

THE FUTURE NEEDS A PUSH

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FEATURED

LEARNING ENGINE

EMBEDDED STEM
COLLEGE-GOING
SUPPORTS

PUSH-ING TOWARD A
MORE EQUITABLE
FUTURE



Helping Students on a Path to College by Embedding College Supports into Pre-College STEM Programs

In STEM PUSH, the networked improvement community, or NIC, is our learning engine.

Pre-college STEM programs test small changes to their programming and gather data about whether these changes are leading to improvements in how well they serve Black, Latina/o/e, and Indigenous students.

Over time, the “tests of change” that individual programs conduct help us learn collectively what works for which students, under what conditions.

In STEM PUSH, we have three improvement cycles each year. Programs participate in at least two of the three improvement cycles and share their learning in between cycles so that programs can build on what their colleagues have learned from prior testing.

STEM PUSH tests changes related to more effective recruitment of minoritized students, nurturing STEM identity and sense of belonging, developing skills that matter for the practice of STEM, using equitable approaches to documenting students’ strengths and competencies, and strengthening college-going pathway supports.

In this issue, we share the learning from one of the Embedded STEM College-Going Support change ideas. Specifically, we explore how pre-college STEM program leads supported guest speakers to better connect with youth.



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CHANGE IDEAS TESTED: EMBEDDING STEM PATHWAY SUPPORT THROUGH GUEST SPEAKER EXPERIENCES

THE ISSUE WE ARE ATTEMPTING TO ADDRESS

Pre-college STEM programs (PCSPs) often organize guest speaker series because they know role models can have a significant influence on the possibilities students see for themselves in STEM. This is especially true for Black, Latina/o/e and Indigenous students who have not seen people that look like them represented in STEM careers often.

The problems PCSPs face in facilitating guest speaker events include not only finding speakers whose backgrounds and interests resonate with students, but also speakers who are able to talk about what they do and how they got there in ways that make STEM careers seem both appealing and attainable.

These related challenges mean that PCSPs are constantly striving to maximize the relevance and impact of these relatively brief experiences through who they bring in, the content presented, and how student-speaker interactions are structured.

The STEM PUSH Network developed this change idea to maximize guest speaker impact and help students develop their STEM identity.



Role models are typically defined as individuals that can serve as an example for another person.

HOW WE APPROACHED THE WORK

PCSP leaders developed processes and tools to make guest speaker experiences more meaningful for students.

Some created a guide for guest speakers that encouraged intentional coverage of topics such as non-linear and non-traditional STEM pathways, how their identities have informed and shaped their experiences, relevance of culturally-informed skills and assets, and support systems they drew upon to persist.

Some engaged students in an interest activity - a game, survey, discussion, focus group - around what they value in a guest speaker so recruitment could be driven by their needs, interests, and passions.

Some programs designed a process which included elements of both student voice and guest speaker preparation.



NOTEWORTHY EVIDENCE

The Artificial Intelligence Pathways Institute of the Boys and Girls Clubs of Western Pennsylvania, solicited student input on guest speakers. They saw a significant increase **(2-3x)** in the total number of questions asked by students.

On average, 35 questions were submitted for consideration by the interviewers, vs. an average of 7 questions posed to the prepared presentations.



Photo Courtesy of Teenagers Exploring and Explaining Nature and Science (TEENS) at the Chicago Academy of Sciences / Peggy Notebaert Nature Museum

KEY TAKEAWAYS

The process of creating a speaker guide helped clarify program goals for bringing in guest speakers.

Seeking student voice on STEM topics, college experiences, and professions of interest can meaningfully shape guest speaker recruitment.

Student input on the content/focus of guest speakers as well as their preferred nature of interactions may increase student engagement with the guest speakers.

Providing a guide to guest speakers increased the likelihood that they would address topics such as identity and non-linear STEM college and career paths in ways that resonate with Black, Latina/o/e, and/or Indigenous students.

CONNECTING TO OUR THEORY OF IMPROVEMENT

The STEM PUSH theory of improvement posits that PCSPs are well-positioned to embed STEM college and career knowledge that helps students and their families pursue post-secondary STEM. However, these PCSPs do not always have the resources to engage in direct advising and counseling related to STEM college and career pathways.

Seeking and centering student input on guest speakers, and infusing guest speaker interactions with humanizing content and themes, are two complimentary strategies for embedding valuable STEM college and career pathway knowledge in ways that nurture and affirm positive STEM identities.

WHAT IS A THEORY OF IMPROVEMENT?

A theory of improvement is a set of hypotheses about how we get to meaningful collective impact on our shared problem. It combines our understanding of the system creating the problem we are seeking to solve with our “best bets” about the most high-leverage areas we can target to achieve our aim.

STORIES FROM THE FIELD

“*In our latest improvement cycle, we developed a guest speaker template. We've always had guest speakers, but being able to develop and articulate our goals for having speakers, our criteria for having speakers, and a structured guide of what we're hoping our speakers will cover, we could actually study the impact of our interventions.*

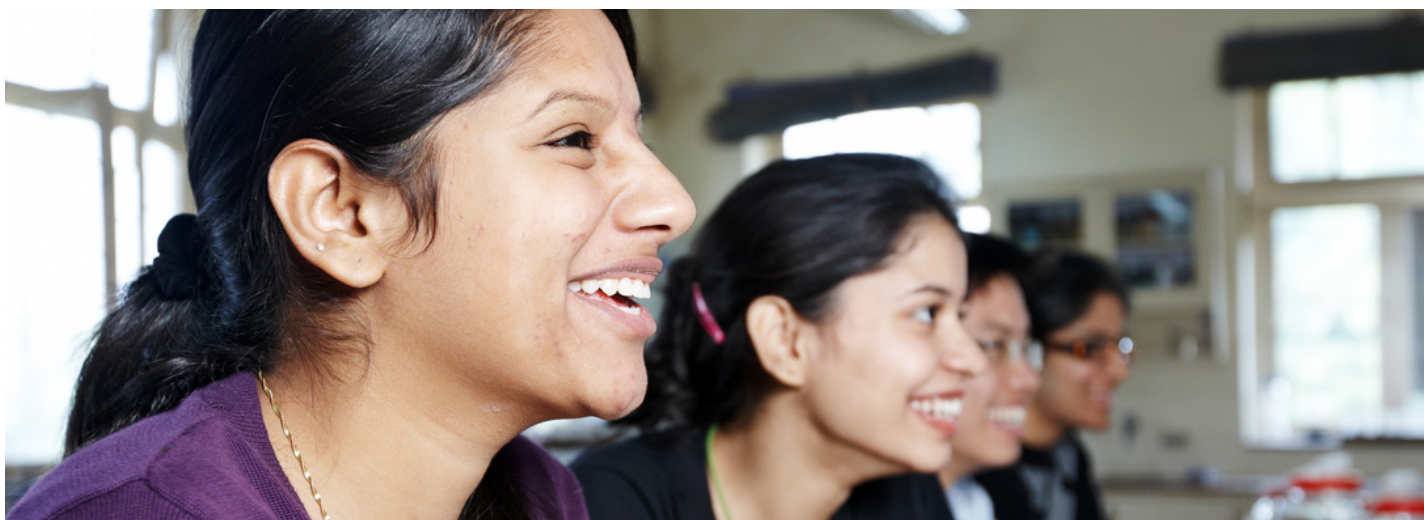
As a result of implementing these tools we saw our teens more engaged. We've also been able to bring these tools and the improvement science techniques to other areas of our programming, as well as to other programs within the museum. Learning and sharing with my colleagues has been really impactful.

”

David Bild, Program Lead, Teenagers Exploring and Explaining Nature and Science (TEENS) at the Chicago Academy of Sciences / Peggy Notebaert Nature Museum

CHICAGO
ACADEMY OF
SCIENCES

PEGGY NOTEBAERT
NATURE
MUSEUM



A PUSH TOWARDS RACIAL EQUITY

We are building the first national network of PCSPs that are focused on equity and are working together to accelerate change.

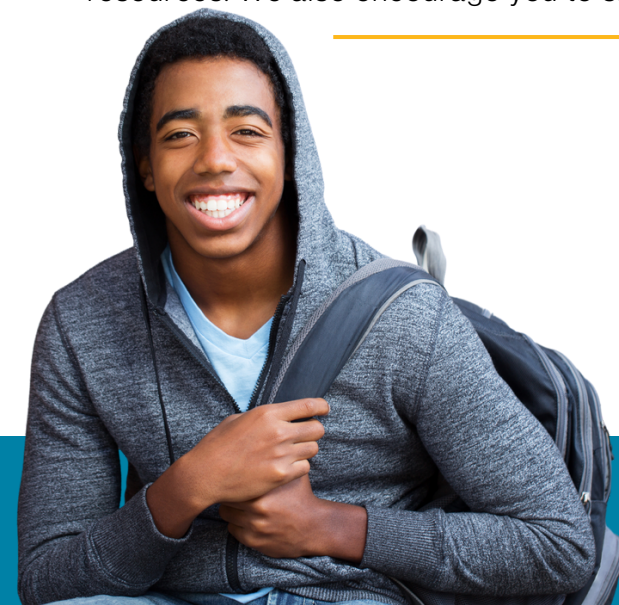
By 2026, the STEM PUSH networked improvement community (NIC) aims to increase the capacity of 40 PCSPs to support Black, Latina/o/e and Indigenous students on a pathway to STEM undergraduate study.

In order to accomplish this, pre-college STEM programs in the NIC will focus on testing ideas that support the following primary drivers for broadening participation:

- Recruiting more Black, Latina/o/e and Indigenous students.
- Nurturing a STEM identity and sense of belonging in ways that honor the experiences of minoritized students.
- Developing student competencies that matter for the practice of STEM.
- Using equitable approaches to document students' strengths and competencies.
- Strengthening college-going pathways supports.

These primary drivers are STEM PUSH Network's initial "best bets" about what to target given root causes of the problem we identified when the Network first launched. Improvement cycles explore and test change ideas directly related to these primary drivers.

To continue learning alongside STEM PUSH visit www.stempushnetwork.org for more information and resources. We also encourage you to share this newsletter with peers and via social media. Join us!



This NSF INCLUDES Alliance is funded by NSF Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (NSF INCLUDES), a comprehensive national initiative to enhance U.S. leadership in discoveries and innovations by focusing on diversity, inclusion and broadening participation in STEM at scale. It is also co-funded by the NSF Innovative Technology Experiences for Students and Teachers (ITEST) program and the Advancing Informal STEM Learning Program (AISL).



www.stempushnetwork.org