

K-12 STEM Summer Institute

There is an engagement crisis in schools today. Students appear to be less motivated and interested in learning. It is reported that there is a feeling among some students that school is irrelevant, with a lack of connection between learning and real-world applications.

In the book *Education*, p. 265, Ellen White states, “Life is too generally regarded as made up of distinct periods, the period of learning and the period of doing—of preparation and of achievement. In preparation for a life of service the youth are sent to school, to acquire knowledge by the study of books. Cut off from the responsibilities of everyday life, they become absorbed in study, and often lose sight of its purpose.”

A number of educators have been addressing solutions for this concern. Several advocate adopting an approach that embraces three phases of learning: (1) “Knowing That” or Surface Learning with an emphasis on acquiring knowledge and skills; (2) “Knowing How” or Deep Learning with an emphasis on making connections, analyzing, and synthesizing information; and (3) “Knowing With” or Transfer Learning with an emphasis on applying the knowledge and skills in new and more complex contexts.

Based on the identified concerns and potential solutions, the SWUC Office of Education organized a K-12 STEM Summer Institute in July featuring a problem-based approach to learning. Problem-based learning, alternately referred to in some contexts as project-based learning, incorporates the three phases of learning as outlined above. “Design Thinking” is employed as the vehicle to accomplish this goal with an emphasis on the identification of a problem, the generation of solutions, and the building and then testing of a prototype to solve the problem.

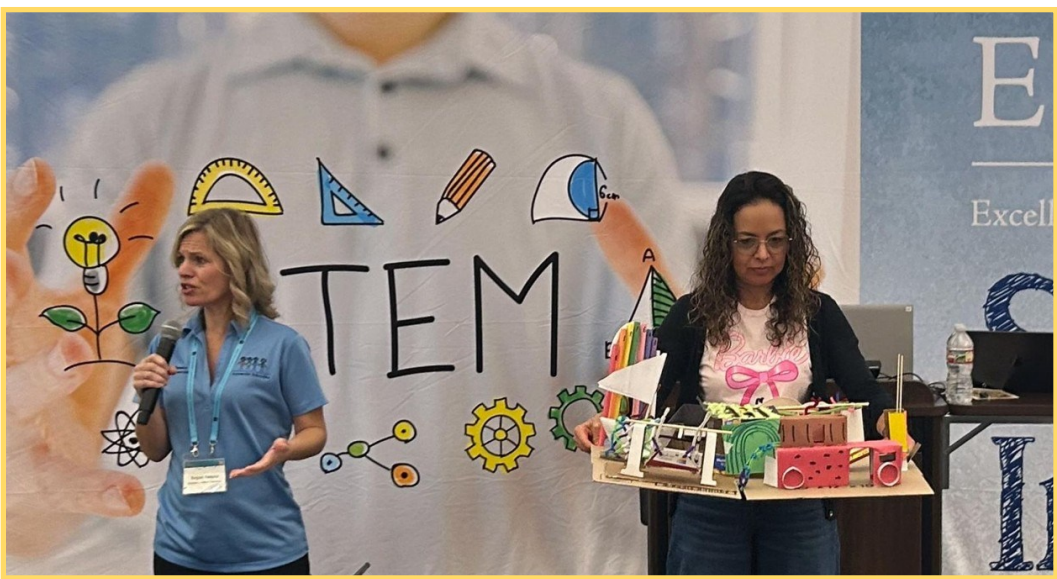


Robert Henley, Director of Innovation for Florida Conference and Associate Director of EXSEED, served as the facilitator of the Institute. Educators were involved in activities that not only developed their knowledge and skills but encouraged them to dive deeper into the design process through the use of analysis and synthesis strategies. Ultimately, they were involved in collaborative groups to transfer these strategies to real-world problems.

The K-6 grade teachers focused on designing a playground for handicapped students. Using construction paper, cardboard, pipe cleaners, etc., they designed a model that accommodated various types of physical disabilities. The 7-12 grade teachers focused on designing a device to address “Pusher Syndrome,” a balance condition resulting

from a stroke. Using a Micro:bit microcontroller and block coding, they designed a prototype for a wearable medical device that assisted with balance.

“Design Thinking” not only reinforced the three phases of learning but also strengthened the Portrait of a Graduate competencies that students should possess upon graduation. The Portrait includes broader outcomes such as collaboration, critical thinking and problem solving, creativity and innovation, communication, etc.



Problem-based learning is a potential solution for the disengagement of our students. Through this approach, they are exposed to experiences that make learning meaningful and relevant to their lives.