

# Chapter 48

## Second or Foreign Language Learning With Augmented Reality

**Aubrey Statti**

*The Chicago School of Professional Psychology, USA*

**Kelly Torres**

*The Chicago School of Professional Psychology, USA*

### ABSTRACT

*The following chapter will discuss the impact of technology use and mobile learning, specifically augmented reality (AR), in the process of learning a second or foreign language, namely English and Spanish. The chapter will begin with an overview of AR and then include a discussion of the theoretical framework, language learning contexts, as well as AR tools and applications in the process of second or foreign language learning. An overview of the benefits of AR in language learning will also be included, as well as an introduction to AR applications and specific AR systems, platforms, and case studies in language learning. The research will also provide a discussion of the challenges of using AR in language learning contexts, including specific attention to challenges with AR and learning, AR and language learning, and mobile learning as a whole. The chapter will conclude with final thoughts from the authors in terms of potential areas of AR development that are in need of further attention.*

### INTRODUCTION

The advancement of wireless applications in addition to the wide-spread use and popularity of mobile devices have contributed to the development of technological opportunities and advantages in learning (Ho, Hseigh, Sun, & Chen, 2017). Research indicates that while in the past the role of technology was still under evaluation, presently the case for the inclusion of technology in the classroom has been clearly made and therefore technology in learning is here to stay (Hoopingarner, 2009). As Holden and Sykes (2011) best stated: “in moving forward, it has been come increasingly necessary to redefine what it means for our students to learn and do, as well as simultaneously find new ways of trying to understand when

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and how this transformation takes place” (pp. 2-3). Additionally, as Godwin-Jones (2011) explained, “learning becomes more real and permanent when tied to learners’ lives outside the academic environment. Mobile devices are a great way to achieve that goal” (p. 8).

The following chapter will discuss the impact of technology use and mobile learning, specifically augmented reality (AR), in the process of learning a second or foreign language, namely English and Spanish. The chapter will begin with an overview of AR and then include a discussion of the theoretical framework, language learning contexts, as well as AR tools and applications in the process of second or foreign language learning. An overview of the benefits of AR in language learning will also be included, as well as an introduction to AR applications and specific AR systems, platforms, and case studies in language learning. The research will also provide a discussion of the challenges of using AR in language learning contexts, including specific attention to challenges with AR and learning, AR and language learning, and mobile learning as a whole. The chapter will conclude with final thoughts from the authors in terms of potential areas of AR development that are in need of further attention.

## **Overview of AR Technology**

With the current advancement of various technology tools and applications used in the field of education, an emphasis has been placed in the engagement of the learner through these platforms. Mobile learning (m-learning) utilizes mobile computing technologies, such as phones and tablets, in order to enhance the learning experience anytime and anywhere (P.L. Liu, 2014; T.Y. Liu, 2009). Augmented reality (AR) is a specific tool of engagement through mobile learning that is currently trending in education and therefore in need of more research and review.

## **Historical Use of AR in Industry**

Although in some professional contexts, such as the military, AR tools have been utilized for more than 50 years, AR has only more recently been made available for the broad public (Sommerauer & Muller, 2014). Movies and science fiction have utilized AR-like technology as far back as the 1980s in films such as *The Terminator* (1984) and *RoboCop* (1987). However, Tom Caudell, a researcher for The Boeing Company (Mullen, 2011), did not officially coin the term until 1990. As Mullen (2011) explained in his description of the history of AR, “Caudell and his colleagues at Boeing worked on developing head-mounted display systems to enable engineers to assemble complex wire bundles using digital, AR diagrams superimposed on a board over which the wiring would be arranged” (p. 3). AR has developed tremendously since its onset and has become a tool used by individuals at a variety of ages, experience and education levels, and professional status. Currently, the advances in m-learning have allowed AR tools to be available to anyone with access to a mobile camera, GPS, and Internet access (Sommerauer & Muller, 2014). AR has also recently become popular in the fields of: advertising, travel and tourism guides, navigation and city guides, architecture, medicine, translation, marketing and sales, entertainment and games, and social networks (Cabero & Barroso, 2016).

## **Definitions and Uses of AR**

Azuma (1997) defined AR as the technological blend of real world and virtual images through real-time interaction. AR technology allows for the use of 3D objects, 2D images, videos, and animations and

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