Chapter 8
Stepping Stones to STEM:
One School's Journey to Revamp and Revitalize the STEM Curriculum

Adriana M. Guerra
https://orcid.org/0009-0004-3044-489X
Ventura Unified School District, USA

ABSTRACT

Using a reflective narrative, the author shares her experiences building a STEM curriculum in a small public Title 1 elementary school. The author breaks down the multiyear process by sharing significant steppingstones that led to the most current project, a tinker structure. The author shares the successful and challenging experiences of the undertaking and cautions of possible pitfalls. The author concludes with recommended processes for readers to consider revitalizing their STEM curriculum.

INTRODUCTION

This chapter shares the experiences of a small public elementary school teacher-leader as she worked to create a curriculum incorporating STEM learning experiences. The work to reinvent the school's STEM curriculum began when the school was awarded a Magnet Schools Assistance Program (MSAP) grant. From the funds awarded, supplies were purchased, but not utilized to best meet students' needs. Years later, the new school administrator sought out a teacher leader with the know-how, energy, and drive to reinvent the STEM experiences for students at the K-5 school. The objectives of the chapter include illuminating the process of revitalizing and

DOI: 10.4018/978-1-6684-8551-4.ch008

reimagining a STEM curriculum, calling attention to some of the challenges of the process and suggesting ways in which other schools may create similar learning opportunities.

BACKGROUND

A child's learning experiences in elementary school can be a powerful driver in shaping a personal identity and a foundation for future learning. Elementary school science education plays a crucial role in developing students' scientific literacy and critical thinking skills. Darling-Hammond calls for a holistic, integrated approach to instruction that connects home, school, and community (2020). The integration of foundational skills, growth mindset, self-efficacy, and instructional design all play a part in creating learning environments that allow students to develop and deepen conceptual understanding (Cantor, Osher, Berg, Steyer, & Rose, 2018). Hands-on, authentic experiences that capture students' curiosity and inspire exploration are fundamental strategies that allow students to engage with the subject matter in a meaningful way, leading to deeper understanding and increased retention. Science, technology, engineering, mathematics (STEM) based lessons, elevate learning experiences by allowing opportunities for creativity, critical thinking, and productivity (Kazu & Kalcin, 2021).

Teaching STEM-based lessons, while impactful, can be daunting for teachers who are elementary generalists (Goodnough et al., 2014). However, when teachers are bolstered with strong collegial working relationships, they may feel empowered to share their areas of expertise and, collectively, share a willingness to take risks (Eckert & Butler, 2021). Further, the actual doing of science supports both confidence and interest in doing more hands-on science (Docherty-Skippen, Karrow & Ahmed, 2020). Getting started, and working with trusted colleagues, can be a solid foundation for leading impactful STEM experiences. Acknowledging the need for a more robust and meaningful STEM curricular experience, the United States Biden-Harris Administration created the *Raise the Bar: STEM Excellence for All Students* initiative with the aim of strengthening Science, Technology, Engineering and Mathematics education nationwide (U.S. Department of Education, 2022). Among other ideals, the initiative aims to, "Ensure all students from PreK to higher education excel in rigorous, relevant, and joyful STEM learning" (U.S. Department of Education, 2022, para 3).

In 2019, for the first time, more than half of the nation's population under age 16 identified as a racial or ethnic minority. Among this group, Latino or Hispanic and Black residents together comprise nearly 40% of the population (Frey, 2020). Consequently, broadening the participation in STEM experiences by creating more