Designing a Student Exchange Program: Facilitating Interdisciplinary, Mathematics-focused Collaboration among College Students

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Abstract

Interdisciplinary collaboration is necessary for students' professional preparation (Laird et al., 2014; Repko, 2014) and may promote effective learning transfer of course content. Such collaborations have resulted in enhanced problem-solving skills and conceptual understanding of statistics content (Dierker et al., 2012; Everett, 2016; Hammersley et al., 2019; Woodzicka et al., 2015). As a result of ongoing collaborations between faculty members in different disciplines and at different universities, we created a "Student Exchange Program" to encourage interdisciplinary collaboration between undergraduate students in mathematics and social sciences. In the current paper, we describe past research that informed the design of this program, the specific steps taken to implement the program, preliminary results, and potential challenges to implementing and maintaining such an initiative.

Keywords

interdisciplinary, collaboration, students, statistics

A National Consortium for Synergistic Undergraduate Mathematics via Multi-institutional Teaching Partnerships (SUMMIT-P) is a large-scale project with the aim of implementing the recommendations from the Mathematical Association of America (MAA) Curriculum Foundations (CF) Project (Ganter & Barker, 2004) to revise lower division mathematics curricula to better meet the needs of students in partner disciplines. A central component of the project is creating Faculty Learning Communities consisting of mathematicians and faculty from other disciplines to determine ways to effectively implement the CF recommendations in the revised mathematics courses. The CF recommendations for developing connections between mathematics and the social science disciplines highlight creating opportunities for graduate student collaborations between mathematics and social science students to facilitate language flow across the disciplines.

Based on these recommendations, faculty members at Lee University designed a novel program to facilitate interdisciplinary collaboration among undergraduate (instead of graduate) students majoring in these two disciplines. A student in the program works together with a student from a different discipline on pre-assigned tasks, with the objective of learning from each other's discipline. Further, the program focuses not only on facilitating language flow between the two disciplines but also on improving students' knowledge of statistics and interdisciplinary knowledge related to the use of statistics. To encourage other institutions to consider creating similar programs, we describe in this paper past research that informed the design of this program, the specific steps taken to implement the program, preliminary outcomes from our program, and some potential pitfalls.

Literature Review

Research in higher education has focused on understanding how to better equip students with the professional skills for academic and vocational success. Students are expected to demonstrate increasingly diverse, complex skills in professional settings, including problem-solving, critical thinking, innovation, teamwork, integrity, ethical decision making, effective communication, and leadership (Everett, 2016; Hart Research Associates, 2013). Due to the high demand for well-rounded professionals, it is imperative to help students develop the detailed knowledge and skills that are expected in various professions (Everett, 2016; Hammersley et al., 2019; Hung, 2013), particularly those that require advanced mathematical or statistical literacy.

Equipping students with such a broad range of necessary skills may be best conducted through collaborative learning opportunities within undergraduate courses. Collaborative learning cannot be described by a single definition, as it is used in a wide variety of fields and is adapted based on different instructional perspectives, but it may be best understood as an interaction, situation, or learning mechanism that manifests a symbiotic relationship of action, status, and knowledge among its actors (Dillenbourg, 1999). This approach not only supports students working together to reach a common objective but also allows students to jointly interact and problem-solve across various contexts, catalyzing effective interactions for learning. In addition, collaborative learning may facilitate an innate, multidisciplinary language among students when students of varying levels of knowledge participate within a group to solve problems and to gain a cohesive understanding of multidimensional concepts (Dillenbourg, 1999; Dillenbourg, Baker, Blaye, & O'Malley, 1995).

An effective platform to foster collaborative learning within statistics courses may be best found through a system that unifies students across disciplines and enhances students' vocational skills within educational settings. Interdisciplinary integration, "the cognitive process of bringing together and blending insights from two or more disciplines," (Everett, 2016, p. 22) may be such a platform; it is especially beneficial for students' professional preparation (Laird et al., 2014; Repko, 2014) and may promote effective learning transfer and knowledge application of course content. Students participating in interdisciplinary work have exhibited improvement in finding novel solutions to complex problems, further facilitating student and faculty expertise, and broadening their conceptual understanding of statistics course material (Dierker et al., 2012; Everett, 2016; Hammersley et al., 2019; Woodzicka et al., 2015).

The publications about the Curriculum Foundations Project (Ganter & Haver, 2011) include recommendations from social science disciplines to foster these types of collaborations. Two of the recommendations are to implement a "graduate student exchange" and to create a venue for social science students to obtain mathematical help from graduate students in mathematics. The graduate student exchange enables graduate students in participating disciplines to work with and support both faculty and students in the other participating disciplines. Similarly, the tutoring lab venue enables social science students to develop their understanding of statistical concepts by working with experienced mathematics graduate students. In this paper we present an alternate version of an exchange program, one that was designed and implemented for undergraduate students.

Knowledge Application

Despite the increasing demand for critical thinking and complex problem-solving skills from twenty-first century employers, adult learners, including college students and workplace trainees, continue to struggle to adequately demonstrate the skills for effectively applying and transferring knowledge (Everett, 2016; Hammersley et al., 2019; Hung, 2013). Notably, many educators may not recognize this deficit in their students or be prepared to help students with the complex cognition that is necessary to correct it. Knowledge application, the basic level of effective learning transfer, is a process that requires higher-order cognitive skills and is one that is not often a natural ability (Hung, 2013). Incorporating discipline-specific language into college-level instruction and including problems with application-based contexts, however, may help students develop the ability to effectively apply their knowledge and transfer skills to other contexts or disciplines.

By introducing students early on to problems with application-based contexts, the instructor establishes the importance of reasoning through problem-solving situations at the very beginning of a course. Then, adapting problems accordingly may help students to expand their familiarity with and understanding of discipline-specific contexts and the relevant connections to mathematics. Students improve their mathematics knowledge application skills when they explore problem-solving situations set in discipline-specific contexts (Hung, 2013). For example, these types of problems help to illustrate the practical utility of applying mathematics concepts to situations in occupations in various disciplines. Hung (2013) maintains that instruction that involves mathematics problems with indirect contexts will, conversely, require students to make an additional cognitive application when faced with similar situations in their future occupations. This type of cognitive reasoning is a cross-context which is not conducive to successful learning transfer and knowledge application across disciplines. Incorporating discipline-focused mathematics problems in instruction will provoke a closer learning transfer and consequently help students to effectively apply mathematical knowledge and skills within their future occupational contexts (Hung, 2013).

Student learning is, furthermore, a multi-dimensional process and dependent upon holistic educational approaches that promote intellectual and personal growth (Baxter Magolda, 2009). To facilitate multi-dimensional student learning and effective application of knowledge and skills in college-level statistics courses, it is important for students to have opportunities to participate in interdisciplinary collaboration. These types of experiences will help students to develop a deeper conceptual understanding of the content which, in turn, may adequately prepare them to excel when working within discipline-specific contexts in occupational settings.

Interdisciplinary Collaboration

Previous research has established that students who engage in interdisciplinary collaboration may more effectively develop the complex skills that twenty-first century employers prioritize, including two high-demand, cognitive skills: innovation and problem-solving (Everett, 2016; Hart Research, 2013). The multifaceted, real-world problems that are conventionally part of interdisciplinary work broaden students' understanding of complex problems (Everett, 2016). Collaboration also often results in novel solutions to intricate problem situations. Work with real-world problems of this type improves students' conceptual understanding of the material being studied. In addition, students who have participated in interdisciplinary team work have demonstrated an even better aptitude for solving complex problems (Hammersley et al., 2019).

However, students are not the only ones who benefit from participating in interdisciplinary team work. This type of collaboration has a significant influence on faculty as well; faculty engaged in interdisciplinary work have reported positive outcomes from the collaborative experience. These types of experiences help faculty better facilitate cross-disciplinary connections with colleagues that would not have materialized otherwise (Goodlad & Leonard, 2018). Faculty have further reported that cross-disciplinary connections in undergraduate settings have challenged faculty intellectually and have subsequently provided a broadened understanding of the value of multidisciplinary work for students. This outcome is similar to the broadened conceptual understanding that students themselves develop from interdisciplinary work (Everett, 2016; Goodlad & Leonard, 2018). Therefore, it is evident that multidisciplinary undergraduate instruction not only supports student development of higher-order cognitive skills that are necessary for effective knowledge application, but also supports the development of cross-disciplinary communication, cognitive flexibility, and a deep understanding of concepts (Dierker et al., 2012; Everett, 2016; Laird et al., 2014), knowledge and skills that are essential for producing erudite, scientific scholars.

Despite the benefits of interdisciplinary work, instruction in undergraduate statistics has become increasingly polarized, with instructors frequently using either discipline-specific statistics curricula or traditional statistics tools which are not useful for making meaningful connections to how different disciplines make use of statistics (Dierker et al., 2012). Such polarization within statistics education appears to also include cross-contexts in student cognition which are not conducive to effective learning transfer and knowledge application (Hung, 2013). This type of polarization can be bridged by integrating cross-field instruction and collaborative opportunities within statistics courses (Everett, 2016).

Past researchers have sought to bridge the divide between traditional statistics instruction and the use of discipline-specific curricula largely by including systems of interdisciplinary, project-based learning in undergraduate introductory statistics courses. In a study conducted by Dierker et al. (2012), students generated scientific questions according to their subjective interests and researched their individual questions while learning about various statistical measures from lectures and with peer tutor support throughout the course. This type of course structure with instruction that is enhanced by team projects and peer mentoring has increasingly been found to encourage student engagement in research (Goodlad & Leonard, 2018; Hammersley et al., 2019). Dierker et al.'s problem-based learning study primarily had participants evaluate the appropriate statistical measures to use for their individual research questions. Through this approach, students developed a broader conceptual understanding of statistics course material, in contrast to more traditional fixed memorization of statistical procedures.

Considering the contributions of prior research on crossing the disciplinary divide that exists within the polarized world of undergraduate statistics education, our program seeks to bridge disciplinary boundaries in ways that are different from the existing and often-used structure of project-based learning. The Student Exchange Program (SEP) instead seeks to introduce a model for interdisciplinary collaboration that promotes effective knowledge application and conceptual understanding in undergraduate students, equipping students with the complex cognitive skills needed for academic and vocational success.

The Student Exchange Program

One purpose of the graduate student exchange as outlined in the CF recommendations is to facilitate language flow between mathematics and the social science disciplines. However, other than stating that "...mathematics graduate students provide statistical and mathematical support to social science students and faculty, while social science graduate students work with mathematics students and faculty" (Ganter, 2011, pp. 34–35), no specific details are provided about this type of program in the CF recommendations. At Lee University we have fleshed out the idea by designing a program that pairs a mathematics undergraduate student with a social science undergraduate student to work collaboratively on pre-assigned tasks. The objective is to create a "student learning community" in the spirit of the faculty learning communities that are quite common in academia.

The Student Exchange Program (SEP) is comprised of undergraduate students who were recruited from a pool of mathematics and social science majors. These students applied to the program after being recommended by various mathematics and social science faculty members who were familiar with SEP. These faculty members, including the first author of this paper, began collaborating in August 2017 to establish and maintain SEP.

The faculty team worked together to select students for the program based on their interests and experiences in mathematics, academic indicators (e.g., grades in mathematics classes, overall GPA), and other relevant skills (e.g., familiarity with statistics software). We also used these factors to determine an hourly pay rate for each student. In addition, we admitted students into the program for one semester and required that they reapply if they wanted to participate again in a subsequent semester. We hired a total of four students (two majoring in mathematics and two majoring in social sciences) per semester. In total, we have hired 16 students (6 men, 12 women) since the program's inception, some of whom participated in the program for more than one semester.

Before participating in the program, students provided informed consent to participate in the collection and analysis of data on their performance in the program and their attitudes about the program. Data collection took place at the beginning and end of each semester. We paired each student majoring in mathematics with one student majoring in the social sciences[1] and required the pair to collaborate on preselected tasks throughout the semester. Faculty members in both disciplines provided input into the tasks before they were assigned. Tasks were chosen to facilitate interdisciplinary collaboration and conversations between students, deepen students' understanding of statistics, and help students understand how statistics are applied in different disciplines. What follows is a detailed description of all of the tasks that were implemented in SEP.

Class Attendance

When the SEP first began, we required each pair of students to attend a section of Introduction to Statistics, a three-credit-hour, freshman-level course. Multiple sections of this general education course are offered every semester. Fall semester enrollment ranges between 300 to 350 students, whereas spring semester enrollment ranges between 200 and 275 students. Class sizes usually range between 16 to 30 students, and all sections are offered in a lecture-based format. This course is required for students majoring in business, nursing, psychology, sociology, anthropology, political science, biology, chemistry, and many of the teacher licensure programs. Students are placed in this course based on their ACT/SAT scores or previous preparations. Although there are no recitation sections for the course, students are encouraged to seek assistance when needed from our Mathematics Tutoring Center, which is run by senior mathematics majors in the evenings during weekdays. Due to the variety of disciplines represented by the student population for this course and the practical statistics applications in these disciplines, the course provides a rich environment in which to pilot SEP. Moreover, all of the aforementioned disciplines have a follow up course for which Introduction to Statistics is a prerequisite or have other situations in which students must apply the concepts covered in the course. For example, future teachers are expected to be able to analyze the data presented in annual course evaluations. This type of analysis requires the knowledge and skills developed in Introduction to Statistics.

We asked all mathematics faculty teaching sections of the course to allow pairs of SEP participants to attend. Participants attended class meetings, took notes on the course content, and occasionally assisted the instructor with class activities and demonstrations. If participants continued working in SEP for more than one semester, they were not required to attend a statistics course in the subsequent semesters.

After SEP had been implemented for one year, we developed new activities for participants to complete and required student pairs to spend more time on these activities. Thus, we eventually phased out the requirement for class attendance to allow time for the new activities which are described below.

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[1] Future iterations of SEP will include students from other disciplines, such as nursing, athletic training, or business.

Structured Interviews

To encourage meaningful interdisciplinary dialogue between SEP participants and to help them understand how statistics can be applied in different disciplines, we required pairs to interview each other about one statistical concept of their choice, such as applications of the normal distribution, correlation coefficients, or hypothesis testing. Mathematics and social science faculty developed four questions that the interviewer was to ask about the selected concept:

1. Briefly, could you define the statistical concept in your own words?
2. How do you use the statistical concept in your discipline?
3. What is or was the most challenging part of understanding the statistical concept for you?
4. In your opinion, what is the most important thing to know about using or applying the statistical concept?

Participants recorded their interviews and submitted them to the program developers for review. We did not analyze the participants' conversations, as this was an activity to encourage and facilitate meaningful dialogue.

Resource Website Design

During the first year of SEP, participants collaborated to create a comprehensive website that could be accessed by undergraduate students taking Introduction to Statistics. We encouraged participants to begin by discussing the types of resources that might be helpful for students in the course and which concepts should be emphasized for students completing different majors. With this information and ample guidance, participants found and compiled resources for the website.

For example, participants selected videos for the website for the purpose of providing helpful information about the concepts covered in Introduction to Statistics. For one page of the website (see Figure 1), participants embedded a series of videos covering statistics skills and software navigation (e.g., Excel, SPSS). On another page, participants embedded original videos made by various professionals (e.g., high school teachers, college professors), who each briefly described how they use statistics in their professions.

Beginning in Fall 2017, the URL for the website[2] was made available to all mathematics faculty members teaching statistics courses as well as to all students in the courses. We also asked SEP participants in subsequent years to continue editing the website and adding new content. We review the new content each semester, and revisions to the website are ongoing.

Statistics Tutoring

Since the inception of SEP, pairs of participants have worked in the Mathematics Tutoring Center to assist students who need help with statistics content. We instructed participants to explain or clarify concepts from the perspective of their respective majors, thus helping the students in the tutoring session to consider how the content may be applied to other relevant domains. We solicited feedback from students who attended tutoring sessions, gathering information to help us improve students' experiences and assess SEP participants' performance.

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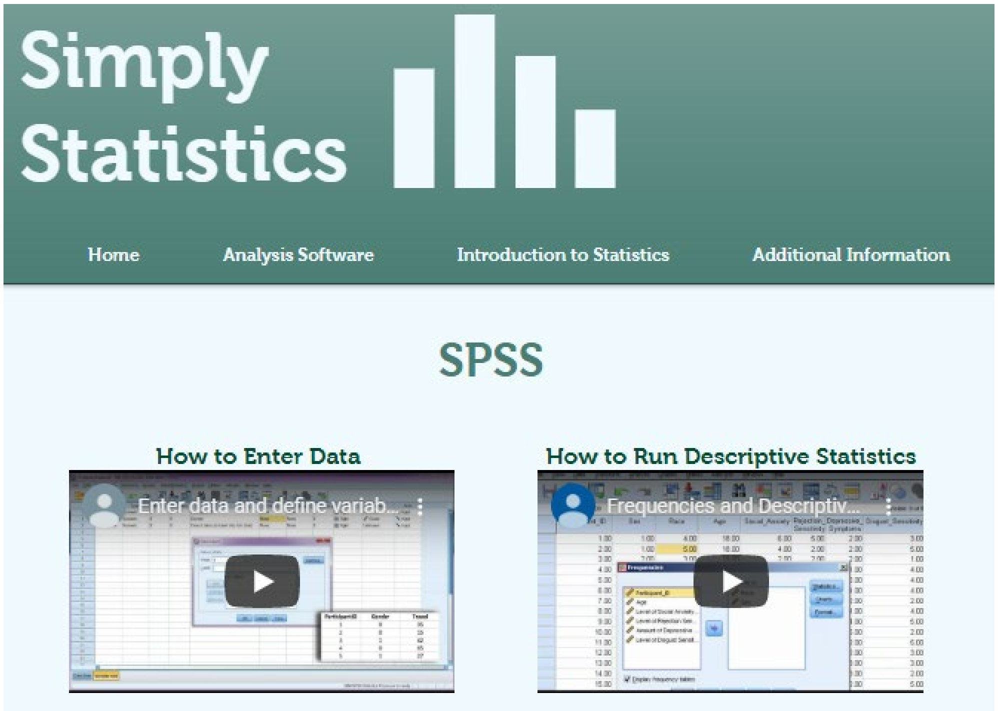
[2] The website URL is available from the first author upon request.

Figure 1
Sample Page from the Resource Website Containing Videos about Analyzing Data with IBM SPSS Statistics Software



Recitation Sections

During the semesters in which participants were not working in the Mathematics Tutoring Center, they hosted weekly recitation sections for all freshman-level statistics students. Past research has shown that recitations, in which facilitators create an environment conducive to review, discussion, and problem-solving (Guetzkow & McKeachie, 1954), are an effective and inexpensive way to improve students' comprehension of course content (Stock et al., 2013). These recitations were established as an additional hour of optional time for students in the course to spend reviewing and practicing class material.

Prior to hosting a recitation, pairs of SEP participants prepared examples of concepts recently covered in the courses and problems for students to solve. They met with attending students for approximately one hour to review course content and work on problems. Students had the opportunity to provide anonymous feedback after the recitation meeting.

Preliminary Outcomes

To determine the effectiveness of SEP, we assessed participants at the end of each semester through a series of targeted questions.[3] Three key questions, which served as the primary source of our qualitative analyses, are listed below:

[3] We have also been collecting quantitative data on participants' attitudes toward statistics. Currently, however, our small sample size prevents us from making meaningful interpretations of these data. Information about these scales or data is available from the authors upon request.

1. What was the most beneficial aspect of working in the Student Exchange Program?
2. What areas of your knowledge in mathematics or statistics changed as a result of your participation in this program? Be specific.
3. What aspect(s) of the program were most beneficial at impacting your attitudes and/or knowledge about mathematics or statistics? Why?

We also analyzed the feedback provided from students who attended tutoring sessions in the Mathematics Tutoring Center. Our preliminary results are described below.

Qualitative Responses

Currently, we have analyzed participants' qualitative responses to the questions we posed from four semesters (Fall 2017 to Spring 2019) of SEP implementation. We used thematic analysis (Braun & Clarke, 2006) to analyze their responses. Ours was an inductive approach to analysis, coding and developing themes based on all participants' responses from the last four semesters. In the end, we identified three key themes in the responses (see Table 1 below).

Review of Statistical Content

The first theme suggests that SEP provided a valuable opportunity for participants to review statistical content. For some participants, it had been two years since they had taken a freshman-level statistics course. They noted their understanding of content was refreshed or improved by attending class with other students, having access to the textbook used in the freshman-level statistics course, and engaging in conversations with other SEP participants. They also noted that the review was beneficial for refreshing their understanding of specific concepts, such as permutations and combinations, which were not emphasized in some upper-level courses.

Application of Knowledge

The second theme suggests that SEP helped participants understand how statistics can be applied to different domains. For example, participants majoring in the social sciences reported an improved understanding of how statistics is used in mathematics and engineering, whereas participants majoring in mathematics reported an improved understanding of how statistics is used by psychologists.

Benefits of Knowledge Transmission

The final theme suggests that participants felt better equipped to communicate statistical information to others after participating in SEP. By requiring participants to work together to tutor students or host weekly recitation sections, they necessarily reviewed pertinent content, prepared helpful examples in advance, and explained statistical concepts in new ways. Together, these activities enhanced participants' confidence in their understanding and comprehension of statistical information and also provided valuable opportunities for students being tutored or participating in recitations to further develop their understanding of the material.

Table 1
Themes Identified in SEP Participants' Question Responses, Fall 2017 – Spring 2019

Themes	Example quotes
Review of statistical content	"I would say that my knowledge wasn't necessarily changed, but it was refreshed and brought back to the forefront of my mind."
	"A time to re-learn everything again from my previous statistics class."
	"I believe I received a higher score on the GRE this semester than I would have had I not been in the SEP because of all the statistics refreshers."
Application of knowledge	"Interacting with my partner helped me gain appreciation for statistics by seeing how it applies in her life and how important it is to her."
	[Participating] "helped me understand the mathematical side of statistics as well as some of the terminology used in math that is not always used in psychology."
	"My knowledge of how statistics might be used in a more mathematically-driven setting was minimal before participating in this program. Specifically, my partner taught me a lot about how statistics would be used in an engineering context, and how it related to other mathematical concepts. I gained a more holistic view of the usefulness of statistics across broader discipline categories."
Benefits of knowledge transmission	"I felt tutoring was the best area to explore statistics because it was the most hands on and forced the most thought."
	"Tutoring the students was the most beneficial to my own understanding of stats. You never truly learn something until you teach it to something else."
	"Leading the recitation sessions and preparing for them helped me gain more confidence in my knowledge of math/stats. Being placed in a situation that required me to explain/teach the concepts not only helped me further grasp statistics but also helped me gain a newfound appreciation for mathematics as a whole."

Student Tutoring Feedback

We collected feedback from students who were taking Introduction to Statistics who also visited the Mathematics Tutoring Center. After students received help from SEP participants, they responded to three Yes or No questions about (1) whether the help they received was clear and effective, (2) if they would be willing to receive tutoring again, and (3) if they would recommend tutoring to a friend. All students who submitted feedback about SEP participants responded "yes" to all three questions. In addition, when asked if there was anything that could improve the tutoring experience, all students responded "no" to the question. Taken together, these data suggest students benefitted from tutoring by SEP participants.[4]

General Discussion

The Student Exchange Program was designed by mathematics and social science faculty members to provide interdisciplinary, collaborative learning opportunities for undergraduate students, facilitating deeper processing and knowledge transfer of statistical information. Preliminary results from our study of this program suggest that participants benefited by reviewing important statistical concepts and skills, developing an understanding of how statistics are applied in other disciplines, and deepening their knowledge of statistics by helping others better understand the subject.

These initial results suggest SEP may serve as a springboard for deep cognitive processing in participants (Craik & Lockhart, 1972), which often leads to long-term retention of concepts and skills (Bacon & Stewart, 2006). For example, when participants in SEP prepared to lead recitation sections or to work together while tutoring other students, they processed the material on a deeper level by generating novel examples of concepts and refining their explanations of the material. Past research supports this assertion. Fiorella and Mayer (2014) found that participants who learned about an unfamiliar topic by preparing to teach it scored higher on a comprehension test than participants who studied the topic in a different way. In a subsequent study, participants who prepared to teach and presented material in a video-recorded lecture outperformed participants who did not teach the material. Explaining material to others, in real or simulated conditions, is more effective for learning concepts than restudying material and writing down explanations (Hoogerheide & van Gog, 2016). Furthermore, positive feedback from students who attended tutoring session further highlights the benefits of these collaborative learning opportunities for everyone involved. However, due to the preliminary nature of our work, some data are not yet available for analysis and discussion. We believe that our initial conclusions about the program's effectiveness will be supported when we formally analyze the quality of all of the resources posted to the statistics website and gather additional data about the effectiveness of tutoring and recitation sections led by SEP participants.

A Catalyst for Collaboration

In addition to providing valuable opportunities for interdisciplinary collaboration between students, implementing and managing SEP has been a catalyst for collaboration between faculty members in our institution, as well as with faculty at other institutions. For

[4] We also attempted to collect feedback from students attending the recitation sections. However, no students submitted feedback on SEP participants' performance.

example, mathematics and social science faculty members at our institution have created and sustained a faculty learning community that did not exist prior to participation in the SUMMIT-P project. Together we have recruited participants for SEP, exchanged pedagogical ideas and resources, designed and reviewed assignments, and shared access to our classrooms and materials. In sum, collaboration between faculty members of different disciplines has been essential to maintaining and improving SEP.

Moreover, SEP has fit into the collaborative mission of the SUMMIT-P project as a whole. For example, faculty members from other institutions evaluated SEP during a project site visit, reviewing our procedures and interviewing participants. Not only did they affirm our efforts, but they also provided ideas for novel ways to expand the scope of the program (e.g., using SEP participants to tutor both mathematics and social science students). In addition, based on our program's success, other institutions within the SUMMIT-P project, such as Ferris State University, have been inspired to implement similar programs or student-centered workshops. These examples suggest the SEP may provide valuable opportunities for novel student and faculty collaborations within and among institutions.

Challenges and Potential Pitfalls

Creating and managing a program like our SEP presents many challenges. First, the program may consume a significant amount of faculty time. For example, interviewing and hiring students as employees and keeping a record of their hours and tasks can be time-consuming, especially if new students are hired each semester. Designing, compiling, or monitoring activities may also take significant faculty time and attention, especially when being done during the academic year. Based on our experience, we recommend hiring a student worker to help manage some of the simpler tasks required to run the program.

Second, maintaining the program might be a costly endeavor. Providing funding for student participants, student workers, and supervising faculty may be difficult without institutional or external support. However, it may be possible to sustain SEP without excessive financial strain by linking student participation to course credit or some type of extracurricular program.

Third, the success of the SEP is contingent on the engagement of the participants. Students who lack motivation or struggle with time management may inhibit how other students are able to perform in the program or limit the progress of the program itself. Program administrators should adopt effective methods of keeping participants accountable and on task, including meeting with participants on a regular basis.

Finally, the small sample size of SEP at our institution limits the ability to draw some conclusions about the effectiveness of the program. For example, given that we hired 16 students over four semesters, we are currently unable to adequately explore our quantitative data to provide additional supportive evidence of the program's success. However, our qualitative analyses and student feedback have revealed promising benefits from participating in this collaborative program even while it is still being developed and refined.

Conclusion

In the twenty-first century, when students are pressed to develop the skills necessary for occupational and academic performance, programs that provide opportunities for deeper, multidisciplinary learning are important. At our institution, SEP, which is a continually evolving program providing opportunities for engaging undergraduate students in statistics, may be an operative platform for effective knowledge application and learning transfer that can benefit participants in myriad ways. Through the inclusion of details about our activities, assessments, outcomes, and obstacles, our intent has been to guide and challenge readers to consider whether similar programs can be developed and sustained at their own institutions.

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