



## **Increasing Sustainability of STEM Intervention Programs Through Evaluation**

*by Casey E. George-Jackson and Blanca Rincon*

Across the nation, there is a persistent call for increasing the number of science and math degrees awarded at the postsecondary level, for reasons of economic stability, international competitiveness and scientific innovation. For groups that have been traditionally underrepresented in the science, technology, engineering and mathematics (STEM) fields, including women, racial and ethnic minority students, and low-income students, success in the STEM fields is also related to issues of educational equity and social justice.

Intervention programs in the STEM fields that seek to recruit and retain students in science and math-based disciplines represent one effort to improve STEM education at the postsecondary level. Through a variety of services such as mentoring, tutoring, and providing research opportunities, these programs aim to improve the likelihood that students, particularly underrepresented students, will enter into, persist, earn a degree, and even enter the workforce in a STEM field.

While these programs serve an important role for our nation's colleges and universities, the current economic downturn and current calls for accountability represent significant challenges to the long-term sustainability of these programs. As programs face pressure to demonstrate their value and seek funding to continue their important services, evaluations become an important tool in the quest for legitimacy and stability. This paper investigates the extent to which STEM Intervention Programs (SIP) at a sample of large, public, research universities are evaluated, and if so, how the evaluations are conducted and the results used. In addition, challenges to conducting evaluations are explored.

### **STEM intervention programs**

Postsecondary intervention programs typically aim to increase the recruitment and retention of students, particularly disciplines such as the STEM fields. The programs featured in this study seek to increase the representation and success rates of students from traditionally underrepresented groups, including but not limited to women, racial and ethnic minorities, first-



generation, and low-income students. SIPs can be found in a variety of science and math-based disciplines, including the agricultural and biological sciences, where differences in representation by group may not be as severe as in other fields such as engineering, but students still benefit from services offered by SIPs.

In the effort to increase STEM participation and success, SIPs provide important services to students through a variety of formats including living learning communities, academic bridge programs and research opportunity programs. SIPs typically seek to provide the following elements: 1) academic and social integration; 2) knowledge and skill development; 3) support and motivation; and 4) advising.<sup>1,2</sup> These services often supplement the formal education students receive within the classroom and major, and can impact students' sense of belonging, academic outcome and even career choices.

Although empirical-based literature on the outcomes of SIPs is currently limited, there is an increasing amount of scholarship that highlights the benefits of conducting and utilizing internal and external evaluations, such as redefining program goals and objectives to meet stakeholder's needs, increasing program effectiveness, developing logic models and informing programmatic changes.

## **Evaluation**

Evaluation is the systematic review of a program or policy, which uses various methodological approaches to determine its merit, quality, worth or value. In addition, evaluations aid in generating knowledge of what interventions and services work best for which students, and in informing decisions related to funding and programming. While individuals and groups informally participate in the process of evaluation every day, evaluation as a profession emerged in the 1960s and has been continually evolving since—mainly in Western countries—with multiple theorists and practitioners contributing to the development of the field.

The 1960s and 1970s greatly influenced early evaluations due to massive increases in public funding for social and education programs and policies, and the need to evaluate the merit, worth and success of such programs and policies. More recently, evaluation has been



described as “assisted sensemaking,”<sup>3</sup> where systematic inquiries result in understanding values which assist in determining a program’s merit or worth. Evaluations have also been described as a process or source of “enlightenment” that educates and informs policy makers and program managers.<sup>4</sup>

It is important to note that evaluation is inherently different from research. Although they are both mechanisms of inquiry and utilize multiple methodologies, the specific questions addressed through the process of evaluation are fundamentally different, as well as the purpose of each activity—namely that evaluation seeks to impact actions and decisions, while research is often conducted for the purpose of knowledge production.

## **Legitimacy**

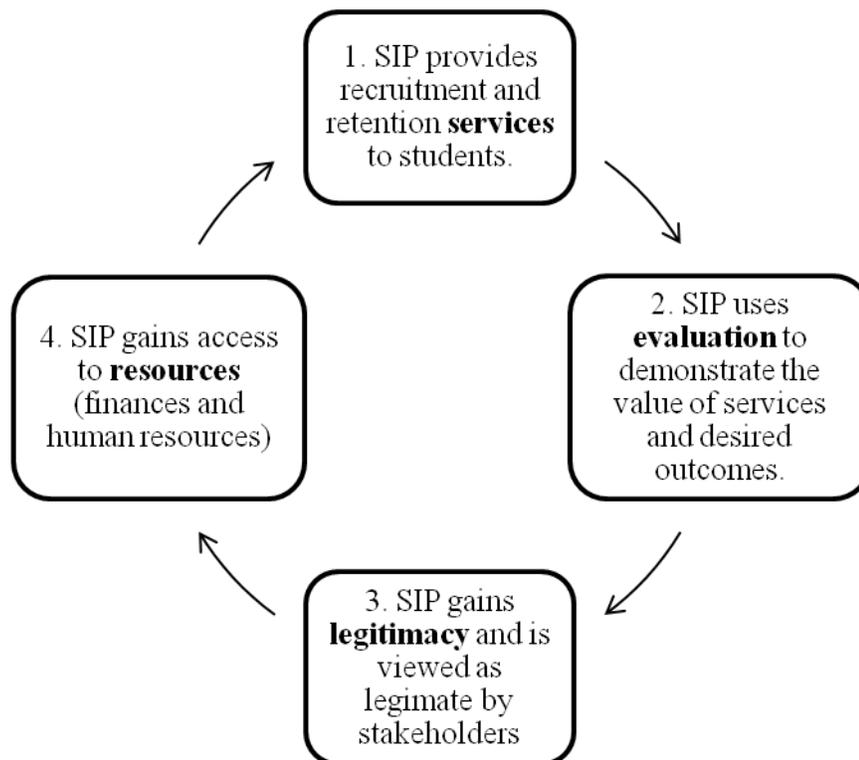
The theoretical framework used in this study to explore the relationship between SIP programs and evaluation is legitimacy theory. Legitimacy theory is a resource dependency theory that describes how organizations—or in this case, a SIP—gain acceptance due to their relationship with mainstream norms and values within an institution or society. As the SIP becomes legitimate, it sustains the flow of resources from the environment to the organization.<sup>5</sup> Moreover, Talcott Parsons, author of *Structure and Process in Modern Societies*,<sup>6</sup> argues that organizations that pursue goals that are in alignment with societal values have a legitimate claim on resources as judged by stakeholders<sup>7</sup>.

Here, SIPs seeking legitimacy may be influenced to incorporate structures and procedures that match widely accepted social norms, or norms found within a college or university. As such, SIPs may be encouraged not only to align their missions and goals with certain values, but also to demonstrate their value or worth to the college or university. By conducting evaluations, SIPs are able to demonstrate how their services and programming align with the norms of the college or university, as well as gain support and funding based on the demonstration of desired outcomes.

As a result, programming, evaluation, staffing, funding, and even visibility can be viewed as a cyclical process for continuous improvement of SIPs, as shown below in Figure 1. This is

referred to as the legitimacy framework, and shows how evaluation results are used to both make improvements to the SIP, but also to gain legitimacy with relevant stakeholders, which in turn increases human and financial resources available to the SIP. With increased resources, the services provided to students by the SIP are improved and the cycle continues.

**Figure 1: Legitimacy framework: use of evaluation results**



SIP = STEM Intervention Program

Figure 1 is similar to the plan-do-study-act (PDSA) cycle, which allows for continuous improvement.<sup>8</sup> A comparison of the two cycles in Table 1 shows interesting differences, yet both equally inform efforts for continuous improvement.

**Table 1: Comparison of two approaches to continuous improvement**

<b>Original PDSA cycle</b>	<b>Legitimacy cycle</b>	<b>PDSA cycle reordered for legitimacy cycle</b>
Plan	Provide services to students	Act
Do	Conduct Evaluation	Study
Study	Gain legitimacy	Plan
Act	Secure resources	Do

PDSA = plan-do-study-act

The table above shows that the legitimacy cycle is similar to the PDSA cycle, yet the order of the components is different. In the legitimacy cycle, the SIP first act by providing services to students. Next, a study is performed of the program's services and impact on students to assess outcomes. The results of the evaluation aid SIP directors and administrators to plan for the future, as evaluation results aid in the process of gaining legitimacy in the eyes of interested stakeholders. Finally, with increased legitimacy, the SIP directors and administrators can perform, or do, their services with increased resources.

While the order of the components between the two cycles is different, both are cyclical processes that lead to continuous improvement of education programs. Ideally, as a SIP gains legitimacy, it will have more financial and human resources to conduct evaluations and deliver services to students. Conversely, SIPs that do not conduct evaluations may be less likely to be viewed as legitimate programs, and as a result, may struggle to secure adequate and recurring funding, support and proper staffing.

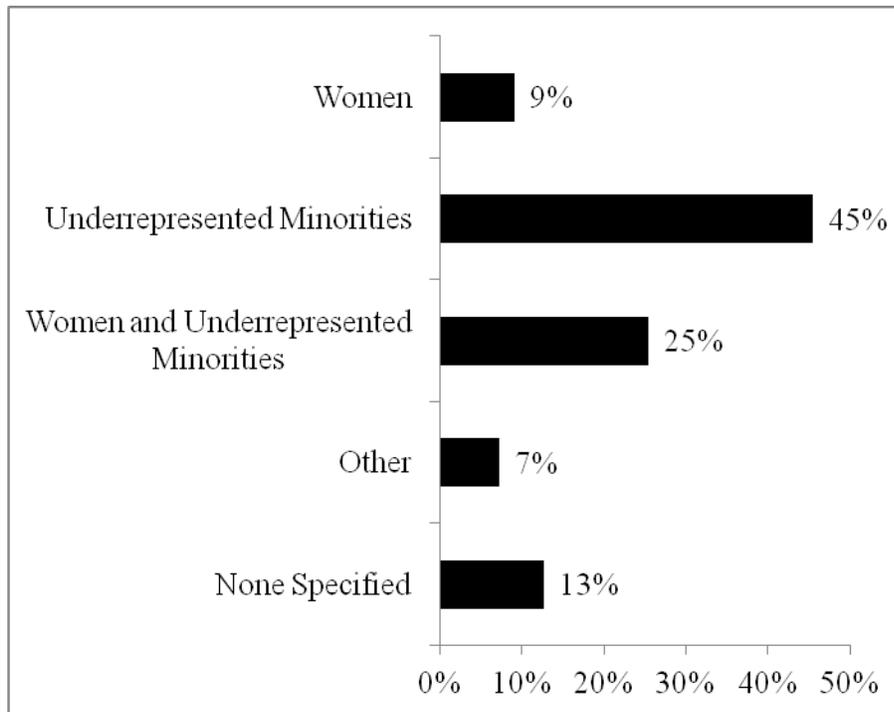
## Data and methodology

The current study is a component of a larger study on underrepresented undergraduate students in the STEM fields at large, public, research universities. The overall project uses qualitative and quantitative data to investigate the many individual and institutional factors that impact the educational decisions and outcomes of women, students of color and low-income students' participation within the STEM fields.

One component of the larger research project sought to explore how SIPs are designed, funded, staffed and evaluated. The full set of interview questions is available in the Appendix. The latter topic is the focus of this particular study, which seeks to specifically examine the extent to which SIPs are performing evaluations of their programs, as well as examine the methodologies used to conduct evaluations and how evaluation results are used by program directors and administrators. Face-to-face interviews were conducted with 55 SIP directors and administrators at 10 large public, research universities in 2009 and 2010. Under the Carnegie Classification system, each university included in the study is classified as a public, four-year, doctoral-granting research university. The participants were identified by searching each university's website for intervention programs in a broad set of STEM fields, and were then recruited to participate in the study.

While the specific missions, goals, services, and targeted populations of each program included in the study varies, each aimed to increase the enrollment, persistence, and/or graduation rates of underrepresented students in the STEM fields. Examples of SIPs in the study include, but are not limited to: summer research programs; mentoring and tutoring programs; leadership development programs; and first-year experiences for underrepresented students in STEM (for example, designated housing and first-year seminars). Figure 2 shows the targeted population of the programs featured in this study.

**Figure 2: Targeted population of SIPs**



Source: Authors' calculations; Project STEP-UP, 2011. Totals may not add to 100% due to rounding.

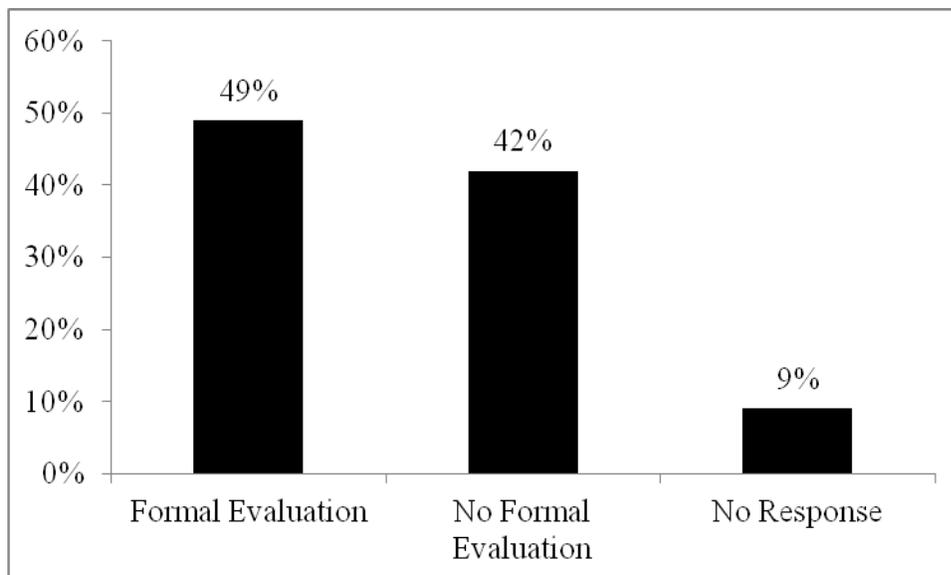
Participants included administrators, faculty and staff of SIPs. A total of 137 individuals from 10 universities were invited to participate in the study. Of the 55 individuals who participated in the study, 12 were male, 43 were female; 26 were Caucasian, 21 were African American, five were Latino, two were Asian American, and one was Native American. In terms of their education levels, 20 had obtained a Ph.D., five were enrolled in a Ph.D. program, 21 had earned master's degrees, and three had earned bachelor's degrees. The remaining six participants did not indicate their highest level of education. On average, interviews lasted approximately one hour, with two interviewers from the research team per interviewee. Interview teams included one principal investigator and one research assistant. Of the interviewees, three were male and four were female; five were African American, one was Latino, and one was Caucasian.

Responses to questions regarding the evaluation practices and results are of particular interest in this paper. Interviewees were specifically asked if the program had been formally evaluated, either internally or externally. If the program had been evaluated, participants were then asked about the focus and results of the evaluation. After the audio recordings were transcribed, the researchers utilized an open coding strategy to organize data into broader themes and issues. Open coding is concerned with describing, identifying, and categorizing the phenomena of interest.<sup>9</sup> Upon development of coding, pattern-matching logic was used to identify distinct characteristics of institutional programs and common themes and issues across all the campuses. Pattern-matching logic compares empirically based patterns with theoretical and conceptual frameworks.<sup>10</sup>

## Findings

Approximately half of the programs featured in the study had been formally evaluated, while another 42 percent had not been formally evaluated and 9 percent did not provide an answer to the question (see Figure 3).

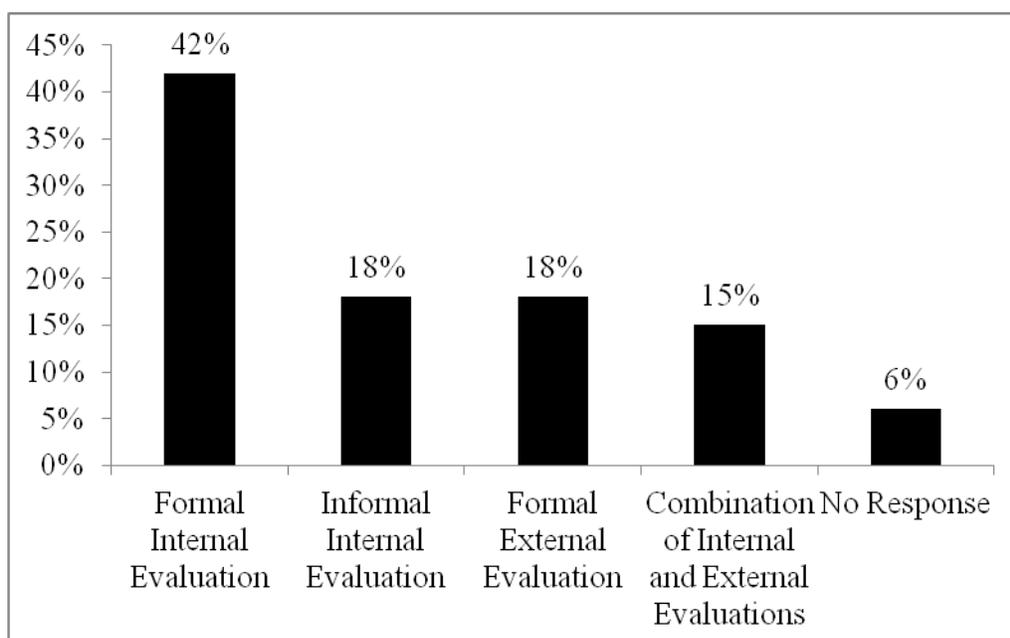
**Figure 3: Evaluation status of STEM intervention programs**



Source: Authors' calculations; Project STEP-UP, 2011.

Of the programs that had been evaluated, 42 percent had been formally evaluated through internal means, 18 percent were formally evaluated through external means, 15 percent had been evaluated both internally and externally, and an additional 6 percent did not specify the type of evaluation conducted (see Figure 4). An additional 18 percent of programs had been informally evaluated through internal efforts. The focus of the evaluations conducted ranged from investigating the climate of a department or college, student outcomes, student attitudes, retention, academic transitions, reasons for dropping required courses, relations with faculty, mentor experiences, and the extent that a program’s mission is being met.

**Figure 4: Types of evaluations performed**



Source: Authors’ calculations; Project STEP-UP, 2011. Totals may not add to 100% due to rounding.

A variety of data collection techniques were used in the completed evaluations, including pre and post-tests, online and written surveys, exit interviews, focus groups, students’ self-evaluation, faculty rankings, observations, mid-program evaluations and even the inclusion of comparison groups. In addition, some participants cited informally following students and their outcomes on social networking sites such as Facebook, and gathering anecdotal information



through informal conversations with students. As expected, external evaluations conducted appeared to be better organized and were more formal as compared to internal evaluations. External evaluations occurred through partnerships with evaluation experts on campus, as well as outside consulting firms. The program directors and administrators who had not conducted an evaluation on their program indicated that they would like to in the future.

An overview of the internal and external evaluations that had been conducted is discussed first, followed by common themes found within the data, including: 1) evaluation as a requirement; 2) evaluations support sustainability of SIPs; 3) evaluation expertise; and 4) resource constraints.

### **Internal evaluations**

As indicated above, the majority of program administrators who had evaluated their program did so internally, indicating that a staff member of the SIP conducted the data collection and assessment. Some of the internal evaluations gathered data through formal means such as exit interviews with seniors and pre and post-tests to assess students' experiences and knowledge of STEM. However, internal evaluations also relied on anecdotal evidence to determine the program's success. For example, one administrator indicated that she would "hear stories" about former students in her program and their continuing involvement in the STEM field, including presenting their research at conferences.

Some administrators who performed internal evaluations of their programs benefited from having had training or a background in evaluation. For example, these administrators recognized the value of having a well-designed evaluation and were able to collect data from comparison groups for each cohort in their program. Being familiar with evaluation methods and design enabled some internal evaluators to incorporate formal aspects of evaluation into their assessment efforts. As such, there was a variety of approaches, methods, and results from the internal evaluations conducted on SIPs.



## External Evaluations

SIP administrators whose programs were formally evaluated were able to do so because of partnerships with other departments on campus, by hiring part-time graduate students who were earning degrees in evaluation, or by hiring an evaluator from outside the university. On-campus partnerships were typically with colleges of education who offer degrees in evaluation methods. Evaluators who were hired from outside the university were paid through funds that had been reserved for the specific purpose of evaluating the program. The National Center for Women in Information Technology<sup>11</sup> was also mentioned as a resource for free evaluation services and assistance, including guidelines for conducting evaluations, examples of survey instruments, and best practices for data collection.

One program administrator mentioned several benefits to having her SIP externally evaluated, including the level of expertise provided by the external evaluators, the ability to demonstrate the program's value to others and how the results could be used:

*"If you're doing a good job and you set up a good evaluation plan, which is why we have outside evaluators—which I think is good, because they know what they're doing much better than I do—I think if you have a good evaluation plan, which we needed for our NSF review, and if the program is successful and you show that to the college and university, then I think that's very strong. If it's not successful, that means you have to change something. And I'm OK with that. If it's not working, I don't want to keep it going the way it is, if it's not working ... [the university] wants [the program] to succeed and they're gonna help make it sustainable."*

This quote also demonstrates a number of the common themes found in the data, including the first theme: evaluation as a requirement.

### Evaluation as a requirement

A number of participants indicated that evaluations were performed to meet the requirements established by a funder, such as the National Science Foundation (NSF) and the National Institutes of Health (NIH), or by another stakeholder. In these cases, the evaluation was not viewed as optional but as a requirement for continued funding or support. One



participant noted that the evaluation requirement made their staff “good stewards of that money” used to fund their program. Another participant discussed the desire of their advisory board to know how the funds were being used and what type of impact the program was having on students, while another mentioned that their “college wants to make sure that they’re getting their money’s worth.”

Some funders, including corporations, NSF, and NIH, required programs to be evaluated and evidence of specific outcomes in order for funding to be renewed. For these programs, a portion of the program’s budget is allocated for the purpose of conducting the evaluation. One participant actually criticized this practice arguing that the funds set aside for evaluation purposes should instead go toward serving the students, and that the funder should pay for the evaluation separate from the program’s budget.

Despite requiring evaluations, the expectations of the funders and stakeholders were not always clearly articulated. One participant felt pressured by upper-level administrators within the university to demonstrate the value of the intervention program, but when asked what the evaluation should specifically focus on, the administrators were unable to provide an answer, other than they wanted the program to be evaluated. This particular program director preferred more direction and information before designing and conducting the evaluation, and at the time of the interview, was still waiting for instructions on what the evaluation should focus on.

Although an external stakeholder desired an evaluation to be completed, without clear guidelines and direction, the evaluation was on hold. Similarly, another administrator described “vague pressure to evaluate our programs” which resulted in “a lot of resistance and pushback” due to the lack of clearly defined expectations.

### **Evaluations support sustainability of SIPs**

Of programs that had been evaluated, participants indicated that the results were used to make decisions about and inform changes made to the program. As one participant described, the purpose of the evaluation was “for us to figure out what we’re doing right and wrong.” Another participant indicated that the evaluation results allowed her to determine “where



our students fit in and where they're lacking, because that also helps me develop programs. If we noticed that students are struggling in science and math in the same semester, so we started a program, just a general workshop about studying for the sciences and math." One evaluation that examined issues of climate found that participation in the program increased student retention as well as graduate school interest and attendance.

Another program evaluated the set of services provided to students, and based on the results, changed their recruitment strategies and applied for a new grant to support the program's new efforts. One evaluation informed the program's administrators that the physical space of the program was too small for the students to be adequately served, and plans were underway to improve upon this limitation. In these scenarios, the results of the evaluation were used to improve upon the existing programs, which will ultimately benefit the student participants.

Other administrators indicated the need to use evaluations to report to offices within their department, college, or university's diversity office. Findings from evaluations were also shared with funders who wanted to assess the impact of a particular program and its services. Some participants indicated that the most important result of the evaluation was to show an increase in the number of students being recruited or retained in the STEM fields.

With the bottom line being the numbers, other outcomes such as an increased sense of belonging for students, improved departmental climate, and increased opportunities to conduct research were considered to be less important than being able to demonstrate an actual increase in the number of students entering and succeeding in STEM.

Perhaps most important in terms of establishing legitimacy is the use of evaluation results to provide evidence of the success of their intervention to others. Doing so enables program directors and administrators to not only engage in continuous improvements of the program, but also to secure recurring funding and demonstrate evidence with which to approach new funders for additional support. One participant indicated that evaluation results "play an important piece to how we prove that we're successful and can secure dollars" to provide additional services to students. Another participant described the use of evaluation in pursuing



additional support: “as we work on building some grant opportunities, evaluation is a critical piece of that so we’re doing more of it.”

One program in particular that was able to demonstrate the worth and value of a SIP to their university was endowed with \$350,000 of funding per year, resulting in the program being institutionalized and sustained from year to year. In these scenarios, the evaluation results served a dual purpose: to provide useful information to the program administrators in order to improve upon the program, and to provide evidence of the program’s benefits to others as a way to increase support and sustainability.

### **Evaluation expertise**

As mentioned above, a number of SIPs that had been externally evaluated were conducted through partnerships with local experts of evaluation, including individuals from their university’s college or school of education, while others were conducted by supervised graduate students in evaluation or education degree programs. Many program directors spoke of wanting to perform internal evaluations, talking about the need for evaluation with their staff, and including evaluations in future plans for their program.

The program directors and administrators who did evaluations themselves or used an external evaluator spoke the language of evaluation, demonstrating a level of expertise on the subject. They described using formative and summative evaluations, and recognized the difference between using a mid-program evaluation as feedback and conducting an evaluation at the end of a program to determine its overall value and outcomes. Comparison groups, and pre and post-tests were also mentioned in relation to evaluations, providing further evidence of familiarity with evaluation methods and techniques. In this sense, there appears to be a knowledge gap between those who are familiar with evaluation and evaluative methodologies and those who are not.

One participant indicated “I’m not a statistician. I don’t know how to design a questionnaire. I don’t know how to do that ... I’m a community organizer.” Another person acknowledged that evaluation was not her background and she did not identify herself as an



evaluator but recognized that “evaluation is an important strength, and I know it’s something we really need to do a better job of.”

### **Resource constraints**

The greatest challenge to conducting evaluations cited by participants was a lack of resources, including qualified staff trained in evaluation methodologies, funds and time. The lack of resources could affect the ability to conduct an evaluation, as well as analyze the results of data that was collected. Perhaps most frustrating to one director was that data had been gathered from students who had participated in the program for the past five years, but the program lacked the resources to analyze the data, resulting in an untapped source of information that could be used to inform and improve upon the program.

Other respondents indicated that evaluations, particularly external evaluations, were simply too expensive to conduct, and with many programs already facing scarce resources, providing students with programming and services took precedence over conducting evaluations.

One participant weighed the options of spending money on an evaluation or servicing students: “I like to get feedback, and I don’t trust myself to do it well. But I don’t want to pay \$50,000 to someone to do it either because it’s taking money from students.” This comment represents the intersection of the lack of resources programs face and a lack of evaluation expertise of program staff. By finding ways to hire staff that has evaluation training, or by partnering with others to perform an evaluation, the challenge of scarce resources may be less burdensome. Of the participants who lacked the resources necessary for an evaluation, a number indicated that they would like to conduct evaluations in the future, if they had the resources to do so. These participants recognized the value of and need to conduct evaluations but simply did not have enough resources to design and conduct the evaluation.

### **Suggestions for best practices**

The findings suggest that evaluations and their results are important tools for SIPs, including the ability to demonstrate the program’s value and worth to others, to seek additional



funding and support, and to inform changes to an existing program. Given the reality of resource constraints that many programs, departments, colleges, and universities are currently facing, partnering with colleges of education and evaluation departments is one way to approach evaluations.

Such partnerships will likely provide programs with the needed expertise of evaluation to develop an appropriate design for the specific goal and needs of the evaluation and program. The availability of graduate student researchers trained in evaluation methods, who are typically seeking out a topic of study for thesis or dissertation purposes, represents one way in which the cost of evaluation can be minimized while not sacrificing the quality of the evaluation. Evaluations can also be budgeted within requests for funding, whether or not an evaluation is required. Integrating resources, such as funds, into the everyday operations of the program can increase the likelihood that evaluations will be conducted, rather than viewed as being optional.

Regarding staff and the need for evaluation expertise, programs should begin to seek training opportunities for conducting evaluations, “learning the language” of evaluation, and seek to hire staff who have a background in evaluation. In addition, evaluation results should be used to inform decisions about the program’s services, mission, goals, and students served, as well as seek to inform the creation of new programs designed to improve students’ access to and success in the STEM fields.

Finally, SIPs with limited resources should seek to partner with other, similarly designed SIPs to create shared data collection instruments from which to evaluate their programs. This would not only combine efforts and potentially minimize the cost associated with developing and administering the instrument, but also may allow for comparisons to be made between similar programs.

### **Demonstrated value**

The findings presented in this paper indicate that evaluations and their results can serve an important role in demonstrating the value and worth of STEM intervention programs and the services they provide to funders and other stakeholders. By demonstrating the program’s value



and worth, programs are in turn able to seek additional funding and support, which can increase overall legitimacy. Evaluation results can also be used to improve the program itself, enabling it to further contribute to the goal of increasing student access to and success in the STEM fields.

While some programs are challenged by a lack of resources and knowledge of evaluation, evaluations can still be pursued through collaborations, purposeful staffing, and budgeting for future evaluations. As the current state of the economy and calls for accountability are likely to persist for the near future, evaluations are an important and necessary tool for continuous improvement of STEM intervention programs and efforts to continue to expand the nation's STEM education capacity and workforce.

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*Casey George-Jackson is the project director and research associate for Project STEM Trends in Enrollment and Persistence for Underrepresented Populations (STEP-UP) at the University of Illinois at Urbana-Champaign. She completed her doctorate in educational policy studies at the University of Illinois at Urbana-Champaign in 2009. Her dissertation examined undergraduate students' major field persistence, as well as patterns of switching between majors, with an emphasis on women and women of color science and math-based fields. Her current research investigates issues of underrepresented students' access to and retention in higher education, including, but not limited, to the STEM fields. George-Jackson also serves as an adjunct assistant professor in the department of education policy, organization and leadership. She can be contacted at [cgeo@illinois.edu](mailto:cgeo@illinois.edu).*



*Blanca Rincon is a first year doctoral student in the department of education policy, organization and leadership at the University of Illinois. Her research interests include issues of access and retention for underrepresented students in higher education, specifically within science, technology, engineering and mathematics (STEM). She has been a research assistant for Project STEM Trends in Enrollment and Persistence for Underrepresented Populations (STEP-UP) for three years. Her contributions have led to collaborative presentations at the Association for the Study of Higher Education and the American Education Research Association. She is a recipient of the National Science Foundation Graduate Fellowship which will allow her to pursue her own research efforts that will examine climate issues for Latina/o students within STEM. Blanca can be contacted at [rincon1@illinois.edu](mailto:rincon1@illinois.edu)*

## **Appendix: STEM intervention program interview questions**

### **Background Information**

1. How long have you worked at this institution? How long have you been in this position?
2. How long have you been involved with \_\_\_\_\_ [name of the program]? What are your specific duties in your current position? Have you worked with any other STEM programs at this institution or any other institutions? If so, which ones?
3. I'd like to ask you a few questions about your background and expertise:
  - a. What is your educational history? Do you have a background in STEM?
  - b. What was your work experience prior to your current position?
  - c. What made you choose to enter this type of work (in your current position)?
  - d. How do you keep current with the research that addresses the work you do in this program?

### **History and goals of the program**

4. Can you tell us a little bit about the program? For example:

ASQ Higher Education Brief (Vol. 5, No. 1)  
ASQ Primary and Secondary Education Brief (Vo. 5, No. 2)  
February 2012  
[www.asq.org](http://www.asq.org)

- a. When did the program begin?
  - b. Why was the program developed? What prompted the program's creation?
  - c. What is the mission or primary goals of the program?
  - d. How is the program structured?
  - e. What specific services does the program provide? (*Possible probe:* For example, does the program offer academic or mentoring services?)
  - f. What ideas guided the design and implementation of the services offered in the program? (*Possible probe:* Did you see that students needed better opportunities for mentoring, a need to improve the climate in order to improve persistence, etc.?)
  - g. Has the goal or the mission of the program changed since its inception, and if so, what precipitated the change?
5. What population of students do you serve or target?
- a. How do you recruit prospective students to participate in the program?
  - b. How do you determine eligibility?
  - c. How do you advertise the program?
  - d. What types of students are most likely to take advantage of the resources offered by the program?

### **Structure and support of the program**

6. Where in the administrative structure of the college or campus is the program located?  
Has it always been located there?
7. How might the organization of the department or college impact service delivery?

8. How is the program staffed? (*Possible probe*: If the program staff includes student workers: Are the student workers enrolled in STEM majors? What is the diversity of the student workers in terms of gender, race, ethnicity, and economic background?)
9. How is the program funded? Does the source of funding impact delivery? If so, how?
10. What is the level of funding from the college, campus, and external sources? (*Possible probes*: Approximately what percent of support for this program is offered by the university? What are the additional sources of support and what do they cover? Over the last five years, has the level of support changed and in what direction?) How does the program benefit its internal and external sponsors?
11. Can you describe the type and level of support of the program from the college dean? Upper-level administrators? Faculty members?
12. What are the forms of collaboration with other units and/or faculty members on campus that the program benefits from? (*Possible probe*: Are there units with which you share resources, staff, courses, etc.?)

### **Outcomes of the program**

13. Does the program meet its mission and stated goals?
14. How successful is the program at achieving its stated goal(s)? By what criteria is success determined? To what do you attribute its success or lack of it?
15. Has the program been formally evaluated (i.e., internally or externally)? What was the focus of the evaluation and what were the results? Would you be willing to share a copy of the evaluation(s) with us?
16. What do you see as the immediate and long-term impacts of this program on students? (*Possible probes*: Why do you feel that this program is beneficial to students? Why do you feel that this occurs? How do you measure the impacts?)



17. What component(s) appear to be most beneficial and useful to students? Why?
18. Do you follow up with program participants after receiving services? For how long and how frequently?
19. Have there been any modifications or adjustments to the program? If so, how has the program changed? What informed these changes? (*Possible probes*: Did you collect and analyze data, conduct focus group interviews, or gather any other data that informed your decisions? In other words, were these modifications based on research?)
20. Is there an area of the program you would like to expand or improve upon? If so, what would it be?

### **Wrapup**

21. What else is important for us to understand about the operation and impact of your intervention program on your campus?
22. Is there anything else that you would like to add regarding your intervention programs?

*This article was adapted from the book, [Quality Improvement Supports STEM](#), available from ASQ Quality Press in May 2012.*