Student Preferences in Mentoring Practices and Program Features in an S-STEM Scholarship/Mentoring Program

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Abstract

Scholarship/mentoring programs have been generally understood to create benefits for mentees as well as mentors. How to improve mentoring relationships and activities has not been sufficiently investigated from the perspective of college student recipients. The literature describes some results and lessons learned from scholarships linked to mentoring programs such as the National Science Foundation's (NSF's) Computer Science, Engineering, and Mathematics Scholarships (CSEMS), and Scholarships for Science, Technology, Engineering, and Mathematics (S-STEM). In this article, student survey results are reported for two years (four semesters) of an S-STEM scholarship/mentoring program in the Jerome J. Lohr College of Engineering at South Dakota State University from 2014-15 through 2015-16. Through analyzing the quantitative and qualitative surveys of student recipients of the mentored scholarships, themes emerged about levels of student satisfaction and critiques of the program. Student opinions and recommendations are presented, as well as discourse about the value of retaining or removing unpopular features of the program or delivering those features in ways that students prefer. Scholarship recipients ranked the most beneficial aspects of the program. They offered suggestions for ways to make an already successful program even better. This is a case study for educators interested in student participant recommendations for improving scholarship/mentoring programs.

Introduction

The Jerome J. Lohr College of Engineering at South Dakota State University (SDSU) was awarded NSF Computer Science, Engineering, and Mathematics Scholarships (CSEMS), and Scholarships for Science, Technology, Engineering, and Mathematics (S-STEM) awards to fund and mentor undergraduate students for 12 nonconsecutive years between 2002 and 2018. At SDSU from 2012-18 the program was known as Opportunities Mentoring, Education, Growth, and Academics (OMEGA). In the OMEGA program, renewable scholarships from $3,000 to $5,000 were awarded to students in STEM fields, primarily engineering, for those who demonstrated financial need and academic talent. The program was a resounding success with, for example, 93.9 percent of male students and 92.9 percent of female students graduating or on track to graduate in STEM fields in OMEGA for the 2014-15 and 2015-16 cohorts that are of interest in the current study.

In addition to scholarship funds, recipients were paired with faculty and peer mentors and were required to engage in academic enhancement activities; and industry, professional, and community activities to prepare them for the workforce and their future professions. The program evaluator for the NSF grant for the 2014-15 and 2015-16 years was a Ph.D. candidate in Sociology at SDSU [1] - [2]. The evaluator conducted on-line student surveys eliciting opinions and critiques to prepare reports used by the project's leaders and included in grant reports. This paper focuses on student participant recommendations extracted from those surveys for those two years of the program to improve an already successful program. Faculty mentor recommendations are the subject of a separate paper covering a more extended period [3].

Overview of SDSU's scholarship/mentoring program

The goal of the SDSU scholarship/mentoring program in 2014-15 and 2015-16 was to recruit and retain recipients with demonstrated financial need and academic talent in STEM majors to better prepare them for the workforce through scholarship funding, mentoring, and

educational enhancement activities. The intended outcomes were to increase participants' retention, graduation, readiness, and transition to the workforce in their field, or to transition to graduate school in STEM.

The purpose of requiring educational enhancement activities was to help build self-efficacy, community connectivity, and professional identity. Another reason was to increase what Sociologist/Anthropologist Pierre Bourdieu [4] refers to as social, cultural, and economic capital, altogether meaning the total accumulation of one's power network of social connections, acquired preferences, educational attainment levels, and financial well-being, beyond simply social class standing. Sociologist Annette Lareau [5] has noted that the United States educational system was and is built on middle class values, and those from economically disadvantaged classes often lack some of the various capital resources of which Bourdieu writes because of parental childrearing practices not particularly attuned to middle class values. Since the scholarship recipients in this program were determined to have demonstrated financial need, there was an attempt to increase their social, cultural, and economic capital.

To promote the intended outcomes of the program, scholarship recipients needed to participate in program activities, and they needed to maintain a 3.0 grade point average (on a 4.0 scale) to remain eligible. Activities included regularly meeting with faculty mentors: for freshmen and sophomores, twice a month; for juniors, every three weeks; and for seniors, monthly. Recipients needed to meet once per semester with peer mentors/mentees. They needed to join, attend, and participate in at least one professional organization per year in their field. Freshmen participants needed to meet with two industry contacts in their area of interest per year, and sophomores, juniors, and seniors needed to meet with three industry contacts per year. Participants were required to attend at least four other approved educational enhancement activities each semester. In addition, participants needed to attend

the yearly scholarship/mentoring program meetings of all recipients, faculty mentors, and other project leaders.

Literature review

Mentoring has long been recognized as contributing to student achievement, retention, and success [6] - [8], and adequate financial aid is crucial in attracting and retaining low-income students [9]. The National Science Foundation (NSF) has recognized the value of providing mentoring, financial support, and educational enhancement activities by providing grant opportunities through a wide variety of programs, to encourage financially disadvantaged, academically talented students with STEM majors. Two examples of such programs are the NSF's Computer Science, Engineering, and Mathematics Scholarships (CSEMS) introduced in 1999; and its replacement, Scholarships for Science, Technology, Engineering, and Mathematics (S-STEM) introduced in 2004 [10].

As an example of the success of such programs, Wilson, et al. [11] have reported results of the NSF/CSEMS and S-STEM programs and the specific model for Louisiana State University (LSU), where they achieved a "nearly 90 percent" graduation rate in STEM degrees for their participants. Other CSEMS laudable results were reported by Sorkin, et al. [12], for the Community College of Baltimore, Maryland; and by Olson, et al. [13] for Boise State University, Boise, Idaho; respectively.

An innovative way to improve the traditional S-STEM scholarship program model was reported by Anderson-Rowland, et al. [14], where they reported leveraging four NSF grants. They built four separate programs for various levels of undergraduate and graduate students, while considering participants' transfer status. All were then brought together at one student center, where they reported impressive retention rates, graduation rates, reduced transfer GPA shock, and high numbers of students moving on to graduate studies in STEM.

The literature has many publications reporting the benefits of scholarship/mentorship programs. Such publications often include results from mentee and mentor surveys evaluating their levels of satisfaction and the benefits of the programs. For example, at Central State University (CSU) in Wilberforce, Ohio, a historically Black university, over 90 per cent of students in the scholarship/mentoring Benjamin Banneker Scholars Program reported that faculty mentoring was the most important aspect to which they attributed their success in the program with results linked to academic performance. CSU faculty were equally enthusiastic about their positive mentoring experiences in the program, reporting a 4.67 mean score on a Likert scale of 1 as strongly disagree to 5 as strongly agree [15].

In most scholarship/mentorship evaluation studies, results of both students' and faculty mentors' surveys are presented, but there is much less data about student recommendations for improving such programs. An exception was Van Eps, et al. [16] where research was conducted into how student nurse participants reported that a year-long mentorship program could be improved.

The focus of evaluations for scholarship/mentoring programs such as S-STEM, according to Yue, et al. at University of Houston-Clear Lake, Texas, should be "essential, measurable, sensible, and simple" [17]. They recommend end-of-semester surveys of participants to determine "satisfaction" as one metric of program effectiveness in summative assessments, and identification of problem areas and ways to improve the program in formative assessments. Other metrics to evaluate effectiveness and success, noted by Yue, et al. [17] should include the percentages for each of the following: participants who graduate or are on track to graduate, complete their degrees within a certain number of years, and attend required program events. These assessment metrics may be used as a model for S-STEM scholarship/mentorship programs and can be tailored to specific non-traditional or underprivileged populations of students.

In another S-Morris University in Illinois, Kalevitch et al. [18] reported collecting the usual quantitative data in evaluating the program. They also engaged qualitative researchers who conducted focus groups of freshmen S-STEM participants during the first week, second week, and a year into the program. For each focus group, from 9 to 11 different questions prompted the discussion. Kalevitch et al. [18] extracted themes of participants' perceptions of their personal experiences in adapting to their first year of college that resulted from discussing the overall program in the first and second surveys. In the year-end survey, many more themes emerged. One or two questions were asked to determine the least beneficial aspect of the program or recommended changes to improve the program in the second week and the year-end surveys.

Methodology

The theoretical perspective of this study is interpretivism [19] [after 20 - 21], where, unlike positivist and post-positivist approaches, the goal was to gain insight by interpreting a specific situation at a particular place. In such an approach, a hypothesis was not tested; statistical inferences were not sought; and the point was not to prove generalizability across other settings. As a methodological approach, this is a case study of program evaluation opinions of student participants for two years of a scholarship/mentoring program at SDSU in 2014-15 and 2015-16. It may be of interest to educators interested in student participant recommendations for improving such programs, although the study is context dependent and no generalizability outside the study is claimed. Case study was selected in agreement with Case and Light [19] who noted that such studies may

> . . . be particularly appropriate to address research questions concerned with the specific application of initiatives or innovations to improve or enhance learning and teaching. The new knowledge here takes into consideration the idiosyncrasies of the institution, its resources, teachers and students, as well as its overall culture.

To assess SDSU's scholarship/mentoring program's impact, the project evaluator's summative evaluations [1 - 2] of program activities were conducted using on-line surveys

each spring semester for the two years of interest in the current research, 2014-15 and 2015-16. The following year's data was not included in this study because of low participation in the surveys. Each spring semester, recipients were invited to participate in on-line surveys through QuestionPro software. The surveys included 72 close-ended and/or open-ended questions. The close-ended questions captured quantitative information such as student characteristics. Other quantitative data was collected by asking participants to numerically rank aspects of the program from most beneficial to least beneficial. Open-ended questions elicited qualitative judgments from student participants about their experiences and recommendations for the program. The survey data was summarized and tabulated, and generalizations were drawn [after 1 - 2]

Survey instrument for scholarship recipients

The scholarship/mentoring program's principal investigator, Ross Abraham, reported that SDSU's Rural Sociology Ph.D. candidate Saileza Khatiwada, under the direction of now Professor Emerita Diane Kayongo-Male, helped to write the survey instrument that was originally used in the earliest days of an SDSU scholarship mentoring program, beginning in 2008-09. It was revised slightly over the years. In 2009-10 it was used by Ph.D. candidate Christine Fabian to evaluate the program. With slight modifications, it was then used by Ph.D. candidate in Sociology, Francis Arpan (co-author), beginning in 2014-15 and continuing through 2016-17 [1 - 2], and continuing through the end of the program in February 2018. The survey instrument was not meant to be used for a sociological research project.

The surveys for student recipients were rearranged into four parts for this publication as follows.

1. Scholarship recipient characteristics
2. Evaluation of the overall OMEGA program
3. Evaluation of the amounts of the scholarships

4. Evaluation of program activities

Results

Scholarship recipient characteristics

As noted in Table 1, over 90 percent (60 of 64) of OMEGA student scholarship recipients participated in the first (26 of 29) and second year (34 of 35) on-line evaluation surveys. All self-reported Caucasian ancestry, with the exception of one person who self-reported African American ancestry in the 2014-2015 survey. Considering that the scholarship/mentoring program was for STEM students, there was an unusually large percentage of female participants (38 percent in the first-year survey, 21 per cent in the second), encouraging numbers considering the generally low percentages of females engaged in most STEM majors.

Table 1. OMEGA Student Recipient Respondents' Characteristics.

Characteristic	2014-15 Cohort n=26 of 29	2015-16 Cohort n= 34 of 35
Respondents	90%	97%
Caucasian	96%	100%
African American	4%	0%
Male	62%	79%
Female	38%	21%
GPA range	3.0-4.0	2.6-4.0
GPA mean	3.6	3.6

Recipients included all levels of undergraduate STEM majors, mostly engineering, with the majority including sophomores, juniors, and seniors, with only 15 percent freshmen (1 to 30 credits) (Table 2). Sixteen per cent of participants planned to attend graduate school in the first-year survey (with another 27 per cent indicating graduate school or employment). Thirty-two percent of participants planned to attend graduate school in the second-year survey (Table 3). Overall, about half of respondents reported intending to obtain employment in their STEM field upon graduation with a B. S. degree (Table 3).

Table 2. Number of College Credits Earned by OMEGA Recipient Respondents by Percentages at the Time of the Surveys.

# Credits	2014-15 Cohort n=26 of 29	2015-16 Cohort n=34 of 35
91 and >	35%	36%
61-90	23%	22%
31-60	27%	33%
1-30	15%	9%
Totals	100%	100%

Table 3. OMEGA Respondent Recipients' Plans after Graduation from College.

Plans after B.S. graduation	2014-15 Cohort n=26 of 29	2015-16 Cohort n=34 of 35
Employment in field	46%	50%
Employment outside field	0%	9%
Graduate school or employment	27%	0%
Graduate school	12%	32%
Undecided	12%	3%
Both graduate school and employment	4%	0%
No response	0%	6%
Totals, rounded	101%	100%

Student participant evaluation of the OMEGA program

Students ranked the overall scholarship/mentoring program, the adequacy of the scholarship funds, and the program activities' importance and usefulness, along with qualitative statements about their preferences and recommendations for program improvement, as follows.

Overall OMEGA program

In evaluating the overall OMEGA program, quantitative results generally mirrored qualitative results. More than 90 per cent of OMEGA student participants ranked the overall

experience as positive or very positive in both surveys. Also in both surveys, student participants overwhelmingly ranked the following themes as the top OMEGA features in the order of importance to them: 1.) the financial aid, 2.) faculty mentoring, 3.) involvement in organizations and clubs on campus, and 4.) industry contacts. Useful, but ranking lower for student participants were educational enhancement activities. Ranking consistently less helpful were the peer mentoring experiences, the general meetings of all the OMEGA scholars, and last was student travel money (Table 4).

Table 4. Ranking of Most to Least Beneficial Program Features by Percentage of Recipient Respondents by Cohort Year [1 - 2]

Beneficial Ranking: 1=most, 8=least by Cohort Year, 2014-15 (n=26 of 29) and 2015-16 (n=34 of 35), respectively	**1**		**2**		**3**		**4**		**5**		**6**		**7**		**8**	
Scholarship Money	81	66	4	11	4	8	0	3	4	3	0	3	0	3	7	3
Faculty Mentoring	16	26	42	34	19	17	15	1	4	12	4	0	0	0	0	0
Clubs/Organizations	0	6	12	20	23	31	42	23	15	3	8	3	0	11	0	3
Industry Contacts	4	3	11	11	23	11	11	26	27	20	12	17	8	9	4	3
Ed. Activities	0	0	8	14	12	11	19	16	27	14	19	23	11	6	4	6
Peer Mentoring	2	0	12	6	4	6	8	8	8	20	19	29	34	17	15	14
Student Travel Money	0	0	12	3	7	6	0	3	4	3	12	8	19	17	46	60

1. Adequacy of the scholarship aid amount

As noted, annual scholarships ranged from $3,000 to $5,000 per year for the OMEGA participants. The scholarship funding was ranked as the most important element of the program by 81 and 66 percent of respondents, respectively, in the two surveys. From 89 to 94 percent of all those surveyed reported the scholarship amount to be generous or adequate.

2. Faculty mentoring

Faculty mentoring was designed to promote comradery between a faculty member and an undergraduate student. The value of such relationships often provides benefits for both the mentor and the mentee. The mentor may gain satisfaction in advising and guiding new

members into the profession, and the mentee may gain by tapping into the experience of a professional who understands the system and how it works.

Faculty mentoring was ranked by respondents as the second most important feature of the OMEGA program with from 92 to 94 percent of those surveyed ranking their relationship with their faculty mentor as positive. Students overwhelmingly reported that their mentors were available and provided helpful academic and career counseling.

3. Involvement in organizations and clubs on campus

Becoming involved in organizations and clubs on campus was popular with most OMEGA students. From 59 to 62 percent of respondents were involved in more than one, in each of the two survey years. Its importance to students was notable, since it ranked even higher than industry contacts.

4. Industry contacts

Results indicated that OMEGA students' involvement with industry contacts was generally beneficial in helping them to network and to discover the requirements for various career paths. For some, industry contacts helped them to confirm the direction of their career through contacts with STEM professionals. All of the respondents met with industry contacts, and a large majority reported the experiences as positive. There remained, however, from 42 to 52 percent of students who were unsure of their career choice in both surveys.

One of the objectives of the NSF S-STEM program was to relieve the burden of employment so that scholarship recipients would have more time to study. While the expectation may have been that most of the S-STEM scholarship recipients would work at minimum wage non-STEM jobs as clerks, that was often not the case. A majority of respondents who were employed noted that they found that employment helped in the establishment of a STEM career pathway, and it did not negatively impact their studies. Of those who worked, they reported that employment increased their time management skills,

work ethic, professional skills development, and future potential for employment in a STEM field.

Some examples of jobs held by some of the 2014-15 respondents included the following: automotive technician, research assistant, information technologist, software developer, gymnastics coach, mechanical designer, research assistant, cook, laborer, and farmhand. A few students became financially ineligible for their S-STEM scholarships because of their incomes from part-time work at local high technology industries. Internships and employment were both generally viewed as invaluable for workforce development along the STEM career pathway. Some recipients worked at Daktronics and were mentored there by professionals.

For the 2014-15 respondents, 62 percent reported having at least one job, and 12 percent reported having more than one. For the 2015-16 respondents, 50 percent reported having one job, and nine percent reported having more than one. A surprising finding, based on survey results, was that a majority of the survey respondents who were employed reported a positive effect on their achievements (74 percent for the 2014-15 respondents and 52 percent for the 2015-16 respondents). Some, however, reported negative impacts on their achievements because of their work: 10 percent (2014-15) and 19 percent (2015-16), and the remainder reported no effect. Thus, while part-time employment reportedly had beneficial results for many scholarship recipients, such decisions need to be made on a case-by-case basis, taking balance into account as recommended by the College Board [22].

5. Educational enhancement activities

The purpose of the educational enhancement activities was to encourage integration into peer study groups, to promote socialization and soft skills, to help the participant to adapt to the university community and the surrounding community, and to promote good

citizenship. Those activities were wide-ranging and included academic enhancement programs, events promoting societal benefits, and community gatherings.

In both years of the survey, over 80 percent of participants ranked the educational enhancement activities as positive. Most students reported that they selected activities based on their own personal interests. Some students requested more guidance as to which activities were likely most beneficial and requested that the activities be optional.

6. Peer mentoring

Peer mentoring was meant to provide some of the same benefits as the faculty mentoring, but with more emphasis on the student perspective. The purpose of peer mentoring was to encourage more comradery among students. The hope was that through peer mentoring, participants could develop collegial relationships with other students in their field, where they could get more opinions about courses, instructors, advisors, study groups, study habits, and coping skills.

Survey participants reported mixed feelings about peer mentoring. Respondents ranking peer mentoring as neutral included the majority in the first-year survey and 44 percent in the second-year survey. From 35 to 38 percent found peer mentoring useful over the two years of surveys, mostly noting that they found their peer mentor's perspective helpful in explaining future expectations in the program.

7. Meetings of OMEGA scholars and program leaders

The purpose of the yearly OMEGA meetings was to bring together all the program's scholarship recipients, faculty mentors, and project leaders as a rally for the coming year. The meetings were meant to provide opportunities for the participants to exchange information about their experiences and to create social bonds. Survey results were very mixed concerning the value of the meetings. The first-year survey indicated that the majority found them of value, and in the second year, the majority did not.

8. Travel funds for scholarship recipients

Of all the activities within the program, the travel funds for scholarship recipients were ranked least useful. The funding was available for students to travel to professional conferences with mentors, to visit industry contacts, or to visit graduate schools in which they had an interest. When considering both years of the survey, from 3 to 5 students each year used the funds for attending conferences or visiting industries, and none used the funds to visit other graduate schools. Most students reported lack of interest in using the funds for those purposes or not knowing about the availability of the funds.

Student recommendations to improve the program: Open ended responses

When students were asked in the on-line survey for recommendations to improve the scholarship/mentoring program, a majority provided a response, apart from freshmen (although there were only four in the program) for the years of interest (Table 5).

Table 5. Numbers and Percentages of Respondents by Class Rank Who Replied to the Question of How to Improve the Program.

		Freshmen	Sophomore	Junior	Senior	Unknown
n=26	2014-15 # of responses	1 of 3	7 of 9	3 of 4	5 of 10	NA
n=34	2015-16 # of responses	0 of 1	12 of 13	6 of 7	8 of 12	0 of 1
	Total # of responses/%	1/25%	19/86%	9/82%	13/59%	0/0%

By far, the largest percentage of students who responded were sophomores and juniors. For the question about how the program might be improved, there were 16 responses of the 26 who took the survey in the 2014-15 cohort, and there were 26 responses of the 34 who took the survey in the 2015-16 cohort. Concerning gender, 4 of 10 females and 12 of 16 males responded to the question of how to improve the program in the 2014-15 cohort. For the 2015-16 cohort, 5 of 7 females and 21 of 27 males responded to the improve the program question. The themes that emerged are presented. Because of Institutional Review Board considerations, the information may only be presented in the aggregate, as follows.

Student recommendations by theme

1. Provide more guidelines, explanations, lists of relevant activities with more prior notice, enforcement, and facilitation of program activities. (17 responses)
2. Have less program requirements/meetings and explain relevancy of those that are left. (11 responses)
3. Eliminate peer mentoring as it stands. (all second cohort) (9 responses)
4. Leave the program as is. (7 responses)
5. Provide more guidelines for faculty mentors, and want either more or less faculty meetings. (5 responses)
6. Facilitate industry meetings along with explanations of what is to be achieved (5)
7. Hold more socialization meetings. (4 responses, females only)
8. Consider mandatory travel to conferences or other graduate schools. (2 responses)

Discussion of recommendations

Considering the survey respondents' qualitative responses to open-ended questions about ways to improve the program, the responses were useful in unpacking their meanings in the quantitative part of the surveys. The following eight themes emerged, listed in order of occurrence.

Theme 1, by far, received the most responses to the open-ended survey question of how to improve the program. Students reported wanting more structure in most aspects of the program, which they repeated for specific topics in Themes 5 and 6. Respondents recommended more organized implementation so that they could understand why various activities could be beneficial to them in their chosen career path. They requested more prior notice and a list of educational enhancement meetings so that they could better plan their semester schedules. Others requested more active participation by their specific department.

Many requested more structure at program meetings and social meetings and in peer mentoring.

Because of the considerable emphasis on adding more structure to the program, there may be value in having a full-time or one-half time coordinator for the program. Considering the amount of structure and guidelines that students requested, there may be too many tasks for one faculty member to organize as a part-time project.

Themes 2 through 4 were the next most often recommended. For theme 2, respondents commented that they preferred fewer program requirements, especially educational enhancement meetings. They noted that such meetings did not have a clear purpose and recommended that after trimming the list, program leaders should clearly relate the relevance to students' career advancement. For Theme 3, although only reported by the 2015-16 cohort, many respondents recommended the discontinuation of peer mentoring. They reported little value in the meetings. For Theme 4, total satisfaction with the program was reported by several, and they recommended no changes.

Based on respondents' comments, there may be value in conducting more frequent student surveys and meetings to gather their input on precisely which activities they consider valuable. In addition, program leaders and faculty mentors could explain the anticipated value of such meetings and how they may relate to the student's chosen career field. The list of recommended educational enhancement activities could be trimmed. Program leaders could also explain employers' requests for soft skills among STEM professionals, indicating how enhancement activities may help to attain those skills. For students with demonstrated financial need, as the program recipients are, a social scientist could meet with the group to explain the value in building social and cultural capital based on studies by Lareau [5].

Program leaders might find ways to help students to form study groups as a way of incorporating the benefits of peer to peer mentoring, while eliminating actual one-on-one

peer mentoring that students report has little value. There may also be value in providing more extensive training for peer mentors.

Lack of change is probably not a consideration based on the participants' thoughtful input on how to improve. Program changes, however, should be made with caution so that those who are very satisfied with the current program are also represented.

Themes 5 through 6 ranked next most often recommended and were of about equal importance. For Theme 5, respondents recommended that faculty mentors have more guidelines to better implement program goals. For Theme 6, students requested more advisory/faculty facilitation of industry visits. They found making contacts to be somewhat awkward and indicated that they were not sure what was to be accomplished at such a meeting, although they understood the value.

Program leaders might also consider instituting a training program for all faculty mentors, a practice already in place at LSU as reported by Wilson, et al. [8]. Guidelines could be established, and agreements reached about what is expected of a mentor. Such training would help to establish more structure in the program, since structure was the number one recommendation for improvement of the program.

An advisory board or program director might keep and distribute an updated list of industry participants with names and contact information. In addition, faculty mentors could coach those students who struggle with setting up appointments and engaging in industry contact meetings. The faculty mentor and program director might provide a letter of introduction for the student explaining the purpose of the visit and its potential long-term value.

Themes 7 and 8 received the least amount of comments. For Theme 7, a few female respondents recommended more socialization meetings, practices which authors Rankin, Nielsen, and Stanley [23] found important for the advancement of academic women in

science and engineering. For Theme 8, it was seldom recommended to use travel money in the program to attend professional conferences or to visit other graduate schools.

Although only recommended by a few female respondents, they expressed interest in more structured socialization, along with more internships, and the formation of study groups. Inclusion of this recommendation in future programs may help to retain female students. Another consideration might be practicing group socialization, where students are roommates in a specific dorm, form study groups together, attend events together, and form friendships and mentoring relationships as practiced in a model used by CSU [15].

Conclusions

By far, the single most often recommended program improvement by S-STEM scholarship recipient survey respondents was the need for more overall structure, although it was often interwoven among several themes that emerged during analysis of survey data. Another recurring request by respondents was the request for explanations from mentors about the relevancy of required program activities for professional development and for enhancement of future STEM career pathways.

By taking participant recommendations into consideration, early and often, already highly successful scholarship/mentoring programs at SDSU may be improved in the future to increase recipients' professional development, retention, grade point averages, incorporation into campus culture, degree attainment, and career development. Results indicated that women recipients, in particular, may be more satisfied with the program through increasing structured social events to increase networking.

A surprising result of analyzing the surveys was the positive impact that respondents reported for the majority of those who held part-time jobs. One of the objectives of this NSF program was to relieve students of the burden of employment so that they would have more time to devote to STEM studies and professional career development. Perhaps the

expectation was that college students would be relegated to low paying unskilled jobs with little future potential. For many students who were surveyed, part-time employment was viewed positively in helping them to achieve their academic and professional development goals, including facilitating access to future STEM careers, sometimes through long-established university relationships with local industries.

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