

## Chapter 16

# Technology for Gifted Students: Designing Learning Opportunities for Students With Disabilities

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### ABSTRACT

*This chapter proposes that software design using software with programming capabilities, such as Classroom Suite, is a good activity for gifted students to increase their science, technology, engineering, and mathematics (STEM) skills while designing appropriate learning activities for all students, including those with disabilities. The chapter describes design techniques that gifted students can apply during the development, offers as an example the design process for one of the authors' own Classroom Suite instructional games, and concludes with a description of several other games designed by the authors as further examples of the kinds of instructional software that gifted students can develop for students with disabilities using Classroom Suite.*

### INTRODUCTION

Standards and academic goals have been the focus of U.S. public education since George H.W. Bush introduced the Goals 2000 initiative (Walsh, 2019). As part of this initiative, each content area developed their own content standards that were replaced in 2009 by the Common Core Standards (Development Process: Common Core, n.d.). Today, most states in the United States are focused on these rigorous Common Core Standards that were developed by the Governor's Conference in 2009 (Development Process: Common Core, n.d.).

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Since 1997, students with disabilities have been required by the Individuals with Disabilities in Education Act (Heubert & Hauser, 1999) to be involved in the same standardized assessments as their general education peers. They have also been required to be considered for assistive technology which includes not only hardware but also accessible software (Mittler, 2007). The latter requirement, both hardware and software, can assist students with disabilities in doing their personal best on standardized assessments.

In recent years, the emphasis of instruction using academic standards in public schools has focused on Science, Technology, Engineering, and Math (STEM) education (Chen & Chang, 2018). The STEM effort of the last several years has led to the establishment of robotics clubs at many school districts for those students who are interested in extra STEM education. Many of these clubs hold frequent activities where they re-engineer battery-based toys to be accessible for students with disabilities via switches or other adaptive access (Atmakers, n.d.). These clubs provide project-based science activities in which interested gifted students can participate. Project-based learning is an instructional technique that has been found to increase the achievement of gifted students (Mioduser & Betzer, 2008; VanTassel-Baska, et. al., 1998). Expanding the focus of these project-based robotics or engineering clubs to include programming activities to design accessible software for students with disabilities is a logical extension of the current disability adaptation activities of these clubs.

The focus of this chapter offers a way to expand this involvement of STEM-focused gifted students to include the creation of activities for students with disabilities. The chapter suggests the use of an accessible authoring program, *Classroom Suite* (Ablenet, n.d.) that includes tools to customize the software for a variety of disabilities. The authoring software and its accessible tools are described in this chapter. This chapter also provides a description of instructional design steps that are beneficial to create the software, including design suggestions for students with disabilities. Using these design steps, gifted students can design and create instructional software that works for students with disabilities. The chapter includes an example of this design process using one of the authors' designed instructional software programs, a program designed to reflect the Chinese culture and based on one of their Chinese games, and developed using Classroom Suite.

The chapter concludes with descriptions of fifteen Classroom Suite instructional games based on different ethnic groups' games that the authors developed, following the instructional design and development suggestions of this chapter. These descriptions offer further software ideas that serve as suggestions for STEM gifted projects.

## **CLASSROOM SUITE DESCRIPTION**

Classroom Suite is an authoring software that is designed to help teachers and students create activities that support general education instructional goals and curriculum that would also be accessible for students with disabilities. The program comes with built-in activities that can be used as they were originally designed or modified by the developer. Classroom Suite also includes a programming component to customize software as desired. For teachers, Classroom Suite includes the capability of tracking student performance on activities that are created by teachers.

The program was developed using the principles of Universal Design for Learning (Rose & Gravel, 2010), which means that Classroom Suite's authoring tools include the ability to design activities for meeting the needs of learners with disabilities. For students with learning disabilities, the program provides text-speech synthesis with voices that read in a variety of languages, such as English, Spanish,

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