Chapter 5

Promoting Critical Thinking Disposition Through Virtual Reality Serious Games

Su Jiayuan
Independent Researcher, Spain

Zhang Jingru
Universiti Sains Malaysia, Malaysia

ABSTRACT

The new VR technology is used in various fields such as medicine, military, and especially in education. A teaching methodology based on logical reasoning in a serious virtual reality game was designed and developed in the study. Through a pre-test and post-test laboratory experiment approach, the California Critical Thinking Disposition Questionnaire was used to detect changes in critical thinking dispositions of a class of 37 students including experimental and control groups. The experimental data were analysed for component gaps by means of independent samples t-tests. Ultimately, through significance data, the instructional model proved to be more effective in developing students' critical thinking than the traditional lecture model.

INTRODUCTION

1.1 Research Background

Although China is more educated than it was in the past, this does not necessarily translate to better education. Due to a variety of historical factors, the educational system in this nation is used to operating in a teach-receive manner, which helps students' views become more solidified (Kirkpatrick & Zang, 2011). However, one of the main objectives of higher education is to foster critical thinking(Tiruneh D T et al ., 2014) As a result, when students join higher education, teachers must invest a lot of time in encouraging their critical thinking skills. Unfortunately, despite four years of training, we have yet to achieve the intended outcomes(K Fan & BH See, 2022).

The majority of educators concur that critical thinking is a higher-order cognitive talent important for student's future success in areas including communication, cooperation, and careers (Scheeder L, 2017). Especially in this age of information explosion, critical thinking guides students to "deciding what to believe or do" (Yang et al., 2008), to evaluate the arguments of others and their own, to resolve conflicts, and come to well-reasoned resolutions to complex problems (Allegretti & Frederick, 1995).

1.2 Virtual Reality (VR)

The dynamic nature of virtual reality has resulted in a constant evolution of both its definition and classification (Kaplan-Rakowski & Gruber, 2019). In the past, Webster's New Universal Dictionary (1989) defines virtual as "being in essence or effect, but not in fact." Subsequently, Sherman & Craig (2018) positioned virtual reality as "a medium composed of interactive computer simulations that sense the participant's position and actions and replace or augment the feedback to one or more senses, giving the feeling of being mentally immersed or present in the simulation (a virtual world)." However, Kaplan-Rakowski and Gruber (2020), two simple definitions based on the two categories of VR, LiVR, and HiVR, were proposed. They define LiVR as "a computer-generated three-dimensional virtual space experienced through standard audio-visual equipment, such as a desktop computer with a two-dimensional monitor" and HiVR as" a computer-generated 360° virtual space that can be perceived as being spatially realistic, due to the high immersion afforded by a head-mounted device". Therefore, it is reasonable to believe that the definition of VR will continue to be iterated in the future. Because of the iteration of VR devices with development engines such as Unity being available (Chen, 2005), VR devices that used to be too expensive have become readily affordable. In the meantime, VR is being utilized in a variety of fields such as medicine, the military,

Related Content

Bitmap Join Indexes vs. Data Partitioning
Ladjel Bellatreche (2009). *Encyclopedia of Data Warehousing and Mining, Second Edition (pp. 171-177).*
www.irma-international.org/chapter/bitmap-join-indexes-data-partitioning/10816

Computation of OLAP Data Cubes
Amin A. Abdulghani (2009). *Encyclopedia of Data Warehousing and Mining, Second Edition (pp. 286-292).*
www.irma-international.org/chapter/computation-olap-data-cubes/10834

Mining Generalized Association Rules in an Evolving Environment
Wen-Yang Linand Ming-Cheng Tseng (2009). *Encyclopedia of Data Warehousing and Mining, Second Edition (pp. 1268-1274).*
www.irma-international.org/chapter/mining-generalized-association-rules-evolving/10985

Web Usage Mining with Web Logs
Xiangji Huang (2009). *Encyclopedia of Data Warehousing and Mining, Second Edition (pp. 2096-2102).*
www.irma-international.org/chapter/web-usage-mining-web-logs/11109

A Bayesian Based Machine Learning Application to Task Analysis
Shu-Chiang Lin (2009). *Encyclopedia of Data Warehousing and Mining, Second Edition (pp. 133-139).*
www.irma-international.org/chapter/bayesian-based-machine-learning-application/10810