

Chapter 4

Bebras Contest and Digital Competence Assessment: Analysis of Frameworks^{*}

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ABSTRACT

The paper is made of two parts. The first part discusses the importance of informal education environments supported by IT/ICT in students' learning, followed by reports of some international competitions and the role they have in improving students' interest and use of Informatics and related disciplines. At the end of the section, it describes the Bebras contest, an international competition supporting students' Information and Communication Technology competences with emphasis on cross discipline competences, which are useful to solve real life problems. In the second part of the paper, the outcomes of a research study on the features of a framework for digital competence assessment are reported. Based on this, some criticisms emerging from the analysis of the answers that students gave to a questionnaire built on the guidelines of the mentioned framework are analysed. They are integrated by the comments that teachers, colleagues and researchers made on the structure of the hypothesized framework. At last, a new model for digital literacy assessment is proposed. In the conclusion, the necessary elements for making the last framework effective are outlined and its suitability for the construction of the yearly questionnaire of the Bebras contest is discussed.

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INTRODUCTION

Information Technologies (IT) and Information and Communication Technologies (ICT) have produced many changes in our society and especially in students' learning; new technologies greatly increased the influence of informal learning on students approach to knowledge construction and made deeper the difference between what they learn at school and what they learn outside it. The above phenomenon is not limited to students, it can be recognized in every kind of people and more generally in firms, corporate and whole organizations; it can be considered an integral part of the transformation process affecting our society, where the role and the importance of non formal and informal educational environments in people's knowledge development is continuously growing and in many cases has overcome formal contexts.

It can be easily recognized that the problem is not with technology but in their use (i.e., computers, laptops, mobile phones etc. are the same in whatever context people use them); process management, process organization and people involvement in the phenomena where IT/ICT play a relevant role are in fact responsible for the described changes. As an example the case of school and extra-school experiences are described in what follows: different topics, tools and strategies have been used in formal education to develop students' computing skills and let people autonomously interact with automatic systems to solve problems, create documents, communicate and, more generally, make with computers what they did in a different way (i.e., to digitally manage information being conscious of the operations they carried out). Outside school, edutainment tools and computer games created special environments where people usually learn by immersion and interaction with a virtual context. Edutainment is a form of entertainment designed to educate as well as to amuse. It typically seeks to instruct or socialize its audience by embedding lessons in

some familiar form of entertainment. Otherwise stated virtual environments, simulation contexts, educational games as well as computer games have been and still are an important part of people's life and modern education and they are also responsible for the development of computing skills. The success of these last experiences is usually attributed to the motivation people have in the interaction with digital media and the corresponding tools and in the feedback they have from them (Vasilyeva, 2007).

Many questions are connected to the above issues:

- first, are the reasons for the reported changes the consequence of the natural evolution of society?
- second, how much the above changes are influenced by the approach people have with technology at school and outside it?
- third, are there strategies helping students, their families and teachers develop and use common IT/ICT based teaching-learning processes?

In what follows an attempt is made to answer the above questions and two different kinds of experiences are discussed: first, the features of the "Bebras" (beaver) International Contest on Informatics and Computer Fluency are described, second, the analysis of digital literacy and the development of frameworks for digital competence assessment are analyzed.

BEBRAS INTERNATIONAL CONTEST AND DIGITAL LITERACY

Since many years different multimedia and edutainment tools have been developed to help young people to improve their thinking skills. Furthermore many instruments have been planned to find students with good mathematical and computing skills and let them develop their

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