

Dr. Mohamed Ibrahim
Arkansas Tech University
Curriculum and Instruction
College of Education

Re. Final report for paper presented at the Association of Teacher Educators (ATE) Summer Conference, Hyatt Regency Minneapolis; July 31-August 4, 2015

A. Research paper entitled *“The Use of Interactive Video to Improve Students’ Knowledge Acquisition in an Online Learning Environment”*

B. Research problem:

Teaching abstract concepts in an online learning environment using traditional learning materials is considered by many educators to be a difficult task. However, the increase use of audiovisual learning materials brings new opportunities for information dissemination for online learners and can aid students in understanding new concepts, especially visualizing abstract concepts and processes (Oldham, 2003). Prior research has shown that multimedia, such as video, animation and simulation can help students to visualize and hence enhance their understanding in many learning situations. Therefore, instructors became more likely to use supporting materials such as audiovisual learning materials to help learners visualize these concepts. A major difference between multimedia and traditional learning environments is that traditional learning environments, such as textbooks or non-interactive learning materials tend to dictate the order in which information is presented. In contrast, multimedia environments allow learners to interact and navigate the information in a nonlinear fashion and help them compose their individual instructional sequence (Lawless & Brown, 1997).

Although the increased use of multimedia in all learning environments was found to help students gain more understanding, especially visual learners, other research argues that the online learning experience is in need of changes in the design and delivery of the learning content to incorporate diverse forms of interaction (Bernard et al., 2009). Cognitive scientists believe that learners’ understanding arises through the interaction of the new information presented in an instructional environment and an individual’s cognitive system (Fincherkiefer, 1988). Therefore, the purpose of this study was to examine the effects of interactive instructional video on students’ knowledge acquisition and academic characteristics in an online learning environment.

C. Research procedure

Students in all sections completed a demographic survey, watched the videos and created a blog based on the principles of the UDL framework. The experimental group completed the same activities as the control group, in addition to answering questions about the blog design while watching the video..

D. Summary of findings

The main finding of this study is that adding an interactive element to the instructional video has the potential to help preservice teachers improve their learning outcomes compared to non-interactive instructional video in a technology integration course in an online learning environment. This benefit was demonstrated by the statistically significant differences in learning outcomes between students in interactive and non-interactive instructional video conditions. The results suggest that when students learn from interactive instructional video, their project scores increase. The results of the present study support previous findings produced in the context of other content areas and with different population and provides empirical evidence that designing multimedia learning content requires manipulation to help students during visual information processing and decrease their cognitive demands imposed by instructional video (Mautone & Mayer, 2001).

According to the cognitive theory of multimedia learning (CTML), human cognitive systems can only process only small portions of the large amounts of visual and auditory stimuli received. Unlike processing printed text, learners in formal educational contexts typically do not have the opportunity to interact with the multimedia presentation and reflect on what they are learning and identify potential gaps in their knowledge. Thus, information processing in this situation frequently requires longer and more intense periods of cognitive and metacognitive activity. Regardless of the amount of information presented in each sensory channel, the learner's working memory (WM) will accept, process, and send to long-term memory (LTM) only a limited number of information-units (Atneave, 1954; Jacobson, 1950, 1951). Thus, working memory requires interaction, pauses or direct prompting to accept, process, and send to the long-term storage only the most crucial information included in the instructional materials (Clark, Nguyen, & Sweller, 2006).

E. Conclusions and recommendations

The results also indicated that although students have different learning preferences and they differ in their pre-existing academic ability, they benefitted equally from learning from the instructional video. These results were indicated by the non-significant correlation between students' test scores and their learning styles or their overall GPA when they learn from instructional video in an online course.

The findings of Research Questions (2) and (3) are generally consistent with the results of previous studies on the importance of the use of dynamic audiovisual learning materials in online learning environments to help students to gain deeper conceptual understanding (Baggett, 1984; Mayer & Moreno, 2002; R. Mayer, 2002, 2003). A possible interpretation of these results are aligned with cognitive research, implying that knowledge acquisition is better achieved through presenting materials in formats optimized to use both the visual and auditory sensory channels at the same time (Jonassen, Peck, & Wilson, 1999; Mayer, 2001). Furthermore, adding interactive elements to the instructional video to highlight the important information in the learning content,

permits students to focus on these important elements in these complex concepts (Gibbons Jf, 1977).