

iDiscover: Inspiring Youth to Pursue STEM

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Abstract

This program was an experiment started in 2011 to look into the ways that we can diversify the STEM pipeline by targeting a group of middle-school students in Baltimore, Maryland. We also introduced Information Sciences principles during our presentation, but were limited by the near-complete lack of understanding about Information Sciences by the students at this public school. We worked with several sources to develop a set of handouts and materials that we hoped would assist the students in pursuing STEM and Information Sciences in college. Surveys were administered to gather preliminary data on our efforts. We then created a Wiki (idiscover.wikispot.org) where further development of the project from other parties can continue.

Keywords: STEM, information, Pittsburgh, diversity, education

Research Question

How can we increase minority participation in Science, Technology, Math, Engineering (STEM), and Information Sciences (IS)?

Introduction

Students are often more enthusiastic about STEM when they are exposed to the field through group-activities (Rhodes et al. 2011). We feel that we are unique to the diversification efforts in Information Science because we are unique in bringing the IS & STEM focus earlier in the pipeline to reach children at a more critical age. We realized we needed a program that addresses needs of minority students such as economic concerns and a need for real-world and group experiences. We hoped to continue the Information Science field's efforts to gain inclusion.

We set out to design a program (we named iDiscover) that met the following goals:

- Provide information about scholarships.
- Provide information about tutoring services.
- Provide information about real-world activities related to STEM (Anakwe & Greenhaus, 2000).
- Encourage students to engage in STEM by providing literature on college requirements and career possibilities (Thiry et al. 2011).
- Build a curriculum around these findings, and created handouts for the students.
- Conduct a Pre/Post survey to gauge iDiscover's effectiveness.

Method

We first gave a presentation orienting the students with the nature of Information Sciences and STEM. We then connected this to real life examples by showing, in the presentation, jobs available for IS and STEM graduates, as well as how these jobs will grow in availability. We then discussed what Maryland colleges want to see from prospective students to make them competitive for STEM programs. After that, we provided resources on tutoring and financial aid to help the students achieve their goals.

We passed out the documents in person as well as posting them on a Wiki. We also provided them with a step-by-step path to college from 6th-12th grade, including admissions goals as well as academic and financial ones. We predicted that we would have at least a 50% increase in the intention to pursue mathematics, since we focused on the career possibilities of encouraging students to engage in STEM by educating them on college requirements and career possibilities the most (Thiry et al. 2011).

We also predicted that the interest in STEM would rise by at least 50%. We predicted that the rise in interest and knowledge about information sciences would rise by only 25%, since this was not covered as thoroughly in the presentation.

Process

Daniel Knopp, Clea Counts, and Olivia Green created a presentation to pitch the idea of a STEM program to the Baltimore City Public Schools (BCPS), looking to help refine the program and set target groups. The BCPS agreed with our findings from our interviews and research that 8th grade would be a good grade to teach this program. They stated that mathematics must be emphasized the most, because that is the biggest topic in city schools right now, so we adjusted the curriculum accordingly. Eventually we were placed with a middle school in southwest Baltimore for a 50-minute segment (one class period). We had built a curriculum for after-school and longer, so we simply consolidated the information. Daniel Knopp taught a selected group of 28 students who had applied to STEM charter schools, but did not get in. This was to show that we had a group who at least had some interest in entering a STEM discipline, but may have been discouraged by not getting into the STEM high schools.

Statistics from iDiscover

Qualitative Observations from iDiscover

- Conducted at a middle school: Located in inner city Baltimore. 54% Female, 46% Male.
- Very motivated set of students and staff.
- Some technology was archaic but still present.
- Students were most interested in financial aid and scholarships, intrigued by the summer programs. Very excited when distributing the resources we gathered for them.
- Some students had difficulty grasping the concept of Information Science. Became more interested when I spoke to some students individually about the interdisciplinary nature of IS.
- Held a discussion with the students where they suggested how information on social sites could be organized.
- School administration stressed that the students needed tutoring resources in mathematics.

Quantitative Results

Compared these two questions:

-Before completing the iDiscover Program, did you have a good understanding about STEM?

Compared with post survey (From pre-survey).

-After completing iDiscover, are you more aware of STEM and Information Sciences? (From post-survey)

- *Highly significant (.000).*

-Before completing the iDiscover program, rate how likely you were to pursue each of these majors in college?

Interest in Math had a *significant (.002)* increase. Interest in furthering reading comprehension skills also increased *significantly (.034)*.

-After completing iDiscover, rate how likely you are to pursue each of these majors in college?

-One questionnaire pair that approached being significant, but was not quite (.057) was the question related to pursuing a major in Information Science. There was almost a significant increase, given that higher scores mean more interest.

Question 3 on the post survey is the same as the pretest Question 4. (Are you interested in going to college after graduating high school?) This could be viewed as a check on reliability of the question. It also revealed a significant improvement in knowledge based on our training, significant at (.001).

Conclusion & Expansion

The middle-school was impressed with iDiscover and asked us to return and present the program to more students. In future presentations, we should focus on STEM more than Information Sciences because of an expected lack of education amongst middle school students in Information Sciences.

Several members of i3 cohort were interested in using the gathered materials for their own versions of the program in the U.S. Virgin Islands and Pittsburgh public schools.

In the future, we should expand to cover Information Sciences more thoroughly. We could look at studies detailing STEM outreach efforts to further refine our efforts. We wanted to focus on each aspect of STEM individually, but were limited by the time allocated for our presentation. In the future we could also incorporate knowledgeable teachers and guests. There are a few organizations in the Baltimore area specializing in STEM outreach that are willing to provide guest speakers.

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