

# Chapter XIII

## Wireless Collaborative Virtual Environments Applied to Language Education

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### ABSTRACT

*This chapter provides an overview of second language learning and an approach on how wireless collaborative virtual reality can contribute to resolving important pedagogical challenges. Second language learning provides an exceptional opportunity to employ mobility and multimedia in the context of just-in-time-learning in formal learning situations, or ubiquitous and lifelong learning in more informal settings. We hypothesize that virtual reality is a tool that can help teach languages in a collaborative manner in that it permits students to use visual, auditory, and kinesthetic stimuli to provide a more “real-life” context, based in large part on Computer-Supported Collaborative Learning. Studies are being conducted in which we assess usability, wireless multimedia technology, and collaborative learning aspects to discover how virtual reality can help students overcome language and anxiety barriers. Furthermore, we suggest carrying out longitudinal studies to determine to what extent wireless, mobile, and collaborative virtual reality can contribute to language instruction.*

### INTRODUCTION

The concept of education has greatly evolved over the last 30 years. Traditionally, the educational setting was confined to the classroom, libraries, or specific spaces set aside at home for doing homework. Technology, however, has significantly changed educational practices and has helped expand the confines

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of the classroom. Today, instructional settings are no longer limited to the physical structure defined by walls, and the time for learning is no longer limited to the school day or traditional times set aside for study and homework.

Wireless technologies provide information and learning opportunities for people, regardless of when or where they are physically located (Wagner, 2005). Different modalities of mobile learning such as just-in-time-learning offer dynamic, flexible learning opportunities on demand, according to the individual needs of the learner (Johnson & Johnson, 1994). Consequently, wireless network technologies, combined with information retrieval systems and multimedia applications, will soon provide an interesting option for lifelong learning. As wireless mobile devices become increasingly smaller and more powerful, they contribute to ubiquitous learning, which is one of the most common, effective, and persistent forms of learning (Holzinger, Nischelwitzer & Meisenberger, 2005).

Second or foreign language learning provides an exceptional opportunity to combine the elements of mobility and multimedia in the context of just-in-time-learning in formal learning situations, or ubiquitous and lifelong learning in more informal settings. Also, because learning and producing language depends on extensive and varied sensory input, virtual reality (VR) and future mobile delivery services represent a combination of technologies that can meet learner needs, based on sound pedagogical and technological foundations.

## **TRADITIONAL MULTIMEDIA**

Multimedia has been used in education almost since the introduction of personal computers in classrooms and households. This technology can be defined as the combination of media elements of video, audio, images, text, and graphics in an interactive computer interface (Mishra & Sharma, 2005). Since the early 1990s, educational multimedia programs have been distributed using CD-ROMs, and more recently, the World Wide Web has become a powerful and practical way to distribute educational multimedia content in quasi-real time to a worldwide audience. Another reason is that Web-based multimedia learning offers synchronous, or real-time (e.g., audio and video conference, instant text messaging) and asynchronous, or non-real-time (e.g., e-mail, blogs, discussion forums) collaboration between students. Regardless of whether they are located in the same classroom or in different parts of the world, persons can communicate and share media content such as images or sound files (Shirmohammadi, El Saddik, Georganas & Steinmetz, 2001).

A number of research institutions around the world have developed and tested networked collaborative virtual environments since the early 1990s (Carlsson & Hagsand, 1993; Macedonia, Zyda, Pratt & Barnham, 1994). Until recently, however, there was insufficient computer and network power or adequate codification-decodification algorithms (codecs) to carry out smooth communications and immersion of participants in CVREs. Therefore, the result until recently has been a trade-off between realism and speed, as well as limited modality interactions that have focused almost exclusively on the exchange of visual and auditory information.

## **VIRTUAL REALITY ENVIRONMENT**

Virtual reality (VR), a computer-based technology capable of generating a 3D space (also called virtual environment) that is multisensorial, interactive, and integrally engages its users (Vince, 2004), is today

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