The Computer-Related Self Concept: A Gender-Sensitive Study

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ABSTRACT

This paper presents the computer-related self-concept as a new theoretical approach to analyzing and understanding computer-related attitudes, emotions, and behaviors. The approach integrates different lines of research on computer-related self-cognitions. The authors developed and validated a questionnaire to measure the computer-related self-concept and conducted a large online survey with more than 1100 male and female computing professionals. Results show that men have a significantly more positive computer-related self-concept than women. Furthermore, the computer-related self-concept shows high correlations with career motivation. Thus, the concept might serve to further analyze computer-related gender differences and eventually to devise supportive measures in order to foster women’s careers in computing. Further prospects for using the computer-related self-concept in research on human-computer interaction are also explored.

Keywords: Career Development, Career Motivation, Computer-Related Self-Concept, Gender Differences, Human-Computer Interaction, Self-Cognitions

INTRODUCTION

Even at the beginning of the second decade of the 21st century, despite many efforts to increase the numbers of female engineering students, women are still severely underrepresented in computing.

In western industrialized countries, the percentage of women in technical fields has stagnated at 10-20%. In some countries, numbers have even been declining over the last decades (Black, Jameson, Komoss, Mehan, & Numero, 2005; Galpin, 2002; National Science Foundation, 2011; Wetzel, 2002; Zweben, 2011). Furthermore, women actively pursuing a career in engineering or computing professions encounter many obstacles (e.g. Black et al., 2005). While women generally hold only a small proportion of senior management positions, especially in European countries, the situation in technical fields is even worse. Women’s short-term and long-term career success is lower than

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men’s, despite equal qualifications (Wolffram, Derboven, & Winker, 2009; Zweben, 2011).

Reasons for this situation are manifold. One main factor, however, is that computers and information technology are still perceived as a traditionally male domain. Girls and young women are still less experienced in using computer technology, display less interest in technical fields, have low confidence in their technology-related competencies, and shy away from technical tasks (Miliszewskia & Horwood, 2000; Symonds, 2000; Wetzel, 2002; Woodbury, 2002). To put it briefly, girls and women seem to integrate computer-related activities into their self-concept to a much lesser extent, thus impacting their career choices, development, and success.

In this paper, we introduce the computer-related self-concept (CSC) as a new approach to analyzing und understanding computer-related emotions, attitudes, and behaviors. It is well-known from prior research that individual self-perceptions have a strong impact on career development (see the fundamental work by Super, Starishovsky, Matlin, & Jordan, 1963). Nevertheless, until now, there has not been any research specifically focusing on computer-related self-referred cognitions, especially regarding women’s professional development in technical fields.

In the next section, we describe the theoretical foundation of the computer-related self-concept and its relation to other self-concept theories. Furthermore, we discuss gender differences in this context.

Subsequently, we present an extensive empirical study that was conducted with over 1100 computing professionals. Utilizing a newly developed and validated psychometric questionnaire, participants’ computer-related self-concept and career motivation were investigated, with a special focus on gender differences. Based on these results, the article concludes with a discussion of the potential for creating practical measures to help advance women’s careers in computing. Additionally, prospects for future research are presented.

THE COMPUTER-RELATED SELF-CONCEPT

The self-concept represents all of a person’s self-referred attitudes. It has an essential psychological importance since it is a crucial determinant of human behavior. It is usually referred to as a multidimensional, hierarchical structure (Shavelson, Hubner, & Stanton, 1976). The general self-concept is made up of a multitude of specific self-referred cognitions relating to different experiences and areas of life. These include ability concepts, which describe a person’s notions about his/her ability in several areas of academic performance, e.g. mathematical or language skills. Ability concepts do not only influence academic performance, (see e.g. Guay, Marsh, & Boivin, 2003) but also a person’s own expectations for success in that field (see e.g. Eccles, Roeser, Wigfield, & Freedman-Doan, 2006). Thus, in the long run, they also determine career development and career success.

The computer-related self-concept represents a new psychological construct that integrates various findings regarding computer-related self-referred attitudes. It is defined as an academic ability concept that explicitly involves self-referred evaluations concerning computer-related skills, interests, experiences, attitudes, and beliefs.

Based on the classic Three-Components-Model of Attitudes by Rosenberg & Hovland (1960), we postulate a multidimensional CSC model consisting of three components that influence each other mutually (Figure 1):

- The conative component represents concrete actions, behaviors, or specific experiences with computers throughout one’s life;
- The motivational component involves (positive as well as negative) emotions, attitudes, and individual reasons for using computers (e.g. as a tool, to understand underlying principles, or to create artifacts);
- The cognitive component involves one’s subjectively perceived competencies and


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