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DESIGNING STEM LEARNING USING THE BSCS 5E INSTRUCTIONAL MODEL

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Synopsis:

Although many educators are interested in implementing STEM, they often are unsure how to get started. This paper will share how a middle school teacher and a university professor collaborated to use the BSCS 5E Instructional Model to develop and teach a design unit to 8th-grade students. This paper suggests that using the 5E Instructional Model is an effective strategy to design, adjust, and personalize STEM curriculum.

Designing STEM Learning Using the BSCS 5E Instructional Model

In recent years, STEM education programs in elementary and middle schools have gained popularity and national attention as a way to foster the growth of the next generation of students in STEM disciplines. However, most teachers have not had training in crafting STEM learning highlighting the need to identify best teaching practices for planning a STEM sequence of instruction. Thus, the authors investigated the potential of the BSCS 5E instructional model as a method to plan, adjust, and facilitate STEM instruction.

The BSCS 5E instructional model is based on a constructivist view of learning and is made up of five phases including engaging learners, exploring phenomena, explaining phenomena, elaborating concepts, and evaluating learners. The original purpose of the model was to provide teachers with an instructional sequence to strategically teach elementary science (Bybee et al. 2006; Bybee 2014). The instructional model is a good fit for designing STEM curriculum. It is a student-centered approach in which students are guided by the teacher to explore topics or problems, explain ideas in their own words, and generalize concepts to a larger context. These skills translate well to STEM learning in which the teacher adopts a facilitator role, guiding students to dig into hands-on activities, tackle real world challenges, and design creative, innovative solutions (Jolly 2017).

This paper describes how the BSCS 5E instructional model was used to plan and teach an 8th grade 3-week STEM unit on assistive technology. The 5E framework led the authors to strategically use free educational technology tools and hands-on activities in an effort to prompt learners to practice the design thinking processes of empathy, ideation, and prototyping. The result was a technology-rich unit in which learners utilized everyday materials to design an assistive technology prototype that solves a real problem faced by individuals with a disability. In the culminating activity, learners presented their idea in the form of a modified Ignite Talk. The web-based technology applications included WatchKin, EdPuzzle, GoSoapBox, Appear.in, Wireframe.cc, Seesaw, and Google Slides. Some of the technology was used by the educators to guide instruction while other technology tools were used by learners to explain their thinking. In conclusion, our experience suggests that using the BSCS 5E instructional model is an effective strategy to design, adjust, and personalize STEM curriculum.

References

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