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**PEERS INSPIRING PEERS:
WHY A SUMMER BRIDGE-TO-COLLEGE PROGRAM BENEFITS FROM THIS PARTNERSHIP**

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A Bridge-to-College Summer Academy for Teaching Assistant Scholars, who serve as Peer Leaders and small-group instructors in several New York City high schools, was designed and held at New York City College of Technology, CUNY. The Summer Academy was designed to acclimate the Teaching Assistant Scholars (TAS), many of whom are underrepresented minority students, to college life. College Peer Leaders assisted in motivating and encouraging incoming freshmen in gaining the academic skills needed to successfully navigate a college environment. The Peer Leaders also facilitated three-day mathematics preparatory workshops that provided students with the confidence to excel in their first credit-bearing mathematics course. The benefits of the Peer Leaders in providing support for the first-year students will be highlighted, and lessons learned are presented. This project is supported by NSF MSP Grant #1102729.

Bridge programs have been effective in the transition from high school to college, especially for students who do not meet certain standards. Activities for the bridge programs generally focus on improving the academic experiences of prospective students and addressing their deficiencies by providing additional coursework to close the learning gap. Results from bridge programs showed participants had higher retention rates (Walpole, Simmerman, Mack, Mills, Scales, & Albano, 2008), higher grade point averages (GPA) (Hicks, 2005), and increased academic and social engagement (Walpole, et al., 2008) than non-participants. Schell (2010) found salient factors for academic success included intensity and strict structure of the program.

Moreover, summer bridge programs with a mathematics enrichment component have had positive results. Gilmer (2007) found that student mathematics performance during a summer bridge program correlates positively with their first-semester GPA. Whalin and Pang (2012) found engineering students are better prepared to take Calculus I in their first semester after successfully completing their bridge program. Other noteworthy results include higher retention rates (Gleason, Boykin, Johnson, Bowen, Whitaker, Micu, Raju, & Slappey, 2010) and reduced time to graduation (Reisel, Jablonski, Munson, & Hosseini, 2012),

Studies have indicated peer support as a component that aids in the social integration of incoming freshmen. Peer-led support groups allow first-year students to establish a social network with current

upperclassmen. This design creates more meaningful connections which allowed the participants to comfortably share their concerns regarding their transition to college (Mattanah, Ayers, Brand, Brooks, Quimby, & McNary, 2010; Velasquez, Lim, & Moran, 2003).

TAS Bridge-to-College Summer Academy

Teaching Assistant Scholars (TAS) serve as peer small-group instructors in several New York City high schools, in the Peer-Enabled Restructured Classroom (PERC) program (Bonner, Keiler, & Mills, 2013). The PERC program has been supported by a National Science Foundation Math Science Partnership grant, and the premise of the grant is to promote a new model for the urban high school. High school students and the TASes build STEM knowledge, collaborative study skills, and motivation in the PERC freshman Living Environment (LE) and Integrated Algebra (IA) classes, then transfer these skills into advanced STEM electives in high school and to college freshman STEM courses.

To assist the TASes after graduating from high school, a Bridge-to-College Summer Academy was designed and held at New York City College of Technology, CUNY. This seven-day program was offered during the second and third week in August 2013; the program was free and provided lunch and transportation (Metrocards). The program focused on acclimating incoming freshmen to college life through academic workshops to prepare them in the skills necessary to succeed in their first year.

The Bridge-to-College Summer Academy was intentionally designed after the PERC model by using trained peer leaders who are well along in their undergraduate studies to serve as guides for the participants. Experienced peer leaders, upperclassmen from City Tech, were recruited to facilitate several workshop sessions, and they were also the instructors for the mathematics preparatory courses. The peer leaders had majors in Applied Mathematics and Mathematics Education, and they were trained in leading topics on how to succeed in college.

Mathematics Preparatory Classes

First year students often are underprepared in their first mathematics course. They have a misconception that habits formed from high school will allow them to pass the class easily. However, they learn quickly that both time and effort are required to successfully complete the course. To assist in building a better mathematics foundation prior to taking their first mathematics course, the Summer Academy students participated in a preparatory course during the bridge program. The goal of this nine-hour course over three days provided the foundational concepts necessary to do well in their first college mathematics course.

Four tracks were offered during the Bridge-to-College Summer Academy:

- 1) *Introduction to Intermediate Algebra*: This course provides an extensive review on graphing linear functions, factoring, exponents, and solving linear and systems of equations.
- 2) *Introduction to Trigonometry*: This course begins with defining basic terms in trigonometry, reviewing special triangles. It progresses to solving basic trigonometric equations and ends with proving basic trigonometric identities.

- 3) *Introduction to Pre-calculus*: This workshop provides an overview of different types of functions. A review of quadratic functions then expands to polynomial functions. Other functions are also introduced: exponential, logarithmic, and trigonometric.
- 4) *Introduction to Calculus I*: The concept of limits is initially presented graphically, then the limit laws are introduced. Following the definition of a derivative, derivatives and basic integration techniques are covered in this workshop.

As mentioned before, the preparatory classes are taught by the peer leaders. The premise behind using peer leaders as teachers is two-fold: 1) The peer leaders impart not only knowledge, but also insightful advice on how to succeed in the course as they themselves are students, and 2) the peer leaders are trained in collaborative techniques that encourage active engagement among the participants. This structure allows students to learn from their peers informally in a formal setting.

College Readiness Workshops

The participants were provided with a copy of *The Companion for the First Year at City Tech* (2012) where topics on study habits, time management, test anxiety, goal setting, majors, grading systems, registration process, and academic supports are presented. Handouts were also provided as the bases for engagement with each area. For example, the session on time management began with filling in the activities for a 24-hour-and-seven-day week. Questions were then posed regarding the allocation of time to sleep, eat, commute, play sports, attend to religious practice, and other pertinent activities that are overlooked because of their habitual nature. This exercise demonstrated how studying time is often not intentionally scheduled. The study skills session widened the students' knowledge on how best to study and a rudimentary understanding of their learning styles (Soloman & Felder, n.d.).

Additionally, the participants read Malcolm Gladwell's *Outliers* (2008), and the Peer Leaders facilitated the discussions on selected chapters. Writing was a major component for each session. Each writing assignment was collected and comments were provided on how to improve participants' writing skills. In addition, peer reviews during the seminar time were used so that participants could read and critique each other's work. Discussions on the topic followed by the reflections were engendered by viewing other participants' writing.

A final presentation was required on the last day of the Summer Academy. Working in groups, participants each presented on what they had learned to prepare themselves for college.

The Participants

There were 69 graduating TASes who qualified for the 2013 Bridge-to-College Summer Academy. Twenty-three had signed up for the program, but only nine attended the program. Vacation plans, work schedules, and disinterest were given as the main reasons for non-participation.

The nine participants were planning to attend different institutions in the fall 2013 semester. Five were enrolled in colleges of the City University of New York (CUNY) system, two in colleges of the State University of New York (SUNY) system, and two in private colleges. Only one was enrolled in a CUNY community college. Their intended majors included three in criminal justice, three in health-related professions, one in electrical engineering, one in human services, and one in hospitality management.

Methodology

The participants of the 2013 Bridge-to-College Summer Academy were surveyed after they had completed their first year of college. In May 2014, telephone interviews were conducted by a neutral third party. Responses regarding their GPA, average number of classes and credits taken, and mathematics course grades were collected during the interview.

Results

The average GPA for the Fall 2013 semester was 2.6 (n=7). At the time of the interview, the grades for the Spring semester were yet not posted. The average number of classes taken in the Fall 2013 and Spring 2014 semesters were 4.9 (n=9) and 4.6 (n=7), respectively. The average number of credits taken was 14 (n=7) and 14.4 (n=5), respectively.

Eight of the nine participants were enrolled in a mathematics course either in the Fall or Spring semester. Three were enrolled in a remedial mathematics course during the Fall 2013 semester; two in a "Quantitative Measures" course; two in an Algebra 101 course; and two in trigonometry. All three students did not pass remediation; of the three students, one did not show up for the final, therefore automatically failed the course. No grades were reported yet regarding the two students who took "Quantitative Measures." In the Algebra 101 course, one student received a B- and the other a C. One passed trigonometry with a B- and the other did not pass.

Open ended responses regarding how beneficial the mathematics preparatory course was prior to taking the actual course during their first year in college were as follows:

- One remedial mathematics student who failed the course said, "Oh yeah - 101 not required. It is high school math all over again; I knew the math."
- Three students thought the Introduction to Algebra was somewhat helpful. Two of the responses were from students taking a "Quantitative Measures" course.
- The two participants who passed Algebra 101 thought it was helpful.
- The one student who passed trigonometry responded that it was very helpful.
- Two participants did not comment on the preparatory courses.

The responses to the question, "Now that you have completed your first semester of college, in retrospect, how likely would you be to attend a summer bridge program to prepare you for your first year of college?" were as follows:

- Two participants said that they would not have attended because they were not really interested
- Two responded, "Somewhat likely."
- One said, "Likely."
- Two participants said, "Very likely." One added that she had a better handle of college life, and was familiar with the grading policies.

Anecdotal feedback was received regarding having Peer Leaders lead and contribute in discussions. The participants responded well to the peer leaders. Meaningful discussions on how to succeed in college where the peer leaders shared their own lessons learned were particularly helpful. How to overcome certain barriers and navigate situations and how to find resources and internship opportunities were also regarded as invaluable information for the participants.

Conclusions

Although this is a pilot program, results have been encouraging. Involving undergraduate Peer Leaders in a pre-freshman Bridge-to-College Summer Academy was considered a valuable component of the program. The participants discovered what skills and behaviors they needed to have to be successful in a college setting. Through the in-depth discussions led by the Peer Leaders, the participants were more open and honest with their questions. As a result, their anticipation and anxieties of what college life is like were alleviated.

For future summer bridge programs, suggestions from lessons learned include:

- Better recruitment methods should be established, especially in following up on their commitment to attend the bridge program.
- A formal mentoring component should be developed where incoming freshmen and current upperclassmen are paired to increase trust and engagement throughout the year. This would allow opportunities for first-year students to have access to a mentor year-round so that pitfalls and mistakes can be avoided.
- Exposure trips to academic institutions during the first year would broaden the students' cultural perspectives and sustain the friendships developed over the summer, thus creating an established support group outside their own institution.
- A preparatory course on quantitative reasoning is recommended for a bridge program. Students who were placed at higher mathematics levels benefitted from the mathematics preparatory courses; therefore, a course supporting non-STEM majors will be more relevant and applicable to their disciplines.

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