Mobile Immersive Virtual Technologies for Professional Communities of Practice

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Abstract. This paper presents the development of an Immersive Virtual Technology (IVT) system serving a community of practice consisting of psychotherapists who use virtual environments for therapy and treatment of anxiety disorders. The psychosocial theoretical background includes the ethnomethodological approach, Situated Action Theory and the Intersubjectivity of the Utterance model. The dialogical importance promoted at each level of the analysis phases becomes the key to a deeper and more fluid understanding of the assumptions and meaning that guide the actions of and interactions between therapists and patients. The entire system design process is inspired by a dialogical perspective, which aims to effectively and non-rigidly integrate the design stages, analysis in context of use, ergonomic evaluation, creation of the virtual reality (VR) system, and final work on the clinical protocol in use.

Keywords. Immersive virtual technologies (IVT); mobile; usability; community of practice; e-health

Introduction

This project aimed to support the development of an Immersive Virtual Technology (IVT) system, serving a community of practice consisting of psychotherapists who use virtual environments for therapy and treatment of anxiety disorders.

This required the fine tuning of clinical protocols for 3D virtual reality environments (the town square, the lift, the supermarket, the underground station), developed in the framework of the Vepsy-Update project ("Telemedicine and Portable Environments in Clinical Psychology", European Project – IST 2000 – 25323), developing mobile interfaces enabling ergonomic, wireless use of 3D virtual environments and tools for the fruition of virtual environments supporting communication within the therapists' community of practice.

1. Method

We focused on two psychosocial aspects: on the one hand a user-centred approach to refining virtual environments [1], and on the other the training of a community using these environments, modelled on the structure of a community of practice [2].

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With respect to the first aspect, we wanted to put an ergonomic research process to the test in a virtual environment for clinical psychotherapeutic applications, with the aim of plugging the gap created by the lack of recognized methodological and assessment standards in this sector. Through a path winding through the two research projects described in the opening paragraphs, we have demonstrated the theoretical and methodological cornerstones of our approach, with particular emphasis on the need for ever greater adherence to the actual context of use from the viewpoint of ecology of process. Given the lack of standard virtual reality systems for the various disorders and the relatively few officially recognized clinical protocols, we considered it essential to involve all those interested in or with knowledge of the clinical aspect in evaluating the ergonomic dimension. We thus included not only the therapists but also the patients themselves, both considered as "expert users of virtual reality environments used in psychotherapy". The involvement of independent therapists proved not just useful but absolutely essential in analyzing how clinicians with different theoretical backgrounds, expectations, and ideas actually used and interacted with the system.

The conduct of user-based tests on outpatients as well as psychologically healthy users and the opportunities for researchers to have direct contact with patients (e.g. helping the therapist in the technical preparation of the setting at the beginning and end of the session, or by being available at any time to note down the patients’ comments and observations) boosted the production of significant data for our goals. From this perspective, we tried to integrate the ergonomic study with the technical development of the environments, to overcome a division caused by the uncritical adoption of models historically consolidated in the development of technological artefacts in two processes: the first, “idealistic engineering” (“design and produce”) and the second "empirical refinement” (“make it, sell it and see how it goes…”).

2. Results

Community training take place in two phases:

a) the fine-tuning of an interface enabling mobile use of the environments;

b) the construction of the Community of practice of the users of the virtual environments developed. Phase b) is still in progress but will be concluded by June 2009.

Fine-tuning an interface, enabling mobile use of the environments, validated technology usability. As the ultimate purpose of the project was to provide use of the virtual environments developed in IVT mode on mobile terminals, we fine-tuned an interface suited to this purpose. Specifically, the following functions were included to facilitate communication between users (therapists and patients): access to TIV; receipt and exchange of therapist-patient messages; vocal therapist-patient connection; execution of actions requested by the therapist; recording of the actions performed by therapist and patient on database. Particular attention was dedicated to the development, in web technology, of an administration interface accessible by the therapist able to allow him/her to: manage the exchange of messages with the patient, evaluate the actions recorded by patients; prescribe the actions to be performed by the patients; perform research and summary analysis. The choice of Origami type mobile terminal provided a tool with similar size and weight to a PDA device but a larger screen, a microphone for communication, a Windows XP operating system equivalent to the normal version for PCs (that therefore enabled the use of the 3D environments already
developed) and above all capable of multiple connectivity through the LAN, WiFi and GPRS network. The web application was developed using Asp.Net technology. A semi-automatic mechanism able to manage the function without interfering with the effective use of the environments or communication between therapist and patient, to guarantee correct synchronisation between the two applications, used without requiring a permanent connection. The start screen of the web application consists of a simple panel that allows rapid access to the functions available.

3. Conclusion

There is an undoubted expansion of the specific role of the researcher expert in the ergonomic aspect. This role, often found in a “technical/technological” context only and limited to a few phases of the planning cycle, is here extended to the entire project, including training in the use of mobile environments.

This result opens new prospects for the production and validation of virtual environments with respect both to analysis of their usability and the training of new users.

References

