STEM grown Master's

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Abstract

The University of Wisconsin-Platteville's STEM Scholars Master's Program was created to attract graduate students from underrepresented populations with STEM backgrounds to further their education by providing financial and academic/career support. The five-year program, which is funded with a $630,410 National Science Foundation (NSF) grant, awards individual scholarships of up to $10,000 to online students who have bachelor's degrees in a STEM discipline and are enrolled in the Engineering, Project Management, or Integrated Supply Chain Management graduate programs. Because online programs often fall short of meeting the career guidance and student service needs of their students, this program was designed to provide an extraordinary level of professional support and personal interaction. As soon as they are accepted into the program, scholarship recipients are paired with an academic advisor, a peer mentor, and a champion, all of whom act as a support network for the scholar while they are working toward degree completion.

The advisor provides program-specific assistance, such as selecting courses and completing graduation requirements. The peer mentor is a current student of the scholar's degree program, and helps the scholar establish educational goals and gain a better understanding of the discipline. The champion, who has an existing career in the scholar's desired field, provides the scholar with networking and professional development opportunities. In addition to receiving personal support, scholars are also presented with online resources. Scholar Spot programming is specific to the STEM Masters Scholars Program and offers online presentations from STEM professionals about relevant resources and opportunities. During the presentations, the scholars have the opportunity to interact with the presenters and ask questions. While other higher education institutions offer scholarship money to STEM students, the STEM Scholars Masters Program is the only one that is 100 percent online and contains a built-in support network for its scholars. Because of these unique additions, we believe the program will be successful in student retention and student success in both our program and in the job market.

Introduction

Dr. Lawrence Flowers of Fayetteville State University (Diverse, 2011) wrote about the contributions to underrepresented populations, combining STEM education in an online environment. In his article, "Online Courses Can be Used to Boost Minority Numbers in STEM fields," Flowers cites National Science Foundation (NSF) and other reports from that same year showing declines in the numbers of minority STEM professionals. In an effort to help curb that trend, he suggests that online education has been growing and conforming to meet the challenges of minority students.

The STEM Scholars Master's Program was created to attract graduate students from underrepresented populations with STEM backgrounds to further their education by providing

financial, academic, and career support. The five-year program, which is funded with a $630,410 NSF grant, awards individual scholarships of up to $10,000 to, online students who have bachelor's degrees in a STEM discipline and are enrolled in the Engineering, Project Management, or Integrated Supply Chain Management graduate programs.

This program was designed to increase the number of underrepresented students advancing in STEM professions and aligns with the mission of the University of Wisconsin-System to increase and promote the number of graduates in STEM-related fields. The scholarship program targets new students entering a STEM program and who meet the specific eligibility criteria such as; undergraduate degree in a STEM field, undergraduate grade point average (GPA) above a 3.0, demonstrate financial need, as well as U.S. citizen or permanent legal U.S. resident. Demographics collected include race, gender and locale. A rubric was created to score applicants meeting eligibility requirements and demographic considerations.

Because online programs often fall short of meeting the career guidance and student service needs of their students, this program was designed to provide an extraordinary level of professional support and personal interaction. When scholarship recipients are accepted into the program they are placed in a cohort, paired with an academic advisor, a peer mentor, and a champion, all of whom act as a support network for the scholar while they are working toward degree completion.

Program Management

This one-of-a-kind scholarship program has a complex structure and requires careful coordination. Because the program continues to evolve and develop, we created a checklist to ensure all key tasks are correctly completed throughout the year (see Appendix A). The checklist components include information on marketing and recruitment, communications, student support services, event coordination, and program evaluation and assessment activities; and it is crucial for replicating and improving program management. In some aspects, the working checklist becomes a reflective journal for the current year. While there were aspects we planned out before implementation, some facets of the program are addressed as they arise. Unexpected situations we have come across includes an initial lack of scholarship program applicants, securing committed speakers from outside the institution for scholar spots, and a shortage of students enrolling in courses full-time. Because of on-going evaluative efforts, we have been able to make changes as soon as we run into issues.

Working with online students, we developed a baseline for requirements and expectations for their involvement while taking into consideration their personal commitments. To ensure equality for academic success we developed and implemented a scoring rubric to evaluate applicant's qualifications. The selection committee reviews the pool of applicants with the scoring rubric and selects the top applicants to be scholars in the program. The number of scholarships awarded each year will vary. While the University of Wisconsin-Platteville is an equal opportunity, affirmative action campus, it seeks to build a diverse student body and encourages applications from women, persons of color, and persons with disabilities. Increasing minority representation in the STEM field is a goal of the NSF grant, and this program

management strategy for the application and acceptance process is helping that grant outcome to be attained.

The annual selection of scholars occurs in July, and the scholars begin their masters program the following fall semester. Promotion of the program was implemented through a strategic marketing plan that was provided to recruiters, advisors, and internal personnel, and through information included on the website for prospects, applicants, and students who have yet to enroll in a course. Additional outreach is completed with new students who have met the eligibility criteria but have not applied.

Program Resources

Mentoring graduate students within a virtual education environment was a key component to our NSF grant proposal, as studies show mentoring positively impacts retention and success rates of online students (Johnson, 2016). To achieve a successful mentoring program, we chose to arm the student with three personal connections to create a built-in support structure. An academic advisor from the university, a peer mentor enrolled in the scholar's degree program at the university, and a champion who has a career in a STEM field work with the student to provide encouragement throughout their time in the program, while answering questions about courses, careers, and future opportunities. They also work with the student to help establish SMART (specific, measureable, attainable, realistic, and timely) short-term, mid-level, and long-term goals.

Table 1 identifies minimal expectations provided by their connections; however, we encourage scholars to reach out as much as they need to receive adequate input and guidance.

Table 1. Scholarship Program Connections

Role	Contributions
Academic Advisor	- Works with student, by recommending courses to map out a plan of action for completing their degree in Engineering, Project Management, or Integrated Supply Chain Management within 2 – 2-1/2 year time frame - Monitors student success in course and degree program along with NSF STEM Master Scholar program - Introduces SMART goal creation for the programs, and time management skills - Meets at least six times per semester - Supports STEM Students, Peer Mentors, and Champions-central hub for all groups - Maintains Scholar Online Community Space
Peer Mentor	- Matched to STEM Scholar from same degree program - Discuss SMART goals established by STEM Scholar - Meets monthly to give student support for struggles that occur and to celebrate successes - Offers their point of view on courses within the respective program for a better understanding of the discipline

Champion	- Supports student in career success for a STEM career - Recommends organizations to join within their STEM field to develop professional opportunities - Reviews and makes recommendations to strengthen SMART goal statements - Meets on a monthly basis - Encourages student step up role at work

In addition to providing academic program support to the scholar, the advisor also prepares the peer mentors before meeting with the scholar prior to the start of the semester. The Learning Management System (LMS) houses two 90-minute peer mentor training sessions that teach the mentors about building relationships, and trust, and how to work through potential conflicts. It is encouraged that the monthly meetings between scholar and mentor occur within the LMS online video room or another method of online communication.

Peer mentors are recommended to the STEM Scholars Masters Program Committee by the engineering, project management, or integrated supply chain management advisors, or the program coordinators. The mentors complete a training before the start of the fall semester so they understand the scholarship program's goal, what their role is in the scholar's success, how to connect with the other mentors, and how to navigate through potential discussions with their scholar. The LMS provides peer mentors with resources to help build their relationship with their scholar, create their own SMART goals to use as an icebreaker, and encourage growth in their scholar's academic success.

Champions are professionals in a STEM career who are recommended by the graduate degree program coordinators or by a previous champion. The champion's established connection to the STEM fields allows the scholar to ask questions about the future of STEM careers, which organizations would be beneficial to join, and where other career-relevant resources can be found.

The University of Wisconsin-Platteville's scholarship program uses an online fillable evaluation form for peer mentors and champions to provide feedback to the academic advisor after each meeting. Feedback received is used by the advisor to provide extra support to the scholar, to guide the scholar in course selection, and to talk about the benefits of becoming a peer mentor for future scholars. The feedback is also used to log the interactions as part of the study and program assessment. Scholars, mentors, and champions have provided us positive feedback on how grateful they are to be a part of the program.

Figure 1 showcases the equal amount each connection plays in the development of the scholar's STEM and academic growth while helping the scholar reach both SMART and educational goals. It is our hope that our scholars realize the importance of the mentoring connection and transition from being a mentee to being a mentor for the next cohort.
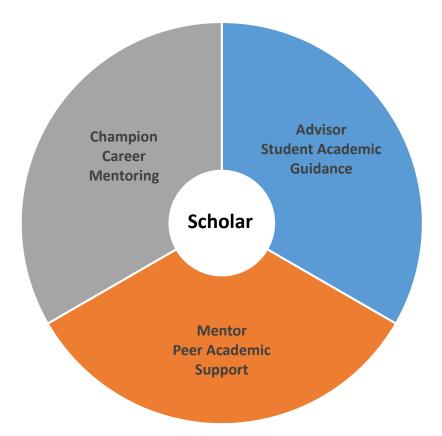
Figure 1. Expansive Academic Program and Career Support Diagram. Image reflecting broad support from scholar's academic advisor, peer mentor, and career field champion.

In addition to the one-on-one support from the advisor, peer mentor, and champion, the scholar receives online resources. As the program continues to grow, networking opportunities also grow for our scholars. Online resources provided to our scholars can include information on how to be valuable at your job, information from the Project Management Institute (PMI), soft skills, and links to additional program specific relevant pages. Also, discussions are held on current topics within the STEM fields, and it is encouraged for the peer mentors and champions to contribute to these discussions to help provide depth to the topics. Another resource, Scholar Spot programming, was designed to specifically target only individuals in the scholarship program. The Scholar Spot offers a professional development opportunity to make additional connections with the presenters. Once a month, a STEM professional is selected to present on his or her topic of expertise through online video technology. Each Scholar Spot speaker is allotted one hour for a presentation, which includes 20 to 25 minutes for questions and interactions with students. Potential Scholar Spot topics include

- the importance of STEM education to US Economy,
- creating an inclusive environment in STEM fields,
- things I wish I would have known before starting my STEM career,
- how to make yourself an invaluable employee,
- networking,
- management/Supervisory Skills,
- soft skills needed by STEM employees,

- general workplace issues,
- how do I know if I want to get a PhD,
- how to evaluate a job offer and negotiating the best offer, and
- Career planning via the curriculum.

Other topics of interest to the scholars will be added as they are identified.

To further connections within the cohorts, an additional online space was created in which the scholars, mentors, champions and advisors can interact. The space allows the scholars to connect and build a community, and ask for support when needed. Components of the community's intentional design include
- scholars' goal setting,
- scholars' end of term reflective papers,
- news about hot topics in the field,
- assignments created to help increase the growth of the scholars throughout the program,
- discussions on issues in the field, program courses, celebrating successes and support for overcoming challenges,
- online Rooms for Scholar Spots and to access video archives of those sessions, and
- announcements, specifically for Scholar Spots and survey follow up.

Each online resource was strategically selected as a part of the scholarship program's expansive scholar student support experience.

Expectations of program scholars is to participate in cohort programming, which includes, mentoring, monthly meetings, online events, and networking opportunities. Additionally, the project leadership will utilize other programs and departments within our university.

The program has yielded unintended positive outcomes for all parties. The first and second cohorts are connecting by participating in the same online courses (names are recognized from the class list within the online space), and working in the same group for course group projects. Peer mentors are participating in group projects that have program scholars, allowing for an altered personal and professional networking connections. One scholar informed us of a recent promotion because of their participation in the program, and we anticipate more student promotions forthcoming. Peer mentors have also donated their mentoring stipend monies back to contribute to scholarships, and some have joined our alumni advisory board to continue their positive involvement with the University of Wisconsin-Platteville. Mentors and champions are requesting to remain in the program to connect with new scholars, and as the program continues, we anticipate additional positive experiences and involvements that arise with continual improvement.

Assessments

Evaluating the program and identifying successes and areas for potential improvement is imperative to its success. The program evolved after its inception in 2015, and enhancements are identified and made each year of the program through our internal assessment activities. While internal assessment areas are identified to evaluate the program and supporting processes for

quality and level of success, NSF also requires semester reports and a yearly assessment. Preliminary information is available for assessments completed in areas related to marketing and recruiting strategies, coordination of the program, mentor and champion selection, application intake and selection process, and other major components. Additional assessment results will be forthcoming as we are able to collect more data with the admission and graduation of scholars each year and as we can begin to have more year-after-year program information for comparison.

Validation of the program structure and the level at which the program objectives are being met occurs through the careful coordination and thorough evaluations and assessment. As noted above, we determined adjustments to the marketing strategies were necessary after the initial program launch. Additional venues were sought out to reach the underrepresented target population for which this program was established and to attract academically talented online graduate students from STEM fields. Initially, the program was designed for students enrolling in courses full-time. Through lack of applicants and more in-depth research, a request was made to offer scholarships to part-time students. The request was granted as a modification to the initial grant. Preliminary response to these changes have been positive, as shown by the increasing number of applicants. Because of the technology available to online institutions, we are continuing to enhance available resources to the scholars. One example is the development of a virtual career fair we are offering later in the program.

Modifications were made to the selection process for our mentor and champion recruitment through evaluation. When we realized we were having difficulty getting peer mentors and champions in the first year, we reached out to our current STEM program advisors to nominate students or alumni who had the potential to make an impact on the scholars. Entering year three, we began recruiting our scholars for peer mentor roles, and asking program graduates to serve as champions. The continuity is a strategy to reach our goal of creating a true STEM grown scholarship program, keeping previous scholars engaged throughout the duration of the five year scholarship program grant.

A survey tool used frequently to facilitate evaluation activities related to the program and its services is Qualtrics. Qualtrics has been very beneficial and is used for data collection for the evaluation of peer mentor training, capturing scholar/mentor and scholar/champion activity, and evaluating Scholar Spot presenters, content, and technologies. The formative feedback received provides evidence used to refine our support approaches and certain program management logistical activities. Formal summative evaluations, such as the scholar participant survey for the scholar program's recent graduates, are forthcoming.

Evaluating the overall program is an ongoing process in which the growth and success of the program is unlimited. Utilizing our resources to share the success we have already experienced as our first three scholars have graduated will increase awareness and viability of this program structure and format that meets the needs of the underrepresented populations in STEM fields, and the other valuable resources and benefits associated with the program.

Conclusion

With the program launch in 2015, we continue to assess and make adjustments on our current processes and strategies. As the STEM Scholars Masters Program continues to progress, we will continue to adjust our program management and student support services to meet our program goals. Our planning committee made the adjustment of eligible scholars from full-time to part-time students, resulting in an increase of the number of applicants. Scholars are appreciative for the opportunity to earn their degree while having the added benefit of financial assistance, career network building, and growth within their STEM career. Mentors are very passionate about their support role to the scholar and want to continue to provide support throughout their educational career and beyond. Champions are honored to be able to provide their STEM and career knowledge to the growth of the scholars while making long lasting connections.

We look forward to sharing our findings throughout the program, and at the completion of our five-year study, we will share our complete findings and recommendations. Our goal is to seek out our opportunities for continuation of the STEM Scholars Masters Program through future NSF grants.

References

Flowers, L. (2011). Online courses can be used to boost minority numbers in STEM
        fields. *Diverse: Issues in Higher Education.* 28 (22), 19.

Johnson, W. B. (2016). *On being a mentor: A guide for higher education faculty.* New York,
        NY: Routledge.

Appendix A
Program Management Checklist
January
- ☐ Encourage students to apply for new cohort
- ☐ Process Awards
- ☐ Scholar Spot
- ☐ Update stem.org report within 30 days of semester beginning

February
- ☐ Application update- decision on how many scholarships can be offered
- ☐ Check with current scholars/mentors/champions to see if interest in being a mentor/champion(again)
- ☐ Reach out for new mentors/champions
- ☐ Scholar Spot
- ☐ Marketing events
- ☐ Publicity articles

March
- ☐ Assessment completion to prepare for new cohort:
- ☐ Scholar Spot
- ☐ Marketing events
- ☐ Begin working on annual report
- ☐ Publicity articles

April
- ☐ Annual Report (April 30th deadline)
- ☐ Recruitment: Communications to admitted not enrolled students
- ☐ Scholar Spot
- ☐ Recognition certificates to mentors/champions
- ☐ Publicity articles
- ☐ Marketing event
- ☐ Assessment

May
- ☐ Mentor payments
- ☐ Mentor/champion checkpoint for applicants
- ☐ Publicity articles
- ☐ Assessment

June
- ☐ Update stem.org report within 30 days of semester beginning
- ☐ Recruitment: Communications to admitted not enrolled students
- ☐ Update/Evaluate scholar spot ideas
- ☐ Add new articles
- ☐ Assessment

- STEM Scholar feature on website

July
- Large NSF committee group meeting (semi-annual meeting)
- Selection Committee will meet and select cohort
- Scholars are notified and contracts are sent
- Complete all necessary documentation
- Peer Mentor Payment paperwork
- Assessment: D2L Shell Design Review/Course Updates
- Notify everyone of peer mentor, scholar, champion (see reusable communication document)

August
- Peer Mentor training (Lori)
- Certificates created and mailed to Scholars
- Press release announcing new cohort
- Process Awards
- Assessments

September
- Update stem.org report within 30 days of semester beginning
- Marketing events
- Review Marketing/Recruiting strategies and prepare for new year
- Scholar biographies are posted on website

October
- Assessment
- Scholar Spot
- Marketing events

November
- Assessment
- Scholar/Mentor/Champion Holiday card
- Scholar spot
- Marketing events

December
- Scholar Spot
- Get scholarship up on website for new year
- Mentor Payments
- Update stem.org report with grades of scholars

Ongoing Thoughts
- After scholar completes first year of program, ask them to be a mentor.
- Upon completing of program ask scholar to become a champion

- o   Encourage them to engage with Alumni events, etc.
- Before assigning mentors, make sure they are not enrolled in the same course
- When students graduate contact photographers to get photos from them at graduation