BOARD # 461: The Husky PAWS (Pathways for Academic Wellness and Success) S-STEM Program

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Abstract

The Husky PAWS (Pathways for Academic Wellness and Success) NSF S-STEM program at Michigan Tech was awarded in 2023. Our team reviewed initial applications in Spring 2024 and launched the primer 3-week Husky PAWS Summer Bridge in 2024. The inaugural cohort included 6 students at the 4-year scholarship level and 6 students receiving one-year finishing scholarships. The Husky PAWS S-STEM program is utilizing Yosso's Cultural Wealth Model [1] to leverage scholar's cultural wealth assets for their academic success. The overarching program goals are increasing retention and graduation rates of these Pell-eligible scholars to those of non-Pell students. Centering the Husky PAWS S-STEM scholars as experts in their own lived experience, the Husky PAWS S-STEM program takes a participatory action research (PAR) approach to improving our program. We have included funding for one of the Husky PAWS S-STEM scholars to serve as a PAR co-researcher alongside our project team. At this point, we have identified our first PAR researcher, who is a co-author on this poster and paper. This paper will highlight progress, and offer key takeaways of the Husky PAWS S-STEM program through its first year. Efforts include developing applicant screening materials, summer bridge metacognition programming, cohort activities to build community throughout the academic year, and our PAR approach to improving these activities for the second project year.

Foundational Theories For Husky Paws S-Stem

Two theories informed the development of the S-STEM Husky PAWS project, including Yosso's Cultural Wealth Model [1] and metacognition [2].

This S-STEM Husky PAWS project specifically seeks to support students via the development of various types of social capital included in Yosso's cultural wealth model (CWM) [1], which includes six types of social capital: 1 - aspirational ("hopes and dreams for the future"), 2 - linguistic ("intellectual and social skills attained through communication experiences in more than one language and/or style"), 3 - familial ("cultural knowledges nurtured among familia that carry a sense of communication, history, memory, and cultural intuition"), 4 - social ("networks of people and community resources"), 5 - navigational ("skills of maneuvering through social institutions"), and 6 - resistant ("knowledge and skills fostered through oppositional behavior that challenges inequality").

Metacognitive skills refer to the ability of individuals to regulate and control self-learning behavior [2]. Metacognition challenges students to think about their cognitive processes [3] and is a tool for students to learn how they best learn, therefore developing an intentional strategy for learning [4]. Metacognition is learning awareness that is built from a reflection on knowledge [5] and integration of higher-order thinking, which includes behavior regulation to overcome challenges. When students develop metacognitive skills, they can transition from a dependent reliant learning process dominant in K-12 to the more independent learning expectations in a collegiate setting. Students who develop metacognitive strategies propel themselves upward on

Bloom's hierarchy of learning levels, elevating appreciation and deeper understanding of STEM concepts [6].

Program Activities

Throughout each academic year, scholars begin their experience on campus with a metacognition-focused summer bridge program. The 2024 program was a three-week intensive one-credit course(13 students), followed by a one-week math prep class (~150 students) and one week of orientation (~1500 students) leading directly into the start of the fall semester. Throughout the academic year, the PI team also hosts bi-monthly cohort meetings that intersperse social capital content with fun social activities aimed at maintaining the cohort community established during the summer bridge. Peer-plus student mentors actively assist with the design of activities, which feature numerous Michigan Tech traditions (cultural and other) that include students, staff, and the local community (Keweenaw Day, Parade of Nations, Heikinpäivä - a community mid-winter festival, Winter Carnival, Spring Fling, Design Expo, etc.).

Fall 2024 Curriculum

The six forms of cultural capital—aspirational, navigational, social, linguistic, familial, and resistant— were central in shaping activities during the Fall 2024 semester (see Figure 1). Through each activity, the focus was building upon the rich, community-based assets students contribute. Activities included:

- Panel with Finishing Scholars (Aspirational, Community). Our S-STEM Finishing Scholars were invited to share their aspirations and advice to be successful in college.
- Keweenaw-day group trip (Navigational). Our Peer Mentor took them to a traditional campus event showcasing clubs and other extracurricular activities.
- Civic engagement (Community). We hosted a session on how to register and vote with the Director of Student Leadership and Involvement and the League of Women Voters.
- Prep for Career Fair (Navigational, Aspirational). We held an interactive session on prepping for the career fair, and crafting a presence on LinkedIn, including clothing distribution.
- Social/fun activities included the Outdoor Adventure Program's ropes course (Community, Linguistic), a hike up Mount Ripley to see the trees changing colors, and a family dinner where students collaborated in the dorm kitchen to cook their favorite family dishes (Familial/Community).
- Consignment Trip (Familial, Navigational). We also hosted a driving tour of the consignment shops to help students purchase winter coats, etc.
- Session on semester-by-semester schedule (Navigational). In combination with their departmental advisor, we provided guidance on developing their schedule for the spring semester.
- Study Away/Passports (Navigational). This workshop walked through study away options as well as a step-by-step guide on how to apply for passports with the Director of Study Abroad.
- Parent/Guardian Webinar (Familial). We conducted a Zoom session for parents prior to the fall break, providing information on the pressures their scholar has been dealing with and tips on how they can communicate support for their scholar.

The spring curriculum will once again be aligned with the CWM to include reflections on organizational strategies in the fall, self-care plans, prepping for the spring career fair, planning for summer employment, social events planned around cross-country skiing/snowshoeing/sledding as well as family dinners. The reflection tools are centered around the questions, "What went well? What do you want to do differently in the spring?" A portion of these activities are decided in response to the scholar's needs. The peer mentor stays in close contact with the scholars, helping suggest supportive and bonding activities.

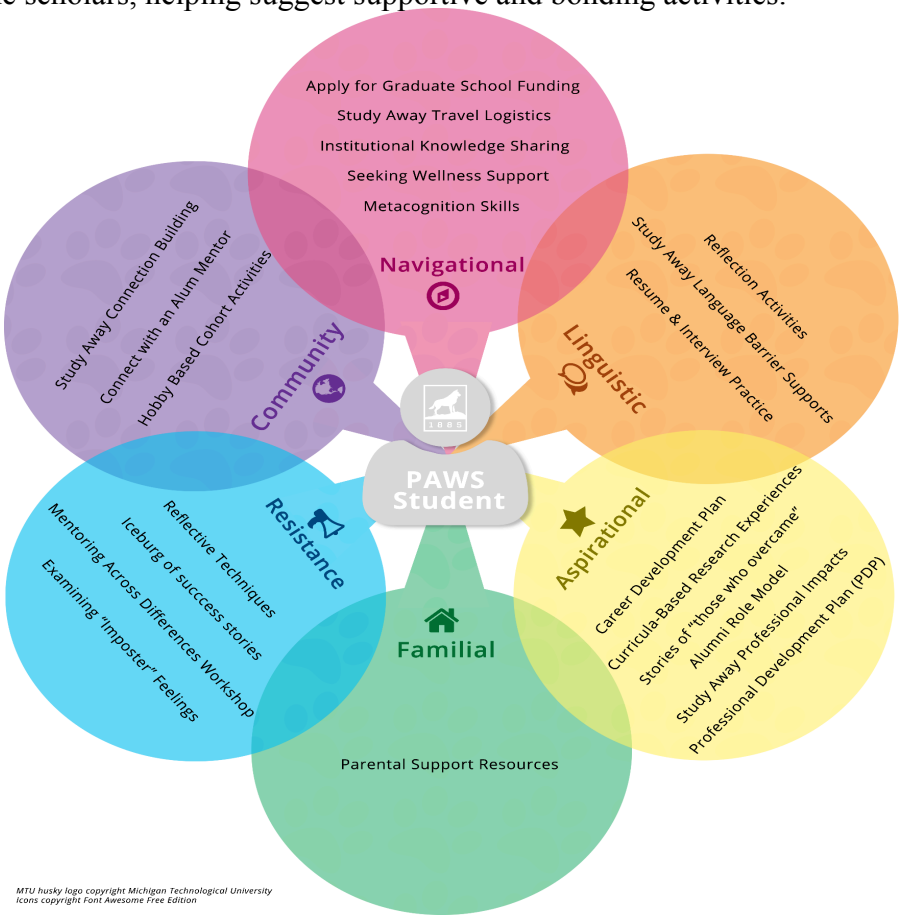

Fig 1. Aspects of Cultural Wealth in the Program

Current Cohort

The 2024/5 academic cohort is the inaugural cohort of the S-STEM Husky PAWS program. This cohort includes six scholars funded for four years of scholarship, as well as six finishing fellows funded for one final year of their undergraduate education. These scholars are studying biomedical engineering, chemical engineering, computer engineering, cybersecurity, electrical engineering, environmental engineering, mechanical engineering, robotics engineering, and software engineering.

Programmatic Assessment And Improvement

The Husky PAWS S-STEM program is being assessed through metrics and scales addressing metacognition [7], cultural wealth [8-9], and student belonging [10]. Scholars were assessed pre

and post-summer bridge experience and will be assessed annually thereafter. Additionally, the program will practice continuous improvement utilizing a participatory action research (PAR) approach. The acknowledgment of expertise provided through lived experience is central to PAR research, which involves those with lived experiences as co-researchers on projects resulting in systemic change [11 -12]. Students themselves have been acknowledged as uniquely positioned to identify needed changes within academic systems [13]. Our S-STEM Husky PAWS project recognizes that the lived experiences of the scholars in our program provide them with the expertise to advise us on how best to improve the program for their benefit. In keeping with PAR values of fostering the ability of impacted people to participate in and conduct research [11], our S-STEM grant included funding for one of our Husky PAWS Scholars to join our team as a PAR co-researcher each academic year. Our current co-researcher is José Padilla, a co-author of this paper.

Throughout the project, the PAR co-researchers will assist with programmatic improvement by conducting focus groups, group-level assessments, and surveys to determine how to best improve the program with each subsequent year's iteration of our programming, as well as determine the impact of the program on the scholars. These PAR co-researchers work in tandem with the co-PIs on the project, who also guide the development of research capabilities within co-researchers.

After the Summer Bridge ended and the scholars were able to experience their college lives, surveys were sent out to them to gather feedback on the application process for the S-STEM scholarship. Their responses allowed our team to revise the application in a way that students would be more likely to apply and respond [14]. As of this writing, the PAR activities have focused on improving our application process, and we are planning group-level assessment activities to revise our summer bridge program for 2025.

The purpose of group level assessments (GLA) is to allow participants to share their personal opinions and experiences regarding a certain topic and work together to figure out a solution — making sure the participants are well adjusted to each other by engaging in ice breakers, answering prompts, and then reflecting on the response given to them [15]. These activities are repeated multiple times throughout the course of the trial and ultimately help the participants to not only be members of an experiment but also provide relevant information and feedback for the research question at hand. These GLA activities end up helping the members to feel empowered and discuss issues that many would brush under the rug out of fear or uncertainty, which allows for the redesign of the summer bridge based on the scholars' experience and advice.

Conclusion

The project's asset-based approach focused on building upon existing skills, knowledge, and wealth to position scholars for success. Early indicators of success include all cohort scholars earning 3.45 and higher GPAs, 100% retention to their second semester, and continued engagement in activities, polls, and robust Discord discussions.

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