Chapter 17

Survey of Students' Perception and the Influence of Learning Style Preferences on Learner's Intention to Use 3D Visualization Instruction:
Learning Style and 3D Visualization Instruction

Yu-Hsin Hung
National Taiwan University, Taiwan

Ray I. Chang
National Taiwan University, Taiwan

Chun Fu Lin
National Taiwan University, Taiwan

ABSTRACT

3D visualization specifically has been widely applied in a broad range of fields, including computer science, pedagogy, and so forth. 3D visualization instruction has become the essential tool that uses computer programs to generate 3D representations of manmade objects. For users, 3D visualization instruction can be manipulated, altered and efficiently communicated to others, and it is efficient for teaching and learning. The aim of this study is investigating students' perception toward 3D visualization instruction, and the influence of learning-style preferences on learners' intentions to use 3D visualization instruction. We are trying to develop the experiment which undergraduate students participated in this study, the purpose of which was to investigate the utilize 3D visualization instruction access to the single learning style and multiple learning styles. Data mining technology was employed in this study to identify multiple learning styles. The result showed that high visual and high sensing learning style has potential of using 3D visualization instruction.

INTRODUCTION

The use of visualization tools for representing data relations and in other types of demonstrations has become popular in recent years. Data visualization representations have become essential in many fields with the recent flourishing of information and communication technology, and visualization technology has been widely applied to teaching and learning (Avgoustinov, 2000; Cheng, Chiang, Ye, & Cheng, 2010; Ieronutti & Chittaro., 2007; Keefe et al., 2008). One example is the Collaborative Virtual Environment, which creates virtual characters to help students with Autism Spectrum Disorder acquire social skills (Cheng et al., 2010). Various types of 3D visualization have also been successfully employed in educational applications (Dalgarno & Lee, 2010).

A learning style is an individual's habitual pattern of acquiring and processing information in learning situations (James & Gardner, 1995). Few studies have considered whether learning styles have a direct relationship to user attitudes toward 3D visualization instruction. The present study examined how individual learning styles influence attitude toward 3D visualization instruction. The Index of Learning Style (ILS) questionnaire (Felder & Soloman, 2003) was used to measure participants' learning styles, and data mining techniques were employed to identify the presence of multiple learning styles. Moreover, questionnaires on learning attitude, technology acceptance, and cognitive load were used to evaluate learners' perceptions of 3D visualization instruction. The purpose was to determine what approaches can best enhance the motivation of various types of learners to benefit from 3D visualization instruction. The overall goals of this study are as follows:

1. To explore whether learning styles can influence the use of 3D visualization instruction, and to determine what relationships may exist between learning styles and intention to use this tool.
2. To investigate information on learners' experiences and motivations for tool usage (also provide 3D visualization instructions and suggestions how to make the tool most effective).
3. To assess students' learning attitude, perceived cognitive load, and level of acceptance with regard to 3D visualization instruction technology.
4. To consider which learning approaches can best assist users of 3D visualization instruction and enhance their learning motivation.

RELATED WORK

Visualization Tool in Education

Sedig and Sumner (2006) defined visualizations as diagrammatic depictions of a collection of symbols that emphasize the properties and relationships of a represented world and visually encode. Visualization tools have attracted a considerable amount of attention from researchers (Avgoustinov, 2000; Ware, 2004; Chen, 2004; Ieronutti et al., 2007; Liang & Sedig, 2010). Some empirical findings have explored how visualizations technology were was applied in the courseware (Avgoustinov, 2000; Ieronutti et al., 2007; Keefe et al., 2008) or learning system (Leenaars et al., 2013). Liang's finding indicated that visualization instruction can effectively engage these students and support their exploration of non-trivial mathematical concepts (Liang's et al., 2010). Virtual Reality Modeling Language (VRML) is applying in describing interactive 3-D image sequences. VRML also be used to create 3-D representations of

Related Content

A Proposed Grayscale Face Image Colorization System using Particle Swarm Optimization

Abul Hasnat, Santanu Halder, Debotosh Bhattacharjeeand Mita Nasipuri (2017). *International Journal of Virtual and Augmented Reality (pp. 72-89).*

www.irma-international.org/article/a-proposed-grayscale-face-image-colorization-system-using-particle-swarm-optimization/169936

Racial Issues in the Virtual Classroom

Alfred P. Rovaiand Louis B. Gallien Jr. (2006). *Encyclopedia of Virtual Communities and Technologies (pp. 397-401).*

www.irma-international.org/chapter/racial-issues-virtual-classroom/18109

Knowledge Creation and Student Engagement Within 3D Virtual Worlds

Brian G. Burtonand Barbara Martin (2017). *International Journal of Virtual and Augmented Reality (pp. 43-59).*

www.irma-international.org/article/knowledge-creation-and-student-engagement-within-3d-virtual-worlds/169934

Sixth Sense Technology: Advances in HCI as We Approach 2020

Zeenat AlKassimand Nader Mohamed (2017). *International Journal of Virtual and Augmented Reality (pp. 18-41).*

www.irma-international.org/article/sixth-sense-technology/188479

Potential and Challenges of the Metaverse on Future Businesses

Dk Farhanah Izzati Pg Mohd Japarand Muhammad Anshari (2023). *Metaverse Applications for New Business Models and Disruptive Innovation (pp. 102-119).*

www.irma-international.org/chapter/potential-and-challenges-of-the-metaverse-on-future-businesses/317296