Computing Competences and Digital Competences: A Case Study

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ABSTRACT

This article discusses the results of the authors’ introductory study on the comparison of computing competences and digital competences. The start of this article describes from the presentation of the discipline structure of Computer Science as proposed by Computing organizations and reports the experience one of the authors made, while working in the international committee of the Beaver competition, for the questionnaires on the assessment of computing competences. Soon after the structure of the DIGCOMP 2.0 is reported as a framework for digital competence analysis and the experience the same author made while working at developing a questionnaire for digital competence assessment. Finally, the structure of study is reported, the instrument for the carrying out of the survey the authors decided to use is presented and the analysis of the collected data.

KEYWORDS

Computing Competences, CS2013, DCA, DIGCOMP, Digital Competences

INTRODUCTION

It is well known that the “digital revolution”, with the development of IT and ICT and the spreading of the Internet, has deeply modified human societies and the approach that subjects have to learning, to the construction and development of knowledge and to communication. Notwithstanding the evidence of the above facts it is still object of debate the question of the influence that digital technology has had on the improvement of subjects’ features and performances and on the development of a better society, and many scholars and institutions have often proposed different hypotheses and suggestions for the knowledge, the skills and the competences people must have to be better citizens in today society (usually known as the “knowledge society”).

It is behind the aims of this paper a deeper discussion of the features of knowledge society and of the reasons leading to the transformation of industrial, post-industrial and information society into the new one; we will focus on the evolution of the concept of competence and especially on the differences between computing competences and digital competences in their first stages of development and on the possible influence they have each other.

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The reasons for the above choice can be found in different facts and phenomena and especially:

- The gap existing between “digital natives” and “digital immigrants” (both in learning styles and knowledge development) (Prensky, 2001); young people can use, in fact, digital equipments to better perform in getting information and communicating with respect to elders, they also have a different perception of the reality (which is populated of computers), and can participate, at the same time, to multiple activities in different contexts (with their smartphones). On another hand they are less reflective on the actions they perform with their digital instruments and are more ready to act than to think about phenomena, with respect to elders;
- It is usually recognized that the use of digital equipment is associated with the development of good information management skills (meta-cognitive skills); recent works show on the contrary that students have problems in the use of computers and other digital equipment, when high level operations with information are required (Pozzali & Ferri, 2010);
- Last but not least, during last decade two main events influenced the panorama of the presence of digital equipment and their use in formal education, especially in the school; on one hand, many studies led to the definition of frameworks for digital competences to let citizens be aware of their level of autonomy and critical use of digital equipment and of the Internet, on another hand, public institutions like Education Ministries proposed experimental projects for the introduction of Informatics topics in school curricula since the first stages of education, i.e. in Primary School and throughout Compulsory education.

On the basis of the above issues it seemed appropriate to try giving an answer to the following questions:

- Are there sensitive differences between computing competences and digital competences, or not?
- If the two sets of competences are different, are there any elements which are common to both of them?
- Furthermore, is it possible to determine the influence of one of these set of competences on the other, so that if one of them develops the other benefits?

To hit the above target the paper will focus on the following topics:

- The contributions reported in scientific literature on Computing (Informatics) competences and the instruments for their analysis and assessment in young generation and especially in the school;
- The contributions reported in scientific literature on Digital competences and the instruments for their analysis and assessment in young people and especially in the school;
- The development of suitable instruments for the analysis of both sets of competences on the same subjects in students (i.e. young people in the compulsory school);
- The discussion of the data collected by means of the above tools and the proposal of possible hypotheses for the characterization of the comparison between the two kinds of competences and the carrying out of future studies.

**COMPUTING (INFORMATICS) COMPETENCES AND THEIR INVESTIGATION**

The analysis of computing competences cannot be separated by the outcome of the most relevant associations working in the field, i.e. ACM and IEEE-Computer Society, which have a long history of efforts to establish international curricular guidelines for graduate and undergraduate programs. Computer Science Curricula 2013 (ACM-IEEE 2013) is the latest in this series of curricular guidelines and we’ll report below their most relevant features.
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