Computers & Education 85 (2015) 94–101

Contents lists available at ScienceDirect

Computers & Education

journal homepage: www.elsevier.com/locate/compedu

Pre-service teachers' self-efficacy perceptions on Web Pedagogical Content Knowledge

Suzan Kavanoz*, H. Gülru Yüksel [1], Emrah Özcan [2]

Yıldız Technical University, Istanbul, Turkey

ARTICLE INFO

Article history:
Received 25 August 2014
Received in revised form
11 November 2014
Accepted 2 February 2015
Available online 14 February 2015

Keywords:
Pre-service teacher education
Self-efficacy
Student teacher attitudes
Web-based instruction
Web pedagogical content knowledge

ABSTRACT

21st century classrooms call for teachers to integrate technology into their instructional practices. This requires the ability and willingness to combine technological, pedagogical and content knowledge. The main purpose of this study is to investigate English as a Foreign Language (EFL) pre-service teachers' perceptions of their self-efficacy regarding Web Pedagogical Content Knowledge (W-PCK) and attitudes towards web-based instruction. Turkish adapted version of W-PCK scale (Horzum, 2011) originally developed by Lee and Tsai (2010) was used as the data collection instrument. The survey was administered to 120 EFL pre-service teachers studying at a Turkish state university. The results showed that pre-service EFL teachers attained high scores on the Web-general knowledge and Web Pedagogical Knowledge subscales while lower scores were measured in Web Communicative and Web Pedagogical Content Knowledge sub-scales. The participants' level of general self-efficacy regarding W-PCK was positively correlated with their attitudes towards Web-based instruction. No significant gender or year level differences were observed.

1. Introduction

Teaching and learning processes have been highly influenced by technological, instructional and pedagogical advances especially in the last two decades (Chou & Tsai, 2002; Kim & Hannafin, 2011; Tsai, 2001). Current developments in computer and information technologies, wide circulation of PCs, productivity applications, multimedia, and network resources have generated the development and utilization of new and innovative teaching strategies (Sam, Othman, & Ordin, 2005). The emergence of modern computer technologies and the new generation of Web has profoundly changed the way students behave and communicate with each other, which in turn altered the mediation of teaching and learning (Chai, Koh, Ho, & Tsai, 2012; Cheon, Song, Jones, & Nam, 2010; Drexler, Baralt, & Dawson, 2008; Tsai, 2001). In most educational settings, teachers are required to utilize ICT in their teaching (Baylor & Ritchie, 2002; Haydn & Barton, 2008; Zhao, Tan, & Mishra, 2001). The importance of integrating ICT in education and teachers' competence in technology mainly results from characterization of a new generation, the so-called 'Net Generation' or 'the digital natives' that refers to young people born roughly between 1982 and 1994 and grew up immersed in technology (Oblinger & Oblinger, 2005; Prensky, 2001; Tapscott, 1998). Several qualities attributed to the Net Generation such as their reliance on ICT and ability to use different social media technologies urges teachers to improve their ICT practices to meet the expectations of this generation (Oblinger & Oblinger, 2005; Prensky, 2001). According to Mishra and Koehler (2006), the need for sufficient digital technology skills and pedagogical knowledge to maximize student learning has challenged the status of technology as a separate entity. Considering technology as a separate construct independent from content and pedagogy later led to the emergence of arguments and proposals as to combine technology with content and pedagogy.

An important criterion for effective and successful use of technology in the classrooms depends on the pedagogical and personal beliefs of teachers (Busch, 1995; Ertmer, Ottenbreit-Leftwich, Sadık, Şendurur, & Şendurur, 2012). Anderson and Maninger (2007) point out that identification and development of PTs' beliefs is essential during teacher preparation as PTs' self-efficacy and beliefs are the strongest

* Corresponding author. Tel.: +90 212 383 4866.
E-mail addresses: shatip@yildiz.edu.tr (S. Kavanoz), hayuksel@yildiz.edu.tr (H.G. Yüksel), eozcan@yildiz.edu.tr (E. Özcan).
[1] Tel.: +90 212 383 4861.
[2] Tel.: +90 212 383 4869.

http://dx.doi.org/10.1016/j.compedu.2015.02.005
0360-1315/

predictors of their predicted use of software in their courses in the future. However, studies on self-efficacy perception levels of prospective teachers toward Web Pedagogical Content Knowledge (henceforth W-PCK) in Turkish context are only a few in number (Gömleksiz & Fidan, 2011; Horzum, 2011; Kaya, Özdemir, Emre, & Kaya, 2011). It is vital to understand how Turkish pre-service EFL teachers perceive their ability in terms of integrating Web in teaching and how they approach using it. The purpose of this study is to investigate EFL teacher candidates' perceived self-efficacy levels and attitudes regarding W-PCK.

2. Theoretical framework

Technological Pedagogical Content Knowledge (TPACK) represents teachers' knowledge required for effective integration of technology into pedagogically appropriate teaching and learning activities (Mishra & Koehler, 2006). This theoretical framework, based on the idea of pedagogical content knowledge by Shulman (1986), depends on the premise that in order to turn classroom environments from teacher-centred passive classroom lectures into collaborative and interactive spaces, it is essential for teachers to successfully combine technological, pedagogical and content knowledge (Lee & Tsai, 2010; Niess, 2005). TPACK, components of which can be listed as *content knowledge*, *pedagogical knowledge*, *pedagogical content knowledge*, and *technological pedagogical knowledge*, refers to the intertwined relationships that combine teacher's technology use, instructional methods, and understanding of the subject matter (Mishra & Koehler, 2006). The content affects the pedagogical goals, methods and the technologies to be used. Reciprocally, the technology used exerts several limitations and requirements that in turn might affect both the content and the way it is transferred to the learners (Koehler, Mishra, & Yahya, 2007). Research asserts that many teacher education programs fail to equip teacher candidates with the fundamental knowledge and skills for effectively integrating technology. As a result, teachers are likely to show resistance for incorporating technological resources within their classrooms (Fishman & Davis, 2006; Maddux & Cummings, 2004; Zhao, Pugh, Sheldon, & Byers, 2002). Since TPACK framework might be a viable construct that has the potential to change the way teachers teach, we believe teacher educators should emphasize development of TPACK in pre-service programs.

Pedagogical content knowledge, which provides the foundation for TPACK, derives from the idea that each content area is unique on its own, and requires instruction peculiar to the specific content. Therefore, teaching content and pedagogy as two distinctive entities do not suffice. The pedagogical content knowledge which is defined as 'the particular form of content knowledge that embodies the aspects of content most germane to it teachability' (Shulman, 1986, p. 9) was accepted as a representation of an integration of one's content and general pedagogical knowledge in a particular context. Currently, the construct is considered as one of the four general areas of teacher knowledge which supplements subject matter knowledge, general pedagogical knowledge, and knowledge of context (Grossman, 1990).

2.1. Web-based instruction

TPACK has been researched in different contexts with different target groups (e.g., Koehler & Mishra, 2005; Mishra & Koehler, 2006; Koehler et al., 2007; Valtonen et al., 2011). Even though TPACK is presented as a reliable framework in the discussion of technology in general, it falls short of offering sufficient information for the integration of Web into instructional practices (Lee, Tsai, & Chang, 2008). The use of the World Wide Web in instructional settings requires teachers to be fully equipped with technological pedagogical content knowledge with respect to Web so that they can create optimal and natural environments for learning (Hung & Yuen, 2010). The Internet is a 'particular' but important technology whose use necessitates several technologies at the same time (Lee & Tsai, 2010, p. 3). Due to its ability to provide opportunities for synchronous, asynchronous, autonomous and co-operative forms of teaching and learning activities (Barker, 1999), it is argued that the construction of web technological knowledge should be different from construction of other technologies (Chou & Tsai, 2002; Horzum, 2011).

Web-based instruction has been associated with constructivist and collaborative learning environments where teachers incorporate the resources of the World Wide Web for supporting and enhancing collaborative instructional strategies in learning (Relan & Gillani, 1997; Wang & Woo, 2009). It is asserted that Web-based instruction can provide learners with distant, interactive, individualized and inquiry-based learning activities, as well as promoting learners' knowledge construction and meaningful learning (Relan & Gillani, 1997; Tsai, 2001). Maranto and Barton (2010) claim today's pre-service teachers (PTs) are not well prepared to use Web 2.0 technologies for teaching and learning despite their proficiency in using social and communications technologies.

2.2. Web self-efficacy and attitudes

The construct Web Pedagogical Content Knowledge (W-PCK) originates from TPACK as technological content knowledge falls short off covering Web pedagogical knowledge. W-PCK concentrates on two areas, perceived self-efficacy and attitudes towards using Web for pedagogical purposes. Since its initial inception as a key concept within social cognitive theory (Bandura, 1982), the significance of self-efficacy has been highlighted as a critical variable for the prediction of individual behaviour (Bandura, 1996). Upon extension of self-efficacy to the ICT and the World Wide Web domains, the term learners' 'Internet self-efficacy' has recently been coined to highlight students' self-perceived confidence in and expectations of successfully executing Internet actions necessary to undertake required procurements (Eastin & La Rose, 2000; Wu & Tsai, 2006).

Internet self-efficacy covers not only the computer skills but also diverse digital skills such as navigating the WWW, downloading/uploading files, creating bookmarks etc. People who have little confidence in their ability to use the Internet, who are dissatisfied with their Internet skills or who find the Internet difficult to handle may be said to have low level of self-efficacy beliefs (Eastin & La Rose, 2000). Depending on the assessment of a person's judgment of his/her ability to apply Internet skills in a more encompassing mode, Internet self-efficacy concentrates on what individuals believe they can accomplish online while using online sources (Eastin & La Rose, 2000). Recent approaches to the integration of technology confirm that learners' computer knowledge, previous experience, awareness and proficiency influence their perceived self-efficacy in using various forms of technological tools (Robertson & Al-Zahrani, 2012).

Another important construct is the attitude towards the Internet. Attitude, which is accepted as a determining factor in predicting people's behaviour, is defined by Fishbein and Ajzen (1975) as: 'a learned predisposition to respond in a consistently favourable or