Chapter 1
INTRODUCTION

With the demand for skilled students to fill critical shortage science, technology, engineering, and mathematics (STEM) careers, STEM has been a major initiative across the United States for a number of years. Creating innovative and engaging ways to interest students in STEM has also been a challenge that many school systems, educators, and community groups have attempted to address. As a result interdisciplinary facilities such as makerspaces, Fab Labs (Fabrication Labs) and STEM labs were created to stimulate innovation and increase interest in hands-on STEM that integrates content from all four disciplines. While simple in theory, these spaces present challenges and require significant planning due to the breadth of hazards and required safety expertise needed relative to all four STEM content areas. To realize the purpose of makerspaces, Fab Labs and STEM labs, one must first understand the educational history that led to the creation of these spaces.

Educational Movements and Standards Leading to Makerspaces, Fab Labs, and STEM Labs

Although the concept of integrating science, technology, engineering, and mathematics content has been practiced in some shape or form dating back to one-room schoolhouses, the term STEM did not become popular until the 1990's. The National Science Foundation (NSF) originally used the phrase SMET (the emphasis being on science and mathematics as signified by the order of the letters), but was later changed to STEM which NSF believed sounded better (Sanders, 2009).

The roots of STEM education can be traced back to the Progressive Education Movement from the 1890's to the 1950's. During this time, education sought to move away from traditional academic curriculum and replace it with a liberal education curriculum that educated the whole child. One of the most notable proponents of this movement was John Dewey, who believed education should be child-centered and supplement social experiences outside of school. In the late 1950's, the launch of Sputnik refocused American education on a more teacher-centered curriculum to close the gap in American students' science and mathematics knowledge deficiency compared to students in other countries. Educating students in mathematics and science was viewed as critical to helping America be the first to set foot on the moon. The 1960's and 70's experienced the Equity Reform Movement focused on providing equal educational opportunities to all children. At the close of the 1970's, the Back to the Basics movement was in full swing, shifting attention to students learning more content within a set of core subjects like math and science. By the 1980's, the Excellence Reform Movement was the new focus as America faced the realization of losing its global economic dominance. *A Nation At*