

PUSHing into 2024



THE FUTURE NEEDS A PUSH

JANUARY 2024

FEATURED

THE LEARNING ENGINE

RESEARCH

ACCREDITATION

QUALITY STANDARDS

ADMISSIONS &
NETWORKS

PUSHING FORWARD

A tireless advocate for equality, equity, and opportunity in STEM, Congresswoman Eddie Bernice Johnson (1934-2023) was a dynamic force for ensuring that America's commitment to science is pursued with the understanding that diversity is a core component for meaningful discovery, progress, and innovation. The first Black American elected to Congress from Dallas, Johnson spent five decades in public service advocating for the expansion of civil rights, for increased access and opportunities for under-represented groups—especially women and girls-in STEM and in medicine, and combating climate change.

In 2023, The National Science Foundation (NSF) renamed the INCLUDES Program to honor Eddie Bernice Johnson's work in civil rights, and her crucial role in advancing science policy, including the Bipartisan Infrastructure Law and CHIPS and Science Act of 2022.

In an interview that same year, Johnson explained that scientific progress and science policy are made better and more effective through decentralization, noting that real innovation is accelerated by breaking down barriers and advancing inclusion.

"We want to broaden opportunities, decentralize, so that inclusiveness can be felt in every part of the country. The more inclusion we have in science, the better outcomes we'll get. We will never be able to be the best until we involve people who have actually experienced some challenges in coming up with brilliant ideas." Johnson said.

The STEM PUSH Network joins the many mourning the passing, and also celebrating the life and legacy of Eddie Bernice Johnson, as we are guided by the same core belief that knowledge derived from a broad spectrum of lived experiences leads to better outcomes and better futures.

As we launch into 2024, STEM PUSH reflects on what we've learned during the last year, including take-aways from learning cycles, our quality standards and understanding equity in STEM. This month's newsletter provides a look back at what we have accomplished this past year in furthering the important work of fostering innovation through equity and inclusion, and as we move forward into a new year, we remain committed to, and inspired by, the possibilities of inclusive STEM education.



Learning Engine

Our Networked Improvement Community (NIC) serves as the learning engine in which PCSPs strengthen their capacity to support Black, Latina/o/e and Indigenous students in STEM and build pathways leading to undergraduate institutions for STEM study by designing and testing routines and tools. These tested routines can then be used by other out-of-school time providers to better serve their students in STEM.

The STEM PUSH Network unites and mobilizes 40+ out-of-school time (OST) pre-college STEM programs that are actively working together to broaden participation in STEM. STEM PUSH is the first of its kind, national network of PCSPs working together to use program power to address inequities in STEM.

Pre-college STEM programs work in STEM PUSH is strengthening their recruitment, programming, and connections to institutions of higher education to increase the numbers of Black, Latina/o/e and Indigenous students admitted to STEM undergraduate programs.

This previously disconnected sector of the U.S. education system is now aligned and activated thus creating a new system within the current education landscape.

WHAT WE'VE LEARNED:

Thirty-four programs have tested change ideas as of September 2023. Our data shows that leaders found the changes to be significant in better serving students. Changes are also being shared beyond the programs that tested the initial ideas. The programs that tested changes collectively serve thousands of students per year across the U.S.

Student Recruitment

27

programs reported an increased focus on recruiting more and/or different students.



17

programs reported a tangible change / improvement in their programs practices or policies.

Nurturing STEM Identity and Sense of Belonging

24

programs reported an increased focus on nurturing a STEM identity and sense of belonging in students.



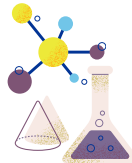
13

programs reported a tangible change / improvement in their programs practices or policies.

Developing Relevant STEM Competencies

22

programs reported an increased focus on developing relevant STEM competencies.



17

programs reported a tangible change / improvement in their programs practices or policies.

College Pathways

24

programs reported an increased focus on strengthening college-going pathways for students.



16

programs reported a tangible change / improvement in their programs practices or policies.

Learning from the NIC

“

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. ”



Said David Bild, Program Lead, Teenagers Exploring and Explaining Nature and Science (TEENS) at the Chicago Academy of Sciences / Peggy Notebaert Nature Museum, after testing the change idea: embedding stem pathway support through guest Speaker experiences

“Staff bring back great ideas, some of which we may use with our students, and it's part of my staff's professional development.”

Said Dr. Mary Valmont, Associate Executive Director for Health Sciences Education, Arthur Ashe Institute for Urban Health, about the collaboration between Arthur Ashe and NYSCI, a fellow STEM PUSH pre-college STEM program.

“We participated in the racism in STEM learning cycle. We worked to develop that protocol and then executed it with my teaching assistants during their summer STEM training.

The work with STEM PUSH has really led us to think more about what our relationships are - how STEM Outreach connects with high school students and their families, how my staff prepares to mentor students and how we communicate their successes in our pre-college programs to the admissions office because we are embedded in an undergraduate institution.”

Said Elizabeth Waters, Director of STEM Outreach, The Cooper Union, after testing the change idea: Racism in STEM

Resources for the Field

Based on findings from learning cycles, three change packets were produced in 2023 to disseminate ideas, templates and resources to pre-college STEM programs looking to better serve Black, Latina/o/e and Indigenous youth. Find change packages at www.stempushnetwork.org/resources

EXTENDING RECRUITMENT EFFORTS INTO NEW SPACES, USING REDESIGNED MATERIALS

Use redesigned practices and materials in new communities to successfully recruit students from new communities to broaden participation.

STEM PUSH seeks to broaden participation of Black, Latina/o/e, and Indigenous students in STEM. Pre-college STEM program leaders in this improvement network test out ideas to move us toward that goal.

These evidence-based improvement packages summarize our promising ideas, offering a collection of planning guides and resources so others may try out these changes.

Are you interested in opening STEM pathways to more Black, Latina/o/e, and Indigenous youth by rethinking your recruitment practices?

This improvement package offers ideas, tools, and strategies to support recruitment efforts. You will find:

- Ideas about how you might rethink recruitment in order to broaden participation of Black, Latina/o/e, and/or Indigenous youth into your organization

BUILDING STAFF CAPACITY THROUGH DISCUSSION OF RACISM IN STEM

Increase program capacity to support students around issues of race and racism that they may encounter in STEM.

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Are you interested in opening STEM pathways to more Black, Latina/o/e, and Indigenous youth by increasing your ability to support students as they encounter racism in STEM?

This improvement package offers ideas, tools, and strategies to support staff to engage in meaningful discussions of racism in STEM. You will find:

- A discussion routine that can deepen awareness of the subjectivity of STEM, and how that is linked to racism and systemic oppression.

DEVELOPING A GUEST SPEAKER ROUTINE FOR STEM PATHWAY SUPPORT

Leverage guest speaker visits to communicate affirming and practical knowledge about STEM college and career possibilities.

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These evidence-based improvement packages summarize our promising ideas, offering a collection of planning guides and resources so others may try out these changes.

Are you interested in improving STEM pathway support for Black, Latina/o/e, and Indigenous youth by maximizing interactions with guest speakers?

This improvement package offers ideas, tools, and strategies for embedding STEM pathway knowledge into guest speaker events. You will find:

- Ideas for centering students' interests and input to inform guest speaker recruitment and content.

Research

STEM PUSH is conducting the first ever cross-program research study of the impact of pre-college STEM program experiences on student enrollment and student persistence in STEM in post-secondary education.



THE DATA TO DATE

The creation of a nationwide, engaged network of PCSPs provides a unique opportunity for a comprehensive examination of the longitudinal impact of pre-college programming on admission and persistence in undergraduate STEM programs.

We now have a large and growing dataset and our results are validating PCSP experiences as valuable STEM education rather than as an extracurricular activity.

Preliminary data shows that

81% of students who participated in STEM PUSH PCSPs' enrolled and persisted

in post-secondary STEM; this is higher than the national average.

Across programs with enough data, the odds of enrolling and persisting in STEM

were more than double

of applicants in the same program. Trends in these data will inform improvements of PCSPs as well as encourage further investment in the PCSP model. These data demonstrate the value of PCSPs and will elevate and redefine this OST sector as education that increases persistence in STEM.

Accreditation

With Middle States Association as a partner, STEM PUSH is developing a novel accreditation system to elevate the validity and recognition of equity-centered pre-college STEM program (PCSP) experiences.

At the higher education admissions systems level, we know that out-of-school-time (OST) experiences, are disproportionately important for minoritized students, so they must weigh more meaningfully as academic preparation considerations in admissions decisions, rather than as “extracurricular activities.”

STEM PUSH is piloting a novel accreditation system that centers equity and is focused on broadening participation in STEM which will allow admissions offices to quickly determine the quality and value of applicants’ PCSP experience for academically meaningful impacts.

University of Pittsburgh’s Broadening Equity in STEM Center, the parent organization of STEM PUSH, earned accreditation as a learning service provider from Middle States Association (MSA) Commissions on Elementary and Secondary Schools.

In partnership with PCSPs, MSA, Higher Ed admissions leaders, Equity in STEM and STEM learning professionals, STEM PUSH has designed a novel accreditation system for PCSPs that is centered around the STEM PUSH evidence-based, equity-centered Quality Standards in ways that reflect the improvement work done in STEM PUSH around key priorities shared between STEM PUSH PCSPs and admissions leaders. What makes this novel is that it is not solely a quality credential, but it recognizes the capacity to create more equitable STEM pathways and social mobility through higher education.

Accreditation: How It Will Work



Six pre-college STEM programs are participating in this accreditation process as a pilot phase.

A pilot cohort of PCSPs is now working through this accreditation protocol that includes a self-study documenting improvements, evidence, and future goals, in preparation for site visit and, ultimately approval and accreditation of PCSPs by MSA. This accreditation pathway will continually center equity, responsiveness, and attention to the broadening participation goals of STEM PUSH PCSPs.

In 2023, University of Pittsburgh’s Broadening Equity in Science, Technology, Engineering and Math Center (BE STEM) earned accreditation as a learning service provider from Middle States Association (MSA) Commissions on Elementary and Secondary Schools. With BE STEM as STEM PUSH’s anchor, STEM PUSH hopes this evidence-based credential will change the way admissions accounts for out-of-school time academic achievement and drive important systems change in the overall process.

STEM PUSH Quality Standards

A new model for accreditation is being developed using STEM PUSH quality standards as the framework. The quality standards also inform the change ideas tested in the NIC. They are a set of research-based benchmarks that programs must meet if they are going to attract, retain, rigorously prepare, and connect Black, Latina/o/e and Indigenous students with undergraduate STEM programs.



You can learn more about the Quality Standards at www.stempushnetwork.org/quality-standards/

Program Goals

Program goals focus on intentionally broadening participation of Black, Latina/o/e and Indigenous students in STEM.



Student Recruitment

Recruitment practices that center minoritized communities.



Student Services

The provision of student services to meet student needs.



Program Design & Implementation

Program design and implementation characteristics that include culturally sustaining pedagogical practices.



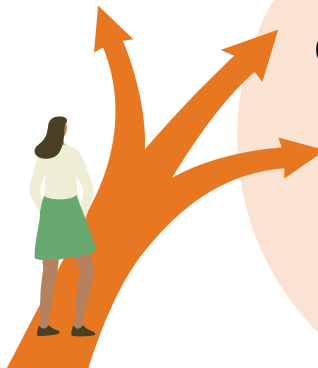
Assessment & Evidence of Performance

Assessment and evaluation for continuous improvement and outcomes monitoring



College Pathways

Articulating a clear connection between the pre-college program and the STEM college and career pathway.



Admissions

STEM PUSH is working toward a more equitable system for post-secondary admissions with some of the nation's top thought leaders and experts in the space.

STEM PUSH works with an Advisory Council of admissions leaders to inform the strategies and partnerships required to create a new pathways for students from pre-college STEM programs.

Working with partners like the National Association of College Admissions Counselors (NACAC) and the Common App, STEM PUSH elevates the work of PCSPs. For example, students typically spend more than 100 hours doing STEM learning activities within pre-college STEM programs. These are profound experiences STEM PUSH is working to highlight, through resources like PCSP profiles.

Joaquin Bustoz Math-Science Honors Program
ASU Arizona State University

Member of the STEM PUSH Network, an NSF INCLUDES Alliance

Joaquin Bustoz Math-Science Honors Program (JBMSHP) students participate in a residential summer program and take a college-level math or computer science course for university credit. Students also attend academic success sessions to learn about academic & social challenges in STEM, the importance of networking, and mental health coping skills.

Participants attend career panels, receive tutoring & mentoring, and work with success coaches to support their transition to university life with skills for persistence & success.

JBMSHP emphasizes & develops several targeted outcomes, including:

- Math or computer science reasoning & problem solving
- Communication skills
- Ability to work in a collaborative environment
- STEM identity & sense of belonging

Students demonstrate these skills through receipt of college credit & grade for their completed course.

About STEM PUSH

STEM PUSH, an NSF INCLUDES Alliance, is a national network of pre-college STEM programs who are engaging youth historically underrepresented in STEM to learn & do in-depth, authentic science, and ultimately to persist in STEM through college & beyond. More information available at stempushnetwork.org

Program Features

- STEM Focus**
Mathematics or Computer Science
- Six-week** math or computer science college course
- Free** for students to attend; all expenses are paid by ASU
- Equity-based** academic success programming for students who are underrepresented in STEM

Program Results

- 210 total program hours
- 75 students served each year
- 99% of JBMSHP students attend college (since 2005)
- 70% of JBMSHP alum earn undergraduate degrees
- 72% are first-generation college students (since 2013)

“Many of the Joaquin Bustoz Math-Science Honors Program (JBMSHP) students are first-generation college-bound and/ or underrepresented in STEM. They may not have the same educational opportunities or the highest standardized testing scores, which are traditionally required for students applying to top-tier schools.

However, participation in JBMSHP provides them with a life-changing college experience while they are still in high school, solidifies their STEM identity, and helps them learn that they can succeed in college. This doesn't always translate on a college admissions application. The program profile is highly beneficial to our students, providing a detailed description of what they accomplished at JBMSHP and has been a useful tool to supplement the student's letters of recommendation.”

-Cynthia Barragan Romero, Program Manager of the Joaquin Bustoz Math-Science Honors Program (JBMSHP) at Arizona State University

STEM Ecosystems exist to serve as **conveners, coordinators, and catalysts**—they bring together disparate stakeholders to support STEM in a region, to ignite sparks of connection so that collaborative opportunities, including PCSPs, can grow and thrive. Ecosystems have the ability to be translators and to **communicate** and **champion** equity. These 5 C's are examples of how Pittsburgh's Remake Learning (Ecosystem) work together to grow local connections.

The STEM Learning Ecosystems Community of Practice (SLECoP) includes over 100 communities working to build regional, cross-sector connections that set students up for success.

“The SLECoP allows us to think about our community more strategically, to navigate partnerships to enable leaders to collaborate to create bigger impacts for youth. We joined STEM PUSH to broaden access to college beyond grades. I didn't have any direct connections to programs, but our board member did. We leveraged partnerships to find the right programs in our community.”

Networks

Ecosystems, regional collaborations between schools, community based organizations, higher education institutions, business and PCSPs, connect STEM PUSH's work into the greater local efforts to develop cradle to career STEM Pathways. Weaving together a network of networks - STEM PUSH cultivates action-oriented communities.

-Jeremy Babendure, Arizona SciTech Ecosystem said about Arizona Ecosystem's process of finding pre-college STEM partners in their region.



The work will continue to PUSH forward in 2024.

STEM PUSH will have new findings to report from another round of learning cycles.

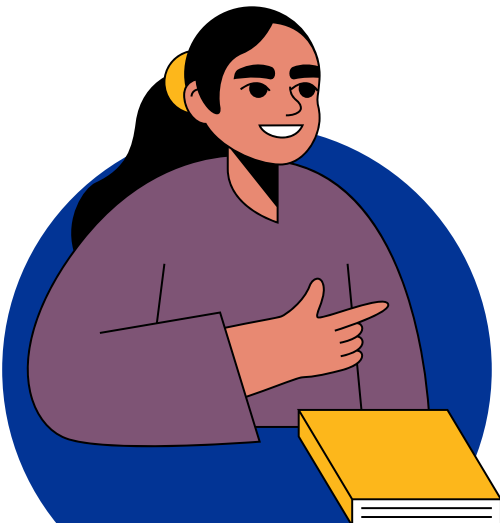
STEM PUSH will contemplate further about equity in STEM and within our education systems.

The Network will continue to research the impact of pre-college STEM programs and work with admissions offices to see the value in PCSP programming.

The strength of STEM PUSH comes from the power of PCSPs within the Network and our partnerships with leaders in the field. With the dedication and willingness of PCSPs to learn from one another, the guidance from admissions partners-- and the research, STEM PUSH is creating more inclusive STEM futures for Black, Latina/o/e, and Indigenous students in the United States.

Learn more about STEM PUSH by visiting
www.stempushnetwork.org

To follow our work this year, sign up for the newsletter. Spread the word on our systems change work by sharing with friends and colleagues.



The STEM PUSH Network is funded by The National Science Foundation's (NSF) Eddie Bernice Johnson INCLUDES Initiative, a comprehensive national effort to enhance U.S. leadership in discoveries and innovations by focusing on diversity, inclusion and broadening participation in STEM at scale. STEM PUSH is also co-funded by the NSF Innovative Technology Experiences for Students and Teachers (ITEST) program and the Advancing Informal STEM Learning (AISL) program.



www.stempushnetwork.org