

Credentialing and Experimental Capital as a Method to Engage Urban Youth in STEM Outreach Activities

Although a large emphasis has been placed on broadening participation and opportunities in the STEM fields, there is still a huge under representation of minority and women students in these careers. This underrepresentation underpins a larger problem in the United States centered on our country's inability to attract students into STEM careers. This lack of engagement of the youth with STEM topics is an artifact of a mismatch for sources of capital between the providers (educators and scientists) and consumers (students) of STEM educational outreach.

Science is often seen as being intrinsically valuable and the youth can either accept or reject the offered engagement opportunity. Many present scientific outreach programs are extremely effective culminating STEM interest in the population of students who already possess this preexisting interest in STEM. This interest in STEM can be seen as a form of STEM educational capital, allowing the students who possess it to have successful educational outcomes. Urban youth however often are left unengaged due to lack of this traditional capital. In order to engage urban youth in STEM outreach it is necessary to move away from techniques that rely on traditional STEM capital. New forms of capital must be found and utilized to reach new populations.

One such new form of STEM outreach is focused on two new types of capital, credentialing and experimental capital. Credentialing capital is focused on leveraging preexisting shared interests between the educator and the students in order to facilitate an authentic connection between STEM topics and the students interest. Experimental capital leverages this authentic connection into hands on experimental work that is focused on the area of shared interest. This changes the role of the STEM material from the focus of the outreach into simply an effective tool to advance the students preexisting interest. In this manner student engagement is not predicated on pre-existing interest in STEM, it is instead predicated by an interest in an area in which the educator is credentialed in.

These new forms of educational capital were used this summer provide STEM engagement to 50 inner city high school students during a 5 week program called "The Science of Athletic Performance". By using sports as a context in which to use STEM topics, students were engaged with the material in an authentic and compelling manner. The students were broken into groups advised by graduate students pursuing their doctorates in Biomedical Engineering at Rensselaer who are "credentialed" by a passion for sports. Their shared interests allowed for a relaxed but immersive program where the students not only learned about how the human body worked in sports but also gained role models in the STEM fields.

By engaging students with outreach that is centered on shared interests where science is not the focus but a tool for understanding, more effective programming for urban STEM education can be created. Using the structure of experimental and credentialing capital other scientists can create effective outreach programs that engage diverse students without a pre-existing interest in STEM.