Training of Differential Diagnosis of Dissociative Disorders with Virtual Reality Simulations. Effectiveness and Usability.

Jose GUTIERREZ-MALDONADO[*], Ángel AGUILAR-ALONSO & Marta FERRER-GARCIA

University of Barcelona, Spain

*jgutierrezm@ub.edu

Abstract: A training program of differential diagnosis skills was developed to enhance the learning of the psychopathological exploration of Dissociative Disorders using Virtual Reality (VR) based simulations. The sample of the study consisted of 60 psychology students (University of Barcelona). Comparisons between the experimental (VR training) and the control group (traditional role-playing training) showed that students trained with the VR system obtained better scores than students trained with the traditional method. The usability was assessed with the *Software Usability Measurement Inventory* (SUMI). Results suggested that simulated interviews are a friendly and motivating tool to train diagnostic abilities in psychology students.

Keywords: diagnostic interview, psychology, psychopathological exploration, Dissociative disorders, virtual reality, artificial intelligence, simulations.

Introduction

Virtual Reality (VR) is widely used to train health-care professionals [1]. This technology provides trainees simulations of real life situations where they can learn by doing in a safe educational context. A virtual environment allows students to change their point of view by observing a phenomenon from different perspectives, enhancing the recall of objects and their localization [2,3]. Similarly, students can play different roles in a social virtual environment which enhances their social skills. The main purpose of this project was to develop a new method to improve the acquisition of psychopathological exploration skills, in psychology students, for the diagnosis of Dissociative Disorders [4], by developing a computerized resource based on VR.

Methods

Sample

Sixty under-graduated students participated in the study. Mean age was 21.30 (SD= 2.20) and most of them were female (71.3%).

Instruments

A software based on virtual reality and artificial intelligence, *Simulated Interviews*, was developed to enhance skills learning. Virtual environments were developed with 3D studio. Agents were modelled with Poser and Character Studio. Interaction and navigation were programmed with Virtools Dev. Voices were directly recorded from actors. The knowledge base resulted from a data base matching question classes and answer classes according to the DSM-IV hierarchical system of differential diagnosis (Diagnostic and Statistical Manual of Mental Disorders) [4] for the diagnostic group considered for the training (Dissociative Disorders). The system included 3D models with realistic textures and illumination, and avatars that play the role of virtual patients whose facial expression matches the verbal contents according to the psychopathology simulated (Dissociative Disorders). A diagnostic interview skills test was also used to evaluate the psychopathological exploration and differential diagnostic skills acquired. The final score was calculated taking into account the correct answers converted on a 10 point- scale. The usability was assessed with the Software Usability Measurement Inventory (SUMI) [5]. The SUMI is a 50-item questionnaire that measures five aspects of user satisfaction: affect (do users like the program), helpfulness, learnability, efficiency, and control.

Procedure

Participants were randomly assigned to one of the following conditions: 30 students who received psychopathological exploration skills training using the simulated interviews (experimental group) and 30 students who received psychopathological exploration skills training using the traditional method of role playing (control group).Two professors were available for each group.

Students in the experimental group were requested to assist to the laboratory for two consecutive sessions of 50 minutes with a ten minutes pause. Every student received from the professor in charge a basic explanation of the main characteristics of the Dissociative Disorders. Later, students had to interact with the virtual simulations of four patients who displayed the disorders. The same procedure was applied to the students in the control group, however, instead of interacting with the simulated interviews training program they received a traditional training based on role playing in which the professor played the role of the patients and every student had to perform the interviews to identify the correct diagnosis. Finally, the effects of the training program on the students learning was compared to the traditional teaching method, thus, students in both groups were required to do the diagnostic interview skills test. Students in the experimental group also assessed the usability of the software with SUMI inventory.

Results and Discussion

Effectiveness

After confirming the homogeneity of both groups in age and gender, a t-test for independent samples was conducted to evaluate the differences between the scores obtained by students in the experimental and control group in the diagnostic interview skills test. Students who were trained with the simulated interviews obtained better scores than the students trained with the traditional method of role-playing (t=3,89, p< 0,01). The group that received the training program by means of simulated interviews reached higher scores in the diagnostic interview skills test than the group that received traditional training based on role playing. This difference was statistically significant. Given that both groups were homogenous in age and gender, the differences found in the final scores obtained in the diagnostic interview

skills test can be attributed to the different training programs applied to the experimental and control group.

Usability

Only SUMI's items that were applicable to our software were considered for data analysis. We selected 15 items listed in Table 1. Participants showed a good level of general satisfaction with the application. Most participants (90%) would recommend it to their colleagues.

Table 1. Answer frequencies

	Frequency (%)		
	Agree	Undecided	Disagree
2. I would recommend this software to my colleagues	90	8,3	1,7
3. The instructions and prompts are helpful	91,7	8,3	0
5. Learning to operate this software initially is full of problems	0	5	95
7. I enjoy my sessions with this software	80	18,3	1,7
12. Working with this software is satisfying	81,7	16,7	1,7
13. The way that system information is presented is clear and understandable	95	5	0
17. Working with this software is mentally stimulating	75	20	5
19. I feel in command of this software when I am using it	75	15	10
26. Tasks can be performed in a straightforward manner using this software	78,3	16.7	5
27. Using this software is frustrating	5	11,7	83,3
29. The speed of this software is fast enough	68,3	26,7	5
32. There have been times in using this software when I have felt quite tense	15	8,3	76,7
42. The software has very attractive presentation	68,3	23,3	8,3
44. It is relatively easy to move from one part of a task to another	75	16,7	8,3
48. It is easy to see at a glance what the options are at each stage	61,7	28,3	10

References

[1] F. Mantovani, G. Castelnuovo, A. Gaggioli, & G. Riva (2003). Virtual reality training for health-care professionals, *CyberPsychology & Behavior, 6,* 389-395.
[2] Dalgarno, B., Bennett, S. & Harper, B. (2010). The Importance of Active Exploration, Optical Flow, and Task Alignment for Spatial Learning in Desktop 3D Environments. *Human–Computer Interaction, 25(1),* 25-66. doi:10.1080/07370020903586670
[3] Lee, K. M., & Jung, Y. (2005). Evolutionary nature of virtual experience. *Journal of Cultural and Evolutionary Psychology, 3,* 159-178.
[4] American Psychiatric Association (1994). *Diagnostic and Statistical Manual of Mental Disorders.* Masson
[5] J. Kirakowski & M. Corbett (1993). SUMI: The software measurement inventory, *British Journal of Educational Technology, 24,* 210-212.