

DIVERSIFYING ACCESS TO URBAN UNIVERSITIES FOR STUDENTS IN STEM FIELDS



Broadening participation in STEM (Science, Technology, Engineering, and Math) fields is among the most pressing needs in education. Diversifying access to STEM education is critical to both workforce development and sustaining an informed democracy.

Many universities offer pre-college STEM programs to help minoritized students prepare for undergraduate studies. However, even when minoritized students succeed in such programs, they may not be accepted for admission due to processes that prioritize GPAs and culturally biased standardized tests.

Our cross-disciplinary team is developing a model for credentialing pre-college STEM programs as an evaluative factor in college admissions. We're designing a holistic, culturally competent approach to admissions that facilitates pathways for minoritized students to enter STEM university programs, and eventually STEM careers.



University of
Pittsburgh



Over a two-year period from 2017-2019, the project is examining mechanisms to strengthen the pathway for minoritized students to enter postsecondary STEM programs.

AIM 1: Create a stronger pathway to help recruit underrepresented minoritized students to pre-college STEM programs

WHAT WE'RE DOING

- Conducting a literature review of recruitment practices and community-university connections.
- Identifying themes based on communities' needs and perspectives
- Developing and distributing a survey tool to gather information about current outreach and recruitment practices and needs of pre-college programs
- Mapping the distribution of community-based STEM programs

WHAT WE'RE LEARNING

- Broad and varied outreach through social media, place-based activities, and relationships with educators and counselors supports recruitment
- Program alumni networks create peer-supported pathways into programs
- Connecting with families and existing community organizations contributes to successful recruitment and retention
- Program features such as hands-on activities, project relevance, community connections, and cooperative learning help retain students and support recruitment

WHERE WE'RE HEADED

- Supporting the credentialing process
- Identifying possible community connections and partners
- Developing a brief to support pre-college and other STEM out-of-school time programming in recruiting underrepresented, minoritized youth

AIM 2: Develop a STEM Success Matrix to identify competencies acquired in pre-college programs that prepare students for collegiate success

WHAT WE'RE DOING

- Conducting literature review to identify student competencies necessary for STEM success
- Working with faculty and admissions to compare the literature regarding student competencies and qualities necessary for STEM success to their observations and experiences
- Composing a final draft of the STEM Success Matrix
- Conducting focus groups of successful STEM majors from underrepresented minoritized groups to compare their experiences to the draft of the STEM Success Matrix

WHAT WE'RE LEARNING

A key challenge is striking a balance between rigor and access. A STEM Success Matrix will only be a reliable measure if it is rigorous enough to predict successful STEM candidates. A STEM Success Matrix that is too layered and complex will have a negative impact on access.

WHERE WE'RE HEADED

- Refining STEM Success Matrix and disseminating findings
- Supporting adoption of STEM Success Matrix with buy-in from STEM faculty

Building on the social innovation theories of Collective Impact and Networked Improvement Community, the project is focusing on four specific aims.

AIM 3: Credential pre-college programs based on program design features that broaden access and effectively develop valued STEM competencies

WHAT WE'RE DOING

- Identifying similarities and differences of intended student outcomes and key design features in 4 pilot pre-college programs
- Identifying set of valued STEM-related outcomes from aims 1 and 2
- Conducting literature reviews of known barriers to underrepresented minoritized participation in STEM and effective practices for serving minoritized student populations in STEM fields
- Identifying and/or developing tools to measure valued outcomes and piloting in the summer 2018 pilot pre-college program implementations

WHAT WE'RE LEARNING

A standards-driven model for credentialing pre-college programs that establishes research-based practices for programs that broaden participation in STEM would be more powerful than an approach that prescribes specific student learning outcomes.

Credentialing programs for broadening participation should include:

- Evidence of effective recruiting practices that ensure the program is known and accessible to minoritized students
- Evidence of established pathways from pre-college STEM programs to admissions with at least one postsecondary provider

WHERE WE'RE HEADED

- Developing tools and measures for assessing pre-college program quality for broadening participation
- Establishing criteria and processes for certifying quality programs
- Developing a plan for a credentialing body that is member-driven and member-enacted
- Developing a playbook for pre-college STEM programs

AIM 4: Develop a holistic STEM admissions model based on pre-college learning and recommendations from credentialed pre-college programs

WHAT WE'RE DOING

- Developing trusting, effective relationships with admissions staff at local universities
- Analyzing admissions data from local universities
- Creating theoretical model for alternative admissions pathway

WHAT WE'RE LEARNING

- Traditional admissions metrics are better predictors of ethnicity than persistence in STEM
- Diversity is lacking in STEM enrollment and is worse at graduation

WHERE WE'RE HEADED

- Piloting an alternative admissions process that values recommendations from credentialed pre-college programs alongside traditional measures
- Evaluating success and adjusting for scalability



THIS PROJECT IS POWERED BY
DIVERSE PERSPECTIVES.

**Are you interested in becoming part
of this effort?**

The project team is starting to share its findings through the Pittsburgh Regional STE(A)M Ecosystem and the National STEM Learning Ecosystems, and plans to scale this work through a national NSF INCLUDES Alliance.

Collaboration is invited and welcomed from partners that are:

- Committed to the goal of leveraging pre-college STEM programs for broadening participation of minoritized students in STEM postsecondary pathways
- Committed to working with other pre-college programs as a collective to evaluate, support, and credential pre-college programs
- Interested in investing in the effort to leverage pre-college programs for broadening participation in STEM postsecondary by contributing time, talent, and/or resources
- Interested in using principles of improvement science to enhance pre-college programs and their role in broadening participation

To get involved, follow this link to complete an interest form:

<http://bit.ly/PittINCLUDES>

Diversifying Access to Urban Universities for Students in STEM Fields is a collaboration of the University of Pittsburgh and the Pittsburgh Regional STE(A)M Ecosystem. The project is made possible by a grant from the National Science Foundation.