of work with pupils and students. Only in the last ten years with the mass use of computers in schools has created the prerequisites for quality educational technology innovation. Multimedia

applications designed for personal computers offer the ability to create electronic books with text, pictures, sound and animation films so that students can independently progress in mastering instructional content, to return to the contents that they are not sufficiently clear, and to obtain additional feedback according to their abilities and interests. Interactivity and the quality of the material presented with the use of multimedia and hypertext gives much richer in content compared with the instruction that occurs in traditional classrooms. Development of telecommunications technology and the massive use of Internet enabled interactive distance learning based on the systematic approach to using electronic media sources of information (Mandić, D., 2008).

2. THE MAIN REASONS OF UNSUFFICIENT USE OF TEACHING AIDS IN OUR SCHOOLS

It is generally thought that schools do not have sufficient number of modern teaching aids, that the best selection of the available ones is not done, that they are not used in teaching according to requirements fixed by modern teaching theory and that, therefore, we can not expect faster advancement of teaching

First, pedagogical, psychological and methodic culture of teachers is not on the level which would make them possible to know more fundamentaly pedagogical function of teaching aids, ways and manners of their programming, to notice their abilities and limitations, learn how to use them and use them efficently in teaching process and free activities of pupils.

Second, space and other conditions in schools often do not allow everyday application of available teaching aids, and financial limitations do not allow completion of teaching aids fund with those which are of newer date, more usable and pedagogically more efficient.

Third, inertia of past accompanied by lethargy of teacher in some places tends to keep blackboard, chalk and book as dominant, if not only, teaching aids and helping devices, because of logic that work was done that way for hundred years, it is being done now and that is the easiest way of doing this job.

Fourth, instituttions for teacher education and training are not well equipped with sufficient number of teaching aids, and therefore those who are „being prepared for teaching occupation, as well as those who are having advanced teaching training, do not have possibility to be informed to satisfactory level education technology, to cumprehend its pedagogical power and to learn how to operate suitable technical means such as expert systems, multimedia computer, projectors, etc. This is not done enough at periodical seminars for permanent education of teachers.

Fifth educational forums (who are in charge of educational policy) and those who are financing schooling, have not so far managed to provide enough resouces for supply, installation and application of teaching aids and devices. It makes an impression with teachers that supply and application of teaching aids is not necessary and that they can work successfully in the old way. Of course, these are not the only reasons why schools do not have teaching aids and why they do not apply them sufficiently in their pedagogical work. We intended here to indicate only some reasons about which we can discuss in more detail, which can be eliminated more successfully and which are, in our opinion, key reasons in our conditions. (Mandić D., 2010,).

3. PEDAGOGICAL IMPORTANCE OF TEACHING AIDS

Modern school has faced so called knoweldge explosion, sudden changes of education contents, changes in education system, as well as in teaching technique and technology. On the other hand, in school there is plenty of verbalism and formalism in pupils' knowledge, there is a. great number of pupils who are repeating a grade, there is clash between those things that are realized in school and those required by society and young people. Special obstacle in more successful school work is rigidity in application of methods, forms and means of teaching work; slow introduction of innovations, in teaching organization, technique and technology of pedagogical work. Strict critics say that school has turned its back towards future and because of that it can not modernize faster its teaching bases, education technology and teaching process.

Verbal presentation of factual material by teacher (with periodical use of balckboard, picture, chalk and book), directing pupils to mostly verbally learn what he had explained and what is written in textbooks, will not and can not be sufficiently attractive for pupils, nor satisfy their subtle needs, satisfy their interests and make conditions to realize their aspirations, nor satisfy social needs for educated personnel. It is olbvious that nowadays child, from the begining of his contact with the world, has possibilities (by means of radio, television, illustrated newspapers, etc) to know it by looking at pictures, listening to live word, listening to music and doing numerous activities in connection with what he listens to and looks at. On the other hand, today's child, thanks to modern transport, is able to visit great part of his homeland, even the world before he starts going to school, and experience all that intensively. When he comes to school, rather often, the width of his field of vision and movement comes to a very narrow space such as classroom (even closer a bench in which he sits four, five or six lessons); source of information is teacher who often does verbally whatever he teaches, simplifies, and vulgarizes, shortly describes monumental regions the child had seen, points to textbook as dominant source of knowledge, mostly teaches the same teaching material with all pupils, in the same way, at the same time, by same speed. This way of work can be source of frustrations for pupils, causes oppositions in them (which can be more or less visible) towards school, teacher and the content he presents; causes indifererce to teaching, negative relation to teaching subjects

and teacher. Cause of such relation of pupil to teachning and teacher is not knowing pupil, nonadequte teaching technology, schematism and stereotype in teacher work, rigid contents, means, forms and methods of work. Child, full of life energy and curiosity, endowed with wish, for knowledge, ready and able to develop, does not bear cliche teaching, but preffers such teaching which would be more in accordance with his interests, previous knowledge, abilities, cognitive styles and teaching styles.

Leighbody's and Kidd's researches have shown that teacher's only presentation is not teaching, pupil's only listening is not learning and pupil's only looking and listening is not learning. They have stated by detailed analysis how much and how these three factors participate in the process of pupil learning (Mandić, D., 2008). Unfortunatelly, many teachers nowadays think that teacher presentation is sufficient for qualitative learning, listening and lookong of pupils, but they can quickly be convinced that what pupils have only looked, only listened or only casually and partially read, is not qualitative and durable knowledge and such knowledge is difficult to apply in practice. In our time the prevailing thinking is that teaching process should have three interconnected phases in which teaching aids would have important pedagogical function.

The first phase contains: preparations of teaching contents, forms and methods of work, selecting objects for carrying out teaching and their adjustment to what is intended to be realized and with whom it is intended to be realized; preparing of pupils (their motivating, preparing to understand sense and importance of what is being presented, to be informed in advance about some facts which are of importance for their active success in teaching, to collect suitable material important for having discussion in teaching process, express different opinions, criticise starting hypotheses and bring in dynamism in the course and results of teaching and learning). Pupil is well prepared for teaching if he is not afraid of what might happen during teaching, but impatiently waits for discussions, where he learns, discovers, concludes and solves interesting problems. In connection therewith is preparation of teacher, his knowing teaching contents which he is going to present, means, forms and methods which he is going to use; skill in lessons organization, in keeping attention and pupils activities; reality in estimating time for introductory part of lesson, realization of new material, repeating and final part of lesson, etc.

Second phase includes dynamic presentation of content, adjustment of the contents to previous knowledge, interests, cognitive styles and pupils learning styles; skilled syncronisation of teacher presentation with demonstration of pictures, drawings, experiments, film, internetportals, TV contents and other things; encouraging pupils to take active part in teacher presentation, to understand what he is demonstrating, understand what he gives for assignments, they come to solutions by their thinking activity and contribute to teaching, develop critical thinking and creative abilities. Such teaching is good which enables understanding sense of contents, encourages thinking, critical reinvestigation, judging, concluding and practical application of acquired knowledge.

Third phase is evolution of preparations, course and results of teacher work where quality of teacher and pupils preparation for teaching is evaluated, process and teaching and learning result, quantity and quality of acquired knowledge and its influence on complete personality development. It seems specially important to evaluate practical importance of acquired knowledge, learnt skills, formed habits and developed abilities. It is not only important to fix commulative being informed or quantity of knowledge, but with what degree of understanding is the acquired knowledge, how much it has influenced development and enrichment of personality, motivation for further learning and self education. Pedagogical value of teaching aids we use in teaching is many-sidedly important in all the three above stated phases and for that reason it has been subject of great number of studies by our and foreign authors.

Adequate use of teaching helping devices enables developing of motivation of pupils, supports concentration of attention during lesson, causes corresponding responses of pupils in teaching process which are of importance for learning quality, makes possible rational organization of pedagogical workjof teacher and pupils learning, supports level of understanding teaching contents, their mor/precise acceptance and more correct repetition. „Teaching devices, if used correctly, can raise scientific quantity during lesson and speed up complete teaching process. If they are not used appropriately they can give wrong perspective of the subject and seriously hinder acquiring of wanted results, learning.. (Vilotijević M., 1999).

Use of modern teaching aids is basic condition for more successful rationalization and intensification of teaching and learning, for modernization and advamncement educational technology without which more substantial advancement of teacher work and school as a whole can not be expected. Teaching aids make possibilities for pupils to understand essential thoughts of teacher in teaching process, and teacher to translate ideas he wants to present into verba and visual language, comprehensible and understandable for pupils. They stimulate interests, keep listeners awake and sensible for what is going on. They can, if used appropriately, cause sympathy, without which understanding and interests are much smaller. Multimedia aims attract attention of the youth, make closer to them contents that are difficult to comprehend, make easier their memorizing and application of gained knowledge in further learning as well as in everyday activity. If many senses are engaged in learning process, pupils activity is more intensive and quantity of knowledge is bigger, and its keeping and reproduction is of better quality. As important sources of knowledge and afficient instruments for creation of dynamic communicative atmosphere in educational work, educational aids become more and more work means and instruments of active acceptance and efficient application of educational values in practice. In our multimedia book there are texts based on hypertext, sounds, video clips, and pupuls could have tests for selfevaluation with feedback and teachers could give final tests where all results are saved in database.
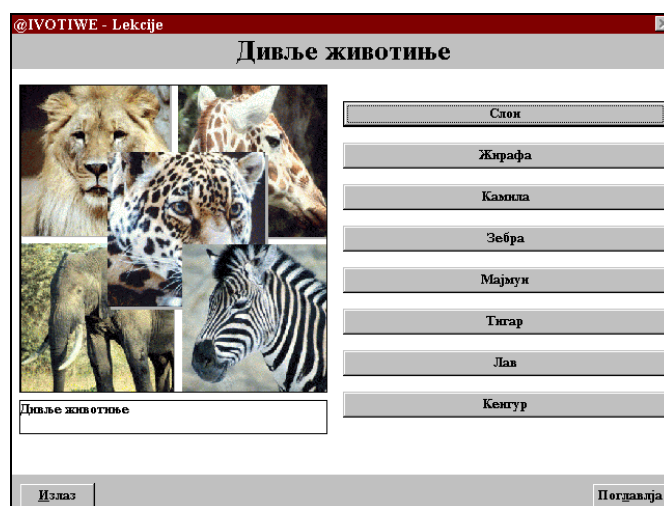
4.

Fig. 1. Multimedia electronic book

Various tests could be done on each class so teachers and pupils could have better picture about their knowledge and they are ecouradged to learn more.
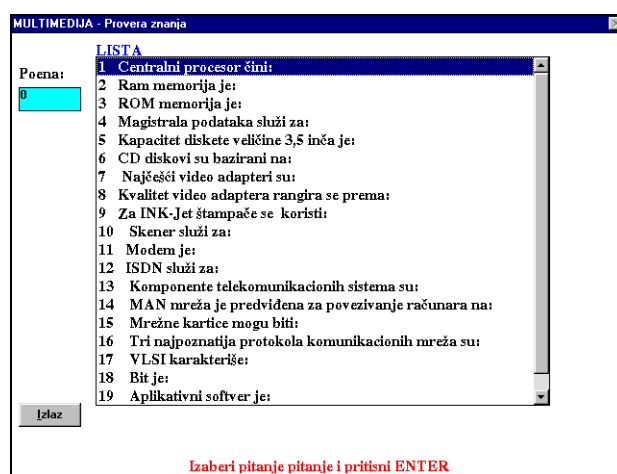

Fig. 2. Tests for selfevaluation

Teaching aids encourage thinking activity of pupils in the learning process, developing of interests for independent work after teaching and they are strong foundation for selfeducation. Writers of the above mentioned works were mostly referring to so called traditional teaching aids, only a certain number of modern ones, becuase their works appeared during the time when modern teaching aids were rarely useddin teaching. Thus, for example, they did not have in mind Internet technologies, computers, DVD, TV, programed software, electronic laboratories for programmed teaching, etc.). In our time some pedagogues: have gone so far in stressing importance and power of teaching aids pointing out that they can replace teacher. When they assert that, they point out to perfect teaching machines based on artifitial intelligence. Naturally, majority of pedagogical writers see in new teaching aids considerable facilities for teacher work and possibility that car more completely do his function of intellectual leader and educator of youth, to extend and enrich his function, not as potential rivals in his profession. From all we have said so far necessarily results pedagogical importance of modern teaching aids, both those we call traditional and those we call modern. We should have in mind the fact that teaching aids are not almighty, they can not „give" knowledge without effort, the can not replace teacher, or solve all the problems brought by technological revolution, information era and „explosion of knowledge". However, they will help young people to get information faster and easier and make communications needed for their more complete development, to make wiser decisions, to use more successfully natural and social processes for their needs, to govern themseles and develop more securely, to include more creatively in the courses of social life and gain wisdom of living in sudden changes society. (Mandić ., 2011, p. 6-7)

Thanks to teaching aids, teacher can adjust more successfully teaching to pupils previous knowledge, interests, cognitive styles and learning styles, capabilities and work speed; he can successfully realise teaching contents on individual bases and provide active participation of pupils in all the teaching and learning phases; he can provide simultaneously information, tasks related to given information, look for and register solutions given by pupils, give additional information in case they did not solve problems successfully and provide feedback information and supposr to

pupils. It is well known that by activiting greater number of pupils' senses, in teaching and learning process, better possibilities for learning are made, conditions for more durable remembering of what had been learnt, more secure recognition and use of what had been remembered. Researches have shown that pupils only by reading memorize about 10.15% of teaching material, „by listening about 20%, by observing about 30-35%, by observing and listening simultaneously about 50% and by listening, obseving and working about 90% (Danon ., 1962, pp. 6-7). There is no doubt that teaching aids are very important for activating, in the teaching and learning process, greater number of senses; for encouraging pupils to learn while working, to make transfer of knowledge and use effeciently the acquired knowledge. Besides, engagement of greater number of senses more corresponds to the essence of human being and the way he comes in contact with reality which is surrounding him; more corresponds to dynamic nature of child and the ways he wans to learn; more corresponds to learning manners which child had and still has in out of school and out of teaching activities.

4. WEB PORTAL

In the last two years we created a Web portal for the planning, implementation and optimal organization of teaching and on-line permanent education. Portal, also, contains materials for directors and professional associates in order to facilitate the planning and implementation of their activities. Portal is located at www.edu-soft.rs Educational value of didactic media could be reduced to the conditional proven fact: didactic media allow faster and better realization of the objectives and tasks of education, they are an important prerequisite for modernization and acceleration methods and forms of teaching, an important factor for the alignment of teaching with life, theory with the practice and teaching content customization features, prior knowledge, needs and interests of young people and adults, their important functions in engaging multiple senses, encouraging and maintaining the attention of students, develop curiosity and desire for learning, for active participation in the educational process and its development. . (Mandić ., 2011, pp. 6-7) Didactic media can actively involve students in the process of preparing, teaching and evaluation of realization. Didactic media allow individual work of students, transfer of knowledge and its application in the work and mastering the techniques of self-education; important presumption that equitable engagement of cognitive, emotional and conative power of personality in teaching and learning, they are important factor in directing student's activities insight stimulate learning, problem solving and creative activities. In Figure 1 is shown WEB portal which contains teaching resources for preparing and teaching in elementary school. Materials are structured by teaching subjects in accordance with the objectives and tasks of the Ministry of Education in Serbia. Portal contains methodological guidelines, preparing drafts, worksheets, multimedia and many other useful materials for teachers, principals and professional associates. . (Mandić, 2010)

Fig. 3 WEB portal for teachers

Didactic media were created as a result of many years of studying the essence of their pedagogical and practical efficiency, and some of them have applied for years in our schools and have proved their undeniable value. This gives us the basis for the claim that it is professionally produced, diligently selected and skillfully applied, affect the teaching organizational, contents, methodology and results. It gives raise to a higher level of quality, happy teachers and students, and it realized what was effectively planned goals and tasks of education in all types of elementary, middle, and senior high schools. We made a WEB portal with didactical matherials for planning, realization and evaluation the effect of physical education and a software for measuring pupil's abilities (Mandic, A., 2011).
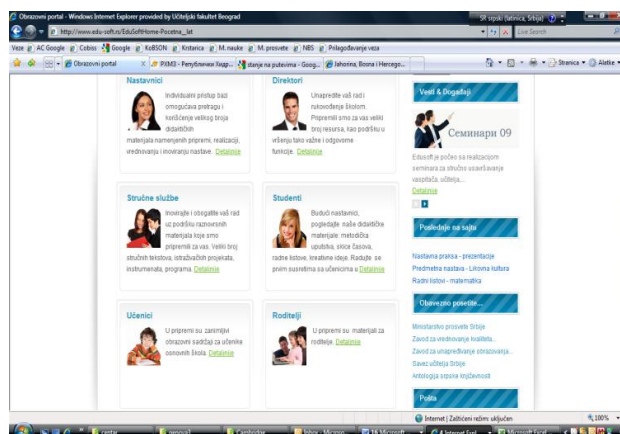
Fig 4. WEB portal for planning activities

We describe the global plans, monthly plans and the student's activities for all classes. Description is combined with a pictures, movies, sounds and instructions. We, also, planed integrative classes to combine content of musical, physical and art education with sciences.
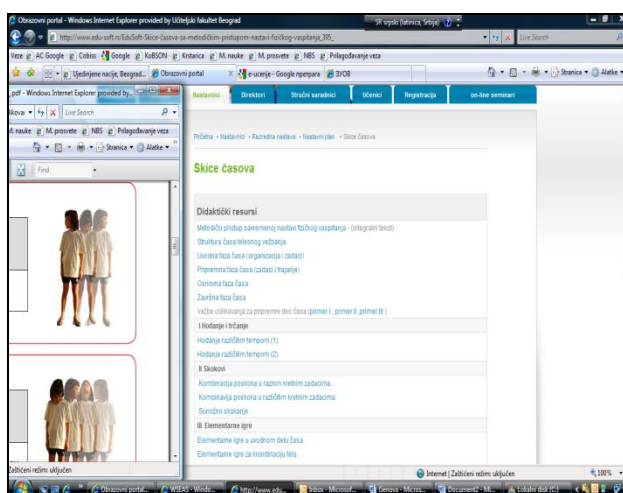

Fig 5. WEB portal with Instructions for teachers

Teachers can use plans, didactical materials, pictures, movies for all exercises according the program. These materials are located in WEB portal and could be saved on DVD, USB disk etc. In last 10 years there are a lot of exercises located on DVD or CD-Rom and it was not so easy to reach them. That's why we created Data Base Management System for didactical materials based on PHP and Content Management System. It takes 5 years to develop enough materials for teachers and we are improving it everyday. Firstly we have problems with teacher's ICT (Information Communication Technology) education, but due to several seminars and on-line materials for improving knowledge in this area we got teachers ready for using WEB resources. Ministry of Education in Serbia is going to make standards for teacher's competencies and ICT competencies are similar to European Computer Driving Licence standards. These standards will be rather the same for all teachers.

5. RESEARCH ON THE IMPORTANCE OF DIDACTIC-INFORMATION INNOVATIONS IN TEACHING

Access to the problem

Innovation of educational technology concerning efficiency, effectiveness and flexibility in presentation of information, has been intensifying within the last five years with mass use of multimedia, hypertext, internet and other up-to-date technologies. Electronic sources of information provide survey of hypertextual documents in accordance with individual abilities and previous knowledge of pupils as well as with constant interaction between computer and user. After the period of using graphoscope, diaprojector and video-projector, possibility of more considerable innovating of

education by using of information technology becomes realistic and attainable. During the last two years development of interactive distance learning system has been intensifying, which is designed and installed at faculties dealing with improvement of education in Serbia and Bosnia and Herzegovina.

Information technique means: computers, multimedia systems, cameras, TV sets, compact disks, BIM projectors, LCD panels, diaprojectors, motion picture projectors, video recordes, etc. Information technology means application of information technique with adequate methods, forms of work and organisation adjusted to educational activity. The following didactic media are now most frequently used in education: multimedia, educational software, Internet, WWW, interactive distance learning systems, virtual reality, expert systems telnet, electronic encyclopedias as wel as journals, graphofoils, video cassettes, audio cassettes.

Research subject matter

Intensive development of information technology, improvement of the existing and constant appearance of new systems require permanent following of innovations and adequate training of teachers for their application. Problem of didactic-methodical training for application of information technology is specially visible with teachers who did not study teaching subjects in the field of didactic-methodical sciencies during their schooling.

Subject matter of this research is establishing degree of teachers being informed, about new information technology, a.s well as establishing needs and possibilities training teachers for adequate application of modern information technology with the aim of increasing quality of pupils knowledge and more afficient work of school as a whole on one side, and, based on received data on being informed, needs and possibilities of teachers, establishment of programme base (model) of education and professional training of teachers in educational information technology.

Level and structure of needs are constantly being developed and they depend on personal affinity for studying modern technology, character of working position, degree of professional training, length of service, previous pedagogical training, work conditions, etc. Therefore, it is very important for programme of training future teachers to satisfy scientific critera, needs of teaching practice as well as individual) needs and interests of teachers.

Importance of research

Teaching technology, regardless possibilities offered by information technology, has not considerably changed during the last 30 years in the regions of ex Yugoslavia. In the beginning of the seventies disadvantages of traditional teaching were identified according to Komensky's paradigm, but even up to date there have not been considerable changes, both because of material conditions and insufficient training of teachers. Researches conducted in the developed western countries have shown that, in thenning of nineties with more mass use of microcomputers at schools, conditions axe made for overcoming disadvantages of traditional teaching, specially In the domain of teaching and learning individualization, raising of interna.l and external motivation, more realistic and objective evaluation of pupils knowledge.

Traditions teaching practice can hardly be overcome without more profound realizing needs of scientific approach to the problems of training teachers for using modern technologies, and one of the contributions of this work would be to point out importance and need for scientific approach to research on this problem.

Contribution of this work would also be analysis of the existing programmes of teacher training for using infromati.on technology in the world, with the suggestion of possible solutions in our conditions, as well rogramming of scientifically verified model in accordance with the researched needs of teachers, objective possibilities of school and applicability of new technology in teaching.

It is very important to respect level of students training for using information technology (secondary school knowledge), in order mot to repeat contents or be taken for granted knowledge which was not acquired by students in secondary school,

Having in mind that research of this problem was conducted from the point of view of investigating needs and possibilities of teachers and information technology, this work represents contribution to methodology of programming teachers professional training for new technologies during schooling, but also after finishing schooling with the aim of teachers training.

Aim, tasks and hypotheses of research

Aim of reseach

The aim of this research is to research and critically evaluate programme of professional teachers training for using information technology in teaching and to establish needs and possibilies of teachers and schools for qualitatve application of information technology with the aim of establishing models of teachers training as well as permanent teachers training for application of new technologies.

Tasks of reseach

Within, the defined aim of research, the following tasks of recan be selected, as specially relevant:

1. Find out teachers attitudes towards didacticrinformation innovations.

2, Establish degree of teachers being informed about possibilities offered by new information technology.

3. Find out degree of teachers training for use of didactic media.

4. Find out teachers motivation for use of new technologies.

5. Make analysis and critically evaluate programme of teachers training for application of educational information technology.

6. Make correlation of all the stated research results with us and in the world.

7. Establish if there is need for defirying new model of teachers training for using information technology.

Hypotheses of research

Essential hypothesis

It is assumed that it. does not exist qualitatively developed, scientifically founded and developed or the needs and possibilities model of teachers training for using information technology in education, that considerably makes difficult raising teaching quality level in accordance with imperatives of information era education thus reducing needs and teachers readyness ermanent training in this field.

Assisting hypotheses

1. It is assumed that in former study programmes for teachers education, as well as in professional training rogrammes, contents in the field of information technology, are not included sufficiently;

2. Teachers are not sufficiently informed about possibilities offered by modern information technology in education;

3. At schools teachers activity in applying information technology is not sufficiently followed and evaluated;

4. Worked out models of professional tea.chers training in the field of applying in formation technologies in education do not exist.

Sample of tested candidatae sharacteristics of polled teachers

Considering comlexity of this research subject, specially consider insr formulated aim of research, and selected research method, the research has been conducted on a sample of 739 teachers from 15 primary schools in the Republic of Srpska. The sample includes both lower grades teachers and subject teaching, as well as other associates (pedagogues, psychologists, libralibrarians), as well as school supervisors employed at the Republic Pedagogica Institute, performing professional-pedagogical Dervision of teachers work in the Republic of Srpska.

Tested candidates for the sample have been chosen in two groups. In the first group, cities from both parts of Republic of Srpska have been deliberately chosen (Banja Luka, Prijedor, Gradiska, Doboj, Mrkonjić Grad and Foča) and, also, deliberately chosen schools in those cities, and then research was conducted in those schools. All the teachers who were present at the teachers council that day of carrying out pollitook part in the research. Namely, several pollsters were engaged (pedagogues and psychologistis) who informed teachers about the sense of testing (with the school principals agreement) at the teachers council, as well as how to fill in the questionnaire. In that way research was conducted in all the schools, providing same conditions for all the teachers. Such a sample could be classified into deliberate smaples in more than one phase, with random sampling,

The designed sample size and the way of selecting tested candidates have been completely realized during work on the terrain. Besides, realized sample size of 739 teachers of the nine grade of primary school is sufficient for the needs of this research, not only for making realiable conclusions, but also for ble segmental amalyses. Since carrying out of poll done according to precise instruction and procedure, we think that realiability of the obtained data and the complete research has been provided.

Essential indexes of the sample structure related to essential characteristics of the tested candidates (chronological age, sex, teaching experience, teachers educational level, and jots they are doing a.t school) have been presented in the following tables.

Table 1. Chronological age of the tested candidates

Chronological age	f	%
1) to 25	19	2.57104
2) from 26 to 35	119	16.10284
3) from 36 to 45	112	15.15562
4) from 46 too 55	387	52.36806

| 5) from 56 and more | 98 | 13.26116 |
| 0) No answer | 4 | .54127 |

Table 2. Sex of the tested candidates

Sex	f	%
1) male	262	35.45332
2) female	467	63.19350
0) no answer	10	1.35318

Table 3. Teachier experience

Experience in teaching	f	%
1) to 5 years	139	18.80920
2) from 6 to 15 years	116	15.69689
3) from 16 to 30 years	258	34.91204
4) 31 amd more years	226	30.58187
0) no answer	85	11.50203

Table 4. Work position of the tested candidates

At school works as:	f	%
1) elementary teacher	268	36.26522
2) subject teaching teacher	393	53.17997
3) pedagogue - psychologist	21	2.84168
4) associate (librarian)	13	1.75913
5) principal assistant	4	.54127
6) school supervisor	36	4.87145
0) no answer	4	.54127

Table 5. Schooling of the tested candidates

Schooling:	f	%
1) secondary school	155	20.97429
2) higher school	505	68.33559
3) university	74	10.01353
5) scientific degree (spec., mr or dr)	2	.27064
0) no answer	3	.40595

Based on the analysis of data in tables 1-5 it can be concluded that selection of the tested candidates in the sample provided representativity of the sample, and therewith obnectivity of the   obtained data was provided as well as possibility of making realiable conclusions about researched occurrences not only related to the sample, but also necessary gener from the sample to population.

Organisation of research

Research was conducted in the school year 2009/2010, at the territory of the Republic of Srpska. Testing wasicarried out with the assistance of supervisor from the Republic Pedagogical Institute of the Republic of Srpska.

During the research teachers both of pra.de and subject teaching were consulted, but also other assosiates (pedagogues, psychologists, librarians), as well as school supervisors employed at the Republic Pedagogical Institute, who are doing professional-pedagogical supervision of teachers work in the Republic of Srpska.

Statistical data processing has been done, using software for statistics on personal computer.

Instruments and methods of research

After theoretical analysis of the available literature, as well as experts for making instruments and the insight in similar researches, our own instruments were created. The survey method and the method of theoretical analysis have been used in this work.

Scale of attitudes on the importance of didactic-information innovations in teaching

Construction and metric characteristics

Scale of attitudes has been constructed according to the model of Likert's summary scale, and it is intended for testing tea,chers attitudes on the importance of didactic-information, innovations in te aching, i.e. as a scale by which it should be asserted whether and how much teachers have orientation towards application and importance of didactic-information innovations in teaching or keeping the existing condition, i.e. teaching organisation without didactic-information innovations. For this scale metric characteristics have been found out on the base of research. Scale validity has been provided in several ways, during the construction or preliminary application on suitable sample of primary school teachers, which are, according to all essential characteristics, identical to the sample of teachers on research was conducted:

1. At constructing scale and selection of items in the scale only items,which clearly show essential aspects of general attitude of the tested candidates towards innovations, were kept. Pesides, in all assertions measuring subject matter is directly mentioned (didactic-information innovations) indicating that at constructin scale, so called „evident validity" was provided.

2. In order to provide scale validity, even at scale construction, experts were consulted in the field of didactics, pedagogy and in aplication of new technologies in education (according to the procedure which is called respecting degree of experts agreement). This procedure was applied even during selection of assertions in the scale and during preparing assertions for preliminary checking. The experts are researchers who have enough methodological knowledge and experience in construction of measuring scales, therefore their suggestions are of great importance.

3. Scale validity is established by „testing validity of differences between groups". Difference is tested by HI-square test, and the results are shown in table number 6.

Table 6. Testing validity of differences between groups

Groups	School without didactic-information innovations is quite illlogical	Scale of attitudes on the importance of didactic-information innovation in teaching					
		distinctly negative	negative	No atitude	positive	distinctly positive	Σ
A	Full agreement	0	0	12	62	21	95
		0.00	0.00	12.63	65.26	22.11	
	Mostly agrees	0	0	21	96	8	125
		0.00	0.00	16.80	76.80	6.40	
	Undecided	2	6	82	131	5	226
		.88	2.65	36.28	57.96	2.21	
B	**Mostly does Not agree**	0	1	78	62	0	141
		0.00	.71	55.32	43.97	0.00	
	Does not Agree at all	2	5	60	52	0	119
		1.68	4.20	50.42	43.70	0.00	
	Σ	4	12	253	403	34	706
		.57	1.70	35.84	57.08	4.82	

Pearson Chi-sljuare: 157.090,   df=16,   p=.000000

Groups have been formed based or the answer to the statement: „School without didactic-informations is quite_illogical". Group A consited of tested candidates who answered „I do not agree at all" and „I mostly do not agree" (N = 220), and gropu B tested candidates who answered „I fully agree" and „I mostly agree", (N - 260). Difference between groups was found out, and essential statistical indexes were computed.

As can be seen from the results presented in this table the obtained Hi-square=157.090 with 16 degrees fres&pm, it io statistically importnat at the level of 0,01 (p=.000000). It should be pointed out here that those tested candidates who were hesitant, i.e. who answered „I am undecided" were not included the analysis .

Such approach to testing hypothesis of differences between known groups has confirmed hypothesis that in the scale which tests teachers attitudes on the importance of didactic-information innovations in teaching one can expect statistically considerable difference between those groups who have positive and groups who have negative general relation towards innovations. Thus, it has been proved that this scale has satisfactory validity and that it can be used in tvis researcn.

4. For establishing validity of any scale, as well as scale of attitudes on the importance of didactic-information innovations in teaching one characteristic of Likert's summary scale is useful, according to which, each item in the scale can be diagnostically valuable, even if evident item content is not directly related; to the accurance, if such item has satisfactory correlation with the grand total of evaluations.

Scale validity has been verified by application of „Split-half" procedure, by which consistency is checked or so called internal homogenity of scale. In other words, scale for testing attitudes on the importance of didactic-information innovations in teaching has also checked concerning height of correlation between theirrandomly defined halfs.

Correlation between the scale halfs is 0,6/164, while validity coefficient, computed by Spearman-Brow's formula, amounts to 0,7852.

Discriminateness has been proved, in two ways.

1. By the procedure „items analysis" statements which separate tested candidates who ere standing „high" from those who are standing „low" on the scale continuum (procedure stating discriminative power of item - DP). In the final version of tve scale items with discriminative power higher than 1,96 have „been included, because discriminative power of the scale is satisfactory if its value is at least 1,96.

2. After computing discriminative power of each item, correlations between evaluations in each item and grand total of evaluations of all items, were computed. As criterium, correlations 0,30 and higher were taken, while itmes with correlation 0,29 and lower were eliminated.

In its final version scale of attitudes on the importance of didactic-informations in teaching 20 items, out of which 11 is formulated as positive and 9 as negative. Higher individual results in the scale show more positive relation towards the importance of didactic-information innovations in teaching, and lower show more negative relation.

Based on the stated metric characteristics of the scale of attitudes on the impoertance of didactic-information innovations in teaching, it can be stated that the scale as a whole meets methodological requirements and that it can be applied in this research.

Interpretation of the research results

Teachers attitudes on the importance of didactic-information innovations in teaching

One of the main conditions of accepting all changes in individual life, as introducing innovations in teaching, has been founded on coordination of changes with the attitudes of an individual. Such a conclusion results from nature of the attitude, which has cognitive, affective and willing component and which therefore determines relationship of an individual towards objects, processes and appearances in his close surroundings.

Starting from such realizations we expect that degree of agreer ment or disagreement with an appearance or aspect of appearance cane have considerable implications on the entire relationship of an individual towards such appearance. In other words, it means that general relation of teacher towards didactic-information inovations can be expressed as a, degree of acceptance or unacceptance didactic-inf orrnati on innovations, but that general relation can considerably influence on his practical engagement in application of those innovations in teacing as well.For those needs Libert's summary scale has been constructed, i.e. scale for testing teachers attitudes towards didactic-information innovations. Analysis of thus presented, results show that teachers express positive general realation towards didactic-information innovations, and also positive relation towerdis their application in teaching. Such statements confirm the received scale values, on the bases of which one can make conclusions on the degree of accepting certain statements in the scale.

It is evident that even the least accepted statement: I would apply didactic-information innovations in teaching under no conditions, (scale value or average acceptability 4.45) show distinct readiness of teachers for accepting didactic-information on innovations. Namely, the obtained results show that 87,28% of teachers expressed their readiness for introducing innovations without accepting assertion in which application of innovations in teaching is in doubt. Such possibility was accepted only by 3,11 % of teachers, while 8,93% were hesitant.

Second accepted statement (scale value 4,19) is the statement: I would like in my school to have more possibilities for application of didactic-information innovations in teaching, which most directly show teachers readiness to apply didactic-information innovations in teaching. This statement was accepted, by 84,56% out of which even 44,38% with expressive intensity, it was not accepted by 2,84%, while 10,55% teachers were hesitant.

Third accepted statement (scale value 4,11) is the statement: (Didactic-information innovations are based on modern technology and that is why they are necessary in teaching), which also show positive general relation of teachers towards didactic-information innovations. This statement is accepted by 79,30%, and it is not accepted by 2,71% of teachers.

The least accepted is the following statement: For application of didactic-information innovations better material foundation of school is necessery, whose scale value is 1,72, which is not accepted by 76,72% of teachers, out of which 56,69% with the intensity „I do not agree at all", and it is accepted by 10,82%, out of which 6,63% with the intensity „I fully agree", while 8,66% were hesitant teachers.

The next statement of unacceptability is: School with out didactic-information innovations is completely illogical (scale value 2,78), which is not accepted by 35,18% of teachers, and it is accepted by 32,77%, while 30,08% were hesitant teachers.

Global lysis of the presented results definitely show that positive relation towards didactic-inf ormation innovations is dominant with teachers, in other words, meaning that teachers in primary schools in the Republic of Srpska positively evaluate the importance of didactic-information innovations in teaching. Thus distributed attitudes of

acceptance or unacceptance of certain aspects of didactic-information innovations show that innovations are very complex phenomenon and for that reason it is understandable that teachers attitudes towards them are diffusely distributed. It results therefrom that considerataion of possibilities for their application is also complex, and for their application it is necessary to provide some other conditions as well. With the aim of more complete analysis of general teachers relation towards didactic-information innovations in teaching, total result has been stated in all the items for each teacher in this school, in the interval from 20 to 10U, considering that answers in the items were scored from 5 (maximum acceptance) to 1 (full unacceptance).Results have been presented in table 8.

Table 8. General teachers relation towards didactic-information innovations

Attitude intensity	Scale value	f	%
1. distinctly negative	do 1,50	4	.54127
2. moderately negative	od 1,51 do 2,50	30	4.05954
3 hesitant	od 2,51 do 3,50	263	35.58863
4. moderately positive	od 3,51 do 4,50	407	55.07442
5 distinctly positive	od 4,51 do 5,00	34	4.60081
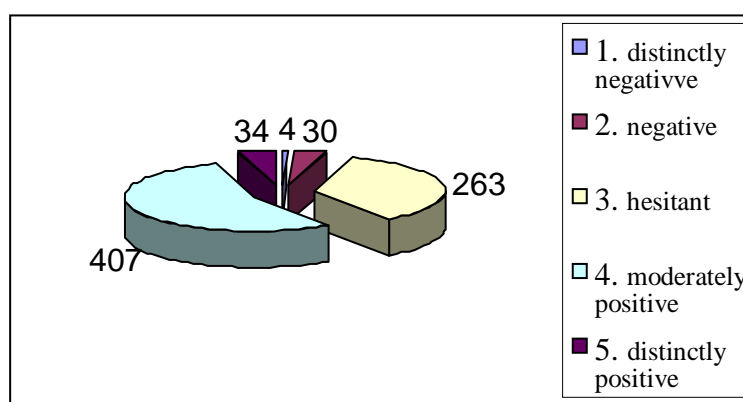
*Graph 1. General teachers relation towards didactic-information innovations*

By application of the above stated distribution it has been stated that only 0,54% of teachers heve distinctly negative relation towards didactic-information innovations, and only 4,06% of teachers are included in the category with negative general realation. It has also been stated that very third teacher (35,58%) is in the category of hesitant (scale value 2,51-3,5), and that every second teacher (55,07%) is in the category of moderately positive relation (scale value 3,51-4,5) and 4,60% are with distinctly positive relation towards didactic-informations (scale value 4,51-5,0).

The above quoted results of teachers relation towards didactic-information innovations indicate in the broadest sense positive general relation of teachers at the level of being convinced, which is expressed, through evaluation of certain aspects of didactic-information innovations. Fowever, such relation does not rive possibility of making conclusions whether teachers with positive attitud are at the sane time also better trained for their application (cognitive component) and rrore prepared for their introduction or not (conative component), as well as what are their previous experiences like, in the application of those innovations in the direct teaching work, what is, also, very important for making conclusions on teachers relation towards didactic-information innovations in teaching.

Former teachers experiences in the application of didactic-information innovations

During testing former teachers experiences in the application of didactic-information innovations in direct teaching work, teachers were offered a list of didactic-information innovation which they should have answered if they had applied them in their former work and to express intensity of their aplication.

Graph 2. Teachers experiences in application of computers
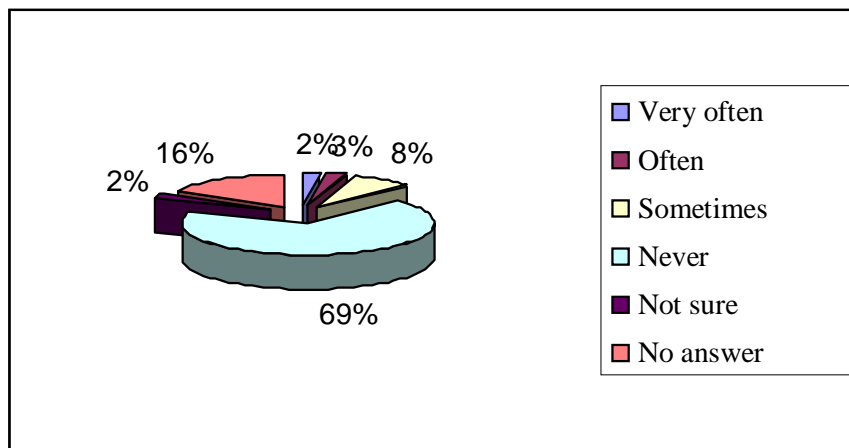
Analysis of the presented results of former teachers experiences in the innovations of didactic-information innovations, observed through fixed arithmetic means of their application, shows very low average of the application of didactic-information innovations in teaching. The fixed arithmetic means are in the interval from l,53 do 2,86, qualitatively meaning that the teachers used the above stated, didactic-information innovations on the average „never" and „sometimes", provided that considerable differences are evident in the application of some of the innovations.

It is also evident that the teachers used graphoscope most frequently („sometimes" 52,91%, „often" 10,55% and „very often" 8,12%), TV sets („sometimes" 35,18%, „often" 9,20% and „very often" 5,95 epidiascope („sometimes" 24,63%, „often" 7,31% and „very often" 4,33%), video recorders („sometimes" 22,32%, „often" 5,01 % and „very often" 4,46%) and projectors („sometimes" 20,29%, „often" 94,87 and „very ogten" 1,89%).

Observed from the other side, i.e. from the aspect of the rarest application, it can „be seen that the least used didactic-information innovations are those based on newer technology. It is evident, for example, that the least used or better said, never used are virtual reality, artificial intelligence, multimedia systems and cameras, although a certain percentage of the tested candidates said that they were used „sometimes", „often" or „very often". However, they were not used by teachers in their everyday teaching work, but probably informatics teachers, pedagogues or school supervisors (who are also included in this testing) used them at the seminars of professional training or demonstration of modern teaching technology.

General conclusion is that teachers used only a small number of modern didactic-information innovations in their former work, first of all, those which are known from before, while they did not use didactic-information innovations based on modern, technology.

State of school equipment with didactic-information innovations

Use of didactic-information innovations in teaching also depends, to a great extents on the state of school being equipped with new teaching aids and devices. It is understandable that teacher can not use modern didactic-information innovations in his teaching if they do not exist at school where he is working. That is why one of the essential aspects of this project is also making list of didactic-information innovations which are teacher's disposal for everyday work .

Graph 3. State of school equipment with didactic-information innovations
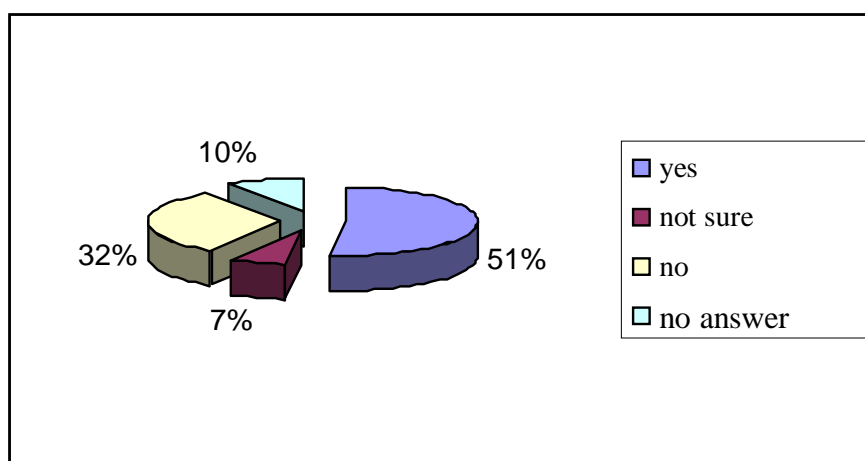
Insight into thus results shows that majority of teachers have information that in their school most frequently exist: graphoscope (72,25%), TV sets (65,09%), computers (51,823), then, although somewhat rarer but still present, video recorders (45,19%), epidiascope (32,20%; and projector (21,243), while didactic-information innovations based on modern technology are much rarer: compact disks, motion picture projector, cameras, multimedia systems, artificial intelligence and virtual relaity.

General conclusion is that state of primary schools equipment with up-to-date didactic-information innovations is not adequate to needs for modern organization of educational process, considering the fact that in schools older generation teaching aids are dominant, which are not appropriate to modern needs.

Teachers needs for introduction of didactic-information innovations

Analysis of general relation of teachers towards didactic-information innovations assumes comprehending needs for using those innovations in everyday educational practice, therefore, for the needs of this work teachers estimation on the needs for using didactic-innovations in direct teaching process has he en taken into consideration. The obtained results are shown in table 10.

Table 10. Teachers needs for introduction of didactic-information inovation

Do you need the following didactic-information innovations in teaching?	AS	Yes	Not sure	No	No answer
		3	2	1	0
- graphoscope	2.67388	85.79161	2.30041	5.41272	6.49526
- TV sets	2.63599	84.43843	3.11231	4.05954	8.38972
- video recorders	2.50609	78.34912	5.27740	5.00677	11.36671
- computers	2.37618	70.77131	7.84844	9.60758	11.77267
- projectors	2.33829	67.52368	11.77267	7.71313	12.99053
- motion picture projector	2.20974	61.84032	11.90798	11.63735	14.61434
- epidiascope	2.18809	60.21651	13.53180	11.09608	15.15562
- Compact discs	2.14614	58.72801	13.93775	10.55480	16.77943
- cameras	2.05683	53.45061	15.29093	14.74966	16.50880
- multimedia systems	1.73884	34.77673	26.79296	15.96752	22.46279
- virtual reality	1.56022	22.86874	33.28823	20.83897	23.00406
- artificial intelligence	1.55480	21.65088	34.77673	20.97429	22.59811
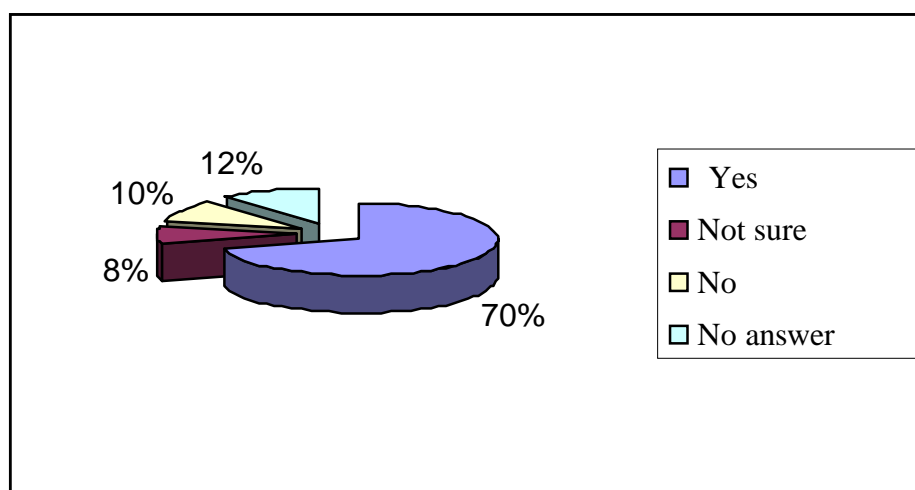
Graph 4. Teachers needs for introduction of computers

Global insight into the obtained results shows that aritmetic means of teachers estimations for certain innovations are in the interval from 1,55 for innovation which is the least need (artificial intelligence) to 2,67 for innovation which is the nost needed (graphoscope). In other words, the obtained average values indicate the expressed teachers needs for certain didactic-information innovations in teaching they organize.

According zo teachers estimations for their efficient educational work more needed are didactic-information innovations of earlier generation, because it is evident that concerning all available didactic-information innovations, teachers point out that the most needed are graphoscope, TV sets and video recorders. It is evident that didactic-

information innovations of newer generation are not to a considerable extent needed „by teachers, „because proje-ctors, compact disks and cameras are not in the center of teachers interest, specially multimedia systems, virtual reality and artificial, intelligence are not necessary. Such, teachers estima-tions could also be consequence of teachers not being sufficiently informed of the possibilities offered by new technologies in teaching. Nevertheless, advancement in expressing needs for using computers, amounting to 70%, is very important.

Besides, result of the expressed needs of primary school teachers didactic-information innovations in teching shows, not only needs for innovations, but indirectly indicates to the existing teaching organization in primary schools. It can freely be stated that teaching, in which graphoscope, TV sets, video recorders and projectors are applied, has been organized „by frontal form of work where methods of lecturing and explanations are dominant.

On the other hand, teaching in which more up-to-date didactic-information innovations would „be applied, should be individualized, where pupils activity is being increased in the learning process. In modern teaching group and individual form of work should be dominant, where tasks would be defined for pupils, which they would solve independently or in groups, and tell others how they came to the solutions. In such a way critical relation of ils towrds contents would be developed through discussions, as well as creativity and ability for analyzing and making conclusions.
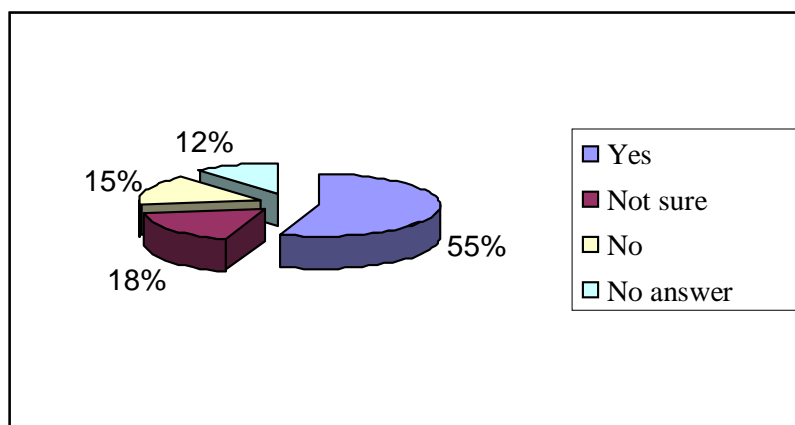
Teachers being informed and trained for application of didactic-information innovations

Adequate application of didactic-information innovations in teaching that teachers should be well informed about possibilities which they offer as well as teachers being trained for their aplicatioon. In that context it is certainly very important to state „how teachers observe their own being informed about possibilities (advantages and disadvantages) of certain innovations as well as being trained for their practical application in teaching process.

The obtained results of testing teachers beinp informed about saibilities of certain innovations application and being trained for their practical application in direct teaching process have been presented in tables 11 and 12.

Table 11. Teachers being informed about aplication of didactic-information innovations

How much do you know about possibilities for application of didactic-inforamtion innovations in teaching	AS	Yes	Not sure	No	No answer
		3	2	1	0
- graphoscope	2.64	81.86739	8.25440	2.43572	7.44249
- TV sets	2.59	80.24357	7.98376	2.70636	9.06631
- video recorders	2.44	71.71854	11.90798	5.27740	11.09608
- computers	2.22	57.23951	20.16238	10.28417	12.31394
- projectors	2.19	56.29229	20.70365	8.79567	14.20839
- motion picture projector	2.16	55.20974	17.99729	15.29093	11.50203
- epidiascope	2.16	55.20974	19.35047	12.17862	13.26116
- Compact discs	2.04	49.39107	21.78620	12.99053	15.83221
- cameras	2.01	46.82003	21.51556	16.91475	14.74966
- multimedia systems	1.59	22.05683	34.10014	25.43978	18.40325
- virtual reality	1.41	10.69012	37.48309	33.69418	18.13261
- artificial intelligence	1.39	10.82544	37.07713	33.28823	18.80920

Graph 5. Teachers being informed about possibilities for application of computers

Insight into the presented results show that estimations of teachers being informed are in the interval of 10,87% for the least being informed (about artificial intelligence) to 81,87% for the best being informed (about possibility of appling graphoscope in teaching).

It is evident that most teachers are informed about possibilities of applying graphoscope (81.87%), TV sets (80,24%) and video recorders (71.71%), while a little less teachers ere informed about possibilities of epidiascopes (57,23%), projectors (56,29%) computers (55,20%), compact disks (49,39%) and cameras (46,82%), and much less about possibilities of applying multimedia systems (22,06%), virtual reality (10,69%) and artificial intelligence (10,08%). Degree of teachers being informed about possibilities offered by computer is unsatisfactory, because, now-a-days, people speak about computers in all educational emissions and scientific sessions.

General conclusion is that teachers being informed about didactic-information innovations of newer technology is worse than about innovations which are existing from before and which are applied in teaching.

Results received on the estimation of teachers being trained for aplication of certain didactic-information innovations in teaching are similar, as can be seen on the base of results presemted in table 12.

Table 12. Teachers being trained for application of didactic-information innovations

Being trained for application of didactic-information innovations in teaching	AS	I am trained very much	I am mostly trained	I am not sure	I am mostly npot trained	I am not trained at all	No answer
		5	4	3	2	1	0
- TV sets	4.08	46.00812	39.37754	3.24763	4.46549	1.75913	5.14208
- video recorders	3.73	36.40054	38.70095	5.95399	6.35995	6.08931	6.49526
- Compact discs	2.75	16.37348	26.65765	14.07307	11.50203	21.38024	10.01353
- computers	2.16	2.02977	20.97429	15.29093	18.80920	38.15968	4.73613
- cameras	2.08	2.84168	16.91475	18.13261	18.53857	34.77673	8.79567
- projectors	1.76	1.62382	7.44249	22.05683	15.42625	41.27199	12.17862
- multimedia systems	1.59	.81191	4.05954	15.96752	21.65088	47.63194	9.87821
- virtual reality	1.46	1.48850	1.21786	17.72666	13.66712	53.99188	11.90798
- artificial intelligence	1.44	2.02977	2.02977	15.29093	12.99053	54.39783	13.26116
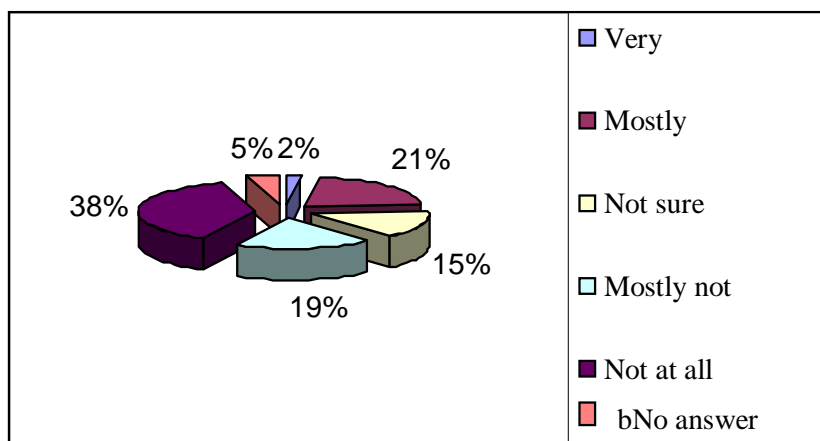
Graph 6. Teachers being trained for application of computer

The obtained results show that majority of teachers estimated that they are trained for application of TV sets in teaching (85,37%) and video recorders (75,10%), then come compact disks (43,03%) while most teachers stated about other didactic-inforamation innovations that, more or less, are not trained for their application in teaching. In that context only a few tested candidates stated that they are he is completely or partially trained for application of artificial intelligence (4,06%) or virtual reality (2,70%) in teaching.

Based of thus distributed results one can conclude that teachers are better trained for didactic-information innovations of older generation, i.e. innovations which are, more or less, applied in educational practice from before than, innovations which are based on modern technology and which are newer in educational practice. Better teachers

being trained for use of TV sets and video recorders can also be consequence of mass usage of these devices at home, and it can, therefore, be expected that with the more mass of computers at home conditions teachers will be better trained for their application.
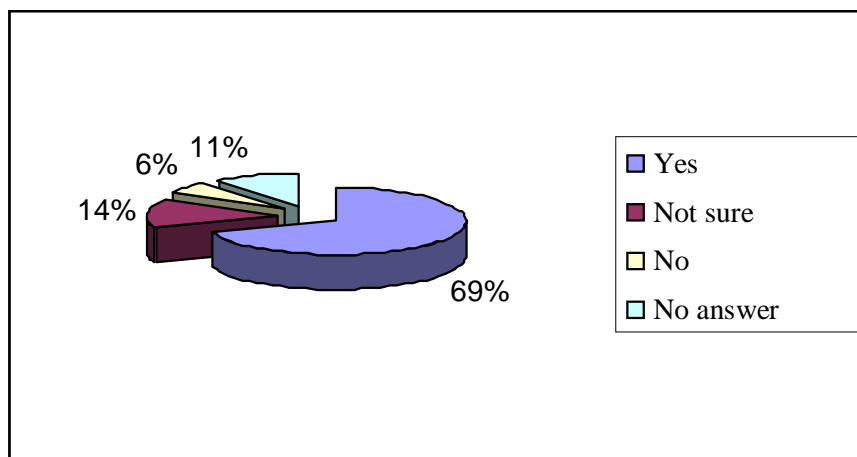
Motivation of teachers for application of didactic-information inovations

In series of important factors which can more or less influence the degree of applicability of didactic-infotmation innovations in teaching is certainly teachers motivation for their application. Since teachers motivation for their application can be interternal, and external, we have tested in this work both internal and external teachers motivation.

We are starting from the fact that indicator of internal motivation could be readiness to apply innovations in teaching if they would be available, i.e. if by applying of some innovations he would contribute to the advancement of teaching process. The obtained results are presented in table 13.

Table 13. Internal teachers motivation for application of didactic-information innovations

| If in your shool existed didactic-information innovations, would you apply them in teaching?	AS	Yes	Not sure	No	No answer
		3	2	1	0
- graphoscope	2.77	89.58051	2.84168	2.70636	4.87145
- TV sets	2.71	86.73884	4.87145	1.21786	7.17185
- video recorders	2.66	83.08525	6.76590	2.43572	7.44249
- motion picture projector	2.49	73.61299	12.58457	3.92422	9.87821
- computers	2.42	69.41813	14.07307	5.95399	10.55480
- BIM projector	2.40	67.65900	15.42625	5.14208	11.50203
- cameras	2.35	65.08796	16.64411	6.49526	11.77267
- epidiascope	2.37	64.81732	18.53857	6.22463	10.41949
- compact discs	2.25	60.48714	18.94452	6.35995	14.20839
- multimedia systems	1.92	38.83627	31.93505	11.36671	17.86198
- artificial intelligence	1.70	26.11637	37.48309	16.91475	19.48579
- virtual reality	1.67	24.35724	38.70095	17.18539	19.75643

Graph 7. Internal teachers motivation for appliction of computers

Insight into the presented results shows that percentage of teachers who would apply innovations with the aim of teaching advancement is in the interval from 24,36%, for virtual reality to 89,58% for application of graphoscope. It is interesting to see that the highest percentage of the tested candidates is prepared for application, not only graphoscope, but also TV sets (86,74%) i video recorders (83,08%) and motion picture projectors (73,61%), that a considerable number of them is prepared to use computers (69,42%) BIM projector (67,66%), cameras (65,09%), epidiascope (64,82%) and compact disks (60,82%), while a smaller number of teachers is ready to apply multimedia systems (38,84%), artificial intelligence (26,11%) and virtual reality (24,36%).

The obtained results of teachers motivation for application of didactiction- innovations with the influence of external stimulation indicate insignifcantly different relation of teachers, as can seen in table 14.

Table 14. External teachers motivation for application of didactic-information innovations

If you were stimulated would you apply didactic-information innovations in teaching?	AS	Yes	Not sure	No	No answer
- graphoscope	2.72	87.68606	3.51827	2.43572	6.35995
- TV sets	2.67	86.06225	3.78890	1.35318	8.79567
- video recorders	2.59	80.78484	7.71313	1.35318	10.14885
- computers	2.51	75.37212	9.87821	4.46549	10.28417
- motion picture projector	2.43	71.31258	12.44926	3.92422	12.31394
- cameras	2.39	68.20027	15.56157	4.05954	12.17862
- epidiascope	2.35	66.84709	14.34371	6.08931	12.71989
- compact discs	2.33	65.89986	15.15562	5.00677	13.93775
- BIM projector	2.33	65.62923	16.23816	4.33018	13.80244
- multimedia systems	1.96	43.70771	27.19892	11.36671	17.72666
- artificial intelligence	1.77	32.47632	32.47632	14.88498	20.16238
- virtual reality	1.77	31.66441	33.96482	14.74966	19.62111
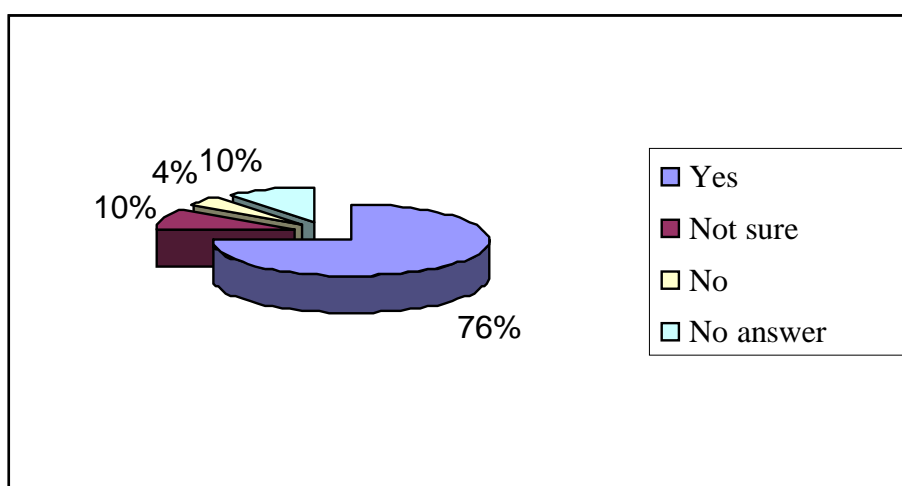
Graph 8. External teachers motivation for application of computer

Global analysis of presented results shows that percentage of teachers who would apply innovations with the influence of external stimulation is in the interval from 31,66%, for virtual reality, to 87,68% for application of graphoscope. It can be seen that the highest percentage of teachers is ready to use, with external stimulation, TV sets (86,06%), video recorders (80,78%), computers (75,37%) and motion picture projector (71,31%), that a considerable percentage is ready to use camera (68,20%), epidiascope (66,84%), compact disks (65,89%) and BIM projector (65,62%) while the smallest percentage of teachers is ready to apply; multimedia system (43,71%), artificial intelligence (32,47%) and virtual reality (31,66%).

Global analysis of the received results definitely shows that positive general relation of teachers is mostly dominant on the level of conviction, expressed through evaluation of certain individual aspects of didactic-information innovations, that they mostly used, in their former work, didactic-information innovations of earlier generation and only a small number of newer gereneration innovations, that state of equipment of primary schools with modern didactic-information media is unadequate to the needs of modern organization of education process, because in schools older generation teaching aids are dominant, which are not suitable for modern teaching needs; that didactic-information innovations of earlier than newer generation are needed for teaching work in them; that teachers being informed about didactic-information innovations of newer technology is worse than about innovations of older generation; that they are better trained for work with innovations of earlier generation; and that they are better motivated for work with didactic-information innovations of earlier generation.

6. CONCLUSION

Intensive development of electronics, computers, telecommunications, information theory and other sciences provide the pedagogical innovation of technology that contributes to the improvement of teaching, students' motivation, raising the quality of learning and others. Using modern media, didactic teaching is evident, dynamic and interesting, with good organization can continue to provide greater activity, better quality and durability of students' knowledge. Using modern

media didactic teacher could satisfactorily adapt their teaching style, cognitive styles and learning styles of students, could meet their diverse needs and encourage curiosity and motivation for learning and ensure that each student demonstrated the specific way to search for specific teaching materials and to overcome their own pace. In recent years intensively developing didactic materials in the Web environment gives the opportunity of better study of certain areas, which corresponds to the individual interests of students (pupils) and all others who use these teaching materials for formal or informal education. We need also to be made permanent evaluation of elearning systems and their development in accordance with the changes taking place in developed countries of the world, and based on the experiences and attitudes of teachers and students in practice. Innovation management is very complex, because of teacher's resistance due to insufficient information and capability and poor equipment in schools. Overcoming this problem involves active participation in seminars for teacher's training. In the end we must have in mind the fact that teaching aids are not almighty, that they can not resolve numerous problems of modern teaching which sxe consequence of nonadequate position of education and schooling in society, relatively modest investasent in raising quality of teaching and still existing shortcomings in teacher training. We can say with sufficient reason that pedagogical power of teaching aids and knowledge sources will be as great as is teacher's knowledge pedagocal training and engagement; it will depend on pupils degree of motivation, and readiness to learn making their own efforts, on the level of teacher and pupils co-operation in teaching; how much will theyr everybody in his domain, be aware and responsible in work; whether will pupil and with how much conviction accept the fact that he does not learn for teacher nor for good grade, but for acquiring the biggest wealth man can possess and which is indestructible - KNOWLEDGE

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