Professional Training, Serious Games and Participatory Design

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INTRODUCTION

Nowadays serious games are used in various educational settings, from school [1][2], to healthcare [3][4] and professional training [5][6]. Born from similar research topics, such as entertainment education and e-learning [7], has managed to emerge as a separate field. Although there is an ongoing debate about their effectiveness [8][9] [10] the development of these games is growing and is reaching various fields of application.

The related literature is often focused on what is the contribution of the proposed new tools and/or how effective they are [5][6]. It usually analyze the "a posteriori" part of the development process: once the game design is completed, there's an assessment of the effectiveness. The literature that discusses the "a priori" (e.g., how the game can be developed through a user-centered design) is quite scarce. However this aspect of the game should not be underestimated. As in fact, the game designer knows the full potential of the game, it is unlikely that he/she is also expert in the field of application. This ignorance takes to an incomplete vision of the system; a lack of information that may be important in the design of the game. Examples of participatory design applied to serious games [11][12][13] discuss this importance, highlighting how user involvement can have a constructive contribution in the development process.

A CASE STUDY FOR PROFESSIONAL TRAINING

The training of firefighters is critical for the management of emergencies, and while there are examples of the use of serious games in this field, in the Italian context these tools are almost absent. The lessons in a generic training school follow a classic model devided in theoretical and practical classes. The former are essential for the consolidation of the theoretical basis (e.g., the behavior of fire, gases and explosive materials), the latter for the application of the gained knowledge to the practical case (e.g., techniques of door breaking or the management of fire in confined spaces).

In this context, we are partecipating in a reasearch project lead by Delta Lab (a company located in Trentino, a region in the North-East of Italy) on the development of a virtual environment targeted to Emergency Management Training (EMT). In this "virgin domain" a question arised spontaneously: serious games can effectively contribute to the training of firefighters?

The answer is not trivial, because the environment at issue is considerably different from the academic one, and its study becomes crucial for the development of a truly user-oriented product. To answer this question we conducted a field study during a preparatory session of the practical lessons organized by twelve instructors of the provincial firefighting school. The session lasted two days and was held at their training center. This experience allowed us to observe some examples of lessons and organize a focus group with the instructors in which were discussed the current structure of the classes (both theoretical and practical) and the possible future introduction of serious game. The focus group revealed the total ignorance of the participants about serious games and their use for training, but the interest aroused by this topic has led to a number of useful feedback to outline a possible integration into their lessons.

To give a brief example, one of the instructors, speaking of the current training, outlined the three categories of topics taught in class:

- Technique: what is being done in practice to address a specific problem (e.g., a locked door that blocks a fire is dealt according to a specific technique of "open-door").

- Tactics: short-term choice, by the team leader, on the techniques to be applied depending on the tools available, the environmental conditions and the amount of information (e.g., a person is stuck in a car and they need to decide whether open the wreckage with an hydraulic clamp or try to free the person by hand).

- Strategy: a set of long-term choices involving the entire emergency operation (e.g., send a large or small tanker on site?)

After introducing the three concepts, the instructor explained that, in his opinion, the *techniques* should be taught in the field and this could not be in any way substituted by virtual simulations. In support of this statement he added that it is impossible in a simulation to

Figure 1, a screenshot of an EMT virtual simulator (left) and two screenshots of a training session on confined fire behavior.

recreate the same conditions of psycho-physical stress of a real case or provide any feedback to the player similar to the heat of fire, low visibility, and the force required to direct a nozzle (see Fig.1). However, the instructor went on saying that, on the contrary, the *tactics* could be easily integrated into a serious game. In this case the ease of repetition of the exercises and the high modifiability of the training scenario could bring strong advantages compared to traditional lessons. Such simple information was considered essential, because it clearly defines a line that separates what can be taught through serious game and what have to be taught through traditional methods. A limitation highlighted by those who know and work in the environment.

CONCLUSIONS

The case study described in the previous section shows that even a brief discussion with end-users is of great interest for the development of a serious game that is truly user-oriented. We therefore believe that participatory design, or more in general the involvement of the users, must be taken into account for the design of serious games. Although it is difficult to discuss with them about technical details or even get valid user requirement (it s often repeated in the literature that the users struggle to express what they want), it is still important to understand their point of view. Ignoring this different perspective on the problem could lead to the development of a product that can be perceived as a "push on the market". We need to prevent the development of a serious game justified by the presumption that they are the evolution of education.

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