

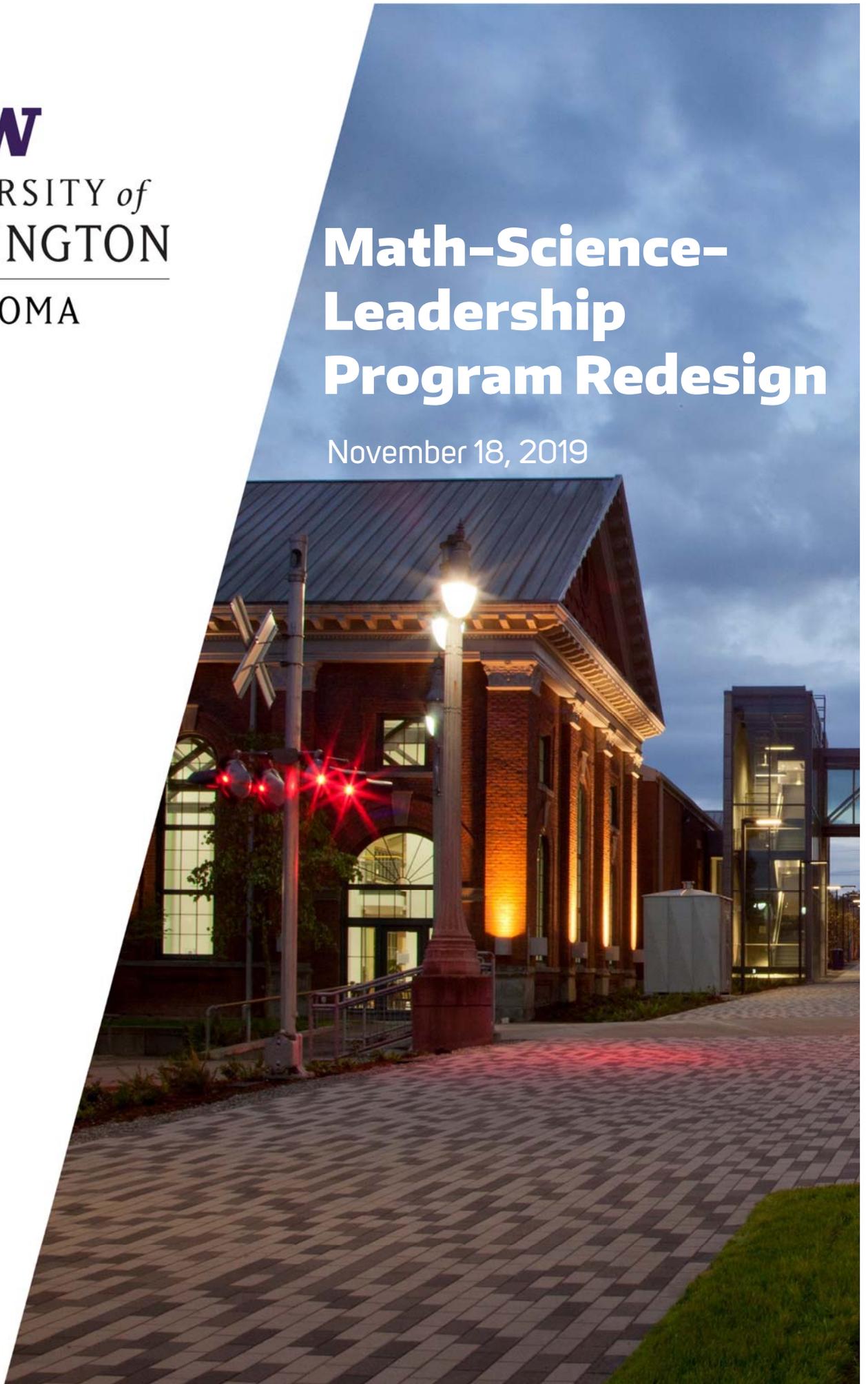
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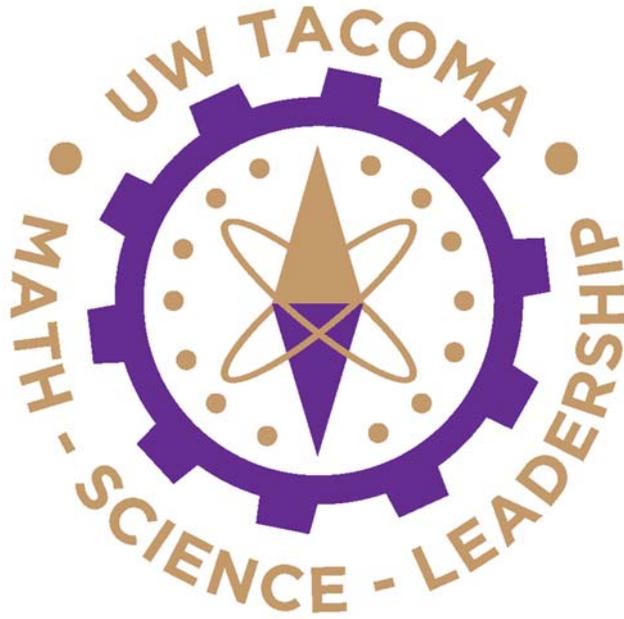
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TACOMA

Math-Science- Leadership Program Redesign

November 18, 2019





Math-Science-Leadership Program 2020 Redesign Team Final Report

November 18, 2019

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SUMMARY

In summer 2019, the Math-Science-Leadership (MSL) Program engaged four youth and three parents to lead an effort to redesign a program that supports leadership development and STEM career aspirations for marginalized and minoritized youth. The MSL 2020 Redesign team all hold gender and/or race/ethnicity identities that are underrepresented in STEM and 78% of the team are people of color. The team used an iterative design approach to create the program model, and hosted focus groups with other youth, parents, and UW Tacoma faculty members before finalizing the model.

The final model encompasses grades 8-11. Youth and family participants unanimously emphasized the importance of a youth-positive culture that centered relationships with youth and their families. There was also universal interest in interdisciplinary, problem and project-based learning, in areas where local employers could potentially provide externships and internships.

<u>Grade</u>	<u>Problem-based Project</u>	<u>Leadership Focus</u>	<u>Higher Education & Career Preparation</u>
8	Environmental Sustainability	Growth mindset	Explore higher education options
9	Biomedical Science	Identities & values	Building a portfolio
10	Engineering & Technology	Teamwork	Externships
11	Healthcare Leadership	Cultural humility	Internships

Involving youth, parents/guardians, and faculty surfaced different perspectives that resulted in a design that is vastly different than if program staff were the sole designers. We were also able to find cost efficiencies (reduced costs from \$4,000 to \$2,020 per student), while ensuring we kept program elements that were most important to participants. The team also identified key priorities for STEM programs to include if they are designing programs for nondominant youth.

BACKGROUND

The Math-Science-Leadership (MSL) Program has operated on the University of Washington Tacoma campus since 2003, providing free programs about science, technology, engineering, and mathematics (STEM) for middle and high school youths. The program has primarily served youth with backgrounds that are historically underrepresented in STEM fields.

The last time any significant design work was undertaken for the MSL Program was in 2012. MSL has evolved significantly since 2012, growing from a summer program into a six-year STEM leadership development cohort program with year-long programming. In spring 2019, MSL staff identified an opportunity to work with participants to re-imagine the program and to help inform other programs who are designing out-of-school STEM

programs to serve marginalized and minoritized populations. The MSL 2020 Redesign Team launched in August 2019 to accomplish the following:

1. Involve youth and family participants in the design process in meaningful and authentic ways
2. Develop a model that would allow for fundraising around multi-year cohorts of students instead of annual programs
3. Develop key objectives curriculum for the curriculum, so that the development of skills to work across difference is scaffolded over time

APPROACH

In summer 2019, the MSL 2020 Redesign Team was established to reimagine what the Math-Science-Leadership Program could look like moving forward. All members of the team hold gender and/or race/ethnicity identities that are underrepresented in STEM, and 78% of the team are people of color. Four youth, three family members, and two UW Tacoma staff worked collaboratively to accomplish the following:

- Identify research and engineering design topics and experiences that align to youth interests and STEM industry workforce needs
- Identify learning objectives that support development of skills and mindsets needed to work across difference
- Define a cohort model for MSL (grades, length of program, annual milestones)
- Identify how to measure program success

Four youth and three parents dedicated 12.5 hours over five meetings. They identified what is important about MSL, and used an iterative design approach to define the final program model. Two focus groups with youth and families (one youth and three parents) and two focus groups with faculty (two Environmental Science, one Education, and one Computer Science) and community members (two City of Tacoma employees) provided feedback on a draft of the program model. Focus group feedback was incorporated into the draft, and the final version of the program was created after feedback from the MSL 2020 Redesign Team.

The agendas and meeting notes for all Redesign Team meetings are available in the Appendix.

CHALLENGES

Staffing changes – A key MSL staff member left UW Tacoma and transitioned out of the program during recruitment of Redesign Team members. With less staff capacity, recruitment for the Redesign Team and the focus groups was more difficult than had been anticipated at the time the process was proposed.

Recruiting employers – The plan was to include an employer from a STEM field in the Redesign Team, but outreach from several UW Tacoma staff members was unsuccessful. The same challenge was encountered when recruiting for focus groups.

FINDINGS

What youth and families find important

Four themes emerged from conversations with the Redesign Team:

1. **Recruitment** – it is important to think through different channels of communication and touch points available in communities. Teachers, families, and youth surfaced as particularly important audiences to empower with information.
2. **Multi-year cohorts** – it matters to youth and families that the program builds on community over time, and that there are opportunities for youth in different grades to connect and mentor each other.
3. **Curriculum** – experiences for youth should be hands-on, allowing youth to apply learning to local problems that directly affect communities. There is also a strong desire to bridge the university and employers, culminating in a paid internship in industry.
4. **Culture and climate** – the social/emotional safety of youth in support of their personal growth is of paramount importance. The impact of diverse mentors and the importance of centering relationships in the program cut across all of the themes.

A mind map of the important elements that youth and families want in the MSL Program is available in the Appendix.

Research and engineering design topics and experiences

Youth and families in the Redesign Team and focus groups emphasized a desire for projects and curriculum to immerse students in the interdisciplinary nature of STEM and problem solving. With these priorities in mind, the following topics were identified because of the industries present in the Tacoma area, the expertise of UW Tacoma faculty, and potential opportunities for externship and internships:

- Environmental Sustainability
- Biomedical Science
- Engineering & Technology
- Healthcare Leadership

Youth and families have requested that for each theme, we find a professor and employer to collaborate on developing a hands-on project that youth can complete and present about in the three-week summer program.

Learning objectives

Because youth and family participants unanimously emphasized interdisciplinary, problem and project-based learning, we will work with professors and employer partners to define the STEM learning objectives. For growing leadership skills that support working across difference, foci for leadership development were identified that built on skills over time and that complemented the interpersonal skills that would help youth be successful in their project.

It was also important to youth and families that the program is being intentional about preparing participants for post-secondary education and the workforce. Families are particularly interested in how youth are connecting education and opportunities in industry. The grade, curricular topics, leadership foci, and higher education and career preparation foci are below.

<u>Grade</u>	<u>Problem-based Project</u>	<u>Leadership Focus</u>	<u>Higher Education & Career Preparation</u>
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Cohort model

Youth and families valued the six-year cohort model and found that to be the most desirable design, but developed a less expansive cohort model in an effort to reduce program costs. Stakeholders noted there are fewer STEM programs for youth in older grades, and it was desirable to support youth as they transitioned from middle to high school. Stakeholders also noted that 12th grade cohorts are the smallest, and that mentoring and advising high school seniors to prepare for post-secondary options could be accomplished outside of the MSL context.

With these considerations, the final proposed cohorts are four years, spanning 8th to 11th grade.

Measuring program success

The work-related experiences (externships and paid internships) surfaced as the most important evidence of success for youth and families. They also placed value in youth earning credit from their school districts for participating, and the program will investigate if that is an option. Other discussions indicated that enjoyment of the program, positive relationships with youth and instructors, and opportunities to celebrate youths' successes were evidence of success to participants.

Financial Efficiencies

The final design of the program reduced total cohort sponsorship costs from \$80K per cohort of 20 students (\$4,000/student over six years) to \$62K per cohort of 24 students

(\$2,585/student over four years). Quality of the program will not be impacted by these changes, and the new cost per student should support greater success in future fundraising efforts.

RECOMMENDATIONS

What we learned in the process of including youth, families and other stakeholders in the design process

- Participants care deeply about the MSL program, which we think originated from centering relationships with youth and parents/guardians over time. To translate their care into action with the program, the investment starts early and an abundance of clear communication and advance notice makes participation much easier.
- Creating a collaborative environment increases creativity. Establishing group norms, brainstorming with open-ended questions, providing time for individual reflection, partner and large group discussions helped everyone feel comfortable sharing their thoughts.
- Involving youth, parents/guardians, and faculty surfaced different perspectives that resulted in a design we think will be more successful than if program staff were sole contributors to the process.
- Timing is important. For the Redesign Team, the timing of starting meetings at 5:30 p.m., providing dinner and stipends made it easier for them to participate. Participants found that sustaining the meetings over several weeks, scaffolding the brainstorming to the design, and the iterative process of designing the program were all helpful in the process. For focus groups, participation may have been more successful if they did not happen around the time that school was starting.

Recommendations to nonprofits who want to create STEM programs that support diverse youth

- Have fun and fill your program with love! Let families and youth know you care about them and their experiences.
- Do not hesitate to engage families – ask them for help and their feedback. You might be surprised by the support you get.
- Involve diverse stakeholders – youth, families, professionals, and businesses. Families and youth are interested in real applications, hands-on learning, and work experience that will support their professional aspirations and educational goals.
- Advertise, advertise, advertise – families will not know if you do not tell them. Most MSL applications came from word-of-mouth and personal referrals of community members who could vouch that marginalized and minoritized youth would have a good experience.
- Collaborate, develop mutually beneficial partnerships, and try to find a way for all stakeholders to get their major needs met.

DRAFT

updated 11/18/19

- Sustaining program funding is hard. Building networks and connections with technology companies, civil leaders, and industry contacts should always be an action item you are working on.
- Reach out to other successful STEM programs for advice and consider opportunities to collaborate.