

Chapter 7

A Pilot Project to Teach Road Safety Using Desktop Virtual Reality

Emmanuel Fokides

University of the Aegean, Greece

Costas Tsolakidis

University of the Aegean, Greece

ABSTRACT

In this work the issue of road safety education is presented. Virtual Reality can be used for this purpose with very good results. An application was developed based on a 3D video game. This application was simulating the environment of a town with traffic and contained not only all of its elements (cars, traffic lights, pedestrian crossings) but also special conditions such as night and rain. It was developed to simulate the walk of a pedestrian and could accommodate many users simultaneously. It was tested by the students of the last three grades of a primary school in Athens. The acquired capabilities of the students/users were compared with the equivalent capabilities of students that had training in the class using printed material only and with the knowledge of another group that had no training at all.

INTRODUCTION

The University of the Aegean is a university network with departments in five islands and offices in Athens. It is a state university with 14,000 students in all its 16 departments. It is a fast growing university with many postgraduate courses. The department of Education sensitive to the challenges of the area it operates, is developing know how that is not only to the benefit of education but also to the benefit of society. Therefore, all forms of distance

education (synchronous, asynchronous, satellite, etc) are examined and researched, while applied extensively. Also nearly all forms of Virtual Reality are studied and applied not only in education in general but also to the remote schools of Greece, Europe and beyond.

SETTING THE STAGE

Road safety education can play an important role in the overall reduction of traffic related accidents, especially if it is introduced in early childhood

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(Thomson, Tolmie, Foot, & McLaren, 1996). This fact is identified by policy makers and relevant actions are introduced either in the school curricula and/or in the wider frame of a national policy for road safety. While the above holds true for many industrialized as well as developing countries (UK's Department for transport [DfT], 2003; New Zealand's Ministry of Transport, 2002; Road Safety Cambodia, 2008), in Greece, a country with a severe problem regarding road safety, very little is done. Whilst the government pledged that road safety education is going to be systematically taught in primary and secondary schools, the recent educational reform disproved all expectations.

Evidently, the lack of a specific teaching framework and didactic material is a fertile ground for any research group interested in developing and testing innovative techniques for teaching road safety to young students. We decided to address the subject using a 3D simulation, a Virtual Reality (VR) application, rather than a typical 2D application. The main reasons for this decision were the unique characteristics of VR applications, as they: i) allow training in a manner very close to real traffic conditions ii) permit the simulation of traffic situations that are very complicated to be presented in reality or extremely dangerous for students to be exposed to, iii) have a playful character similar to modern computer games and iv) provide the possibility to implement different teaching techniques (Fokides & Tsolakidis, 2008).

CASE DESCRIPTION

In our case, the task of creating a certain type of computer application was not that of converting the existing educational material in another form, since such material is non-existent. Consequently, we set the teaching objectives, determined the teaching methodology and we wrote, collected and modulated the teaching material. Furthermore,

we considered the following conditions of great importance:

- *Effectiveness*: Students should be able to learn a practical piece of knowledge and apply it in their everyday life;
- *Accessibility*: A large number of students should be able to access and work with it. Since schools are not equipped with high-end computers, the application should be lightweight enough in order to run smoothly in mid-range or even low-end computers;
- *Compliance*: The school life should not be disrupted with time consuming activities that will affect an already congested timetable and curriculum; and
- *Cost*: Not to have significant cost regarding its development.

To form the instructive framework, the necessary knowledge, dexterities and behaviors which would enable children to a safer conduct in the street environment were determined. These are: i) orientation in space and the detection of traffic, ii) detection and the evaluation of dangerous situations, iii) evaluation of the vehicles' distance and speed and iv) synchronization of perception and movement as well as the co-ordination of information from various directions (Fokides & Tsolakidis, 2008).

The decisive factors for the success of any road safety education program are the active participation of students in the educational process and the extensive practice of what they learned. The active attendance during the training process is very well documented by the learning theories that stress the importance of social interaction and interactive learning (Piaget, 1985; Vygotsky, 1978). Documentation on the value of practice in pedestrian skills is rich, since it provides children with a concrete and tangible frame in which they can apply concepts that orally or written are difficult to comprehend and follow (DfT, 2002; Sandels, 1975). The resulting teaching methodology that is

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