Peer Mentoring in the First-Year Engineering Experience

Emily Sandvall, Baylor University

Emily Sandvall Associate Director for Undergraduate Programs, School of Engineering and Computer Science, Baylor University, Emily_Sandvall@baylor.edu

Deanna Calder
Ms. Megan Harper, Baylor University

I am a second-year Masters student in the Higher Education and Student Affairs program at Baylor University.

Mr. Zachary Bruce Jackson, Baylor University
Mr. Billy Joel Baker

Work-In-Progress – Peer Mentoring in the First-Year Engineering Experience

Billy Baker, Deanna Calder, Megan Harper, Zack Jackson, Emily Sandvall
Bbaker20@elon.edu, Deanna_Calder@baylor.edu, Megan_Harper@baylor.edu, Zack_Jackson@baylor.edu,
Emily_Sandvall@baylor.edu

Abstract - **Creating intentional connections between students in the first year of college is essential to developing a sense of connection and belonging to the university. In engineering, creating opportunities for peer mentorship allows new students to see beyond the incoming year and enables them to build bonds which can sustain them through the peaks and valleys of the academic experience. The School of Engineering and Computer Science (ECS) at Baylor University utilizes a variety of peer-mentoring models with pre-engineering majors that engages students both in and outside the classroom. This paper will discuss two models of peer mentoring – one intentionally designed within the new student experience and another self-selected program called *The Power of Two* mentoring program. The new student experience at Baylor integrates Peer Mentors through pre-matriculation programming and the classroom environment. These Peer Mentors become teaching assistants charged with communicating timely new student messages in addition to building community. *The Power of Two* mentoring program, hosted by the ECS Learning Resource Center, a success center designed for ECS students, is an application-based mentoring experience which pairs first-year pre-engineering students with an upper-division student mentor. This year-long program allows mentors to invest in students one-on-one as they walk alongside them throughout their pre-engineering year. These approaches to peer leading, although vastly different, provide new engineering students with support, offer guidance, and connect them with their community.**

Index Terms – new student experience, peer mentoring, student success

INTRODUCTION

Baylor University, located in Waco, Texas, is a private Christian University and a nationally ranked research institution. Nearly 17,000 students from all 50 states and more than 80 countries call this vibrant campus community home. With more than 10 percent of Baylor University's freshman class pursuing major courses of study in the School of Engineering and Computer Science each year, the focus remains, as at the university's founding, on preparing graduates for professional practice and responsible leadership with a Christian world view. At Baylor, ECS students might study bioinformatics, computer science, electrical and computer engineering, engineering, or mechanical engineering.

All incoming students enter as pre-engineering if they meet a set of admission requirements, a 1290 SAT or 27 ACT. The first year of a pre-engineering student's experience is structured with opportunities designed to support and acclimate them to the culture within the school. Two of these programs utilize upper-division student leaders, Peer Mentors, to guide new students through their incoming year. The New Student Experience (NSE) is made up of both programs and courses which assist with the transition to the college experience. In ECS, Peer Mentors are utilized through Welcome Week programming and in the NSE course to deliver content and to build community within EGR 1095, the major-specific new student experience course for pre-engineering students. The second, *The Power of Two* Mentoring Program, provides students with optional support through intentional relationships with upper-division students. Pre-engineering students can opt in for a deeper, more connected mentoring experience through this program supported by the ECS Learning Resource Center, a success center specifically for engineering and computer science students. Together, these experiences encourage ECS students throughout their first year to make connections with other students, faculty, and staff, identify useful resources, and develop intellectually, socially, and spiritually. At the end of the pre-engineering year, first-year students select their major in engineering once they meet the progression requirements, a B or better in the first two introduction to engineering courses. These mentoring programs, in collaboration with the introductory course experience, are intentionally designed to support, guide, and direct new engineering students on the journey to selecting their best-fit major. This paper will explore these two specific peer mentoring opportunities and their impact on Baylor's newest engineering students.

BACKGROUND

Research on mentoring includes several definitions used throughout literature to define this concept. Reference [1] defined mentoring for their study as a relationship involving a passage of information and knowledge from an individual with more expertise to an individual with less experience. There are also two different types of mentoring - formal and informal. Reference [2] described formal mentorship as being set up by a third party, with many relationships beginning without the mentor and mentee having met. These

mentoring relationships are highly structured with formal meetings and set agendas. Informal mentoring relationships begin as a voluntary act between two people, often being developed through shared recognition by both parties of similar interests with the possibility for growth [2].

Peer mentoring involves a similar structure, where a mentor still passes along knowledge and information to the mentee; however, the peer mentor is able to use more recent experiences when communicating with the mentee [3]. The mentee may experience a more relaxed experience when asking for advice and guidance from a peer mentor [3]. Peer mentoring has been shown through research to help in the transition into higher education and enhance the overall student experience [1]. Also, research has shown that the mentee may experience increased satisfaction with their university having had a peer mentor [4].

Within the STEM field, [5] conducted a study into effectiveness of mentoring and its relationship to student outcomes, such as satisfaction with one's major, involvement with one's major, and the probability of retention within the major. Specifically, the study wanted to examine the factor of peer mentoring with the development of a student's professional identity, or an attachment and identification with one's chosen career path [6]. Reference [5] concluded that the rigorous nature of STEM majors and course work can make the development of professional identity a pertinent component for retaining students [5]. University of Pittsburgh School of Engineering requires all first-year students to enroll in a large group seminar that includes a small-group, peer-mentoring component [7]. This course discusses topics ranging from academics to social life within the first-year. The mentoring component has a nonacademic feel, but still incorporates developing personal relationships, academic advice from the upperclassmen, and a supportive environment for the first-year students [7].

NEW STUDENT EXPERIENCE

The New Student Experience at Baylor University consists of a variety of components designed to help students transition well to the academic environment at the institution. This experience combines courses and programs to assist in engaging students academically, socially, and spiritually in order for them to form meaningful connections with others, build academic community, and be successful at Baylor both inside and outside the classroom.

Since 2003, Baylor University has offered new student experience courses designed to assist in the transition process for incoming students. As the university has moved to offering these as "credit-bearing" courses, ECS has developed an intentional curriculum for pre-engineering students offered in tandem with EGR 1301, Introduction to Engineering. EGR 1095, the new student experience course required of all pre-engineering students, is led by both a faculty member and Peer Mentors, upper division engineering students. These student leaders are recruited, hired, and trained to serve as mentors and teaching assistants. In addition to their role in the classroom, these Peer Mentors also serve as leaders during Welcome Week, which features programming designed to acclimate new students to their campus community before classes begin. These Peer Mentors are intentionally assigned to connect with the students in their EGR 1095 classes during the Welcome Week experience, which provides for a smooth transition to the classroom upon the start of the academic year.

In the EGR 1095 classroom, Peer Mentors work alongside the faculty member to deliver course content, which is focused on topics such as time management, goal setting, professional development, and an overview of academic resources and support. These are just some of the topics covered in this course which meets once a week for the first six weeks. In addition, Peer Mentors are encouraged to create opportunities for academic community outside the classroom through informal gatherings for meals, study groups, and other first-year-specific programming. This interaction outside the formal classroom environment allows for deeper, more transformational conversations to occur between first-year students and the Peer Mentors about college life and academic success in engineering. Allowing Peer Mentors to co-teach opens the door for more focused conversation and creates another opportunity to reiterate curricular topics covered in the classroom.

This past academic year, approximately 220 pre-engineering students were enrolled in eight sections of EGR 1301/EGR 1095. Each section utilized 1-2 Peer Mentors within the EGR 1095 experience. In informal assessments given to students at the end of the first six weeks (the conclusion of EGR 1095), the integration of the Peer Mentor in the classroom is consistently a highlight. Many articulate that they enjoy getting a "real" perspective on life as an engineering major and appreciate the connections that are created by integrating an upper-division student in the experience. Another theme that is consistently expressed in these assessments is that of community. Students are grateful for the ways that the Peer Mentor creates opportunities for community both inside and outside the classroom. The Peer Mentor is the conduit for this type of interaction during the Welcome Week experience, and the relationship that is initiated then is continued through the course.

When Peer Mentors are asked about their motivation to serve, they consistently articulate their desire to "give back, help others, and plug students in to a community." There is a great desire to see others be successful in the major, and these Peer Mentors want to help pave a path for future students in engineering. Additionally, the upper-division students expressed wanting to create a hospitable environment for new students and desiring to share wisdom to ease the challenging aspects of the transition process. In their desire to help, Peer Mentors also gain a great deal from this leadership experience which is easily transferrable to other leadership opportunities, academic group projects, internships, and jobs. The

opportunity to collaborate and lead others and the focus on public speaking were mentioned as specific takeaways from the Peer Mentor experience.

LEARNING RESOURCE CENTER

The Engineering and Computer Science Learning Resource Center (LRC) is a collaborative learning environment designed to meet the needs of Engineering and Computer Science students. ECS students utilize the space for independent and group study, student-sponsored tutoring, and additional programming. The implementation of LRC programming is a direct result of evaluating the unique needs of ECS students.

The Power of Two (TPOT) Mentoring program was developed in fall 2015 out of a desire to provide student peer-mentoring to incoming first-year ECS students. Following a formal application process involving interviews, a mentor team consisting of five upperclassmen students was selected to serve for a one-year paid appointment.

First-year students have traditionally been recruited to the program through a number of different advertising channels. Physical posters, social media, faculty intervention, and extended-orientation classes are used to introduce potential students to the TPOT program. Mentors are assigned mentees based on a number of criteria: gender, intended career path, major, transfer status, international status, and general interests.

Mentors work independently with individual mentees. On occasion, mentors create opportunities for their mentees to come together as a larger group. In addition, efforts are made to introduce mentees in separate mentor groups to each other. Mentors are trained and educated on a number of talking points to have meaningful conversations with mentees at peak points in the semester. In the second year of the program, each of the five mentors was provided talking points on goal setting, essential relationships, time management, degree planning, and finals preparation.

Year one assessments indicated that mentees were genuinely satisfied with the level of interaction they experienced with their mentors. Mentees expressed that their mentors helped them develop healthy study habits through bi-weekly meetings. In addition, mentees indicated that mentors were especially helpful in describing their own collegiate experiences. General themes pertaining to the value of networking, faculty introductions, and course recommendations were present throughout the qualitative data.

In 2016, 28 first-year students participated as mentees in the program. Year two mentee experiences mimicked the previous year. The introduction of the talking points led to an increased level of reported conversation regarding study skills and social groups. However, more data was collected on potential changes that could be made to the program. Mentees indicated that they would benefit from small group interaction with other mentees in their selected group. Overall, mentees and mentors indicated a positive experience that met their initial program expectations.

Professional staff met with each of the five upperclassmen mentors throughout the semester to assess program feedback from the mentor perspective. *The Power of Two* mentors indicated that they felt a sense of purpose from participating in the program. The mentors reported enjoying the flexible schedule associated with the informal mentee meetings, but also added that formal gatherings may yield some benefit for first-year students.

An analysis of the data from the last two years of the program yielded a few interesting results. Each TPOT cohort was analyzed in comparison to a similar group of non-mentees based on gender, ethnicity, and age. The fall 2015 cohort had a slightly higher first year retention (93.75%) than their non-mentee counterparts (87.50%). This cohort also had a higher first term GPA (3.44) than non-mentees (2.85) which was statistically significant. At this point, retention data is not yet available for the fall 2016 cohort. This TPOT mentee group did have a slightly higher term GPA and cumulative GPA than their non-mentee colleagues. However, these differences were not deemed statistically significant.

FUTURE IMPLICATIONS

To continually enhance the first-year engineering student experience at Baylor University, the School of Engineering and Computer Science continues to seek to transform programs and activities to fit the needs of an ever-changing student population. Because on the positive feedback from faculty, student, and Peer Mentors, the structure of the New Student Experience will remain the same, with a few modifications, for the next academic year. Adjustments in curriculum will be made to enhance the integration of Peer Mentors into the classroom experience and to expand upon their ability to assist in connecting new students with one another. These changes will be implemented during Peer Mentor training which will better connect the Welcome Week and NSE course experiences for students.

Due to budget constraints, *The Power of Two* Mentoring Program will continue from this point as a voluntary experience for Peer Mentors. The feedback from past mentors and mentees regarding their experiences in the program has helped shape changes for future cohorts including modifying the timeline for mentee recruitment, enhancing the talking points designed for mentors to meaningfully engage mentees in timely topics for new students, and decreasing the mentor/mentee ratio for future groups to allow for increased time and depth of relationships.

These two programs are a work-in-progress as the needs of incoming students grow and change. The use of Peer Mentors in these experiences is useful and will continue to be enhanced to encourage student success in engineering and beyond.

REFERENCES

[1] Carragher, J., & McGaughey, J., "The effectiveness of peer mentoring in promoting a positive transition to higher education for first-year undergraduate students: a mixed methods systematic review protocol." *Systematic reviews,* 5, 1, 2016, 68.

[2] Cornelius, V., Wood, L., & Lai, J., "Implementation and evaluation of a formal academic-peer-mentoring programme in higher education", *Active Learning in Higher Education*, *17*, 3, 2016, 193-205.

[3] Parker, P., Hall, D., & Kram, K., "Peer coaching: A relational process for accelerating career learning", *Academy of Management Learning & Education,* 7, 2008, 487-503.

[4] Sanchez, R., Bauer, T., & Paronto, M., "Peer-mentoring freshmen: Implications for satisfaction, commitment, and retention to graduation", *Academy of Management Learning & Education*, 5, 2006, 25-37.

[5] Holland, J. M., Major, D. A., & Orvis, K. A., "Understanding how peer mentoring and capitalization link STEM students to their majors", *The Career Development Quarterly*, *60*, 4, 2012, 343-354.

[6] Ferreira, J. A., Santos, E. J., Fonseca, A. C., & Haase, R. F., "Early predictors of career development: A 10-year follow-up study", *Journal of Vocational Behavior*, *70*, 1, 2007, 61-77.

[7] Budny, D., Paul, C. A., & Newborg, B. B., "Impact of peer mentoring on freshmen engineering students", *Journal of STEM Education: Innovations and Research*, *11*, 5/6, 2010, 9.

AUTHOR INFORMATION

Billy Baker Community Director, Elon University, Bbaker20@elon.edu

Deanna Calder Graduate Apprentice, Baylor University, Deanna_Calder@baylor.edu

Megan Harper Graduate Apprentice, Baylor University, Megan_Harper@baylor.edu

Zack Jackson Graduate Apprentice, Baylor University, Zack_Jackson@baylor.edu

Emily Sandvall Associate Director for Undergraduate Programs – Engineering and Computer Science, Baylor University, Emily_Sandvall@baylor.edu