Revisiting thinking styles' contributions to the knowledge and use of and attitudes towards computing and information technology ☆

Li-fang Zhang *

Faculty of Education, The University of Hong Kong, Pokfulam Road, Hong Kong

Abstract

This study examines the role of students' thinking styles in their knowledge and use of as well as in their attitudes towards the use of computing and information technology (CIT) in education. One hundred and five students from a large university in Texas responded to the Thinking Styles Inventory and to a brief measure of their attitudes towards the use of CIT in education. Between the present study and a previous study of Hong Kong students, the following common findings have been obtained. First, the more creativity-generating thinking styles positively predicted knowledge and use of CIT as well as a favorable attitude towards the use of CIT in education, whereas the more norm-conforming thinking styles negatively did so. Second, female students reported less knowledge and use of CIT. Minor differences were also identified between the U.S. and Hong Kong groups. These findings have implications for teachers, staff development personnel, and for CIT program designers.
© 2007 Elsevier Inc. All rights reserved.

1. Introduction

The past decade has witnessed the use of computing and information technology (CIT) to become an increasingly important means for conducting teaching and learning at different levels of educational institutions worldwide. However, much research has indicated that the outcomes of using CIT can vary dramatically depending on many factors, including individual-difference variables such as age and gender (Yelland & Lloyd, 2001). In the present study, we examine the differences that university students' thinking styles make in their knowledge and use of CIT as well as in their attitudes towards the use of CIT in education.

Undoubtedly, the existing studies (Pillay, 1998; Reed, Oughton, Ayersman, Ervin, & Giessler, 2000) have helped us to understand the roles of intellectual styles (a general term for cognitive, learning, and thinking styles) in the outcomes of the use of CIT and in individuals' attitudes towards the use of CIT. However, two limitations exist in these studies.

First, the most frequently used style constructs are some of the earlier ones such as Witkin's (1964) field-dependent/independent styles and Kolb's (1976) learning styles. However, these styles have been criticized for being merely specific aspects of cognitive-stylistic functioning (Grigorenko & Sternberg, 1995). Second, the existing studies investigated the impact of styles upon only particular types of CIT operations such as hypermedia or office automation (Liu & Reed, 1995; Zhuo, 1999). No study attempted to capture the relationships of people's styles to their knowledge and use of a comprehensive constellation of CIT operations. Together, these limitations suggest the need for a study that examines the impact of the styles defined by a general theoretical model upon people's knowledge and use of CIT and upon their attitudes towards the use of CIT in education.

1.1. Theory of mental self-government

As the most general theory in the existing styles literature, Sternberg's theory of mental self-government has generated much research interest. Sternberg (1988, 1997) contended that just as there are many ways of governing a society, there are many ways of managing our activities (i.e., thinking styles). Furthermore, Sternberg argued that thinking styles can be cultivated.

The theory addresses thirteen thinking styles that fall along five dimensions: functions, forms, levels, scopes, and leanings of the mental self-government (see Appendix 1). Sternberg's theory is general not only because it applies to different populations, but also because it embraces all three approaches to the study of styles: cognition-centered, personality-centered, and activity-centered (Grigorenko & Sternberg, 1995).

Recently, based on empirical findings, Zhang and Sternberg (2005, 2006) classified these thinking styles into three types. Type I thinking styles, including the legislative, judicial, hierarchical, global, and liberal styles, are more creativity-generating. Type II thinking styles, including the executive, local, monarchic, and conservative styles, suggest a norm-favoring tendency. Type III styles, including the anarchic, oligarchic, internal, and external styles, may manifest the characteristics of both Types I and II styles, depending on the stylistic demand of the specific task.

The theory has been operationalized through several instruments, including the Thinking Styles Inventory (TSI, Sternberg & Wagner, 1992). Abundant studies indicated that the TSI has good psychometric properties (Cano-Garcia & Hughes, 2000; Kaufman, 2001). Furthermore, thinking styles played an important role in students' cognitive (Zhang & Sternberg, 2000), affective (Zhang, 2001), and psychosocial development (Zhang, 2002). Yet, only one study has examined the relationship between thinking styles and the use of CIT in education (Zhang & He, 2003) and there are three reasons for replicating the study in a different culture.

First, although reasonably good reliability and validity data were obtained for the CIT scales in Zhang and He's study, the scales were merely used with Hong Kong students. Would similar data result in a different culture? Second, although Zhang and He argued that the significant relationships between the CIT and thinking style scales were more likely to be true than to have been found by chance, would the specific patterns of relationships identified between the two constructs hold in a different culture? Finally, verifying Zhang and He's results in a different culture is important also because culture may play a critical role in each of the variables under investigation. For example, whereas the American culture tended to be more rewarding of Type I thinking styles, the Hong Kong culture tended to be more rewarding of Type II styles (Zhang, 2004). Also for example, Brosnan and Lee (1998) found that gender difference in computer anxiety was absent among U. K. students but present among Hong Kong students. In the present case, although both Hong Kong and the United States are at the forefront regarding the use of CIT in education, different cultural values (e.g., respecting authority is still prevalent in Hong Kong, whereas autonomy is a value long held by people in the U.S.) may affect students' responses to the CIT scales.

Thus, the principal goal of the present study was to identify if the findings from Zhang and He's study can be replicated in the United States. Specifically, the study examines the predictive power of thinking styles for U. S. university students' general knowledge and use of CIT and for their attitudes towards the use of CIT in education.

As in Zhang and He's study, this study predicted that students who employ Type I thinking styles would report better knowledge and more frequent use of CIT and to express a more favorable attitude towards the use of CIT in education. This prediction was based on the following reasoning: As a relatively new component in education, CIT, like any other new events, may be better received by students who are more open-minded. Previous research revealed that Type I thinking styles are positively related to open-mindedness (Zhang & Huang, 2001). Therefore, it was predicted that Type I thinking styles would significantly contribute to better knowledge and more frequent use of CIT and to a more favorable attitude towards the use of CIT in education.