

Chapter 12

Augmented/Virtual Reality Technologies and Assistive/ Humanoid Robots: Students With Autism Spectrum Disorders

Leila Goosen

 <https://orcid.org/0000-0003-4948-2699>
University of South Africa, South Africa

ABSTRACT

The purpose of this chapter is to provide readers with a literature review of the latest research with regard to augmented reality (AR) and virtual reality (VR) technologies, as well as assistive and humanoid robots, for especially differently abled students, who have been diagnosed with autism spectrum disorders (ASDs). While introducing and describing the general perspective of the chapter as specifically focusing on objectives in terms of students with ASDs, background that summarizes the content of this chapter as also consisting of significant results from certain earlier work and/or with regard to young children, adolescents, adults, and/or older people, as well as references in terms of research related to other connected conditions, will also be offered where applicable. Problems and challenges in this regard are presented, together with possible solutions and recommendations, future research directions, and concluding remarks.

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INTRODUCTION

This first section will describe the general perspective of the chapter and end by specifically stating the objective of the chapter.

In higher education systems, equal importance must be given to differently abled students. But not all educational institutions have the infrastructure to admit these students. There are many *services* and financial assistance available to such students. New assistive technologies are making teaching learning processes much easier for these students. Not only differently abled students, but also socially and financially deprived students need support and help to overcome their **problems** in taking to higher education. While using new technologies, like e-learning and blended learning, in the education system, these students might need special attention, as well as some advanced training and additional features, for them to become familiar with such technologies. This chapter could serve as a ready reference for higher educational institutions to implement effective assistive technologies and other related *services* to provide differently abled students with a quality and equal education, enabling them to excel in their fields and find suitable employment.

This chapter will contain the latest research with regard to Augmented Reality (AR) and Virtual Reality (VR) technologies, as well as assistive and humanoid robots, for especially differently abled students, who have been diagnosed with autism spectrum disorders (ASDs). Certain earlier work, as well as references in terms of research related to children, adolescents, adults and/or older people, will also be offered, where applicable.

The chapter extends recent work by Goosen (2020), which provided an overview of how research on technology-supported teaching and learning and Information Systems (IS) are opening new worlds for those with autism spectrum disorders (Goosen, 2019a); (Goosen, 2019b), as well as assistive technologies for children and adolescents with autism spectrum disorders (Goosen, 2022).

“Diversity is one of the main characteristics of modern societies. To be teachers and trainers, it is necessary to use all” possible tools to respond to differently abled students (Lorenzo, Lorenzo-Lledó, Lledó, & Pérez-Vázquez, 2020, p. 99).

“Over one billion people in the world” can be classified as being differently abled. “Nevertheless, according to the World Health Organization”, students, who are differently abled, “are particularly vulnerable to deficiencies in *services*, such as health care, rehabilitation” and support. In the field of electronics, Martinez-Martin, Escalona and Cazorla (2020, p. 1) therefore provided an overview of socially assistive robots for older adults and people with autism.

Students with autism and/or who are otherwise differently abled struggle with acquiring and appropriately using “social skills to improve the quality of their lives. These critical skills” could be difficult to teach, as these “are context dependent

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