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Teacher self-efficacy, academic self-efficacy, and computer self-efficacy as predictors of attitude toward applying computer-supported education

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ABSTRACT

There is a large body of research regarding teacher self-efficacy, academic self-efficacy, computer self-efficacy, and attitude toward applying computer-supported education of teachers and prospective teachers. However, no study has been conducted on the correlation among the effects of teacher self-efficacy, academic self-efficacy, computer self-efficacy, and attitude toward applying computer-supported education and which additionally explains their relationships to one other. This research is conducted in order to test the effect levels among the latent variables of teacher self-efficacy, academic self-efficacy, computer self-efficacy, and attitude toward applying computer-supported education and these latent variables' ratios to each other. For this, eight hypotheses were developed in light of theoretical information by reviewing the literature. This research is done by using Academic Self-Efficacy Scale, Teacher Self-Efficacy Scale, Computer Self-Efficacy Scale, and The Attitude Scale Toward Applying Computer-Supported Education. The participant group of the research consists of 323 prospective teachers. Exploratory factor analyses of scales were analyzed via SPSS 16.0 software. For the confirmatory factor analyses of scales and the structural equation modeling, AMOS 20.0 software was used. The most significant finding of this study is that teacher self-efficacy, academic self-efficacy, and computer self-efficacy are important predictors of prospective teachers' attitude toward applying computer-supported education.

1. Introduction

Today, the individual qualities needed by societies has changed. The changes and developments in education, science and technology constitute the main reason for this situation. One of the most important outcomes of development taking place in technology is the computer as well. As to the computer, on the one hand, it transforms into a more functional structure inspired by science, while on the other hand it provides speed and other contributions to the development of science. As an expected result of this situation, the computer has begun to be used in industrial, medical, military, agriculture, engineering, and every other area of life. One of the most important computer usage areas is education. Through the use of computer in education, the concept of "computer-supported education" has been replaced in the literature. The philosophy of progressivism, lifelong learning, student-centered approach, distance learning, constructivist theory etc. which are the important elements of today's education system bring the importance of computer-supported education and function to the forefront.

Alessi and Trollip (2001) arrange in order the most important benefits of computer-supported education as; increasing the quality of teaching, overcoming the problem of time, presenting the content in different formats, the creation of flexible learning environments and increasing the academic achievement of students. Indeed, many studies conducted on the subject have revealed that computer-supported education improves students' academic achievement (Cavanaugh, 2001; Demir & Basol, 2014; Dockery, 2006; Drost, 2002; Li & Ma, 2010; Liao, 2007; Shachar, 2002; Tienken & Wilson, 2007; Wong, 2001; Zhou et al., 2005). It has been found that computer-supported education has not had a

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significant impact on students' academic achievement; however, as a result of some research even if only a small number of studies (Palmer, 2009; Papanastasiou, Zemblyas, & Vrasidas, 2003; Steele, Battista, & Krockover, 1983). It was found from researches conducted on the subject that the most important determinant why teachers apply computer-supported education is the training and attitude that they have received in computer technology (Dupagne & Krendi, 1992; Torkzadeh, Pflughoeft, & Hall, 1999).

When the person wants to reveal his knowledge, faiths and beliefs, he makes it clear with his behaviors. The skills of the person by creating an integrated structure determine the tendency to behave in a specific manner, in other words they determine the attitude. When considered from this point of view, the belief, self-efficacy and attitude are directly or indirectly related to each other (Demirtas, Comert, & Ozer, 2011). Indeed, the studies that have examined the relationship between self-efficacy and attitude reveal that there is a positive relationship between self-efficacy and positive attitude (Li, 2012; Sarikaya, 2004). On the other hand, it was revealed among the results of the studies conducted by Ozkal (2013) and Tarkin and Uzuntiryaki (2012) that self-efficacy strongly predicts the attitude, to increase self-efficacy level is also increasing positive attitudes, the high self-efficacy contributes to exhibit positive attitude. The concepts of self-efficacy and attitude both affect each other and are influenced by each other (Akay & Boz, 2011; Bandura, 1997; Kutluca & Ekici, 2010; Perepiczka, Chandler, & Becerra, 2011; Saracaloglu, Yenice, & Ozden, 2013; Sezgin, 2013). Based on these studies, it can be said that academic self-efficacy, teacher self-efficacy, and computer self-efficacy are important predictors of the attitude toward computer-assisted learning and they affect the attitude toward computer assisted learning in a positive and significant way.

1.1. The research questions

The purpose of this study was to determine the teacher self-efficacy, academic self-efficacy, and computer self-efficacy as predictors of attitude toward applying computer-supported education. Therefore, the research questions that focus our study are:

RQ1. Do the teacher and computer self-efficacy together affect attitude toward applying computer-supported education?

RQ2. Do the teacher and academic self-efficacy together affect attitude toward applying computer-supported education?

RQ3. Do the teacher, academic, and computer self-efficacy together explain attitude toward applying computer-supported education?

1.2. Importance of the study

Computer-supported education and online learning (eLearning) have become a global phenomenon as many educational institutions worldwide have entered the field in an attempt to enhance the students' experience of learning. While numerous studies have focused on the effectiveness and benefits of eLearning, few have focused on understanding and measuring the user experience and relating this to the actual student usage of the eLearning system (Davis & Wong, 2007). On the other hand, there are many studies regarding academic self-efficacy, teacher self-efficacy, computer self-efficacy, and the attitude toward applying computer-supported education of teachers and prospective teachers (teacher candidates/pre-service teachers) (Arastaman, 2013; Becker & Maunsaiyat, 2002; Caprara, Barbaranelli, Steca, & Malone, 2006; Celik & Yesilyurt, 2013; Chemers, Hu, & Garcia, 2001; Erdem, 2015; Eroglu & Unlu, 2015; Frantom, Green, & Hoffman, 2002; Hoy & Spero, 2005; Oakes & Martin, 2002; Pajares & Graham, 1999; Pajares, 1996; Sam, Othman, & Nordin, 2005; Schumacher & Morahan-Martin, 2001; Semerci & Semerci, 2004; Shapkaa & Ferrarib, 2003; Skaalvik & Skaalvik, 2010; Yesilyurt, 2013a, 2013b, 2014). In general, these studies were conducted in order to put forward opinions of participants regarding academic self-efficacy, teacher self-efficacy, computer self-efficacy, and computer-supported education. On the other hand, those studies have concentrated on only one of these themes. It is theoretically known that academic self-efficacy, teacher self-efficacy, and computer self-efficacy influence attitude toward applying computer-supported education. But no research has been found, confirming the statistical accuracy of this theoretical information. In the related literature part, it seems that the relationship between the attitudes toward computer-assisted training examined as the dependent variable and the independent variables, and the effect etc. are separately discussed. In this context, being tackled together the attitude related to computer-supported education which is an independent variable in comparison with the other independent variables is regarded important in terms of evaluating in a broad perspective the attitude related to computer-supported education in the study.

In this study, academic self-efficacy, teacher self-efficacy, and computer self-efficacy level of impact on attitude toward applying computer-supported education both separately and together, their explaining ratio and their statistical significance are dwelt upon. This situation also reveals this study's biggest difference from similar studies in the literature. On the other hand, no study has been conducted on the link between and effect of academic self-efficacy, teacher self-efficacy, computer self-efficacy, and the attitude toward applying computer-supported education and their ratio to each other. For this reason, it is important to detect which variables affect prospective teachers' attitudes toward applying computer-supported education and to what extent changes in these attitudes are explained under which variables and it is also important to put forward a concrete model in this subject. In addition to this, by beginning to use high-level analysis software (AMOS etc.) in the social sciences, the level of affect and explaining ratio more independent variables more dependent variables can be detected.

2. Theoretical framework

2.1. Computer-supported education

Arslan (2006) defines computer-supported education as benefiting from the computer as a tool to help the teacher enhance the quality of training during education activities. The definition “transferring the instructional content or activities through computer” defined by Hannafin and Peck (1988) is one of the most widely accepted definitions of computer-supported education. With reference to definitions, it can be said that the common point in computer-supported education is the transfer of educational content or activities through computer. The use of a computer by a teacher in the educational process is an issue directly related to her attitude about how to carry out computer-assisted education. In other words, effective computer-supported education is partly made possible by having a positive attitude about practicing computer-supported education. Cuceloglu (1998) defines the attitude as “the tendency of long-term feelings, beliefs and behaviors quite organized.” The most important factor for achieving success in the application of computer-supported education, is the attitudes and self-efficacy of teachers and prospective teachers toward computer-supported education (Kutluca & Ekici, 2010; Shashaani,