A Vision on the Evolution of Perceptions of Professional Practice: The Case of IT

Cristina Casado-Lumbreras, Universidad Internacional de La Rioja, Madrid, Spain
Ricardo Colomo-Palacios, Østfold University College, Halden, Norway
Pedro Soto-Acosta, Universidad de Murcia, Murcia, Spain

ABSTRACT
Human factor is the element that produces more deviations in the costs of information technology (IT) projects. Recently, a gap between the competences required from the IT industry and the competences taught in the computer science university degrees has been proposed as a possible explanation to it. This paper further investigates this issue following several steps. First, through a questionnaire administered to different groups of computer science students, it analyses their performance according to a set of professional competences. Then, it addresses the evolution of the students’ competences from the beginning of their studies until the end. Finally, it determines the matching of the students’ competences with their personal characteristics at the moment they select their major. The results obtained permit recruiting staff to identify competence stereotypes in students and their evolution as well as comparing them with studies of competence requirements included in recent curricular efforts, so that they can act accordingly.

Keywords: Competences, Computer Science Education, Professional Stereotypes, Soft Skills, Students Evolution

INTRODUCTION
Stereotype is one of the most familiar concepts in the fields of Social Psychology, and is applicable to almost every sphere of knowledge. Stereotypes can be defined as a set of shared beliefs about personal attributes, usually personality traits but also the behaviours of a group of people (Yzerbyt & Schadron, 1994). Walter Lippmann (1922) first introduced the concept of stereotype in its socio-psychological sense. To Lippman (1922), stereotypes generally have strong feelings associated; they have their origins in the society and offer a way to justify relationships between groups. Based on Lippmann’s (1922) arguments, social psycholo-
gists have further studied this issue and offered very different approaches, including the study of professional stereotypes.

The concept of competence, from the Latin verb “competere”, is associated with the analysis of professional activities and the inventory of what is necessary in order to accomplish the missions involved in these activities (Levy-Levoyer, 1996). Thus, competences can be defined as an individual’s core skills (motives, traits, self-concept, knowledge, and abilities) that are causally related to a specific, effective criterion and/or a superior performance at work (Spencer, & Spencer, 1993). Several authors have established taxonomies in which particular (Levy-Levoyer, 1996) or technical competences are established as those that are necessary to carry out a very specific task of that work position, and include knowledge, abilities, and skills. Whereas, universal (Levy-Levoyer, 1996) or generic competences are those that, though not linked to a specific activity or function, make possible the performance of tasks related to a work position, inasmuch as they refer to characteristics or abilities of the individual general behaviour.

As technology advances and the business environment continues to evolve, organizations and training institutions face a key challenge: to identify critical skill sets for current and future computing practitioners. In an attempt to address this issue, this study carries out a comparative study between stereotypes, descriptions and evaluations of competences, using the above defined two concepts together with several curricular efforts to assess the competences of computer scientists. More specifically, the objectives of this study are twofold. Firstly, it attempts to examine the development of competences in Computer Science students throughout their undergraduate studies and, secondly, it analyses the relationship between stereotypes, students’ competences and several curricular initiatives which indicate the generic competences for information technology (IT) professionals. The remainder of this manuscript is structured as follows. Next, the relevant literature in professional stereotypes in computer science is outlined. Then, the characteristics and of the study conducted are described. Following that, the results of the study are presented and, finally, the paper ends with a discussion of research findings and concluding remarks.

**PROFESSIONAL STEREOTYPES IN COMPUTER SCIENCE**

Several authors have addressed the stereotype image of the Computer Science profession (Ahuja, 1995; McGrath Cohoon, 1999). Computer science profession is seen as unattractive, hard and “uncool” (García-Crespo et al., 2008). This image is one of the factors leading to career abandonment (Colomo-Palacios et al., 2014a). In addition, this negative image is confirmed by the IT strategic contribution paradox, which recognizes the contribution of IT within enterprises, though at the same time the status of the IT department and IT personnel is low (Avison, Cuthbertson, & Powell, 1999). Moreover, these stereotypes are widely shared by a large part of society and have been reported in several studies. For instance, stereotypes include nerdy/geeky (Beaubouef & McDowell, 2008; Fisher & Margolis, 2002; Gurer & Camp, 2002; Rashid, 2008), anti-social (Martin, 1998), solitary (Beaubouef & McDowell, 2008; Craig, Paradis, & Turner, 2002; Rashid, 2008), unethical (Martin, 1998), snack food and “pizza and coke” eaters (Rashid, 2008; Timms et al., 2008), poorly dressed (Jemielniak, 2007) and men-only (Lavy, 2008; Anderson et al., 2008; Rashid, 2008; Fisher & Margolis, 2002; Durdell & Thomson, 1997), among others. For a summary of the main stereotypes associated with Computer Science students see Joshi & Schmidt (2006). Still other authors have studied the impact of cinema (Colomo-Palacios, Gómez-Berbis, & García-Crespo, 2007) or television (García-Crespo et al., 2008) on the characterization of IT professionals. These studies indicate the proliferation of negative characteristics (personality traits, physical…) of IT professionals, although for the case of
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