Building Collaborations Across Institutions: Lessons from a Multi-Institutional S-STEM Program

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Title and Description of Primary Image: S-STEM students in the lab. S-STEM students from partner community colleges tour a lab at UNC Charlotte.

Abstract

Community college students represent a large and growing portion of the undergraduate student population. Their experiences upon transferring to baccalaureate-granting institutions present unique challenges to student retention and achievement and highlight an area where institutional-level interventions can be helpful to increase student success. This essay provides advice on the multiple steps involved in building multi-institutional coalitions for large educational grants to promote this type of intervention, using an S-STEM consortium as an example. It focuses on the experiences involved in obtaining and managing a Track 3 S-STEM award designed to support high-achieving students from low-income backgrounds across their community college and baccalaureate-granting institutional careers. Our coalition includes two community colleges and one university, collaborating on efforts to smooth transfer pathways and increase degree attainment at both the community colleges and the four-year institutions, particularly among students seeking degrees in the biological sciences. In this essay, I discuss some valuable lessons learned from the establishment and operation of this grant, offering advice to others who may be interested in submitting proposals to the Track 3 program or in building similar types of multi-institutional coalitions to promote student success.

INTRODUCTION

Students from low-income backgrounds are underrepresented in STEM undergraduate education and the STEM workforce (1, 2). These students frequently encounter systemic disadvantages that harm access to educational opportunities (3, 4). As a result, they are less likely than students from higher socioeconomic status (SES) backgrounds to graduate with four-year STEM degrees, though they express higher levels of interest in STEM majors before beginning college (3, 5). Calls to diversify the population of STEM students have highlighted the potential of community college students, a population includes a high percentage of low-income students (6) who aspire to transfer to four-year universities (7). Because STEM jobs tend to be well-paid, diversifying the population of students earning four-year degrees in STEM can increase upward socioeconomic mobility for low-income students (2, 8).

One way the National Science Foundation (NSF) supports STEM education is through the Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) grant program (https://new.nsf.gov/funding/opportunities/nsf-scholarships-science-technology-engineering). It offers funding for scholarships for high-achieving students from low-income backgrounds at a range of institution types, from community colleges through graduate study. Funding is limited to fields that NSF defines as STEM and to principal investigators (PIs) who use publicly available data to establish a need for students with those degrees in the labor force. Undergraduate students are currently eligible for up to $15,000/year when they earn grades at a level that the grant defines as “high-achieving,” meet citizenship criteria, and can demonstrate unmet financial need. There are separate “tracks” of proposals that vary in overall budget and organizational complexity, from single institution to multi-institution grants. Here, I discuss the process of planning for a Track 3 grant, which requires multiple institutions to collaborate, has the largest maximum budget (a substantial percentage of which must be spent on student scholarships), and must include knowledge-generating research activities regarding institutional approaches to supporting the academic success of low-income students. Lessons from this experience with a Track 3 grant can be extrapolated to other multi-institutional coalitions for large educational grants as well.

Faculty and staff from our consortium of one university and two community colleges (Gaston College, Rowan-Cabarrus Community College, and University of North Carolina at Charlotte)

began meeting in 2016 to prepare a 2017 Track 3 submission. This proposal built on Gaston College's successful Track 1 project from 2014. In 2018, our consortium was awarded a five-year grant to support the enrollment of up to 156 students across the three institutions. Community college student enrollment began in Fall 2018, while UNC-Charlotte used that year for planning, enrolling the first cohort in Fall 2019. The project's goals were to: (i) increase the numbers of community college students earning A.S. degrees, (ii) support students in transferring to the biology major at UNC-Charlotte, and (iii) increase the numbers of community college transfer students earning bachelor's degrees in biological sciences. To this end, project activities included implementing a learning community model, improving cross-institutional faculty communication, removing barriers to degree completion, and redesigning courses at the community college.

While the timing of the COVID-19 pandemic made several aspects of managing this project challenging, this essay will focus on the process of establishing a consortium for a Track 3 grant and how to manage the ongoing project. This advice may help those who are seeking to establish similar consortia and thereby increase access to STEM degrees for eligible students through the S-STEM program and other funding opportunities. It builds on the excellent advice that Connors (9) gives to S-STEM grant writers by discussing areas of emphasis for aspiring Track 3 grant-writers and others writing multi-institutional grants.

ESTABLISHING THE INSTITUTIONAL CONSORTIUM

Reverse Engineering the Timeline

As Connors (9) describes, understanding the requirements is the first key step to writing a successful proposal. Uniquely for the Track 3 proposal, knowledge-generating activities, distinct from the evaluation plan that all S-STEM proposals require, must be included. These knowledge-generating activities contribute to understanding of how the program increases student retention and graduation for low-income students. Articulating a research plan benefits from the meaningful integration of education, learning science, or social science researchers in the proposal-writing team.

All S-STEM proposals require the inclusion of certain kinds of institutional data on the number of potential scholars and how "unmet need" will be calculated, among others. Thus, the PI

team must allow adequate time for gathering required data, described in the RFP, and to establish expectations regarding contributions to the project. Because Track 3 grants are typically collaborative grants among institutions, one institution must be designated as the "lead" and the other institutions' budget materials linked to the lead institution's budget. Thus, leadership is needed both on the PI team and at the institutional level. Delineating responsibilities in grant management is a required portion of the proposal: having this clear delineation helps avert problems in project management after the proposal is funded.

Beginning with the grant deadline and any relevant institutional deadlines in mind, PIs should reverse engineer a realistic timeline, considering any university breaks where colleagues may be unavailable, along with the overall workload of faculty and staff involved with proposal preparation. A successful Track 3 proposal will reflect the efforts of many individuals across multiple institutions: having them all meet a submission deadline requires accounting for contingencies.

Building a Team

Track 3 grants require buy-in and representation from faculty and administrators at all institutions. In many cases when writing a Track 3 grant, it is useful to have experience with Track 1 or Track 2 grants as a foundation. Our grant team had foundational PIs from Gaston College, which had a successful Track 1 grant that included redesigning courses. Those colleagues were eager to extend the lessons they had learned to colleagues at Rowan-Cabarrus Community College, as well as provide support for their students to continue their education at UNC-Charlotte. When contacted by the UNC-Charlotte administrators who suggested the S-STEM consortium, Gaston College faculty and administrators were willing to share their successful Track 1 proposal and allow its use as the basis for the Track 3 proposal. Established relationships among high-level administrators at both community colleges facilitated the inclusion of Rowan-Cabarrus Community College: those administrators identified faculty who might be well-positioned to implement the grant on their campus. Because community colleges in our state do not require students to declare a specific major, those teams could focus on students who were earning associates of science degrees.

Additionally, we needed to develop a team of faculty at UNC-Charlotte with interest and capability in STEM education and to identify the STEM students on which the program would

center. The most involved administrators were in what was then called the College of Liberal Arts & Sciences, which had four eligible S-STEM fields. I am a sociologist with an appointment in the same college, and my research has long focused on inequities in STEM fields. Given the confluence of those two factors, and the relative size of the transfer student populations in the S-STEM-eligible fields, we made a strategic decision to focus on students majoring in biology. Because many S-STEM programs across the country have difficulty recruiting eligible students, we decided to focus on the field with the largest number of transfer student majors and where the labor market needs were most obvious. This early step of the proposal-planning process required the involvement of the Office of Institutional Effectiveness & Analytics to generate data on the number of transfer students and their majors to facilitate estimations of the size of the eligible student population, a required element of the proposal.

Once those decisions were made, we were able to secure the cooperation of the department chair and faculty members in the Department of Biological Sciences, as well as a handful of faculty members in departments such as Chemistry where biology students take several courses. The last step of team building was to identify an external evaluator for the program. None of these decisions was made quickly and all required relying on existing personal networks and extensive email and videoconference communication.

Institutional Buy-In

Communication is important beyond the immediate team of faculty writing the proposal. Because Track 3 grants are collaborative, they may require the designation of a lead institution and the involvement of grant offices at each institution to create budgets. In collaboration with the PIs, staff at the lead institution may take responsibility for communication with other budget offices and coordination of budget-writing activities. This communication ensures consistency across this important piece of any proposal.

Moreover, successful teams include higher-level administrators or, at a minimum, letters of support from administrators at each institution involved in the proposal. These letters are especially critical when faculty leading the project have junior status or are not in decision-making roles themselves. Required letters also must come from university offices that are necessary for the collaborative project. In our case, that included the Office of Financial Aid and the Scholarship Office, which would be administering the students' stipends. Thus, it is helpful

to have a succinct description of the project to send to other personnel as an introduction before beginning conversations to ask for letters, keeping overall timelines in mind.

PROJECT EVOLUTION AND MANAGEMENT

In the grant-writing process, constant communication is necessary, along with agreed-to deadlines. Establishing those deadlines early in the process helped to keep the team working on the Track 3 proposal on a pathway to success. Throughout the operation of the project, that communication needs to continue, albeit at a slower pace as the project operations mature. For our project currently in a no-cost extension year, a leadership committee meets at least four times per year for regular updates, with more frequent communication occurring among PIs around topics including data collection efforts to support knowledge-generation, external evaluation, and annual reporting. Earlier in the project, the entire leadership team met more frequently to work toward identifying and removing institutional barriers to successful student transfer to the university.

Communicating extensively and meeting regularly facilitates trust-building. When working with multiple institutions, especially those that are operating within the same general geographic area, there may be histories of competition or interactions among institutional personnel that could hamstring cooperative efforts. Knowing those histories is an important first step to avoid their replication. This concern may be particularly important for university personnel seeking to build similar coalitions, as it is common for a history of power differentials in university/community college relationships to undermine current levels of trust and desire to collaborate. Thus, everyone involved in the project must consistently assume that others in the project have positive intent, especially when obstacles arise.

In the implementation of the project, hurdles come up repeatedly. Although a global pandemic may not interrupt your multi-institutional project in the way it did ours, other hurdles to anticipate include recruiting scholars, personnel turnover, and changes in the educational environment. Given recruitment difficulties, it is important to be realistic about the capacity of each organization to identify and recruit eligible scholars. Working with low-income students frequently means understanding demands on their time, which may make them less likely to submit complicated applications to scholarships. We found that making the application process as straightforward as possible helped to boost the number of participants.

On a large team, personnel turnover is almost inevitable. Faculty and administrators retire, move institutions, or change roles. Communicating clearly helps to ensure that there are well-defined transition plans in place and that new faculty/administrators stepping into the project have a solid understanding of their roles and responsibilities. It may be necessary to revisit the proposal's discussion of responsibilities and adjust it but having that discussion as a foundation provides a necessary starting point.

Finally, the project may encounter policy or institutional-level changes that affect project implementation. In our case, those changes included the rapid growth of the dual-enrollment high school student population at both community colleges, shifts in institutions' scholarship administration programs, and free community college tuition that students received for several years during the height of the COVID-19 pandemic and made recruitment especially challenging (to say nothing of the shift to emergency online instruction in the Spring of 2020). It is certainly not possible to anticipate all these issues. Understanding that they will arise in some form and creating high levels of trust and functional communication patterns ensures that projects can evolve to survive those environmental pressures.

CONCLUSION

In sum, there are several important lessons that we will draw on in future collaborations, with the consortium and beyond:

- Establishing clear leadership and designating responsibilities is critical early in the collaboration process.
- Reverse engineering the proposal timeline must be done, with adequate time for all institutions to contribute required data and build budgets.
- Building on prior successes and existing social networks to define the project's scope and staff its implementation will be helpful.
- Gaining support from upper administration is foundational to the proposal (and project's) success.
- Communicating is key, both to building trust and improving efficiency.
- Assuming positive intent on the part of all collaborators will make proposal-writing and project implementation work more smoothly.

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