Chapter 1
Learning With Avatars:
Exploring Mixed Reality Simulations for Next-Generation Teaching and Learning

Kristin M. Murphy
University of Massachusetts – Boston, USA

Jon Cash
Bridgewater State University, USA

Janna Jackson Kellinger
University of Massachusetts – Boston, USA

ABSTRACT

Similar to flight simulators used to train airline pilots prior to flying an actual airplane, mixed-reality simulations allow students to practice behaviors expected in their future career. In this chapter, we present mixed reality simulations as a tool for next generation teaching and learning in college classrooms based on a review of the research and our own practice using mixed reality simulations in teacher preparation courses. First, we will define mixed reality simulations and present a review of the literature. Next, we will engage in a discussion of the ways in which we have utilized mixed reality simulations in in our college-level instruction for students preparing to become teachers. Then, we will discuss potential opportunities and applications for mixed reality simulations in coursework beyond teacher education. Finally, we will discuss challenges and implications for future implementation of mixed reality simulations in coursework for next generation teaching and learning.

INTRODUCTION

Across many college courses, students have the opportunity to engage in role-play activities grounded in scenarios with their peers that they are likely to encounter in future internships or careers. There is a long and varied collection of multidisciplinary research supporting role-play as it can change behavior, attitudes, and knowledge as learners practice complex situations in a safe environment with their peers that presents little to no real-world consequences (Storey & Cox, 2015).

However, role-play activities can present challenges. In traditional role-plays where are all of the roles are played by fellow students, interpersonal issues can make the experience more difficult. A student can simplify things for another student in order to achieve social desirability, or conversely, can make a role play too difficult. In addition, having a student pretend to be someone who is of a different ethnicity or other characteristics (e.g. having a white male student role-play as a black female) may risk that student coming across as portraying stereotypical or even offensive behavior.

Mixed reality simulations represent an alternative to traditional role-play activities. Similar to flight simulators used to train airline pilots prior to flying an actual airplane, mixed-reality simulations allow students to interact with avatars, i.e. computer animated characters controlled by humans, in order to practice behaviors expected in their future career. In mixed-reality simulations, the avatars respond to the students in real-time, which allows for rich and meaningful interactions that agent-based (computer animated characters controlled by algorithms or artificial intelligence) simulations lack. In this way, mixed-reality simulations provide a middle ground between agent-based simulations and reality. In doing so, mixed-reality simulations allow students to get realistic practice in a risk-reduced environment. In having students role play with avatars instead of with peers, the potential for awkward interpersonal issues that may affect the role play objectives are no longer an issue.

Researchers have begun to examine the benefits of mixed-reality environments for teacher preparation (Hughes, Nagendran, Dieker, Hynes, & Welch, 2015) as an alternative to role-playing and as an intermediary step that allows teacher preparation candidates to practice their newly learned skills with student, parent, and school staff avatars before they actually begin work in a teaching internship or career. This next generation teaching and learning tool provides a unique opportunity for practicing newly learned skills before stepping into a school and being tasked with the roles and responsibilities teachers hold in their work with students, colleagues, and parents.

In this chapter, we present mixed reality simulations as a tool for next generation teaching and learning in college classrooms based on a review of the research and our own practice using mixed reality simulations in teacher preparation courses. First, we will define mixed reality simulations and present a review of the literature. Next, we will engage in a discussion of the ways in which we have utilized mixed reality simulations in in our college-level instruction for students preparing to become teachers. The pros and cons of each method will be discussed. Then, we will discuss potential opportunities and applications for mixed reality simulations in coursework beyond teacher education. Finally, we will discuss challenges and implications for future implementation of mixed reality simulations in coursework for next generation teaching and learning.

BACKGROUND

Defining Mixed Reality Simulations

A mixed reality simulation provides an opportunity for preservice teachers to practice what they are learning before stepping into a classroom and providing live instruction. It removes the potential for harm to living, breathing students and creates an environment where novice pre-service teachers can not only take risks, but can also risk being "seen as weak or insecure" without being in front of "an actual classroom full of students" (Hughes et al., 2015, p. 135). Mixed reality environments differ from strictly virtual environments. Virtual environments are defined by pre-programmed responses and behaviors

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