

Chapter 6

Look at What I Have Created!

5P Social Justice Model for Underrepresented Students in STEM

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ABSTRACT

This chapter addresses the underrepresentation of students of African descent and Latinx heritage by offering a model that supports inclusion into science, technology, engineering, and mathematics (STEM) pipeline via research competitions. The 5P Model is a social justice framework designed to redress the exclusion of underrepresented students by providing a support structure for success in research competitions. The model includes conducting research, performing a research experiment, creating a poster board presentation, writing the research paper, and the oral presentation. These elements develop research skills and strategies which are foundational for overall academic success and preparation for most career pathways. Drawing from a qualitative study of 120 middle school 6th and 7th grade students from a middle/high charter school in New Mexico, the data reveals evidence that, as self-efficacy increased, persistence and positive attitudes toward participation increased.

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INTRODUCTION

Background

When I started teaching in Chicago back in 1992 the 8th grade science teacher came into my classroom and said, “We do science fair here, so you have to get these kids ready”. I am a product of very good New York City public schools but had never been exposed to science fair. I quickly had to learn. I bought books on science fair, and I asked questions. I got involved in the regional science fair for Chicago and volunteered to help with set up and cleanup of the fairs. This allowed me to see the projects that came from the top schools in the city. I watched the judges and later I became a judge. The 5P model summarizes what I have learned over the years. I did this for one reason: I wanted all of my students to have the self-efficacy to compete and feel competent and prepared for the rigors of the competition!

From Science Fair to Research Expo and Competitions

The science fair competition as it is known today dates back to 1928 when the American Institute of New York City hosted the first research competition at the American Museum of Natural History (McComas, 2011). From 1921 the Society for Science began by providing research publications to inform the public but moved quickly to offering science education competitions. Today, this organization is sponsor to the globally recognized ISEF, the International Science and Engineering Fair (societyforscience.org, 2022). Through their yearly competition, ISEF brings students from around the world to share their research or engineering projects. Using the scientific method, students present data to validate their findings; engineering projects demonstrate innovation and solution to real world problems. From retinal fatigue to snails and the effects of climate change, the ISEF competition allows students to mimic the work of scientists by using their own curiosity to identify a problem, collect the data and share the results of their research findings (societyforscience.org, 2022).

Science competitions have expanded to include Science Olympiad, Rube Goldberg for engineering (Rube Goldberg, 2022), and Junior Science and Humanities Symposium (JSHS) which includes presentation on original research via a paper and presentation (Junior Science and Humanities Symposium, 2022). The aim of these competitions is to expose students to project based learning through hands-on investigations. These schoolwide projects are often excellent venues for students to develop cross-categorical skills. Teachers from various disciplines often guide students through the problem solving and strategy as they design, develop and implement their projects.

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