Thinking Skills and Creativity 7 (2012) 245–257

Contents lists available at SciVerse ScienceDirect

Thinking Skills and Creativity

journal homepage: http://www.elsevier.com/locate/tsc

From knowledge sharing to knowledge creation: A blended knowledge-management model for improving university students' creativity

Yu-chu Yeh [a,*], Yi-ling Yeh [b], Yu-Hua Chen [b]

[a] Institute of Teacher Education, Research Center for Mind, Brain & Learning, Center for Creativity and Innovation Studies, National Chengchi University, 64, Chih-nan Road, Sec. 2, Taipei 116, Taiwan, ROC

[b] Department of Education, National Chengchi University, 64, Chih-nan Road, Sec. 2, Taipei 116, Taiwan, ROC

ARTICLE INFO

Article history:
Received 10 December 2011
Received in revised form 11 May 2012
Accepted 15 May 2012
Available online 21 June 2012

Keywords:
Blended learning
Creativity
Knowledge creation
Knowledge internalization
Knowledge sharing

ABSTRACT

Creativity and knowledge management are both important competences that university students need to strive to develop. This study therefore developed and evaluated an instructional program for improving university students' creativity based on a blended knowledge-management (KM) model that integrates e-learning and three core processes of KM: knowledge sharing, knowledge internalization, and knowledge creation. Moreover, this study investigated the underlying mechanisms that achieve the effectiveness of this model. A 17-week instructional program was conducted. The findings from both quantitative and qualitative analyses suggest the following. The blended KM model is effective in improving knowledge, dispositions, and abilities of creativity. The online sharing and evaluation of creative products, learning communities and discussions, and the practice of creativity strategies have substantial effects on all three aspects of creativity. The observation and peer evaluation of group assignments and creativity-related feedback enhance the learning of knowledge and dispositions. Finally, the creation of products and scaffolding of a teacher are critical to skill improvement.

1. Introduction

Recently, the cultivation of university students' creativity has been greatly emphasized. It has been suggested that creativity requires not only the application and sharing of knowledge but also the creation of knowledge (Gurteen, 1998). Knowledge management (KM), which is mainly characterized by knowledge sharing and knowledge creation (Alavi & Leidner, 2001; Ungaretti & Tillberg-Webb, 2011), has therefore become an important strategy for enhancing personal creativity. Methods for improving university students' creativity via a KM-based training, however, have scarcely been studied.

KM depends on several core competencies, including the acquisition of knowledge and storage, knowledge application, knowledge sharing, and knowledge creation (Alavi & Leidner, 2001). KM also emphasizes the integration of technologies (Gurteen, 1998; Schmidt, 2005). Recently, many information technology industries and educational institutions have attempted to integrate a blended knowledge management (KM) model into their human-resource training program and curriculum (e.g., Alony, Whymark, & Jones, 2007; Choi & Lee, 2003; Ferguson, Mathur, & Shah, 2005). While some models emphasize knowledge sharing (e.g., Alavi & Leidner, 2001; Bartol & Abhishek, 2002; Earl, 2001; Gagné, 2009), others value knowledge creation (e.g., Imani, 2007). However, only a few models emphasize the importance of internalization (e.g.,

* Corresponding author. Tel.: +886 2 29393091x66134; fax: +886 2 29387765.
E-mail address: ycyeh@nccu.edu.tw (Y. Yeh).

1871-1871/$ – see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.tsc.2012.05.004

Nonaka & Kenney, 1991; Nonaka & Takeuchi, 1995). Internalization is a key process of cognitive learning (Vygotsky, 1986); it refers to the process of transforming explicit knowledge into tacit knowledge (Nonaka & Takeuchi, 1995). Moreover, it has been found that a blended learning approach that combines classroom instruction and e-learning is more effective than a pure e-learning approach (Osguthorpe & Graham, 2003). Accordingly, this study aimed to develop as well as to evaluate a blended KM-based training program for improving university students' creativity. In this model, knowledge sharing, internalization, and creation were emphasized and e-learning was integrated into classroom teaching. Moreover, this study aimed to investigate the underlying mechanisms that might achieve the effectiveness of the proposed blended KM model.

1.1. The definitions and elements of creativity

Creativity and innovation are sometimes regarded as the same concept. However, many researchers have suggested that they are two disciplined areas (e.g., Amabile, 1996; Baron & Tang, 2011; Hopkins, 2010; McLean, 2005). For example, Amabile (1996) claimed that creativity is the production of novel and useful ideas in any domain, whereas innovation is the successful implementation of creative ideas within an organization; all innovation begins with creative ideas. Baron and Tang (2011) concluded that creativity is often a necessary condition for subsequent innovations. In the same vein, McLean (2005) suggested that while the focus of creativity is primarily on the individual levels, innovation operates much more at the group and organizational levels; the focus of innovation is more on interrelationships and dynamics among actors and components of the organization and its environment. Since this study is focused in the individual level in educational settings, I used creativity, rather than innovation, in this study.

Since the advocate of creativity research by Guilford in 1950, proposed definitions of 'creativity' have changed from the unidimensional to the multidimensional plane; from factors related to personal characteristics to those concerning the social milieu; and from the cognitive to the affective domain (Yeh, 2011). What more recent works on creativity have emphasized, however, is that multiple components must converge in order for creativity to take place.

In her *Componential Model of Creativity*, Amabile (1996) defined creativity as the production of responses or works that are reliably assessed by appropriate judges as being original. Accordingly, she reported that three components are essential for the production of such responses and works: domain-relevant skills, creativity-relevant procedures and task motivation. In the *Evolving System Model of Creativity*, Gruber and Davis (1988) used the case study method to investigate the processes of highly creative individuals and proposed an evolving system model of creativity. They concluded that the creative person is unique, developmental change is multidimensional, and the creative person is an evolving system. They also reported that the evolution of creative ideas is influenced by an individual's expertise, motivation, emotions and environment. In the *Systems Model of Creativity*, Csikszentmihalyi (1990) proposed that three systems highlight creativity as the interactions of the field, the domain and the person. This model emphasizes that individuals create within a particular domain and that, therefore, domain knowledge is required. Similarly, in the *Interactive Perspective of Creativity*, Gardner (1993) underscored the interaction of three core elements: the individual, other persons and the work. Moreover, in the *Investment Theory of Creativity*, Sternberg and Lubart (1996) claimed that creative people are willing and able to "buy low and sell high" in the realm of ideas. They also suggested that a confluence of six distinct but interrelated resources is required for creativity. These are intellectual ability, knowledge, particular style of thinking, personality, motivation and the environment. More recently, Yeh (2004) proposed the *Ecological Systems Model of Creativity* based on a thorough review of these well-known confluence models of creativity. This model emphasized that creativity is a process in which an individual generates a culturally and contextually original and valuable product in a specific domain, which derives from the interaction of four systems. The microsystem specifies personal characteristics; mainly knowledge, dispositions, and skills and strategies; the mesosystem consists of family and school experiences; the exosystem comprises organizational factors that relate to an individual's work; and the macrosystem refers to a social milieu.

Although the aforementioned literature shows that creativity may be influenced by multiple systems, a consensus exists that among these influential factors, personal characteristics have the most direct and strongest effects on an individual's creative performance, and such characteristics can be divided into three categories: knowledge, disposition, and abilities (Yeh, 2006). Sweller (2009) declared that the first element of creativity is a comprehensive knowledge base. Baer (2008) concluded that creativity is best conceptualized as domain specific. Crawford and Brophy (2006) also argued that creativity requires a basic level of expertise and fluency within a specific knowledge domain along with deep knowledge of the subject. Apparently, knowledge is the most fundamental and critical element of creativity.

As for dispositions, the second element, their importance has been highly emphasized in famous creativity models (e.g., Amabile, 1996; Sternberg & Lubart, 1996). Tinerney and Farmer (2002) found that personal self-confidence or self-efficacy helps to foster creative behavior. Claxton, Edwards, and Constantinou (2006) have also illustrated that dispositions such as curiosity, resilience, experimentation, attentiveness, and thoughtfulness are important for the performance of creativity. Based on a thorough literature review and empirical findings, Yeh (2006) identified nine categories of personality traits pertaining to creativity: tryout, joy in work, adaptive cognition, multidimensional reasoning, independence, problem-solving, interaction and prudence, interest, and intuition and imagination; she found these personality traits were positively related to an individual's creativity. These nine categories of personalities were measured in this study.

As for abilities, the third element, Martins and Terblanche (2003) regarded creativity as a kind of capacity that integrates many new ideas for products, services, processes, and procedures. Pelled, Eisenhardt, and Xin (1999) declared that the range