

FACTORS AFFECTING TEACHERS' VIEWS AND PERCEPTIONS OF ICT IN EDUCATION

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ABSTRACT

This article presents the results of a study investigating current teachers' beliefs and perceptions of ICT in education. The survey was administered in Greece to a total of 1165 primary and secondary education teachers, just after they had completed a training programme on basic ICT skills. The majority of the teachers in the sample stated positively towards the role that ICT could play in education. However, only a small percentage of them have adopted and use ICT in their instruction job. Our findings have also revealed some interfering factors, which make many teachers cautious or skeptical about ICT integration in the educational practice. We have also recorded differences in teachers' beliefs and perceptions according to their gender and subject specialty. Finally, we conclude with some implications, which could be helpful to the educational policy authorities in their attempt to implement new initiatives aiming at teachers' preparation to effectively integrate ICT in their everyday classroom practice.

KEYWORDS

ICT in education, teachers' beliefs, teachers' professional development, educational policy

1. INTRODUCTION

The expansion of Information and Communications Technologies (ICT) is increasingly ubiquitous and influences many social aspects such as administration, economy, labour, education, culture etc. ICT and education are nowadays intimately associated and ICT is perceived as an integral part of the educational reform efforts necessary to teach students the knowledge and skills considered important for the 21st century Knowledge Society (Unesco, 2002). Over the last decade a great deal of educational initiatives, also in the EU and in the other developed countries, has been directed towards ICT integration in the schools. Most of them have been focused on the development of technology infrastructure in the schools and the production of effective educational software or ICT-based learning environments.

Although ICT infrastructure and educational software disposal have rapidly increased in the schools, teachers do not appear to make effective use of ICT tools for instruction (Becker, 2001; Russel et al., 2003; Zhao & Cziko, 2001). It has been argued that teachers' attitudes and skill levels still remain an obstacle to ICT adoption and integration in the educational process (Pelgrum, 2001). During the last years there is a movement to initiatives aiming at teachers' preparation in order to be able to integrate ICT in their everyday educational practice. A great number of programmes have been designed and established in the EU countries (eLearning, 2004), USA (PT3, 1999), Australia (ICTL, 2004) etc., aiming at enhancing teachers' skills about ICT pedagogical application in the instructional and learning processes. Most teacher training programmes are basically designed to raise ICT knowledge and skill levels, and to foster positive attitudes towards ICT as a teaching and learning tool in everyday practice (Kumar & Kumar, 2003; Galanouli et al., 2004).

Teachers in general agree that computers constitute a valuable tool and are positive about students' achievement of ICT knowledge and skills. In most cases, they perceive ICT as a new subject-matter in education rather than a new way of teaching or interaction between learners and knowledge (Williams et al.,

2000). It appears that, even though they recognize the importance of introducing ICT in education, teachers tend to be less positive about their extensive use in the classroom and far less convinced about their potential to improve teaching (Cox et al., 1999, Ma et al., 2005; Russel et al., 2003; Ruthven et al., 2004; Shapka & Ferrari, 2003; Vosniadou & Kollias, 2001).

Although teachers show great interest and motivation to learn about ICT, their use of ICT tools is very low and focused on a narrow range of applications, mainly, for personal purposes. Most of them continue to use computers for low-level supplemental tasks such as word processing (lesson plans, worksheets, tests, grades' calculations etc.) or getting information from the Internet (Russel et al., 2003; Waite, 2004; Williams et al., 2003). Few teachers routinely use ICT for instructional purposes and fewer as a learning tool.

This article reports the investigation of the effect of a teachers' ICT training programme on their beliefs and perceptions about ICT in education. Our findings indicate that the teachers in the sample were generally positive and willing to adopt ICT as a teaching and learning tool. Moreover, we have identified some interfering factors, which make many teachers cautious or skeptical about ICT integration in the educational practice. We have recorded significant differences in teachers' beliefs and perceptions according to their gender and subject specialty. Finally, we conclude with some implications about teachers' effective preparation on ICT in education, which could be helpful to the educational policy authorities.

2. THE CONTEXT OF THE STUDY

2.1 The Project Teachers' Training on ICT in Education

Technology integration in the classroom practice is considered to be a significant national priority for the Greek educational system (UCF, 1998), which has further supported by the EU policy. In the framework of the Information Society initiative (Information Society, 2003), Greek Ministry of Education and EU Commission have funded a large-scale project named Teachers' Training on ICT in Education (TTICTE). The first phase of this ambitious programme was focused on developing teachers' ICT knowledge and basic skills towards ICT use in education. This initiative, costing 240 million € overall, established during 2002-2003 and approximately 84,000 pre-school, primary and secondary education teachers participated in. In the prefecture of Ioannina the project took place during two periods and 165 classes, consisted of 10-12 teachers each, were operated. A total number of 1620 pre-school, primary and secondary teachers participated in and 98 trainers, mainly computer science high-school teachers, were used. A local committee carried out the administration of the project in the area (the first author has been a member of this committee).

The whole course lasted 48 hours in total, which were spread into 16 lessons of 3 hours duration. The curriculum content comprised basic ICT concepts, office applications (e.g. word processing, spreadsheets, and presentation software) and the use of the Internet. Furthermore, two lessons (6 hours in total) were devoted to the teachers' familiarization with various titles of educational software.

2.2 Aims and Research Questions

There are three main purposes justifying this study: a) to replicate and extend previous research findings concerning teachers' attitudes and beliefs about ICT in education (Jimoyiannis & Komis, 2006). We believe that past research may become dated because of the teachers' recent exposure to computers and their development on ICT knowledge and skills, b) to our knowledge, the relation between teachers' ICT in education profile and their specialty has not been extensively investigated (Becker, 2001). Our results could be of interest in an international perspective also, and c) to suggest to the Greek educational policy authorities ways of enhancing future design and delivery of initiatives aiming at teachers' professional development on ICT in education.

This study was designed to provide information to better understand

- the impact of TTICTE project on teachers' beliefs about ICT in education
- the main factors influencing teachers' perceptions and beliefs about ICT integration in the educational practice

- possible differences in teachers' beliefs across their attributes (e.g. gender, subject specialty etc.).

The research instrument was a Likert-type questionnaire, which contains statements of beliefs toward ICT and its application in education. We used a 5-point scale anchored by 'strongly agree' and 'strongly disagree'. Demographic information, such as gender, age, years of service experience, specialty, previous ICT experience etc., was also requested.

2.3 Sample and Procedure

The survey presented has been administered to the Ioannina prefecture, in Greece, just after the end of the TTICTE training programme. All the trainees were asked to respond the questionnaire, while a total of 1165 primary and secondary education teachers (540 males and 625 females) participated in. The research achieved a 72% response rate and the subjects approximately represented 60% of the primary and secondary teachers' body in the area. Teachers were asked to respond as honestly as possibly and told that there were no right or wrong answers. No other intervention took place on the part of the researchers.

During this time period, all secondary schools had at least one computer laboratory (of 10-12 stations each) and an ISDN Internet line (GSN, 2004). On the other hand, 37% of the primary schools had a computer laboratory and 96% of them were connected with the Internet. All primary and secondary teachers could have their free e-mail account through the Greek School Network (GSN, 2004).

3. SUMMARY OF FINDINGS

3.1 Teachers' Use of ICT

A total of 685 teachers in the sample (58.8%) reported ownership of a personal computer at home. Among them, 377 teachers (32.4%) have an Internet connection and 286 (24.6%) their own personal e-mail account. Table 1 shows the classification of the teachers according to their ICT experience and engagement before entering the programme. In total, 9.4% of the teachers were using computers to support their instruction job while there are significant differences between males and females.

Table 1. Teachers' classification according to their ICT experience

ICT experience	Males (%)	Females (%)	Total (%)
No experience at all	41.7	55.3	49.0
Use ICT sparsely	27.9	28.0	28.0
Use ICT frequently	15.9	8.3	11.9
Use ICT to support their instruction	11.9	7.4	9.4
Use ICT as a teaching and learning tool	2.6	1.0	1.7
Total	100,0	100,0	100,0

Although the teachers studied have shown great interest and motivation to learn about ICT, we discovered that their use of ICT tools is focused on narrow-range supplemental tasks, for personal purposes or for supporting their traditional instruction. They have reported applications such as word processing (lesson plans, worksheets, tests, grades' calculations etc.) or getting information from the Internet, confirming the results of previous studies (Russel et al., 2003; Waite, 2004). Only a small percentage of the teachers in the sample (1.7%) have used ICT as a teaching and learning tool, mainly incorporated as short episodes in the existing curricula and their conventional teaching approaches.

Our results indicate that ICT access in their environment is not a particular barrier to the teachers. But the disposal of ICT tools is not a factor favouring or promoting, by itself, teachers' usage of ICT for educational purposes. Figure 1 shows the distribution of the teachers related to their ICT profile. Approximately, 6 out of 10 teachers have a PC at home, while 1 out of 3 have an Internet connection and 1 out of 4 their personal e-mail account. Despite that, only a small percentage of the teachers use ICT in their instruction and even fewer

use ICT as a learning tool. There are also significant differences in the ways men and women use ICT. The gender issue still remains a critical factor as far as teachers' ICT profile concern.

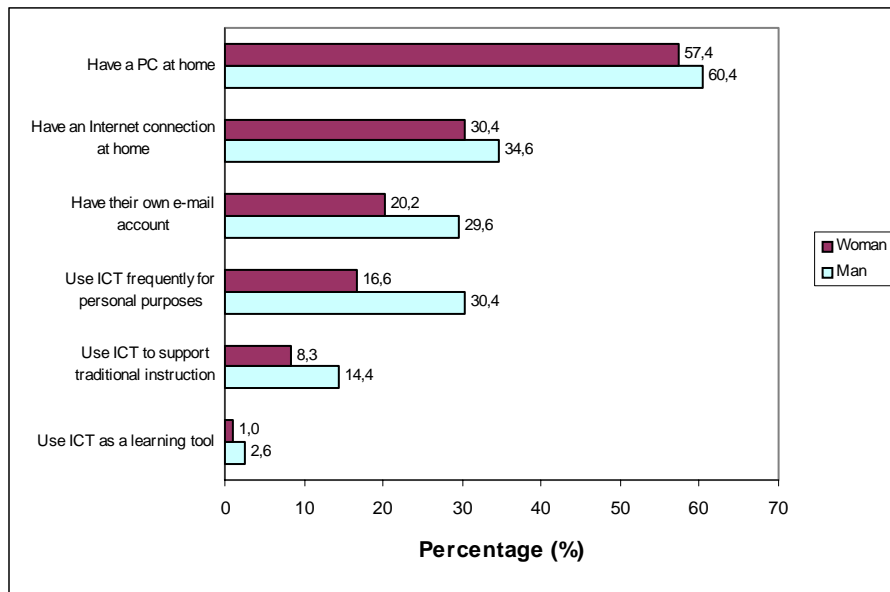


Figure 1. Teacher distribution according to their ICT profile

Figure 2 shows the distribution of the teachers who use frequently ICT tools to support their conventional instruction. We have found that the core specialties in the curriculum (preschool, primary, literature-history, and mathematics teachers), with an exception as far as the science teachers, did not use computers that often. On the other hand, business and technology teachers reported that ICT use occurred frequently during their preparation and their instruction also. Our results confirm previous findings that teachers' ICT usage for educational purposes varies between different subject areas (Becker, 2001).

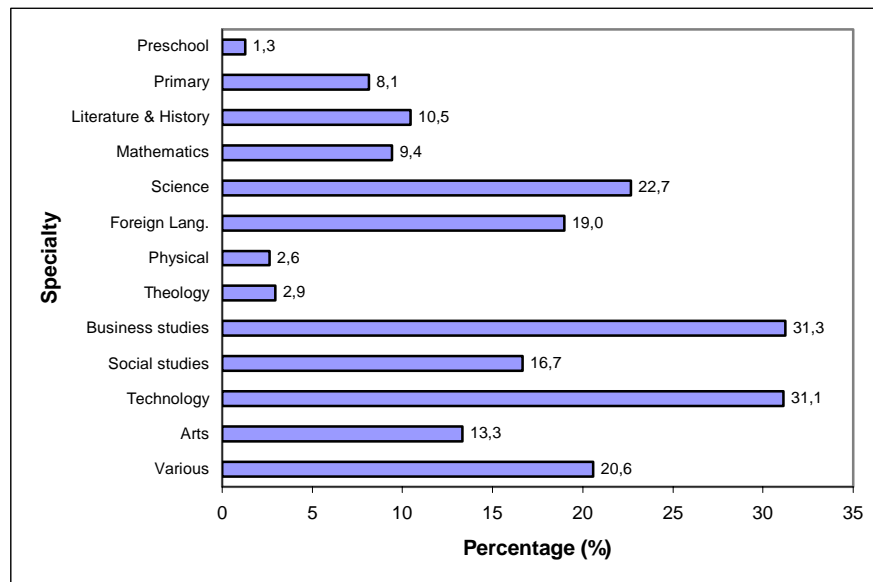


Figure 2. Teacher distribution according to their use of ICT for instruction purposes

Teachers were also asked to report ICT applications that could be used in their instruction. The great majority (74.8%) gave no answer at all, while only 1 out of 10 teachers reported appropriate educational software for their subject-matter. Those teachers were referred to the titles they were familiarized during the programme and/or to some simulation or multimedia software (Interactive Physics, Modellus, Tina, WorkBench, electronic encyclopaedias etc.). The others were restricted to presentation software (3.4%) and/or the Internet (4.8%) for supporting traditional instruction activities. Finally, 3.3% of the teachers referred only to basic ICT applications for administration and teacher's preparation (production of worksheets and tests, management of the exams or students' grades etc).

It appears that the result of the training programme on teachers' awareness about effective ICT applications in their subject instruction was unexpectedly poor. The great majority of the teachers' were not able to shape a wider view of ICT in education, beyond its technological dimension.

3.2 Teachers' Beliefs About ICT as a Teaching and Learning Tool

The teachers participated in this survey have demonstrated a range of views and perceptions about ICT in education. The great majority of them stated particularly positively about a) the importance of students' acquiring basic ICT skills (99%), b) the importance of students' using ICT tools for research and learning along the subjects in the curriculum (87%), c) the impact of their recent ICT training on their professional development (93%), and d) the importance of ICT training regarding to their specialty (81%).

They also stated positively about ICT as a teaching and learning tool. The teachers in the sample believe that ICT could a) be a tool for instruction and learning for all subject matters in the curriculum (80%), b) help students' critical thinking (63%), c) activate students (74%), d) upgrade teacher's role making it more substantial (69%). Moreover, they believe that ICT will cause substantial changes in education, as far as the role of the school (74%), the role of the teacher (69%), and the educational media used (51%).

On the other hand, there are some factors indicating that many teachers have not been convinced about the usefulness and the potential of ICT in the educational practice:

- One out of two teachers (56%) need more convincing reasons about ICT usefulness and effectiveness into the instructional process (Fig. 3).
- One out of three teachers believe that ICT is useful only for administration and for helping teachers to prepare their conventional instruction (leaflets, exams, tests etc.)
- One out of three teachers believe that ICT is impressive but cannot offer substantially in teaching (Fig.4).

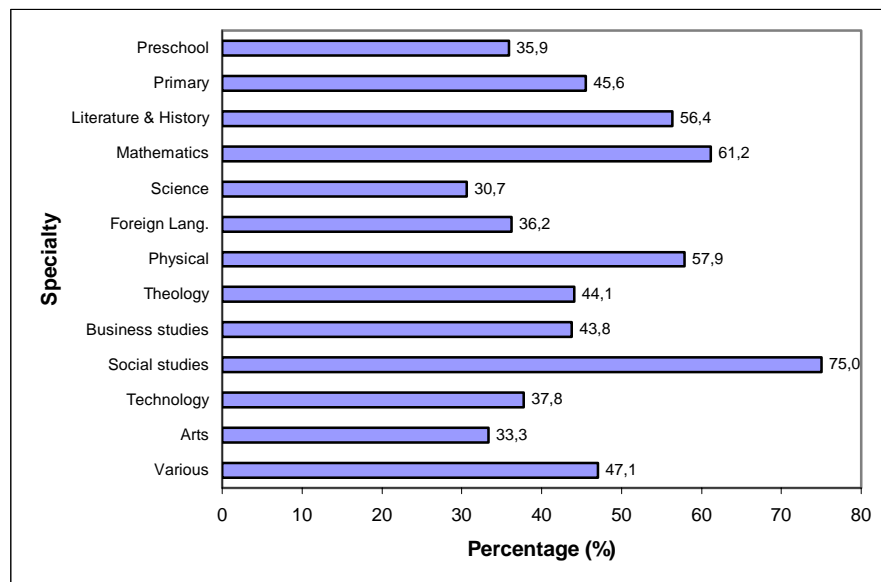


Figure 3. Teachers' distribution: I need more reasons to be convinced about the potential of ICT in education

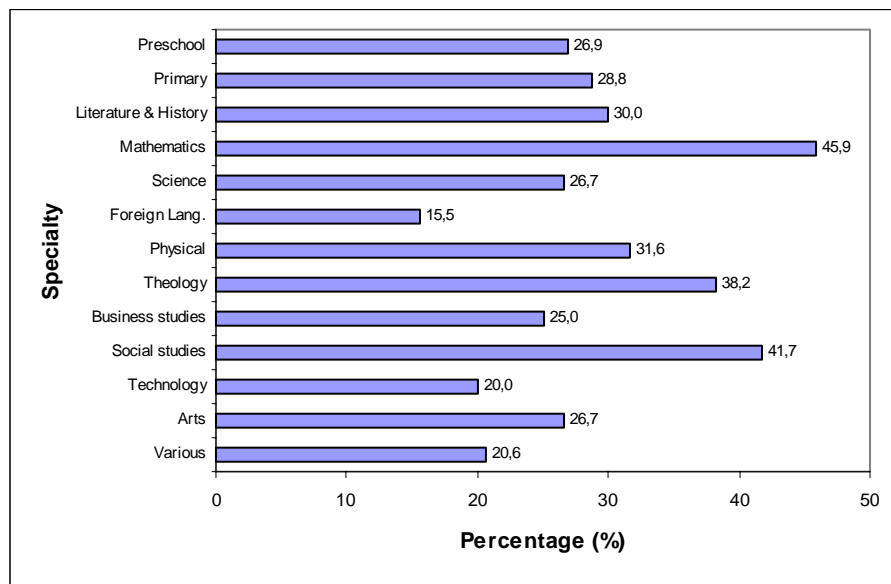


Figure 4. Teachers' distribution: ICT is impressive but cannot substantially help in teaching

3.3 Teachers' Beliefs About ICT Integration in Education

Our findings indicate that the pedagogical aspect of ICT is not clear or prevalent in teachers' views. Despite that they are willing to adopt ICT as a teaching and learning tool, 92% of the teachers in the sample perceive ICT as a necessity in our modern society. It seems that they have a consumer-like representation about ICT in education.

We have also identified three interfering factors, which make the majority of the teachers skeptical or cautious about ICT integration in the educational practice:

- Two out of three teachers recognize the importance of relevant ICT pedagogical issues (e.g. difficulties in organizing students' ICT-based activities, class management etc.).
- One out of two teachers believe that ICT restrict social interaction and isolate people.
- One out of three teachers feel insecure about the application of ICT in education.

Our analysis has shown that the science, technology, art, preschool and foreign language teachers (English, French and Germany) constitute a strongly positive community about ICT in education. On the other hand, math, literature-history, physical and social studies teachers are more sceptical or conservative about ICT in education. This finding confirms previous results, concerning the differences between the core subject and the new specialties, about their perception of ICT in education (Jimoyiannis & Komis 2006). It appears that, in general, the females and the traditional secondary specialties are more conservative or cautious about ICT as a teaching and learning tool.

4. CONCLUSION

The teachers encountered during this study were motivated and interested in developing ICT skills and knowledge, primarily because they feel that ICT has much to offer to their students and also to their own professional development. Because of the recent exposure to ICT, the teachers exhibited enhanced motivation and willingness to adopt ICT as a teaching and learning tool. It seems that providing opportunities to the teachers to acquire ICT skills is critical in order to strengthen their beliefs about the value of ICT in teaching and learning. Our analysis has also revealed significant differences in teachers' beliefs, across the questionnaire according to their gender and specialty. In general, the males are positive about ICT in education while the females are neutral or negative. Moreover, the science, technology, art, preschool and

foreign language teachers are strongly positive about ICT in education while math, literature-history, physical and social studies teachers are cautious or negative.

ICT integration in the educational practice is a complex and multi-faceted issue. There is no doubt that teachers constitute the critical factor in the attempt to integrate technology in the classroom. Teachers should become more aware of the value and the potential of ICT as a tool for lifelong learning, for their students as well as themselves. They must be able, not only to use ICT tools, but also to understand how ICT can be integrated into everyday practices and to principally reorganize their instruction by engaging their students into appropriate ICT-based activities. Effective programs aiming at teachers' ICT preparation and support should be flexible, continuous, and subject focused rather than uniform or identical for all. They must clearly articulate specific types of effective instructional models and representative ICT paradigms for every subject-matter in the curriculum. Appropriate teachers' support and guidance should take account of their different ICT skills' level, their subjects (curricula), and also their professional development targets.

There are still a lot of parameters to be identified about the way teachers perceive ICT in education and the practices followed when they use computers in their classrooms. To increase the likelihood that computers will be used in the school practice, teachers need to be encouraged to try and acquire convincing experiences about the effectiveness of ICT on teaching and learning. It is critical that ICT should not be treated as a special event or an extra tool to the traditional instruction. In other words, this means that ICT integration must be organized in the context of broader instructional reforms aiming at the curriculum, the educational media and, principally, at the pedagogical practices used. Professional and pre-service development programs should focus on coupling changes in teachers' pedagogical cultures and philosophies with their training on how to use appropriate ICT tools with their students.

It stands to reason that this study could not thoroughly cover the subject, even into the Greek case border. Further research is necessary to address such issues in order to redirect current policies and strategies employed for ICT integration in the classroom. It is imperative for the Greek educational authorities to conceive ICT use in education in terms of specific pedagogical dimensions rather than a single technological dimension. ICT plans and programs should be developed in an integrated context of school improvement, curriculum reform and teachers' professional development. The findings and the implications of this survey could be helpful to future attempts to design, develop and implement the second phase of this initiative, aiming at teachers' professional development to effectively apply ICT in their classroom practice.

We believe that the development of an ICT educational mechanism, able to continuously offer efficient support to the teachers, is crucial. Our current work has been addressed to the design of an integrated teacher ICT support system, which aims at

- Helping teachers to adopt ICT, not as a trend in our modern technological society but as an efficient teaching and learning tool.
- Encouraging teachers to develop a novel educational culture and integrate self-development on ICT in education into their professional development planning.
- Creating active teacher communities of practice and knowledge to provide continuous training, support, communication, and knowledge interchange, on both ICT pedagogical and technological issues.

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