Understanding STEM Education and Supporting Students Through Universal Design for Learning

The purpose of this article was to provide a basic understanding of STEM education and how to deliver this information to a diverse group of students. There is a national focus on STEM, but it seems that only general education students are being exposed to the content. The authors found that students with disabilities struggle with STEM content. There is an increase number of science, technology, engineering, and mathematics jobs in the US specifically designed for students with disabilities. Many of students with disabilities are high capable to perform the tasks, but the students do not take the initiative to follow the STEM careers after high and college. Teachers and researchers are diligently working to find a tool to engage and meet the needs of all students. The universal design for learning (UDL) framework is used to promote the STEM content. This framework allows teachers to meet the needs of a diverse group of student learners.

In order for the STEM education to be appropriate for all students, teachers must understand the content, students learning needs and problem solving abilities. It is recommended that teachers understand and use UDL to provide an engaging STEM environment. STEM education promotes higher levels thinking instead of the traditional recalling facts science class. It seems as if students with disabilities would struggle to understand STEM curriculum, but this is not true. Teachers must activate prior knowledge and scaffold information to meet the needs of the students. Doing this will allow student to use this information to problem solve. Teachers must also understand that STEM has an interdisciplinary approach. It should not only focus on the main areas of science, technology, engineering, and mathematics. Basham & Marino recognized that the hardest part of the STEM is the engineering part of the curriculum. It is recommended that, “Teachers focus on 3 areas of engineering: engineering design; developmentally appropriate knowledge and skills for mathematics, science, and technology; and the adoption of engineering ‘habits of mind’ ” (9).

Engineering design focuses on problem solving and finding solutions to problems. Teachers have to keep the design of their instruction in mind. Student should be engaged in many STEM exploration activities and job shadowing experiences. Engineering habits of mind are essential to the overall STEM curriculum. Students should use graphic organizers to relate concepts to the world and their own lives, develop and enhance creativity, develop the want/ability to problem solve, work with others, communicate their ideas effectively, and think ethically through all experiences.

Reflection

The article provided an in depth understanding of the STEM curriculum. I have read many articles about STEM education, but this was the first that provided specific strategies to teach the curriculum. I can see STEM fitting in well with the IB framework that is used in my school. We already use the UDL framework when planning our inquiry planner/units. I have always struggled to envision the engineering portion of STEM within IB, because we focus on projects already. I realized that engineering doesn’t just focus on the building and designing of things. The engineering comes alive when students have to problem solve and find solutions. These skills could be effectively used in my classroom. For example we teach a Social Studies unit about Ancient Greece. We often have trouble with integrating science into this unit because of the heavy government content. In this same unit students learn about the influence of Greek architecture in the US. We talked about allowing students to build different building with aspects of Greek architecture, but it would take too long. It is apparent that students need the time to problem solve and come up with solution to these problems. After reading this article I also reread my grade level standards and found the habits of mind standards. I was pleasantly surprise to see any components of the engineering habits of mind found in the article were also reflected in our state standards. Maybe we are evolving!