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Guest Editor's Introduction

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About the Portuguese reality of ICT in Education

This special issue of Interactive Educational Multimedia is entirely dedicated to Portugal. Its main purpose is to contribute to the understanding about what is going on in this country in what concerns the use of Information and Communication Technologies (ICT) in the educational context.

As generally in all the UE countries the interest showed by the educational national authorities in Portugal about ICT is very high. In general, following the European directives and, more recently, pursuing the strategic goals to be attained by 2010 as defined by the Lisbon European Council held in March 2000.

The main interest of the researcher is to understand at what level the policy and the official discourse is translated in concrete measures that allow an effective and regular use of ICT in the activities promoted at the school level, and if those measures are, in fact, a factor of innovation of the teaching and learning processes (Papert, 1993, 1996) and an important impulse of society development in general, values many times proclaimed but not always fulfilled (Cuban, 1993, 2001; Salomon, 2002).

With the purpose of a better understanding of the Portuguese reality we brought together a set of texts from Portuguese authors and researchers who have been working and reflecting on these issues and to whom we are grateful.

For obvious reasons, the selection of the texts has not obeyed to a very rigid and previously defined structure, but depended more on the knowledge we have of the research and practices in the field in the last few years.

In spite of that, we think that the sample of articles included in this number of IEM represents a relatively faithful mosaic, even though an impressionistic one, of the reality of the educational use of ICT in Portugal in the beginning of the century.

This reality should be understood at the light of the politic, socio-economic and cultural development of a country of the south of Europe that beyond its recent integration in the EU (since 1986), has only a little more than three decades of democratic life (Revolution of April, 1974), although these concerns do not fit in the scope of this publication.

Despite the great investment in the last years, the problematic of ICT in Education has been growing slowly, probably because the time of maturation of the different and complex issues involved in this process is still reduced. After all, very few years passed after the introduction of the "teaching machines" (Pressey, 1926) and the "programmed instruction". The latter had its origin, as we know, in the first theoretically supported proposal (behaviourism) of the use of technologies in teaching and learning process suggested by B.F. Skinner in the article "The science of learning and the art of teaching" published in 1954.

Being today completely different the potential of the technologies and much more rich and diversified the approaches on the way we learn, it is also much more complex the set of issues that the problematic of the ICT in Education involves.

The idea of this edition was in some way to try to answer the questions that emerge in Portuguese context in the field of ICT in Education and it is in this line of thinking that the selection of subjects must be understood:

- the degree of development of ICT at the different levels of the Portuguese Educational System and the use of technologies by students and teachers;
- the use of internet as a strategy for distance education, for example, in teachers' education programs, or by the students of the Portuguese universities;
- the specific preparation of teachers and educators for the educational use of ICT, in terms of initial or continuing education;
- the trends and directions of the scientific research in this area and on the conduction of empirical studies;
- the national projects related with ICT in education and respective forms of management and funding;
- the specific educational products which have been developed (for example, educational software) as an illustration of the creativity of Portuguese teachers and researchers;
- the opinions of the different actors on the role of the technologies in learning, namely teachers and students, but also parents, educational deciders or publishers;
- the evaluation and regulation studies of the processes of integration of ICT in Education, namely in terms of the impact in the learning process and in the global development of the Portuguese society.

Although not all these axes of analysis are directly approached, as it would be natural given the extension and complexity of the implicit issues, we think that it is possible to find in the texts that follow the answers to some of the questions above mentioned.

The first article by Ana Amélia Carvalho from the Universidade do Minho and António Moreira from the Universidade de Aveiro, analyses and summarises the body of research studies produced in Portugal in

the area of Spiro's Cognitive Flexibility Theory, mainly in the context of academic degrees, trying to assess the impact it caused in the community of educational researchers.

The second article is a report on the results of two national studies on the use of ICT by teachers and students promoted by the Ministry of Education and it was written by the responsible of the studies, Jacinta Paiva, from the Universidade do Porto. The discussion of the data includes some general reflections and perspectives about the Portuguese reality and the future of ICT on Education.

The two following papers take the student's point of view and their effective practices with ICT at school as their concern: Abílio Cardoso, Maria Helena Peralta and Fernando Albuquerque Costa, from the Universidade de Lisboa, report a study that confirms the success of computers and multimedia among the young Portuguese students, explicit either by their attitudes or by the diversity of their personal experiences with informatics.

Different (or maybe not) are the results of a master-degree study conducted by Sofia Viseu (Universidade de Lisboa) which reveals a lack of educational use of the Internet by students in some non-supervised contexts, such as school libraries and school resource centers.

The next four articles are dedicated to the issue of the preparation of the Portuguese teachers for the educational use of ICT:

The first one presents the results of a national study also promoted by the Ministry of Education. It was written by José Duarte, Conceição Brito and Mário Baía, from the Escola Superior de Educação de Setúbal, and gives a picture of what have been the inservice teachers' education modes, contents and methodologies for ICT educational use in the last years.

The second one describes a four year experience of collaboration between K-12 Schools and a higher education institution to promote the integration of ICT in schools. It was written by Isabel Chagas, from the Universidade de Lisboa, in collaboration with a research team composed by João Sousa, Paula Mano, Gilda Piteira and Rosa Tripa.

In their paper, Paulo Dias, Maria João Gomes and Ana Augusta Dias, from the Universidade do Minho, present the "e-learning" strategies as a new approach for inservice teacher education in such way that support collaborative learning and promote the development of virtual communities.

The fourth article, by João Pedro da Ponte and Leonor Santos, from the Universidade de Lisboa, discusses the role of reflection and collaboration based on case studies of three groups of mathematic teachers involved in a distance in-service teacher education setting that addresses the classroom use of mathematical investigations.

In accordance with the two last papers in what implies on-line and distance learning strategies and the design of new learning environments, we introduce now the article of António Dias de Figueiredo, from the Universidade de Coimbra, who starts by summarising some key issues of the concept of "learning

contexts" as a way to allow reflexion on how the use of the new technologies will influence and will shape the learning environments of the future.

In the same way, the article of Maria Teresa Pessoa, from the Universidade de Coimbra, gives a personal view of the importance of a reflexive and flexible approach to the increasing of the ability to think namely on the different scenarios in which she is using technologies of on-line communication like as, for instance, the discussion forum, the email or the instant message programs.

The next two contributions are about ICT in pre-service teacher education:

The first one reports a national survey promoted by the Ministry of Education and led by João Filipe Matos, from the Universidade de Lisboa, to study how teacher education programmes (at the universities and schools of education) address the preparation of prospective teachers for the use of ICT in their classroom practices.

In the other paper, Gerd Hammer, from the Universidade de Lisboa, make a description of how the preparation of student teachers to adopt ICT is thought of in a department of teacher education in the University of Lisbon, describing a plan to create a "new generation of teachers".

The last three articles can, in some way, be representative of the reflexion about the integration of the computers in the classroom activities for the study of concrete learning subjects as physics or electricity:

It is the case of the reflexion proposed by Vítor Teodoro, from the Universidade Nova de Lisboa, who argues that computers must be used as cognitive artefacts, as tools that allow students to think with (cognitive tools) as it is the case of physics where students can use specific software to learn by making hypothesis, manipulating concrete-abstract objects, etc..

In the some way could be understood the paper proposed by Maria João Loureiro, from the Universidade de Aveiro and Christian Depover, from the Université de Mons- Hainaut, Mons, Belgique, in which they describe the qualitative studies carried out to evaluate the impact of a learning environment called WLABEL (Windows Electricity Laboratory) specially designed to promote students' conceptual change in electricity.

"The Web@classroom project: portables computers and wireless technology in the classroom" is the last article, by José Luis Ramos, from the Universidade de Évora. Integrating a larger international team that carried out a study in four European schools he presents a summary of the findings on pedagogical innovation and change in the permanently Internet-connected classroom, as well as on the impact of educational ICT uses on teaching and learning outcomes.

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