Analysis of the influence of multimedia instructional materials on engineering students' creative thinking: a pilot study

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Abstract

With the advance of computer technology, information can now be represented beyond static and paper-based forms, such as in dynamic and multimedia forms (Mayer, 2002). The use of multimedia-based materials in educational settings is increasing, and in Malaysia, such a move is also apparent (Teoh & Neo, 2006). Although studies on the use of multimedia instructional materials (MIM) have been conducted for years, the focus has mostly been on retention and transfer performance (Mayer et. al., 2007; Paas et al., 2007; Seufert & Brünken, 2006). Moreover, in the technology and engineering business sectors, there is increasing emphasis on creativity for the individual (Amabile, 1998) and organizational (Dhillon, 2006) survival. It is therefore important to investigate the impact of instruction on engineering students' creative thinking. In this study, the impact of multimedia instructional materials on Malaysian engineering students was investigated. This paper reports on the results of a pilot study which is part of a doctoral research project. The pilot study aimed to determine whether the use of multimedia instructional materials (MIM) among engineering students had any impact on their creative thinking. Fifteen MIMs were developed based on the principles of Cognitive Theories of Multimedia Design (Mayer, 2002) and Cognitive Load Theory (Sweller et al., 1998). The MIMs were used by 27 mechanical engineering students in lab sessions over a period of 4 weeks. To assess the impact of the MIMs on the students' creative thinking, the Torrance Tests of Creative Thinking (TTCT) verbal forms A and B were administered to the participants as pretest and posttest. Semi-structured interview were also conducted with ten voluntary students from the sample in order to find out the students' opinions on the effectiveness of the MIMs utilisation to their understanding and creative thinking. The results indicate that the MIMs have helped the engineering students to think creatively.

1.0 Introduction

Creativity requires knowledge. Creative acts do not simply appear in a flash although it is undeniably true that some individuals are naturally gifted with such talent. For all other individuals born without the natural gift of creative potential, creativity is a skill that can be learnt (Amabile, 1998). It requires among other things, knowledge, and it entails the cognitive interplay between new and existing knowledge (de Bono, 1990; Sweller, 2009). De Bono (1990) states that the cognitive process of creativity involves the ability to use and communicate ideas, and how new and old ideas are manipulated to create one's own novel ideas. This cognitive manipulation of ideas and knowledge is part of the complex phenomenon of the human cognitive system which is often explored as an information processing system (Sweller, 2009).