Board 302: Helping Rural and Underrepresented Students Succeed in STEM

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Helping Rural and Underrepresented Students Succeed in STEM

The need to increase the science, technology, engineering, and math (STEM) labor pool by tapping into the underrepresented and rural populations is well documented [1, 2]. With funding through an NSF S-STEM grant, researchers at the University of Arkansas (UA) have created a program to provide 38 Pell Grant eligible students with scholarship funding and retention programming. This program, *Closing the STEM Labor Gap through a Path to Graduation (PTG) for Low Income, Rural Students (DUE 1742496)*, recruits promising undergraduate students (high school GPA 3.5+ and ACT 23-27/SAT 1130-1300) into STEM and helps them succeed by partly removing financial, academic and social barriers. These students rarely qualify for other large scholarships due to their moderate standardized test scores.

The PTG program [3, 4] provides the following support services to its students:

- Residential bridge program for first-year students held immediately prior to their first semester on campus. The bridge program provides an opportunity to get acclimated to the campus and expectations related to taking college-level courses. It also creates cohort bonding experiences.
- First-year living learning community in the honors residence hall to engage in intellectual and success programming and make social connections with other serious students.
- Peer mentoring for motivation, emotional support, and guidance from PTG students who have recently been through similar experiences.
- Student success advising from professional mentors to help students stay on track, navigate the university, and help with any issues impacting their paths to success.
- Research faculty advising to help students stay on track academically and encourage students to engage in undergraduate research.
- Monthly cohort meetings to build community, while providing information on academic opportunities, campus resources, and health and well-being.
- Interventional advising to provide advice and counsel for students having any acute problems.
- Social opportunities to build friendships and generate a sense of community.

Based on the program assessment:

- Three cohorts of students have been admitted to the PTG program for a total of 38 undergraduate students (58% rural, 68% underrepresented minority (URM), 40% female). The recruitment goals were met and URM and rural students were much more heavily represented than the general UA STEM population (URM 68% vs 19%, rural 58% vs. 15%).
- In cohort 1, the retention goal of 68% was not met. Only 38% (5 out of 14) of students graduated, but all cohort 1 students who retained did graduate in four years. Covid had a major impact on this cohort. Three of the students who left the program also left the university. This resulted in more work being done with the following cohorts to better integrate students into the university and STEM and to help provide a stronger sense of belonging.
- Four of the five graduates (cohort 1) completed an exit survey. 100% felt the bridge program was tremendously helpful. All graduates also said that PTG provided a positive impact on their academic performance and on completing their degree.
- Cohort 2 retention after 3.5 years is 77% (10 of 13 students) and cohort 3 retention after 2.5 years is 64% (7 of 11). Great improvements were seen in cohort 2, however in cohort 3 two

students switched out of STEM and one left the university. Additional follow-up will be made to gain insight.

- Much was done to turn around the retention impact of Covid on cohort 1, which resulted in much better retention for cohort 2. However, the retention mark was again missed with cohort 3. Although it is too early for researchers to compare pre- and post-Covid college retention, some studies indicate that the pandemic generation has had a difficult time when attending college. In high school, many students fell behind, particularly in math. Indications are that it may be worse for low-income and URM students [6].
- In cohort 3, the annual survey showed potential issues in academic integrations and self-regulation. Academic integration is a measure of the students' perceptions of their academic experiences with faculty, counselors, and administrators, as well as perceptions about their career preparation at their institutions. Self-regulation is the awareness, knowledge, and control of cognition. It includes the students' ability to control their effort and attention in the face of distraction and uninteresting tasks [5] which also may reflect the potential lack of motivation seen in the pandemic generation [6].
- Academic performance goals as measured by GPA were met with recent cohort median cumulative GPAs of 3.35, 3.29 and 3.42.
- Survey results showed that PTG students were satisfied with the program before and after Covid. During Covid, they felt a direct negative impact on their learning due to remote instruction and limited on-campus opportunities including PTG opportunities. However, after Covid, PTG program satisfaction was higher than prior.

Lessons Learned

Retention has not been as high as hoped in the first and third cohorts, however, a tremendous amount has been learned about this population of rural and URM STEM students with the stated ACT/SAT and GPA scores. The team needed to adapt strategies as they learned more about supporting this population. PTG students come from rural and underfunded schools that, in general, underprepare students academically compared to the more urban, wealthier areas. The PTG team found it best for these students to not take calculus, physics and chemistry all in the first semester, since they are often playing academic catch-up. These students also typically need more direction about time management than other students, as well as more in depth information on student responsibilities with their classes and coursework.

Another very important lesson learned was that the PTG population needs reassurance and conversation centered around their worthiness to be at the university. There needed to be more work centered around a sense of belonging. As mentioned, most PTG students come from underpreparing schools. They are typically first generation, so their family does not have the college experience to support them through the trials of college. Because they are financially disadvantaged as Pell grant students, they cannot afford the material items that other students have, such as expensive cell phones, laptops, and clothing. Having a conversation and creating a space where they can be reminded that although they may be the only one in a class like themselves, their cohort gives support and therefore they are not alone.

Providing peer mentors with more resources and packets with special topics to reference was also an important supplement for this population. It allowed the peer mentors access to the information that they needed after normal work hours, so they could address mentee needs as soon as possible.

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