Chapter 19

Implementation of STEM at the District, School, and Classroom Level

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ABSTRACT

At the district level of a school system, there are immense pressures to add value to the community as a whole. This is achieved through high test scores, graduation rates, and the production of a vital workforce that will propel the community financially. This is a daunting task when the rate of information growth is increasing exponentially faster than educators can adapt. Offering STEM education is an effective means of meeting this demand. This chapter will outline steps that will facilitate the implementation of STEM throughout a school district, school, and classrooms.

INTRODUCTION

Felicia Strayhorn, Ed.S.- Greene County Schools School systems are held responsible for producing a quality workforce that will sustain and increase the economic health of the community. This is a daunting task when the rate of information growth is increasing exponentially faster than educators can adapt. Offering STEM Education is an effective means of meeting this demand. This chapter will outline steps that will facilitate the implementation of STEM throughout a school district, school, and classrooms.

At the district level of a school system, there is immense pressure to add value to the community. Some see this as the job of teachers and define value in terms of high test scores, graduation rates, and the production of a vital workforce that will propel the community financially. This pressure to enhance the community through the local education agency is a daunting task when the rate of information growth is increasing exponentially, faster than educators can adapt. Moreover, school districts cannot thrive without healthy revenue from property taxes; therefore, communities must sustain growth in employment in order to increase housing growth and education funding. This growth model makes the school district the foundation for the financial health of the community. Findings from a longitudinal study suggest that
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42–44% of students that participate in Science, Technology, Engineering, and Math (STEM) in school have intentions to pursue a STEM-related career, which is double the national average for high-school graduates (Franco, Patel, & Lindsey, 2012). So, how does one convince district-level decision-makers to change the “tried and true” curriculum to include STEM Education? One way includes supporting a mind shift from the goal of high graduation rates to goals that seek to help all students graduate career- or college-ready, through STEM education that supports the needs of local business partnerships.

These business and education partnerships serve as the foundation for transforming school districts, and consequently the culture of the community, from the ground up. These transformations are necessary for states to respond to future educational and employment needs. The U.S. Department of Labor reported 8.8 million STEM-related job openings in May 2016 (Schiraldi, 2014). In my state of Tennessee, state employment predictions address the need for STEM occupations.

Tennessee will experience a robust growth of STEM occupations over the next several years. In 2012 there were 252,000 STEM employees. This level will increase to 295,000 in 2022. The 43,000 additional STEM jobs will account for 11% of the jobs added in the state through 2022. Additionally, STEM occupations are projected to increase at a more rapid rate than for all occupations in Tennessee. New STEM jobs as a whole are expected to grow at an annual rate of 1.6%, whereas on average all new jobs are expected to increase at an annual rate of 1.2%. Even more, healthcare STEM employment will increase by approximately 2% annually. (The Demand for STEM Occupations in Tennessee, 2014).

Thus, the education system must be prepared to meet the needs of the future labor force of its local communities. One problem with meeting these needs resides in the lack of resources and specific knowledge of the job requirements. Therefore, the local school district should initiate partnerships between school systems and STEM businesses that will foster communication about the needs of the businesses and the needs of the school system, to create a bridge that can sustain both entities. Educators are experts in teaching general education, but often they lack instruction about specific science or math concepts required in the local job force. Conversations between the two entities enable educators to understand the needs of the workforce, and the STEM professionals and businesses to learn how to foster and support the learning process in partnerships with the school system. Operationally, in one district where such conversations happened, career experts became guest speakers within the classrooms and laid the foundation for the learning that students will experience once they are in the workforce. These same career experts also partnered with the system STEM Instructional Coach to provide professional development for educators and administration, about the science or math concepts that educators could address with students. Businesses also helped teachers to understand problems or projects that their employees face daily. In the remainder of this chapter, ideas about how to provide such support to educators and administrators will discussed.

The beginning of this chapter established the importance of and the need for high-quality district-level professional development that builds teacher capacity. Educators need help to understand how to shift their instructional strategies from compartmentalized subjects to an integrated, authentic approach. This section argues for a district-level Instructional Coach who leads this professional development and works closely with teachers to develop their capacity in STEM learning. This STEM learning happens when a District Instructional Coach facilitates: