Apoyando y Modificando el Currículo: Supporting our Next Generation Latinx STEM Students

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Mayrismir Cordero obtained her Master's Degree in Public Administration from St. Mary's University in San Antonio. She knows and understands that student success is a collaborative effort. Her project management and organizational skills have led her to design programs that lead and serve a large community of multidimensional learners. After 17 years in education, her love for students, her connection with faculty and her shared identity as a Latina with the Hispanic/Latino community, are the motivating factors that continue to encourage her work in Higher Education at Palo Alto College as an Academic Program Coordinator while collaborating on the NSF Eddie Bernice Johnson INCLUDES ALRISE Alliance grant as a Regional Hub Lead & Experiential Learning Coordinator, PDSA Facilitator.

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Abstract

Work in Progress(WIP) Paper: To address inequity within higher education, the NSF INCLUDES ALRISE Alliance (NSF#2120021) has empowered faculty to modify their curriculum, tackle inequity issues within Hispanic Serving Institutions (HSIs), and aim for systems change benefiting Latinx/e students in STEM. Inequity manifests in various forms within the classroom, by adjusting the curriculum, faculty can establish an equitable learning environment. The Plan-Do-Study-Act (PDSA) approach within the ALRISE Alliance equips STEM Team faculty with the tools to identify problems, devise and implement solutions, and utilize data to refine PDSA cycles. The PDSA is an iterative process that is normally done in 60 days, or in our case in a 120-day semester, all in pursuit of addressing the shared challenge of broadening participation. This paper will delve into the implementation, design, and execution of the PDSA framework during a lightning talk.

Introduction

The Plan-Do-Study-Act (PDSA), developed by the Carnegie Foundation for the Advancement of Teaching, is part of Continuous Improvement, "A problem-solving approach centered on continuous inquiry and learning". The PDSA is a powerful tool used to accelerate improvement, its rapid process applies a microscopic lens to programs, activities, and curricula that faculty are doing within the classroom, and outside the classroom. In addition, the PDSA can be used to modify processes and policies that, together with optimizing programs, activities, and/or curricula, contribute to system change which is the goal of the ALRISE Alliance.

In our Year 3 of the NSF INCLUDES ALRISE Alliance (NSF #2120021) as part of our goals we have asked that each ALRISE STEM Team create a new Culturally Responsive Experiential Learning or modify an existing Experiential Learning (EL) using the PDSA tool. Culturally Responsive Experiential Learning could be implemented in two forms: Work-based experience (WBE) or Undergraduate Research Experience (URE). The STEM Teams need to complete their ELs within the 5 years of the grant completion.

Background

The NSF's Eddie Bernice Johnson INCLUDES Accelerating Latinx Representation in STEM Education (ALRISE) Alliance is a national network of local and regional HSI educators and partners across 22 higher education institutions with over 220 members, industry, and community partners who collaborate and use culturally-responsive experiential learning to increase Latinx STEM student success. Designed as a collaborative change framework in a Networked Improvement Community (NIC), ALRISE addresses the persistent underrepresentation of Latinx students in STEM by monitoring and assessing institutional, regional, and alliance-level data for the generation, evaluation, and continuous improvement of culturally responsive experiential learning opportunities.

The Ecosystem of NSF ALRISE Alliance

Figure 1 shows the ecosystem of our 22 ALRISE Alliance institutions. Each institution is placed in a hub and provided support by these hubs.
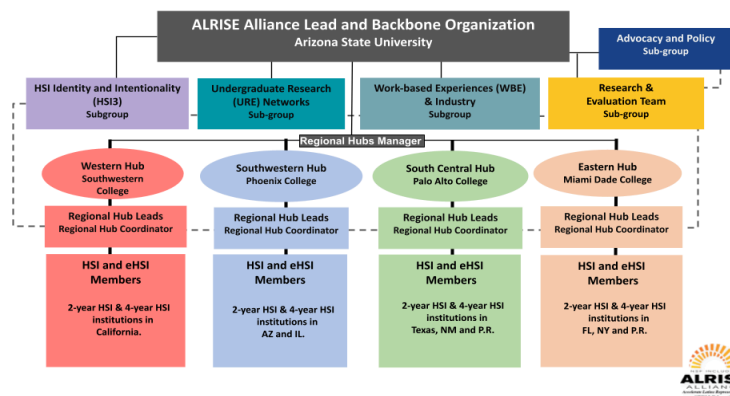

Figure 1[3,4]

STEM-ESS Framework used to develop STEM Team Plan goals.

The STEM-ESS is a framework that provides STEM Teams with a complete self-assessment of 92 institutional attributes reported and collected as data for student success strategies. The assessment is given to each member at the beginning of their institution's onboarding. STEM pathways, leadership, technology integration, and industry connections are categories included in the Self-assessment and related to recruitment, retention, and completion. The self-assessment results are aggregated at the institutional level to identify strengths, challenges, and priorities for an intentional acceleration of Latinx representation in STEM. As shown in *Figure 2* the STEM-ESS process informs STEM Teams of goals and objectives that the teams should set and prioritize as they develop their action plans with success metrics. In Year 3 of the grant, STEM Teams were encouraged to revisit their STEM Team Plan goals that were developed by their STEM-ESS assessment and decide on a goal that the team would like to change or improve using the PDSA.
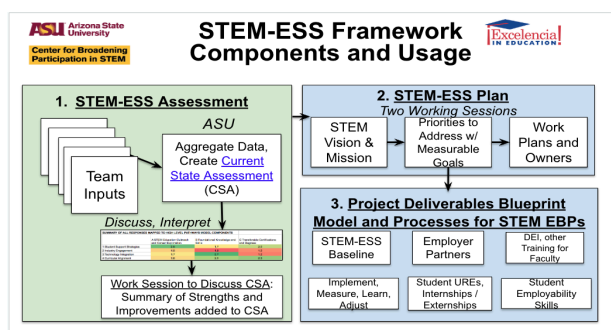

Figure 2[3,4]

ALRISE STEM Teams

STEM Teams are created to support the institutional system change goal of the ALRISE Alliance. These STEM Teams consist of 10 team members that support different areas of STEM. These members are faculty, support staff, STEM students, and administrative employees like VPs, Deans, Directors, and Department Chairs who belong to different departments throughout their institution. All the members of the STEM team play an important role in the PDSA. Each STEM Team has a Team Lead that holds all members of the team accountable for creating and implementing Culturally Responsive Experiential Learning at their institution. The success of their PDSA is in part due to everyone's participation.

STEM Team: Meetings, Professional Developments, and Support

Throughout the semester STEM Teams are expected to attend several meetings and Professional Developments. ALRISE embedded in their infrastructure 3 subgroups led by experts in the fields: Undergraduate Research Experience, Work-Based Experience, and the Hispanic Serving Institutes Identity and Intentionality (HSI3) subgroup that would provide through Communities of Practice professional developments and opportunities for collaboration that without the support from ALRISE the teams might have never received. Teams are also expected to attend Regional Hub Meetings led by their Regional Hub Coordinator intended to be a space where teams can collaborate, an Annual Convening led by the Backbone Team and

intended to bring all hubs, subgroups, and industry together and STEM Team meetings are led by Team Leads in which the team comes together to collaborate and work on their PDSA.

ALRISE also supports the teams by having a PDSA facilitator attend the STEM Team meetings as a subject matter expert for support but not to run the meeting. Facilitators provide feedback and discuss the PDSA worksheet with the teams in which they will use iterative problem-solving processes and use the worksheet to document, evaluate, refine and implement changes. The team is encouraged to jointly decide on a PDSA Aim and they are given autonomy over how to disseminate the work. To maintain verbiage consistency with our Professional developments and meetings we customized the foundational questions used in the PDSA worksheet. The ALRISE Alliance endeavors to prepare the STEM Teams with the knowledge and skills needed to create successful Culturally-Responsive Experiential Learning using the PDSA.

The PDSA has a four-step cycle illustrated in *Figure 3* [2] that's used to achieve continuous improvement, consistent results, and maximizing processes. This scientific method of change can be repeated again and again. Through the PDSA, STEM Teams learn to identify gaps within their institution and build institutional capacity with effective culturally-responsive experiential learning programs that will create system changes to improve Latinx STEM student engagements and experiences.
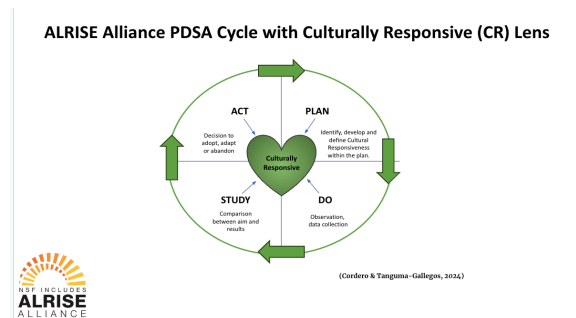
Figure 3 [2]

Foundational Questions to be used during the PDSA (Plan) cycle.

Each cycle has a set of questions that are used to guide the STEM team members in completing each section of the cycle. We have included the following foundational questions of the plan cycle.

The STEM Teams discuss and write out their AIM statement on their PDSA Worksheet.
- What specifically are we trying to accomplish?
- How can our student's *cultura* be embedded into our work to support Latine/x students?

Faculty using the PDSA:

The ALRISE Alliance held a focus group with Faculty members that completed UREs as part of their PDSA. They shared their (outcomes) & testimonials with us. *Consents were signed.*

Faculty members indicated that the PDSA guided them to focus on Culturally Responsive practices that enhanced their student participation, student development, and approach toward Latinx students. One of the faculty members also indicated that due to the PDSA, they were able to look at their behaviors and beliefs and recognize that they needed to change how they approached, taught, and interacted with Latinx students.

Over the past year:

- School X embraced the PDSA cycle and integrated it into the classroom setting, specifically in Biology 180. This class consisted of 12 Latinx students. The primary goal was to incorporate scientific inquiry within the Latinx community. As part of the curriculum enhancement, Tiny Earth, a program that inspires students to engage in scientific research, was introduced to address anti-fungal resistance in crops. Each student experimented, and based on their findings, they were offered an opportunity to join the science lab. To foster a sense of identity within the lab, Latinx students were informed about the significance of specific native plants in medicine within their culture. Additionally, the faculty designed a Culturally Responsive framework to sustain the momentum of scientific exploration and discovery. The Faculty member also added a pre and post-survey to the curriculum in which items like a sense of belonging, acquired skills, team building, science identity, protocol understanding, and research interest were covered. The faculty encouraged the class to look into further Undergraduate Research Experiences. Three of the students shared their new interest in research and took the challenge. They proceeded to pursue classes with embedded Experiential Learning opportunities.

-A Math Faculty embraced the PDSA and integrated it into the classroom setting. The goal was to meet the student's needs of understanding in a math college prerequisite course. After surveying the students and engaging in classroom conversations, the Faculty realized the gap in the student's success. The student's first language was Spanish and even though they had the requirements to enroll in the institution they were not fluent in English and struggled with understanding and conversing in English. They would not ask questions and preferred to drop a class where they were expected to actively participate. Their low passing rate was due to language and not lack of background knowledge or capacity to complete the tasks. The faculty took a semester to translate most of the class curriculum into Spanish. The faculty translated the Syllabus into Spanish, recorded the lessons in Spanish, created tutoring sessions in Spanish, and most of the online documents in Spanish. The Faculty provided all these resources for the students but continued to teach all the concepts in English. The Faculty still expected the students to learn all the concepts in English and take the tests in English. Translating these materials into Spanish indicated that the faculty met the students' needs and increased the student success rate in the course. The Math Faculty adopted this PDSA and now has continued to translate other courses to meet students where they are.

Conclusion

The PDSA tool has empowered members to drive change within their classrooms, institutions, and themselves. It offers a structured approach for testing ideas, allowing members to adopt successful solutions, adapt with modifications, or abandon ineffective strategies and initiate new PDSA cycles. Members embark on a journey of cultural humility, self-exploration, and lifelong learning, identifying gaps, accelerating improvements, and developing culturally responsive experiential learning programs. Through ALRISE PDSA implementation, we have gained insight into the challenges STEM Teams face, from resistance to change to resource constraints within the institutions. Yet, we are witnessing the faculty's commitment to accelerating Latinx student's representation in STEM for the future.

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