Examining the Engineering Attitudes and Experiences of Wolverine Pathways Participants

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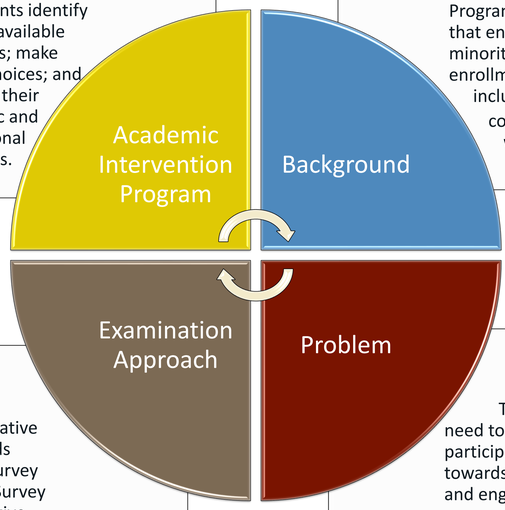
Introduction

Academic Intervention Programs (AIPs) are established to help participants identify and use available resources; make career choices; and enhance their academic and professional outcomes.



The University of Michigan's (UM) Wolverine Pathways Program is an AIP that encourages minority student enrollment and includes a full college tuition waiver.

- Quantitative Methods
  - Pre-Survey
  - Post-Survey
- Qualitative Methods
  - Informal Interviews

There is a need to examine AIP participants' attitudes towards engineering and engineering careers to understand how to increase and broaden participation in engineering.

Research Questions

- What are the attitudes of Wolverine Pathways participants toward engineering and engineering careers?
- What are the experiences of Wolverine Pathways participants?

Methodology

- Participants: African American, 11th grade Wolverine Pathways summer camp attendees
- n = 11 girls and 3 boys
- Survey instrument (5 point Likert Scale) comprised of:
  - 6 items: Gender, academic level, age, GPA, citizenship, and race
  - 20 items: Attitudes to Engineering Scale (Hirsh et. al, 2003)
    - *"I think that engineering could be an interesting career"*
- Informal interviews: career interests and camp experiences

Quantitative
- Pre Survey: **n=13**
- Post Survey: **n=14**

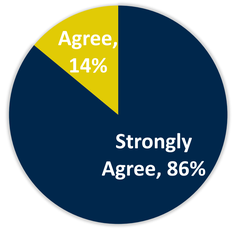
Qualitative
- Informal Interview: **n=9**, Transcribed, Analyzed for key findings

Findings

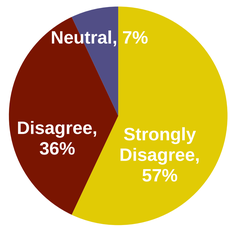
Key Findings from Surveys:

Finding #1: Participants demonstrated a shift to all disagreement statements for negatively phrased statements. Statements such as "Engineering is boring" and "To be an engineer requires an IQ of a genius" earned a little agreement on the pre-test. Those same statements received 0% agreement on the post-test.

Finding #2: Participants had the highest agreement on both pre- and post-surveys about women succeeding in engineering. For, "A woman can succeed in engineering as easily as a man can":



Finding #3: Participants indicated that they learned much more about engineering from participating in the camp. For a statement such as "Engineers don't really need to know much about engineering":



Key Findings from Interviews:

Finding #4: Parental Influence on Engineering Attitudes

"[My mom] wants me to do engineering so bad, so it was more than that, it's more than just science and math, it's the way you think and the way you do things. I was a little "iffy" at first but it turns out that I actually like it and I feel like it's a.. well I want to go into the medical field, so I feel like it's a good gateway there."

Finding #5: Change in Perceptions About Engineering

"I learned that there is a wide variety of engineering. I thought that there were four types of engineering in the career section, but I learned that there are a lot more and they all do different things and it's not just building stuff."

Finding #6: Shift in Attitudes after Workshop Completion

"Before I got into this program, I really didn't think that much of engineering because in school I took a physics class and that class was a great struggle for me. So, I came out with a B- in that class so I don't really know how I would feel about trying to pursue this career for myself. For others it seems like a cool experience."

Discussion

Gained a Better Understanding of Engineering

- Wolverine Pathways Participants learned more about engineering and now have more positive attitudes towards engineering and engineering careers.

Learned New Skills

- Participants came to the camp with the perception that engineers are very smart and that they only build things. They learned that engineers use the Engineering Design Process to complete their tasks. This process is similar to the scientific method that they are taught about in their high school studies.

Attitude Shift

- Participants' attitudes about engineering shifted during the camp.

In summary, academic intervention programs, like the Wolverine Pathways Program, may help participants change their attitudes and learn new skills and understand various career options.

Study Limitations

- Sample size: n=14; more participants could yield different results.
- Duration of camp: 5 days; more time could yield greater shifts in attitudes.

Future Research

Expand this study to include Wolverine Pathways participants from the 9th, 10th and 12th grades.

Examine the changes in engineering attitudes and experiences of Wolverine Pathways participants who desire careers in engineering in contrast to participants who do not.

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