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Policies of ICT promotion and implementation on education

Thesis summary

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In the contemporary society, technology plays an important role, and the current context, characterized by a high volume of software, hardware and information resources has launched towards the school a challenge that was the subject of debates, analysis and concerns of researchers in the last three decades. During this period, not only that the technology has evolved and brought with it changes which contributed to the emergence of an information and knowledge society, but has led to changes both at the individual and school level.

The need for an analysis focused on ICT and their policies is enhanced both by rapid changes in the technology, but also by its growing role in everyday life, mainly in the life of students. Changing how they learn, play, socialize, technology is no longer just an option but it should be an imperative for each one of the teachers and of the institutions responsible for their training. Why? Because there are almost thirty years since the first computer have been introduced in school, twenty years of extensive research and analysis on this issue and the results indicate their influence in improving the quality of educational and increasing student involvement in learning activities. Therefore, not only that technology is not just another resource that has its place in school, but is an ally which supports both teachers and students.

In this paper, we start from the fact that the integration of ICT in education should not be seen as an isolated issue, but should be analyzed in terms of the changes that have taken place in the social context. Therefore, the analysis of the ICT policies starts from identifying the information society and knowledge society development strategies and the specific measures which lead to the ICT integration in several European education systems and among them is also the Romanian one.

The aims of this research were:

- Presentation and analysis of the main concepts (ICT, eLearning, technology literacy, information literacy, digital literacy, information society and knowledge society), identification of the advantages and challenges of ICT integration in education (**Chapter 1**);
- Analysis of ICT policies developed in nine European countries, from the perspective of providing school infrastructure, developing teacher training programs and transforming the curriculum (**Chapter 2**);
- Analysis of ICT policies developed in the Romanian education from the perspective of the three indicators mentioned above (**Chapter 3**);
- Identifying the level of ICT integration in the Romanian pre-university education (**Chapter 4**);

- Identifying the level of ICT integration in higher education, in initial teacher training programs for primary and pre-primary teachers (**Chapter 5**).

The thesis starts with an analysis of the main concepts presented in the first chapter. Furthermore, in the same chapter there are also analysed the benefits and the challenges brought by the technology in the education field. Our approach has also analysed both the systematic measures that allowed the introduction of ICT resources in European society, facilitating the development of information and knowledge society (BANGEMANN, 1994, p.11, EC, 2000, p.4, EC, 2005, p.3; EC, 2005, p.3, EC 2011, p.11), and their impact on schools, community and universities.

Understanding the changes that are currently taking place in school, in terms of ICT use and development, can not be achieved without an analysis of the measures that led to the integration of these resources. This analysis was conducted in the second chapter where we've studied the developed policies and strategies towards ensuring infrastructure, teacher training and curriculum transformation of education systems in the following European countries: Austria, Bulgaria, Denmark, Finland , France, Germany, Norway, the Netherlands and Hungary. The results of this chapter contribute to the literature on policies of ICT implementation in several ways. **First**, by analyzing the historical evolution, the results allowed the identification of three distinct stages of technology development. **Second**, by systematizing the three indicators at each stage, the approach developed allowed us to identify the diversity of measures used to facilitate the integration of ICT in schools. **Third**, by analyzing the strategies of countries located in the same region of Romania, as Hungary and Bulgaria, countries with which we share not only some boundaries, but a similar socio-political and educational systems tradition, we obtained a clearer picture of the strategies used in the regional context.

Knowing the European directives, the course of action outlined by them, and the variety of measures adopted by various education systems in Europe, we were interested to analyze the situation in our education system. Thus, in **the third chapter**, we showed that, as in other European countries, the technology integration was made in the context of the emergence of the information society development initiatives. ICT programs were initiated as part of a national strategy in which there were adopted measures aiming to contribute to computerising the structures of education, health, business, and public administration. The measures implemented in the education system, although they followed the path of those developed in the European context, have not been initiated at the same time with those of the states analyzed in the previous chapter, not at general level, nor in the context level. Unlike

neighboring countries, Romania has initiated these steps later, and when they were developed central government interest in education technology integration focused primarily on tertiary education sector and on the transformation of the school curriculum. This situation is understandable considering that in the 90's Romania had to recover not only the difference between our system and other systems in the European regarding the technology integration, but had to rethink and redefine the entire system of education. Giving a particular attention to the curriculum reform, new teaching programs have been developed teaching, new textbooks emerged and new subjects were introduced in the curriculum, including the computer science. If the initial orientation of this subject was toward acquiring programming languages (valid situation at that time in many European countries but persists today in Hungarian primary education), latter on, in the context of a change of approach in Europe, computer science main aim was directed toward the technological literacy of students, and, in the last two years, towards their digital literacy.

The analysis of the situation from our education system has continued in the fourth chapter, where we were interested to identify how technology is integrated in pre-university education by analyzing both the access and use of ICT by the teachers (**Study 4.1**.) and the factors that influence the integration of these resources into the educational activities (**Study 4.2.).**

Using a questionnaire on ICT access and use in education, developed specifically for this study, and involving 164 teachers from four regions of the country, the **study 4.1**. revealed the fact that despite of the improvement of ICT resources access due to the investment on ICT infrastructure and on teacher training programs, the differences between schools in rural and urban areas are still very important. In addition, differential focus efforts to ensure ICT began to contribute to the emergence of a new type of gap between high schools and secondary schools and between schools from preschool and primary level. Joining the existing gap between rural and urban units, this difference sets serious difficulties in ensuring equal opportunities to quality education, regardless of the level of education or area of development. However, this study has identified that the presence of ICT resources in the classroom is not always a factor to determine teachers to use the equipment in the educational activities. Moreover, the teachers involved in our research used ICT at finding information and organizing teaching lessons. This situation is possible due to the fact that the applications used by the teachers allow them to edit documents (word), to search for information (internet) and to develop presentations (Power Point). The identified situation is not valid only in the Romanian education. Other previous studies from different socio-

cultural and educational spaces have indicated that despite the amount of investments on ICT resources, teachers use ICT at a basic level (Dawson, 2008, p.203; Tezci, 2010, p.35).

Based on these findings, we were interested to identify factors influencing the integration of the ICT resources in activities and therefore we have analyzed, together with external factors (access to resources and involvement in training, Ertmer, 1999, p.48, Coppola, 2004, p.110, Hew and Brush, 2007, p.10), the impact of internal factors. Thus was how we developed the **study 4.2**. in which we have analyzed the expectations, beliefs, perceptions towards ICT, and the specific ICT skills of teachers. Along with the questionnaire used in the previous study, all 164 teachers were asked to complete the following instruments: *Questionnaire on the implementation of technology* (Wozney, Venkatesh, and Abrami, 2006), *Inventory if basic ICT skills* (Christensen, University of North Texas) and the *Tool for identifying the stages of ICT adopting in education* (Christensen, 1997). Only 57 (34.75%) of teachers had sent these documents completed.

Our results indicate that, although most of the teachers consider that the introduction of these resources is especially needed in light of the fact that students do not develop their skills working with ICT outside school, more than half of them believe that ICT leads students to neglect traditional resources, like the library and the books. Such fear can act as a deterrent to the true value of using technology and can be a real obstacle for the effective integration of these resources, if coupled with poor access to ICT equipment and training. In addition, there are still teachers who fear that the introduction of technology in schools has not only changed the role of the teacher (as evidenced, moreover, at the level of the ICT beliefs), but will act in the future in order to replace him. Moreover, there has been a constant debate related to these fear since the beginning of the '80s and, over the years, there have been other studies that indicated teachers fear that computers use will soon allow their replacement (Fuller, 2000 as cited in Bauer and Kenton, 2005 , p.521). The results of this study also showed that teachers perceive ICT as requiring too much time and effort for planning. This has been highlighted previously by other research conducted internationally (Ramboll Management, 2006, p.22, Dawson, 2008, p.203).

The results of this study come to support the idea that ICT training for teachers, after more than ten years from the start of the first training, still emphasizes technological knowledge. This explains why teachers, despite their involvement in ICT skills training use ICT only to seek information and to prepare their activities.

Based on these findings, the further investigative approach was placed in two institutions providing initial teacher training: Alexandru Ioan Cuza University of Iasi and

Stefan cel Mare University of Suceava. Using a mixed method research that combined *document analysis* (institutional strategies, institutional development plans, syllabus, handouts of disciplines, reports) and *questionnaire-based survey*, the study presented in the **fifth chapter** allowed the identification of both institutional regulations and measures developed by universities to integrate technology in initial teacher education programs for primary and preschool teachers and of student perceptions on the of ICT use, their attitude towards the use of ICT in their training, ways in which student teachers using technology, and also the difficulties encountered when seeking to use these resources at the faculty.

Involving 166 students enrolled in the first and the second year at the specialization of Pedagogy of Primary and Preschool Education from the two universities and using the questionnaire presented in the Annex 3 of the thesis, this study has shown that integrating technology into the two institutions is more accomplished in the administrative structures, none of the universities is not having an explicit strategy for developing ICT in academic activities. Its absence is closely correlated with the underdevelopment of the monitoring and revision measures related to the ICT use in education. At Alexandru Ioan Cuza University of Iasi (UAIC), technology is mentioned in the institutional development strategy and at the Stefan cel Mare University of Suceava (USV) is integrated into the development strategy of lifelong learning principles. Currently, according to the data reported by the two universities, ICT resources were developed and can be accessed by students both in classrooms and in the library or computer labs. Official data indicate differences at the level of ressources access between the two universities. Thus, while the UAIC, on average, 13 students have access to a computer at USV their number increased to 17. Although both universities have ICT facilities in libraries, less than half of the students claimed that they access ICT more in the library than in any other place where such equipment exists in the faculty. This result can be explained by the fact that, often, the use of computers in the library aims to search books, references, serving more as a means of documentation and preparation of projects and activities, and less for the concrete achievement of the project work. In addition, faculty libraries do not have a special room equipped with several computers, where students can work and make their projects.

Such a situation would be possible if there were enough resources to allow individual work, desktop computers for students, special areas where access is not restricted **by material barriers** (too few computers) or **temporal barriers** (inadequate time program) identified in this study. To these barriers we are also adding the poor promotion among students of the available resources in the university.

We cannot neglect the finding that despite the growing role played by the internet in the finding and studying information of the students, the review curricula of the two universities indicated that none developed specific course aiming to develop the students' information literacy. Most likely the access to quality information is made through recommendations from professors in courses and seminars.

A course covering information literacy can be useful both in terms of skills training to identify quality information, processing it, but also in terms of skills training for working with scientific information, in order to write scientific documents, create articles and academic projects. On the short term, the benefits of such a course are related to accessing information quality and on the long term it will contribute to improving portfolios and assessment of students.

Recommendations on ICT implementation policies

At the level of pre-university education

Creating legal structures for specific development and contributing to the emergence of a shared vision which will promote the use of ICT by Romanian teachers and the extension of ICT use as a tool for organizing educational activities and enhancing collaboration.

Aligning ICT training to the needs of teachers

Involvement of teachers and school managers in differentiated training courses enabling them to identify the benefits of technology integration in schools and how these resources can be used in activities and projects.

Sharing best practices in educational institution

Organizing meetings and workshops in schools, involving all the teachers to make presentations on the ways in which they use technology in educational activities.

At the level of the higher education

Improving the ways in which the existing ressources are promoted among the teaching staff and the students.

Integrating technological literacy-teaching courses in initial teacher curriculum by including the technological and informational literacy courses, digital literacy courses and techno-pedagogical literacy courses.

Expanding the information regarding the access at quality scientific resources beyond the library space by setting up meetings, seminars and workshops in which students learn about the resources they can access, but also about the ways in which they can use them.

Establishing regulations on the use of ICT in education activities by developing a strategy that would help create the legal framework to encourage, reward, promote the use of resources in the academic activities.

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