Factors Determining Teachers' Beliefs and Perceptions of ICT in Education

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INTRODUCTION

We live in the information age, at a time that *information and communications technologies (ICT)* permeate all aspects of our social activities (administration, business, industry, research, entertainment, culture, etc.) and radically influence our lives. ICT has been widely welcomed as having the potential to enhance learning by offering a variety of learning environments for the students and the adults as well. Educational systems around the world are under increasing pressure to use ICT in order to teach students the knowledge and skills needed for their future directions in the 21st century's *knowledge society*.

During the last decade, in most developed countries, a large number of educational initiatives have been directed towards ICT integration in the schools. In general, the approaches tried have been focused on

- The development of technology infrastructure in the schools
- The infusion of appropriate educational software in the schools
- The preparation of the teachers in order to adopt ICT as a tool efficient to enhance instruction and learning.

Even though educational policy directives have articulated clear and unambiguous statements about encouraging the use of ICT in the schools, the application of ICT in educational settings is rather peripheral acting, in most cases, as an "add on" effect to regular classroom work. Despite that home access to ICT has been growing rapidly, both for students and teachers, and ICT resources in the schools (computer labs, educational software disposal, connection with the Internet, etc.) have improved substantially over the last years, teachers do not appear to make effective use of ICT in their instruction (Becta, 2004a; Cuban, 2001; Russel, Bebell, O'Dwyer, & O'Connor, 2003; Waite, 2004). The outcomes of the initiatives concerning ICT in education are more evident in pupils' achievement in ICT capability than in applying their skills and knowledge to other subjects across the curriculum (OFSTED, 2004). On the other hand, it seems that individual attitudes and skill levels still remain an obstacle for the teachers to adopt ICT and make effective use of ICT in their instruction (Becta 2004a, Dexter, Anderson, & Becker, 1999; Lang, 2000).

Designing and implementing successful ICT preparation programmes for the teachers is considered to be the key factor to fundamental, wide-ranging educational reforms (Davis, 2003; Pearson, 2003; Unesco, 2002; Vosniadou & Kollias 2001; Watson, 2001). During the last years, initiatives directed to searching for efficient ways to prepare teachers to integrate ICT in their everyday instructional strategies have been of major priority in several countries across the world (Becta, 2004b; Dexter & Riedel, 2003; Hennesy, Ruthven, & Brindley, 2005; Knezek & Christensen, 2002; Lang, 2000; Niemi, 2003). Various programs have been implemented aiming at enhancing teachers' skills toward the pedagogical application of ICT as a tool to support instruction and learning (EC, 2002; 2004; ICTL, 2004; OFSTED, 2002; PT3, 1999; TTICTE, 2005).

There are three main questions requiring to be answered:

- Why ICT failed to induce a major impact in the schools compared to other disciplines in our modern society (administration, business, labor, research, etc.)?
- What factors support or prevent teachers from using ICT in their instruction?
- What type of educational directives and orientations could be encouraging for the schools and the teachers to integrate ICT in everyday practice?

In this article the factors involved in the uptake of ICT by the teachers and the schools are examined. The focus of our argumentation is that teachers constitute a critical factor in the attempt to integrate technol-

ogy in the classroom but they are not appropriately prepared for that undertaking. An extensive review of the literature associated with teachers' views and perceptions of ICT in education is presented. Finally, we conclude debating on the demand of a new curriculum and a new pedagogical framework, both based on and enhanced by the new environments and tolls ICT offer in education.

WHAT ICT BRINGS IN EDUCATION

It is widely accepted that ICT would lead to significant educational and pedagogical outcomes in the schools, beneficial for both students and teachers (EC, 2004; ICTL, 2004; OFSTED, 2002). A great amount of research has shown that proper use of ICT in education can increase students' motivation and deepen understanding, promote active, collaborative and lifelong learning, offer shared working resources and better access to information, and help students to think and communicate creatively (Jonassen, 2000; Webb, 2005).

Nowadays, ICT is perceived to be inherent to the educational reform efforts necessary for the 21st century society, since it has changed the key aspects of the nature of knowledge and the way we access it. Moreover, ICT appears to change the very nature of teaching and learning, since the teaching profession is evolving from an emphasis on teacher-centred instruction to *student-centred* learning environments (Webb & Cox, 2004).

There are three main aspects inherent to the role of ICT and its impact in the schools:

The vocational aspect: ICT has lead to changes in the way people access and manipulate information, solve problems and organize their work. The required skills and competencies are therefore changing for both students and teachers. Gaining in importance are the following skills and capabilities:

- Critical and analytical thinking
- Decision making
- Handling dynamic situations
- Team working
- Effective communication
- ICT competencies.

The pedagogical aspect: ICT integration in the school practice is not restricted to a simple improvement of the traditional instruction but rather it is associated to fundamental changes in the learning process. In other words, ICT is widely perceived as a catalyst for school change, since it could bring major benefits to the learners and the teachers, such as:

- New educational materials
- Shared learning resources and environments
- Promoting *active and collaborative learning*
- Shift towards *autonomous* and *lifelong learning*.

The societal aspect: Societal pressures have been present since the launch of ICT into schools. Parents, television advertisements, industry, and commerce aspects, the Internet have all provided pressure for pushing ICT into education. Possession of a computer and an Internet connection line at home is a recent form of *social culture*. Several researchers have found that home computers were mainly used for games playing and the Internet as a leisure activity. This is usually not of positive benefit to school learning. For example, it can pose a problem if teachers feel threatened by pupils' superior knowledge of ICT (Jimoyiannis & Komis 2004) or if school hardware and software is far less up-to-date than that being used at homes.

In the field surrounding the design, application and integration of ICT in education, many myths and misconceptions have been developed and promoted across countries, educational institutions, policy makers, and educational planners. Attempting to analyze the critical issues related to ICT in education and the low impact in schooling produced till now, we present an outline of the myths and realities regarding the current influence of ICT into the schools. Following we analyze the key factors determining teachers' views and perceptions of ICT in education.

Myth 1: Putting computers into the schools will directly improve learning; more computers will result in greater improvements in education.

Reality 1: Till now, education has been affected by ICT only marginally.

Myth 2: Once teachers learn the basics of using computers and the Internet, they are ready to effectively use ICT in their instruction.