

VIEWS OF ICT TEACHERS ABOUT THE INTRODUCTION OF ICT IN PRIMARY EDUCATION IN GREECE

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ABSTRACT

The difficulties in the effective integration of ICT in the classroom make the subject a constant challenge for modern educational systems. The "New School", an innovative new curriculum applied experimentally in Greek schools, introduces the full and effective use of ICT in all aspects of school reality. Prominent in this effort is the role of ICT teachers. Given the vague framework which describes the integration of ICT in primary schools with reformed curriculum, it is important to investigate the views of ICT teachers in relation to the aims of the Ministry of Education and the obstacles they encounter in their teaching process. The research results reveal that on one hand, there is a considerable confusion among teachers with regard to their role and on the other hand, there are several external and internal barriers to effective teaching.

Keywords: Integration obstacles, educational reforms, experimental schools

1. INTRODUCTION

Technological progress, combined with a parallel evolution of pedagogical sciences, results in the belief that the integration of Information and Communication Technologies – ICT – into learning interaction may bring about a new era in the educational practice (European Commission, 2002); (Tsikalaki & Valatidis, 2010). However, the introduction of ICT in the educational practice is followed by essential gaps and encounters multifold difficulties (Solomonidou, 2002). This fact turns ICT into a significant challenge for both the needs and the orientation of each and every educational system (Kyriakou & Charalambous, 2006), imposing a complete review of their planning and organization, in order to make the transition to a new stage of systematic exploitation of technology possible. The present paper aims at researching the degree up to which the notifications of the Ministry of Education can be implemented in the particular field. Therefore, what is examined here are the views of ICT teachers in Primary Schools with Uniform Reformed Educational Curriculum with reference to the aims of the Ministry of Education and the potential obstacles during their educational practice.

The structural inflexibility of the Greek educational system, the traditional assessment systems and the restrictive teaching material act as a resistance factor working against the introduction of innovations and the application of the research results into school classes (Maistros, 2010). A significant number of reforms of the late years do not seem to have changed the existing pedagogical practices, outlining, in this way, an assimilating, counterproductive and obsolete school (Ministry of Education, 2010). More specifically, as far as ICT is concerned, it is pointed out that, despite the repetitive attempts to introduce them into education, innovation and qualitative teaching upgrade seem to remain "written on paper", as ICT teachers tend to use technology by just adapting it to their own methods and practices (Liakopoulou 2010, Tokmakidou et al, 2010).

At the same time, the repetitive projection of pedagogic issues under a technical and practical perspective seems to lead to unfulfilled expectations, supporting a series of problems which –due to their extent and complexity– deter the clarification of the situation (Mavroyiorgos, 2001, Tzimoyiannis & Komis, 2006, Sianou-Kyrgiou, 2010). The quantitative and qualitative under-use of computers at school, the obsolete and already problematic laboratory equipment and the inadequate teacher training intensify even more the question around the issue (Vosniadou, 2002, Koustourakis & Panagiotakopoulos, 2008, Shoretsanitou & Vekyri, 2010, Ministry of Education, 2010).

In this framework, the “New-Digital School” orientates towards a critical learning of communication and technological skills through an extended and essential use of ICT throughout the learning process (Koustourakis & Panagiotakopoulos, 2008, Drenogianni, 2010, Ministry of Education, 2010). Teachers constitute the central pillar in this attempt since their ability to use ICT effectively in the learning process is directly linked to the pursuit of education reform (Bikos & Tzifopoulos, 2011). The ICT teachers’ perceptions on the role of ICT in the implementation of effective teaching, the potential obstacles encountered during its use, possible participation in relevant, provided training and the feeling of efficiency and effectiveness during the ICT-supported teaching interaction, significantly affect the quality of the educational practice (Gogoulou et al, 2011).

Nevertheless, only one out of two ICT teachers in Primary Education state that they feel adequately trained for their role (Papageorgakis et al, 2011), while the generalized, vague curriculum and the absence of a school book may have a negative effect on ICT teachers’ feeling of self-efficacy and the quality of their work in the classroom (Sang et al, 2010, Vaggelatos et al, 2011). In addition increased usage of computers and educational software at schools is insufficient to overcome effectively the obstacles that ICT integration brings into the educational process (Tzimoyiannis & Komis, 2004). The result of this effort relies heavily on relevant views and beliefs that teachers hold about the integration of ICT in their pedagogical approach (Fessakis et al., 2010). Taking into consideration the Ministry’s focus on a horizontal, integrated approach of ICT in education, while ICT teachers’ are oriented towards techno-centric or pragmatic approaches (Kordaki & Komis, 2000), expressing severe oppositions against many of the axes of the current educational reform (Koustourakis & Panagiotakopoulos, 2010) it is evident that the implementation of the directions prescribed in the Ministry’s notifications is anything but easy. As a result, the delayed, forced and, generally, disorganized introduction of ICT in education (Tzimas, 2009; Liakopoulou, 2010) appears to be repeated, once more, confirming previous research assertions about the Greek educational system’s weakness to successfully integrate innovative learning approaches, thus conveying its problems and deadlocks to the “New School” (Vosniadou, 2002; Bougias & Dimitriadis, 2006).

It therefore becomes obvious that there are important reasons for investigating the views of ICT teachers on the outcomes of the reforms related to the effective use of ICT in education.

2. RESEARCH

2.1. RESEARCH AIM AND OBJECTIVES

The present paper presents part of the results of a wider research and focuses on the ICT teachers’ views in relation to:

- the Ministry of Education proposals referring to the ICT integration into Primary Education
- the obstacles that ICT teachers encounter during their teaching practice and their influence over teaching effectiveness.
- their role in teaching effectiveness

The aforementioned directions compose, on the one hand, the theoretical framework in the light of which the proposed reforms become perceived by those qualified for their practical application and, on the other, the reality which these changes are required to reform.

2.2. METHODOLOGY AND RESEARCH QUESTIONS

Taking as criteria (i) the need to assure research validity and reliability, (ii) the number of schools and the differentiations among them, and (iii) the suitability of the quantitative method in the framework of sociological research, we have chosen to apply a quantitative review in order to achieve a rapid, economical and multifaceted investigation of the problem (Vamvoukas, 2007, Kyriazi, 2009).

Taking advantage of the feasibility of the Internet as a data collection tool, an online questionnaire has been designed and the data collected in this way have been analyzed with the use of a statistical software in an attempt to draw conclusions regarding the degree of the effectiveness of the introduction of ICT in Primary Education during the first period of the application of the “New School”. The data collected have been analyzed with the use of statistical software –PASW v. 18.0.

The questionnaire of the particular research was developed by the research team and was based on its specificities, following general criteria of the questionnaire formation practice, while taking into account the specificities and the necessities of the subject (Cohen & Manion, 1997, Bird et al, 1999, Katerelos, 2008, Kyriazi, 2009). As an evolution of the questionnaire via mail, the online questionnaire constitutes a satisfactory form of educational research overview and is often selected in such attempts, which have proved to be successful

as far as quality and number of answers are concerned (Cohen & Manion, 1997). To reduce arbitrariness in the selection and formation of the issues and to minimize the possibility of invalid measurements, during the questionnaire development phase, similar texts from the Ministry of the Education as well as elements and directions of relevant researches on similar topics, have been utilized (Pelgrum, 2001, Tzimoyiannis & Komis, 2006, Bimiglas, 2009, Fessakis & Karakiza, 2010, Piliouras et al, 2010, Ministry of Education, 2010).

Taking as criteria the research aims and objectives as well as the validity and the possibility of easy coding of the responses by the researchers, various kinds of questions were used. More specifically, for the recording of demographic data closed questions were mostly used, whereas, in the other sections, ranking scale questions were mostly used –five and four rank Likert scales, depending on the question– so that there would be more degrees of freedom and relative standardization the responses of participants (Paraskevopoulos, 1993, Zafeiropoulos, 2005, Katerelos, 2008, Kyriazi, 2009). Where necessary, based on the question nature, participants were provided with the possibility to complete the answers through open questions.

The questionnaire is divided into three sections. The first one collects sample demographic elements while the rest examine in the following order:

- the degree up to which ICT teachers agree with the Ministry’s proposals concerning the integration of ICT in primary education
- the obstacles they encounter in their every day teaching practice

2.3. PARTICIPANTS AND PROCEDURE

The sampling approach followed in the present research may be characterized as simple and random (Cohen & Manion, 1997). 87 ICT teachers participated in the research, 56% of whom are male and 44% female. Given the high degree of homogeneity of the examined population, the sample size is considered satisfactory as compared to the number of 800 schools. At the same time, the free, equally probable participation of all ICT teachers working in these schools guarantees representativeness and randomness of the sample, while, the selected methodological approach ensures, additionally, its independence (Vamvoukas, 2007). In this way, validity and reliability questions are avoided and result generalization can be possible.

In order to be able to identify the sample and explore possible relationships, various demographic elements such as: sex (Table 1a), age (Table 1b), professional status (Table 1c), years of teaching experience (Table 1d), years of previous teaching experience in primary education (Table 1e), type of school area (Table 1f), basic degree (Table 1g) and type of post graduate studies (Table 1h), were collected and are presented in [Table 1], here below:

Table1a: Distribution of sex			Table 1b: Distribution of age		
Sex	N	%	Age Groups	N	%
Male	49	56	25-29	21	24
Female	38	44	30-34	37	43
Total	87	100	35-39	19	22
			40-44	7	8
			45+	3	3
			Total	87	100

Table1c: Distribution of professional status			Table1d: Distribution of years of teaching experience		
Professional status	N	%	Years of Teaching Experience	N	%
Permanent teachers	53	61	< 3	26	30
Full-time substitute teachers	26	30	4-6	30	34
Part-time substitute teachers	8	9	7-10	18	21
Total	87	100	>10	13	15
			Total	87	100

Table1e: Distribution of years of previous teaching experience in primary education			Table1f: Distribution of type of school area		
Years of previous teaching experience in primary education	N	%	Type of school area	N	%
No experience	24	28	Rural	4	5
Less than one year	21	24	Suburban	10	11
1-2	33	38	Urban	73	84
>3	9	10	Total	87	100
Total	87	100			

Table1g: Distribution of basic degree			Table1h: Distribution of post graduate studies		
Basic Degree	N	%	Post Graduate Studies	N	%
University/Higher Technological Educational Institute non-Computer Science Department	5	6	Post Graduate Studies in Education	5	6
Higher Technological Educational Institute Computer Science department	24	28	Post Graduate Studies in Computer Science related fields	30	35
University Computer Science Department	58	66	A combination of the two above	3	3
Total	87	100	Other	5	6
			None	44	50
			Total	87	100

Table 1: Demographics of the sample

One out of two participants has less than one year’s experience in Primary Education. In general, working experience of the sample is also limited in structures of Secondary Education –46% state that they have never worked in a junior high school, 38% in general senior high (lyceum) and 45% in vocational education– a fact, which, combined with the ICT teachers’ young age, suggests that the majority of them have probably been part of the institution of the Day Schools in previous years. (Day School is a modern form of elementary school that was introduced to the Greek educational system to serve high educational and social goals. It started as institution that aimed in supporting effectively the typical basic school by providing multifaceted education to students of working families. Ultimately, its implementation did not fulfill the initial expectations).

The research was carried out in April – May 2011 when the training programs of ICT teachers of Primary Schools with Uniform Reformed School Curriculum had been completed and the participants had formed a definite picture of the dimensions of both their roles and the problems they encounter. Part of the research is related to the Programme of Postgraduate Studies “Adult Education” of the Hellenic Open University. The questionnaire, which the participants were invited to fill in, was created using a form of Google Docs and the link to the survey is:

<https://spreadsheets.google.com/spreadsheet/viewform?formkey=dE9KYWQ0cDVVelhLQnhyczg5aHVXNHc6MQ> (in Greek)

Immediately after the questionnaire configuration and before its release to those concerned, the implementation of a preliminary research was decided so as to avoid potential problems and gaps (Kyriazi, 2009). The questionnaire was initially sent to a small part of the sample and the conclusions of the pilot research were incorporated into its final form (Bird et al, 1999, Katerelos, 2008).

Subsequently, the link to the survey was sent to websites relevant to the science and teaching of Information Technology, to educational portals and electronic lists used by the ICT school advisors for their communication with the ICT teachers.

3. RESULTS

For the descriptive data analysis the potentials of Google Docs were used while for the deductive process the program PASW Statistics v.18.0 was selected.

Regarding the conditions they encounter in their professional routine, 60% of the participants have at least 16 students in their classes, while in some classes the number of students exceeds 24. A percentage of 64% of the people questioned state that the school laboratory has ten or fewer computers in operation and 76% claim that they use the existing equipment without problems. The above seem to enable the usage of ICT in group and inter-group activities. Towards the latter seem to be orientated 68% of the participants, using in parallel the software proposed by the Ministry of Education –84%. However, in a following question, nine out of ten people questioned state that they face problems in the implementation of an effective teaching procedure due to the space and the infrastructure of the laboratory with regard to the number of students per class; only 3% state that they can smoothly implement innovative teaching approaches. Given that 62% of the participants had not integrated laptops in their teaching, these contradictory replies, particularly with regard to the use of the infrastructure, are indicative of the ICT teachers’ confusion regarding the orientation and the demands of the new framework as well as the obstacles they encounter during their teaching practice.

A percentage of 60% and 57% respectively of the participants are orientated towards interactive processes between a learner and a computer and connect their teaching practice with the preparation of their students to attain a computer skills certification exam. At the same time, 71% consider interdisciplinary approach an important aim of ICT teaching, correlating their subject to other cognitive ones. However, only three out of ten suggest that they keep frequent cooperation with teachers of other subjects, stating, in a percentage of 83%, that they feel adequately trained to cope with the demands of their role. Meanwhile, only 63% feel that they generally succeed in having effective teaching sessions. With reference to the latter, 67% feel that the lack of assessment for the particular subject acts as an inhibiting factor in meeting its aims and 75% consider that the presence of a school book would help them and the students in the learning process.

A percentage of 82% of the people questioned are positively disposed towards the implementation of critical teaching approaches, expressing, important concerns – 71% - as far as the correlation of the subject to processes of computational thinking is concerned, though. Nevertheless, six out of ten seem to disagree with the necessity of promoting students’ needs, considering the teacher as the main class organizer and the gradual learning of computing principles as an aim of their teaching approach.

Finally, a percentage of 85% of the ICT teachers state that the Act P80 laptops were not used by other subject teachers in their teaching practice. (Act P80 refers to a National Strategic Reference Framework (NSRF) 2007-2013 Program entitled “Pilot introduction of computers and related equipment in elementary schools for a digitally supported teaching”, which ran in Greece in the school year 2010-11. Act P80 was implemented under the Operational Program: “Education and Lifelong Learning”, ESF Axis Priority 1 “Upgrading the quality of education and promoting social inclusion in the Entry Phase 2 districts” and was co-funded by the European Social Fund (ESF). Almost all Primary Schools with Uniform Reformed Educational Curriculum had been equipped with a set of laptops within the framework of this program).

An indicative part of these results is presented in detail, in [Table 2] below.

<i>I correlate the teaching of ICT to other subjects</i>	<i>I cooperate with teachers of other subjects</i>		
	Answers	N	%
	Rarely	25	29
	Sometimes	33	38
	Often	26	30
	Almost, in an daily basis	3	3
	Total	87	100

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Table 2: Presentation of the answers to selected questions

Since the data collected were nominal or ordinal in nature, non-parametric statistics were chosen to analyze the responses. With the help of the Mann-Whitney test, it was firstly found, that pedagogically trained ICT teachers tend to agree more with the critical acquisition of computational skills (Mean Rank = 47,25, $\alpha=0,046$, Mann-Whitney U = 594,5), whereas ICT teachers without pedagogical competence feel less confident with reference to the dimensions of their role in the particular schools (Mean Rank = 47,80, $\alpha=0,020$, Mann-Whitney U = 561,5). Applying a non parametric test based on the Spearman's rho it was pointed out, additionally, that an increase in the number of students in school classrooms is connected with a decrease in the feeling of teaching competence of the ICT teacher ($a=0,001$, $cc=0,358$), contributes to a decreased implementation of innovative teaching approaches ($a=0,024$, $cc=-0,241$), to decreased exploitation of the proposed educational software ($a=0,022$, $cc=-0,246$) and of laptops by teachers of other subjects ($a=0,027$, $cc=0,237$) and, in combination with problems of laboratory infrastructure, it obstructs the effective development of the educational planning ($a=0,005$, $cc=0,296$). It can also be noted that there is a positive correlation between the degree to which ICT teachers agree with the absence of student assessment in ICT and of the feeling of achievement of an effective teaching session in a framework of increased rates of freedom ($a<0,001$, $cc=0,431$).

The feeling of self efficacy of ICT teachers tends to decrease with the increasing incidence of problems in the laboratory ($a=0,005$, $cc=0,297$) and it is improved with both, the combination of ICT with other cognitive subjects ($a=0,023$, $cc=0,243$) and the implementation of learner centered teaching methods ($a<0,001$, $cc=0,467$). The frequency of application of the latter is associated with the degree of cooperation among ICT teachers and teachers of other subjects in the planning and implementing teaching sessions ($a<0,001$, $cc=0,367$), which decreases while working experience in general senior schools (lyceums) increases ($a=0,020$, $cc=0,249$). The increase in working experience years in general senior schools (lyceums) is also negatively related to the frequency of smooth implementation of innovative approaches ($a=0,017$, $cc=0,256$). The survey results also reflect an increase in the number of ICT teachers who are oriented towards the use of ICT in group activities as we move towards more flexible forms of work – from permanently appointed ICT teachers, to full- and part-time temporary substitute teachers – ($a=0,024$, $cc=0,242$).

As far as laboratory equipment is concerned, the number of computers in operation is connected with both a decreased frequency of problem emergence ($a=0,001$, $cc=0,343$) and the importance of p80-Act laptops in the improvement of the educational process ($a=0,009$, $cc=0,279$). Moreover, as the contribution of laptops in achieving an effective teaching is considered more important, these (laptops) seem to be used more often by teachers of other subjects for the aims of their teaching practice ($a=0,001$, $cc=0,345$). ICT teachers who are positively disposed towards the interdisciplinary framing of ICT avoid the correlation of their teaching practice to the cognitive subject of computer programming ($a<0,001$, $cc=0,542$), without raising critical issues around the importance of ICT in order to avoid cultivating negative attitudes to students ($a=0,021$, $cc=0,247$), while ICT teachers who use more frequently the proposed educational software tend to consult to a greater extent, the directions of the curriculum of the Ministry of Education ($a=0,005$, $cc=0,299$).

4. DISCUSSION

It is obvious, first of all, that the orientation of the Ministry of Education towards the prerequisite of pedagogical training of the ICT teachers, seems to be in the right direction, since it can reinforce their feeling of competence, thus contributing to the improvement of the effectiveness of the educational work. However, the transition from an exam oriented, guiding system to a “libertine” framework of educational interaction, results as expected, into uncertainty and misconceptions. A series of external and internal obstacles have been recorded, which create confusion to the participating ICT teachers, hindering the successful integration of ICT into the learning environment. These obstacles seem to interweave, thus composing a problematic reality for the ICT teacher, who, feel insufficient to face it without being provided with relevant, suitable support. As a result, they tend to feel inadequate, gradually converting themselves as part of the problem and not of the solution. In overall, the results of the research reveal a dominating issue: the existence of a wide and acute confusion among the ICT teachers that are working in the new framework of PSUREC regarding the dimensions of their role and the characteristics of effective teaching.

While, theoretically, a sufficient degree of agreement with the Ministry of Education notifications has been recorded, the situation, in reality, does not seem to be characterized by innovation or essential differentiation from the previous framework. Apart from the external obstacles, other factors to which the specific fact may be attributed include: the ambiguous framework of the integration of ICT in Primary Education, the insufficient development and pedagogical training of ICT teachers, as well as their lengthy working experience in Secondary Education (Vaggelatos et al, 2001, Papageorgakis et al, 2011). The permanently appointed ICT teachers with increased working experience seem to be more orientated towards teacher centered approaches which focus on a direct student-computer interaction, possibly because of the way the ICT courses are taught in Secondary Education and also because of their targeting on computing processes and computational thinking. This attitude can also be attributed to the traditional reproductive characteristics of ICT teachers in a centralized educational system (Bikos & Tzifopoulos, 2011). The feeling of safety that accompanies permanent appointment is probably associated with a reduced willingness to adapt to new educational approaches which would entail increased requirements on the part of the ICT teacher. The internal obstacles of ICT teachers seem to play, in this case as well, an important role for the successful use of ICT (Bingimlas, 2009).

As expected, the combination of all the above causes substantial difficulties for the achievement of a critical and interdisciplinary “horizontal” approach to ICT in Primary Education, which constitutes one of the main aims of the Ministry of Education for Primary Education.

Additionally, the status of the laboratory in relation to the number of students influences the ICT teacher's self-perception, thus significantly affecting the effective integration of ICT into the learning process (Sang et al, 2010, Papageorgakis et al, 2011).

As far as the first of the aforementioned parameters are concerned, the introduction of regulation for school laboratories in Primary Education is considered essential, especially after the supply of laptops, as an attempt of recording and possibly diminishing external obstacles. Regarding the number of students, large classes in combination with old or/and few computers seem to create many problems in the educational practice and have a negative impact on teachers' efficiency and the effectiveness of the educational process.

The increased number of students negatively relates to both the implementation of innovative teaching approaches and the use of the proposed educational software, possibly, due to the problems arising from the use of the latter when many students are crowded around a computer. The large number of students in a class also seems to negatively affect the use of laptops by teachers of other subjects, despite the fact that the educational software often facilitates group work approaches and critical, self-directed learning (Papageorgakis et al, 2011). The latter are expected, however, to encounter more difficulties in the use of educational software, if one considers that the introduction of ICT in their teaching practice already constitutes a form of innovation. The limited and often inadequate relative training combined with a focus on the covering of the syllabus which supports the use of traditional, wide acceptable teaching approaches, contributes even more to the typical use of ICT in the learning process (Maistros, 2010; Tastsidis et al., 2010). Thus, despite the basic claim of the "New School" for a cooperation between teachers and their involvement in the use of ICT (Ministry of Education, 2010), the positive attitude of the primary school teachers towards the integration of ICT in Primary Schools (Papageorgakis et al, 2011) and the orientation of ICT teachers towards an interdisciplinary approach, it seems that the fragmentation of school life into separate cognitive subjects and the limited interaction among the teachers is maintained. What is therefore confirmed, once more, is the difficulty of cooperation among teachers of the Greek school, a fact which constitutes an important obstacle in the effort for the establishment of a new culture.

Finally, as far as the acquisition of lap tops is concerned, it is confirmed that, despite the constant and systematic purchase of ICT systems, their implementation into the educational activity remains fragmentary and limited (Maistros, 2010, Bikos & Tzifopoulos, 2011).

5. CONCLUSION

The present paper presented the results of a research which attempted to record the views of ICT teachers of Primary Schools with Uniform Reformed Educational Curriculum in relation to the aims of the Ministry of Education towards the introduction of ICT in Primary Education, as well as the obstacles they encounter during the educational practice. What has emerged is an intense confusion on the part of ICT teachers with regard to the dimensions and the demands of their role in the new working framework. While they seem to agree with the majority of the aims set by the Ministry of Education concerning the New School, when it comes into practice, ICT teachers face important difficulties during their implementation and tend to apply more traditional and safer educational approaches.

Finally, although ICT teachers hold a positive attitude towards interdisciplinary approaches to ICT, they barely cooperate with teachers of other school subjects for the planning and implementation of their teaching sessions. As far as the laptops acquired under the p80 act are concerned, they have not been proven especially helpful during teaching practice, while they were scarcely used by other school subject teachers.

It should be mentioned, at this point, that the particular research is subject to certain limitations which concern the representativeness of the sample, since, due to the free access to the internet, there is no possibility to check the identity of participants, as well as the use of the quantitative approach only. As far as the sample is concerned, the recent implementation of similar researches - such as those of Fessakis and Karakiza (2010), Mountridou and Soldatos (2010) etc – together with the research design, minimize the possibility of raising validity issues. As of the use of quantitative methodology, the authors propose the conduction of a long-term study, which will give the researchers the chance to apply mixed methodology and thus to clarify in detail the obstacles related to ICT integration into school practice.

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