

Partnerships in Learning: A Faculty-Academic Support Center Collaboration to Enhance STEM Student Success

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The low retention rates of students in Science, Technology, Engineering, and Mathematics (STEM), and STEM-related, majors is a serious concern in today's higher education community in the United States (Chen & Soldner, 2013; President's Council of Advisors on Science and Technology, 2012). This concern is not new to William Paterson University (WPU). The relatively high D/F rates of grades earned by students in high-risk STEM courses were identified in a 1993 Academic Support Services report, which indicated that "the highest failure rates are in mathematics and science, especially the freshman level science courses such as anatomy and physiology" (William Paterson University, 1993). In response to these concerns, a faculty member in the biology department implemented efforts to lower the D/F rate in biology courses by providing academic support to students in the biology laboratories where instruments and anatomical models were located. Throughout this initiative, she donated her time to direct the program and to help tutor the students. She also obtained funding to compensate tutors for a brief period of time through a grant. Concomitantly, the university's Academic Support Center offered science and mathematics tutoring in a separate mid-campus location. Unfortunately, relatively few students in these courses sought academic support at this center due to the inconvenience of traveling to its location. After a review of the two programs—the faculty initiative and the Academic Support Center—the biology faculty member and the coordinator of academic support for the sciences concluded that a more synergistic approach might prove more beneficial to students. In agreement, Cox and Orehovec (2007) proposed that isolated initiatives focused on student success would have marginal results as many components contribute to the student experience.

The implementation of this decision required that the skills of both groups (i.e., faculty and administrators) be used to create a structure that would enhance the likelihood of student success. The creation of the partnership between the faculty and the Academic Support Center required consistent interaction, communication, flexibility, and adaptability. Although this partnership began with the Biology Department, faculty throughout the College of Science and Health became partners in this endeavor as awareness of the program diffused among faculty and students. This paper describes the development of this partnership from its promotion to the pedagogy employed to innovate a new type of support center. This discussion focuses on primary areas of concern that were relevant to the success of this venture—proximity, promotion, and pedagogy (see Figure 1).

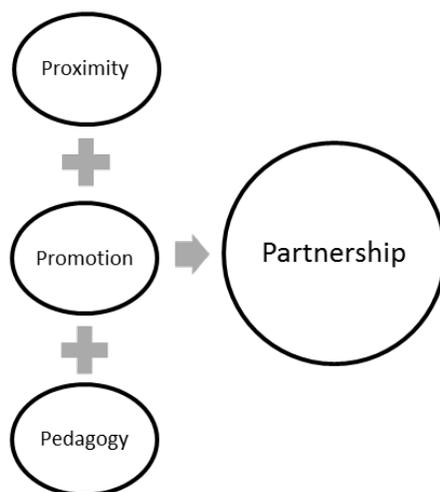


Figure 1. Primary components of a successful faculty-learning center partnership.

Creating Synergy: Partnering through Collaboration

Initially, the partnership collaborated on immediate logistic and pedagogical concerns that needed to be addressed in order to support the proposed initiative. Accordingly, efforts at this stage focused on the proximity or physical relocation of STEM-related academic support to the science building and adoption of a study group-based support model.

Proximity: The Issue of Access

The first initiative of the newly merged program was to move academic support for the sciences from its central location on the campus to the science building. This decision enabled students to have access to science resources and to meet with their faculty and fellow students between classes. The importance of situating academic support in close proximity to academic departments had also been recommended by other support programs (Casazza & Silverman, 1996; Martin & Arendale, 1992).

Pedagogy: Connecting through Study Groups

The rationale for using study groups for student support was based on a substantial body of research demonstrating the ability of study groups to promote student success (Light, 1990, 1992; Martin & Arendale, 1990, 1992, 1994; Matyas & Malcom, 1991). Results of studies show that students in study groups develop learning communities that provide them with opportunities to become connected (Ryan & Deci, 2000), to develop relationships (Bowman, 2007), and to increase their engagement with each other (Johnson, Johnson, & Stanne, 1985; Akey, 2006). These influences have been found to contribute to task persistence (Eisenberger, Kuhlman, & Cotterell, 1992). Numerous researchers have also reported that cooperative learning can also impact self-esteem, confidence, and concept reinforcement (Benware & Deci, 1984; Dansereau, 1988; Devin-Sheehan, Feldman, & Allen, 1976; Newbern, Dansereau, Patterson, & Wallace, 1994; Slavin, 1996; Webb, 1989, 1992). Observations of students participating in study groups at the center were consistent with these findings. It was also found that group learning provided facilitators with the opportunity to use a combination of theories, including behaviorism, cognitivism, schema theory, and situated learning, to promote the higher-order learning needed for STEM disciplines.

Subsequently, the partnership's attention focused on other important processes necessary for the success of a newly located center—plans for promoting and attracting students to the center. Initial promotion strategy focused on branding and the use of student incentives.

Promotion: Name Changes and Student Incentives

In order to avoid the stigma associated with remediation, the partnership decided to change the perception of the program from academic support to a learning community. Based on a faculty member's vision of a central location where a community of students could engage in collaborative exploration of the sciences, the program was renamed the *Science Enrichment Center* (SEC). The name was abbreviated to the acronym SEC to promote memorability and visibility.

In an effort to further increase student attendance, the partnership developed an incentive program to reward students for pursuing academic support in 2003. Specifically, students were provided with a coupon point for each 1.25-hour mediated study group session they attended. This point could then be exchanged for extra credit in courses taught by professors who adopted the program. Close collaboration during the development of the program ensured that faculty members were confident that the student attendance records were authentic and that stringent security measures were used to validate the coupon credit.

Initial faculty adoption of the program was relatively low. However, as assessment by the partnership showed that the reward program was successful in improving student grade outcomes and motivating voluntary study group attendance, faculty adoption of the incentive program increased. Three years after the establishment of the program, student attendance at the SEC

increased by 139%. The following year, 2007, there was a 60% increase in student attendance. A jointly published study of the coupon program's outcomes validated this effort for the larger higher education community in 2013 (Potacco, Chen, Desroches, Chisholm, & DeYoung, 2013).

In addition to the coupon program, consistent and frequent faculty presence at the center motivated student attendance by nonverbally communicating their endorsement of the center and promoting a sense of community.

Realizing a Sense of Community through the SEC

According to the *Community of Inquiry* framework of Garrison and Arbaugh (2007), effective learning can be promoted by three overlapping elements: social presence, cognitive presence, and a teaching presence characterized by collaborative and constructive discourse. The partnership used this concept to guide the pedagogical foundation of the study group format, fostering a unique mode of interaction that differed significantly from traditional classroom instruction. The goal was to enable students to receive individual attention, ask questions, and benefit from student-student interactions facilitated by instructors.

Faculty-Student Interaction: Building a Sense of Community

Implementation of the study group infrastructure was systematic and purposeful. The groups were scheduled between classes at pre-established times and days that were convenient for both students and faculty. At the beginning of the collaboration, faculty would visit these groups to answer questions and talk to students. Later in the program's development, at the initiative of a physics professor, faculty members began to hold their office hours at the center. Some professors chose to maintain a regularly scheduled presence, while others utilized the center less frequently for reviews. One year after the office hour initiative began in 2012, program data revealed that student attendance at the SEC had increased by an additional 14%.

The study group format enabled a mentor relationship that benefited both students and faculty. Faculty mentorship provided students with the opportunity to interact more closely with their professors and to observe them as role models. Their professors' presence in the center also reinforced its image as "the 'educational workplace' of serious professionals" (Potacco & DeYoung, 2007, p. 21). For their part, faculty mentors expressed appreciation for the opportunity to work with their students in a supportive and public environment with access to learning resources. In addition, faculty mentors provided mentoring to peer tutors by providing guidance and modeling strategies in pedagogy and communication. The ability of mentorship to positively affect student outcomes has also been widely supported in the literature (Beisser, Kurth, & Reinhart, 1997; Brownell & Swaner, 2010; Cox and Orehovec, 2007; Fuentes, Alvarado, Berdan, & DeAngelo, 2014; Finley & McNair, 2013; Kuh, 2008; Kuh, O'Donnell, & Reed, 2013; Tinto, 2004, 2006).

Using Faculty Expertise as a Resource

Faculty support and engagement were essential in promoting and supporting the success of the SEC. Assessment of participation revealed that faculty members were instrumental in promoting students' initial adoption of the program. Once students observed tangible improvements in their grade(s), participation became more self-motivated. Grade and other outcome measures of the program were also analyzed independently by faculty and the administrative coordinator to determine the efficacy of the program. Corroboration by these multiple sources of evidence motivated the faculty to continue to refer their students to the center and the university administration to provide additional funding.

Faculty support and engagement were also essential in creating the academic infrastructure upon which the SEC would be built. The faculty provided needed expertise in defining and guiding the emerging culture and student support initiative of the center. Since the center had no budget during its first few years, faculty served a critical role in supplying books, tests, models, multimedia equipment, and study guides for students and selecting hardware and software germane to course pedagogy and content. In addition to donating physical resources, faculty played the vital role of recommending their outstanding students as tutors, based on their academic excellence, communication skills, and leadership abilities.

The most important benefit realized from the partnership built between faculty and the administrative staff is that it creates a type of synergy that supports student success and fosters a sense of community (Potacco & DeYoung, 2007). Frequent positive interactions with faculty, staff, and peers influenced students to continue utilizing the center. Faculty and the administrative staff energized the process and validated their efforts through assessments. The assessments validate the partnership's belief that their observations are consistent with research demonstrating that community building plays a significant role in motivating student persistence in pursuing academic support (Tinto, 1997, 1998, 2000, 2008).

Assessment: Adding Value through Validation for the Program

This partnership's focus on assessment provides important information on outcomes for participating student attendance, grades, and retention. This was extremely important information given that the student population discussed in this case consists of students enrolled in William Paterson University's STEM and STEM-related courses, which are known for their quality and rigor. The population of students taking a science course is typically 47% to 50% minority, 58% female, 96% undergraduate, and 76% commuters. The average age of these students is approximately 22.5, and their overall average GPA is 2.84 (Potacco & Ramirez-Levine, 2013). The proportion of students taking a science course by class level in a semester is 43% seniors, 26% juniors, 21% sophomores, and 11% freshmen.

The partnership assessed student attendance at the SEC in order to evaluate the efficacy of individual initiatives and the center's progress over time. Based on longitudinal student

attendance data, student contacts increased from 1,478 to 18,980 (1,184%) since the partnership began in the fall semester of 1991. Approximately 75% to 80% of these contacts consisted of participation in study groups, which were 1.25 hours in duration and involved direct contacts with faculty or peer facilitators and peer students. In later years, a digital reporting system was designed to record student attendance in a database compatible with the university's database. This database provided faculty with a tracking system that enabled real-time feedback related to student attendance at the center. Data compiled through the database also provided the center with a means of analyzing the relationship of the intervention to retention and grade outcomes.

Retention

Retention data analyzed over six years demonstrates that students who attended the center had a significantly higher retention rate, compared to students who did not attend the center (Potacco & Ramirez-Levine, 2009, 2010, 2011, 2012, 2013, 2014). Retention rates were measured based on whether students enrolled in a high-risk science course in the spring of each year and re-enrolled at the university the following fall. Based on a 95% confidence interval from historical data, the retention rate of students receiving academic support in these high-risk science courses ranged from 4.69% to 4.71% higher than that of students not receiving academic support.

Grades

The analysis of grade outcomes over six years demonstrates that a significantly higher proportion of students in high-risk science courses earned satisfactory grades, including A's, B's, and C's, than students who did not come to the center (Potacco & Ramirez-Levine, 2009, 2010, 2011, 2012, 2013, 2014). Based on a 95% confidence interval from historical data, the proportion of students receiving satisfactory grades among students receiving academic support in high-risk courses ranged from 10.5% to 14.5% higher than that of students not receiving academic support.

Lessons Learned and Conclusion

There were both expected and unexpected benefits of the partnership between the faculty and the Science Enrichment Center, all of which contribute to an understanding of how to create a successful student learning center.

Holistically, an effectively designed partnership builds a bridge between the faculty and administration that helps coordinate and augment the student retention efforts of both entities. It also provides an essential foundation for a learning center that can fulfill the diverse needs of students, faculty, and the university. Within this relationship, members must respect each other's strengths and share ownership through collaborative decision-making. Faculty are content experts in their discipline and set academic goals and expectations for students. In contrast,

learning center administrators have expertise in support and administration. They have the responsibilities of supporting students' efforts to meet the academic expectations set by faculty, relieving faculty of the administrative tasks associated with the operation of a learning center, and providing program feedback. A well-coordinated alliance can use this feedback to fine-tune their individual and/or collective efforts.

Important lessons were learned during the implementation phase of this center. Importantly, the proximity of the learning center to faculty, students, and resources facilitated the ability of these groups to communicate, meet, coordinate, and share resources. Faculty appreciated their ability to observe and facilitate their students' learning and influence the center's operation. Students appreciated the convenience of meeting with their professors in a group outside of the classroom. The center's staff appreciated the assistance, insight, and academic direction provided to them by the faculty.

As the partnership developed, it also became obvious that the faculty were the most influential recruiters for the center. Students consistently revealed that they had come to the center based on the recommendation of their faculty and/or to attend a study group with their professor. As the center developed, faculty continued to promote adoption by helping the center develop highly effective promotional incentives, such as the Coupon Program, that motivated students to seek support (Potacco, Chen, Desroches, Chisholm, & DeYoung, 2013). Concomitant with faculty's investment of effort and trust, the center recognized its obligation to consistently and accurately assess and document the outcomes of initiatives through reports and publications.

The benefits of partnerships can extend beyond the internal community in which they exist. The demonstration of common goals and a strategic alliance between faculty and administrators has the capacity to enhance respect across the community and contribute to the collaborative spirit of the larger community. On a broader scale, partnerships provide the opportunities for faculty and the administrative staff to engage in innovative collaborative research that can be shared with the larger educational community in multiple areas related to academic success and retention (Potacco & DeYoung, 2007; Potacco, Chisholm, Ramirez-Levine, & DeYoung, 2008; Potacco, Chen, Desroches, Chisholm, & DeYoung, 2013). In this case, research and the partnership also provided a support structure for grant programs focusing on student success, such as the National Science Foundation's Increasing Student Success in Biology and Biotechnology (ISSBB) and Garden State Louis Stokes Alliance for Minority Participation (GS-LSAMP) grants.

Most importantly, partnerships serve the needs of students. Faculty and learning centers have the potential to affect student outcomes when the factors that foster quality interaction are applied. Faculty and learning specialists can assume "critical roles as agents of socialization" (Fuentes, Alvarado, Berdan, & DeAngelo, 2014) and mediators of learning through their mentorship. As stated by Tinto (2006), though "student retention is everyone's business, it is now evident that it is the business of the faculty in particular. Their involvement in institutional retention efforts is often critical to the success of those efforts" (p. 5). In agreement, when faculty and support centers fully invest in the common, exclusive goal of student success by

partnering, they have the potential to create innovative practices in student success that synergistically exceed the efforts of each member independently. The benefits of this collaboration have the potential to impact students and faculty at the micro level, institutions at the macro level, and the higher education community at the mega level.

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