

Improving Engineering Transfer Student Onboarding and Retention through Scholarship and Programmatic Interventions

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Abstract

Students' incentives for attending community colleges include affordable tuition, flexible schedule, opportunity to explore interests, and smaller class sizes. Community colleges provide the foundation for a bachelor's degree, vocational training, career certificates, and associate degrees. Universities offer community college students the opportunity to advance their career prospects by earning a bachelor's degree.

In February 2021, we invited current engineering transfer students to complete a survey about their experiences transferring to Mississippi State University. We received 121 completed responses, representing a response rate of 12.3%. The responses were not limited to specific majors or income levels. Students rated the transition to Mississippi State University from community college in three categories (academics, social, financial), and rated the support they received while at Mississippi State University considering five categories (academic coursework, academic advising, career and professional development, social engagement, and financial support). Respondents overwhelmingly indicated that the transition was difficult. Respondents rated financial support and social engagement as having the lowest support. Student comments indicated a general frustration with transferring from a two-year to a four-year institution.

Our findings corroborate existing research on the barriers faced by engineering transfer students. In this paper, we describe how our survey findings were used to develop a program aimed to improve transfer student recruitment and retention. The new program, called BETS, links scholarships, faculty and peer mentoring, transfer student engineering organizations, and enhanced advising to aid students in transitioning to Mississippi State University. We will highlight the significant aspects of the activities and resources for the incoming engineering transfer students.

Introduction

Low-income transfer students come with unique challenges toward earning an undergraduate degree in engineering. When having a low income is paired with being a transfer student, the barriers toward success are compounded. The impact of living in poverty has far-reaching implications. Certainly, the chronic stressors associated with poverty affect emotional and cognitive development, which leads students from poverty to experience higher levels of depression and anxiety; students raised in poverty also tend to be more impulsive and impatient [1]. In addition, students may not have been taught the implicit rules of etiquette and social graces [2], leading their interactions with peers and faculty to operate outside the academic and social norms. These abnormal, and generally perceived as negative interactions may produce a lack of acceptance from these groups, which can harm academic performance [1]. Because low-income transfer students are also typically first-generation students, some of the obstacles faced

by first-generation students also impact them. First-generation students suffer from limited communication and interactions among peers and faculty, leading to difficulty adjusting to college, as well as low levels of academic self-esteem [3]. Students may struggle to fit in both academically and socially [3], and this struggle may be amplified for students of color. Minority students may face the additional stigma that their presence is due to affirmative action rather than academic abilities [4]. Transfer students may have difficulty fitting in because, in addition to the impact of being low income, they are often entering programs with established cohorts. The snowball effect of the perceptions of a hostile academic environment, negative student-faculty interactions due to violations of academic norms, and limited cross-racial communications can lead low-income transfer students to drop out at a higher rate than other students [4].

Research on how to intervene against the challenges particular to low-income transfer students have a strong, singular theme. The best and most robust strategy to increase student success is a strong relationship between students and their teachers [5]. Supportive peer relationships are also associated with both retention and “school-appropriate” behavior [6]. Students who are surrounded by other students with similar aspirations and goals are supported toward achieving their own goals. Hudley and coauthors stated that these social encounters not only help this group of students develop academic skills, but also help them learn to navigate social encounters with other college students and with school personnel [6]. Prospero, Russell, & Vohra-Gupta call for interventions that focus on the specific barriers and motivations particular to this group [7]; targeted interventions have a proven positive effect on college success [3]. Sommerfeld and Bowen found that students with high college social integration have greater college retention, more academic confidence, and a sense of belonging [8]. Finally, positive interactions with faculty, advisors, and staff are critical for this group of students to feel connected to their academic programs [9].

Another barrier toward student retention and graduation that differentially impacts transfer, low-income, and first-generation students is a lack of knowledge about the academic norms related to navigating the university systems (i.e., which classes to take and when, how to register, how to be advised) and the social norms around interacting with other students and faculty (including how to communicate with peers, how to approach faculty for help, how to perceive groups/races/classes of people within the program, and cultural expectations of the program, such as dress code, lingo, and institutional rules). These academic and social norms are part of what is called the ‘hidden curriculum’ [10]. The hidden curriculum is not part of the formal curriculum and can even contradict what is formally taught. Rather, it is the implicit, unspoken culture of a program that is understood and accepted by members of the program. For example, for some programs, casually approaching faculty in the halls to ask a question may be typical, but other programs might consider approaching faculty without an appointment or outside of office hours to be rude. Some programs encourage challenging other students’ thinking in the classroom, but others endorse a less confrontational approach. Transfer students may have the most trouble accessing this hidden curriculum because they are thrust into a new environment with little time to acclimate. Additionally, they may struggle even more if the academic norms

do not align with the social norms of low-income and culturally and racially diverse students. In a four-year program, transfer students may enter a program two years behind students who had had more time to acquire the academic and social norms that are part of the hidden curriculum. Repeated violations of these norms cause difficulty assimilating into the college setting both academically and socially, leading low-income transfer students in particular to struggle to find their place, leaving them feeling left out and isolated [3]. In fact, in their statement on socioeconomic status (SES) impacts on students, the American Psychological Association cited school conditions as a key contributor to SES differences in learning outcomes. The best intervention to help this group of students break down these barriers toward success is to make the implicit, hidden curriculum explicit. The academic and social norms must be identified, articulated, and disseminated to students.

This objective of this project is to determine the extent to which these barriers are experienced engineering transfer students at Mississippi State University, and to subsequently design an intervention program to improve transfer student success within engineering programs

Methods

In the spring 2021 semester, we invited current engineering transfer students to complete a survey about their experiences at Mississippi State University. Students were invited to participate in the web-based survey via email. We received 121 completed responses, representing a response rate of 12.3% of the engineering transfer student population. The responses were not limited to specific majors or income levels. Students rated the transition to Mississippi State University across three categories (academics, social, financial), and rated the support they received while at Mississippi State University considering five categories (academic coursework, academic advising, career and professional development, social engagement, and financial support). Students were also invited to provide comments about their transition from two-year to four-year college and provide suggestions on how the transition could be improved.

Results

Respondents overwhelmingly indicated that the transition to Mississippi State University was difficult overall. A summary of ease of transition ratings are shown in Table 1. Students reported the most difficulty with financial aspects of the transition, followed by social and academic transitions.

Table 1. Ratings of Ease of Transition for Engineering Transfer Students

	Extremely Difficult	Somewhat Difficult	Neither Easy/ Difficult	Somewhat Easy	Extremely Easy	No Response
Transition - Academically	10%	27%	18%	22%	7%	16%
Transition - Socially	13%	16%	20%	18%	17%	16%
Transition - Financially	9%	31%	25%	12%	7%	16%

Respondents rated financial support and social engagement once at Mississippi State University as having the lowest support levels for engineering transfer students. As shown in Table 2, engineering transfer students felt supported with regards to academic coursework, academic advising, and career and professional development. Respondents offered a number of suggestions on improving the transfer experience (see Table 3).

Table 2. Ratings of Support Provided for Engineering Transfer Students

	Not At All Supported	Not Very Supported	Somewhat Supported	Well Supported	No Response
Support - Academic Coursework	3%	16%	44%	21%	16%
Support - Academic Advising	5%	19%	29%	31%	16%
Support - Career and Prof Dev	3%	11%	42%	28%	16%
Support - Social Engagement	10%	26%	32%	16%	16%
Support - Financial	6%	15%	44%	19%	16%

Table 3. Representative Comments from Engineering Transfer Students

What services or resources could have improved your experience transferring to Mississippi State University?	What services or resources could improve your experience as a transfer student at Mississippi State University?
<i>"Scholarships for transfer students from other four year universities. Despite having a full scholarship and 4.0 at my other school, there were no scholarships available to me because I was no longer a freshman."</i>	<i>"More ways to meet other students."</i>
<i>"My experience coming to Mississippi State University to sign up for classes the spring before transferring the following fall was absolutely awful. Myself along with several other transfer students experienced issues with class sign up on campus and our advisors had very little knowledge on what to do."</i>	<i>"Access to a personal assigned academic advisor for day 1 would be extremely helpful."</i>
<i>"More about the paperwork side of things, always felt like I was missing one thing or another."</i>	<i>"Getting more scholarships for engineering students who can't maintain a high GPA. Our class work is significantly more difficult and most scholarships are 3.5 - 4.0."</i>
<i>"Resources on how to handle the new way of balancing and study school."</i>	

Planned Interventions

At Mississippi State University, we have developed a new program targeted at improving transfer student success within engineering programs. The Bulldog Engineering Transfer Student (BETS) program provides financial support to transfer students, as well as two college-wide programs to improve engineering transfer student success: BETS Transitions and All BETS On Me (see Figure 1).

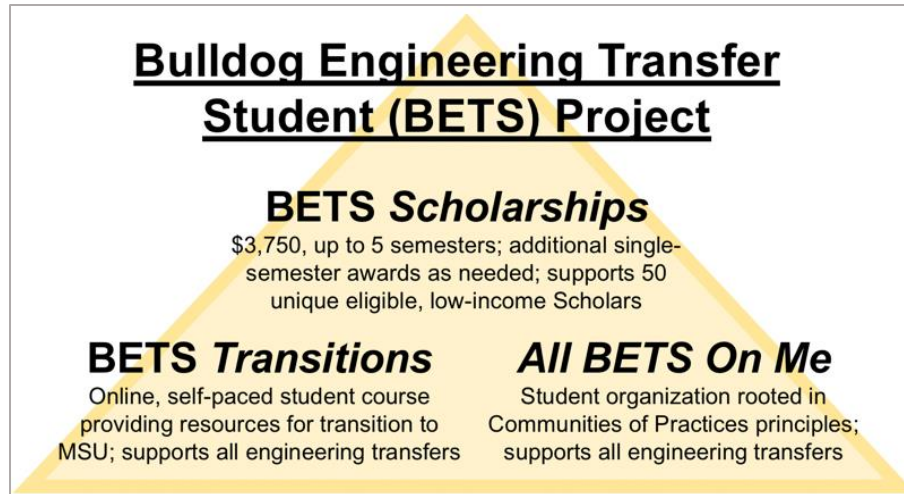


Figure 1. Bulldog Engineering Transfer Student (BETS) Project

As the availability of online resources continues to expand, informational resources available to community college students for guiding their academic journey also increase [11]. However, prospective students from low socioeconomic backgrounds are less likely to have access to informational resources about college [12]. To improve informational access, we will create an online, self-paced course in Canvas, Mississippi State University's learning management software. All admitted engineering transfer students will be granted immediate access to the course.

With social cognitive career theory in mind, the first step in positioning transfer students for success is to ensure the major they have chosen at Mississippi State University aligns with their personal interests. Transfer students enter Mississippi State University having completed general education requirements and typically take multiple discipline-specific engineering courses in their initial semester. Discovering a major is not a good fit often results in transfer students leaving engineering or significantly lengthening time to degree completion. To promote students' confidence in their major choice, students will view a video introducing engineering majors available at Mississippi State University. The BETS course will include additional pertinent information for new transfer students. Topics for BETS Transitions include:

- How to use the CANVAS course – A quick how-to video to highlight the functions of the course
- Choosing an Engineering Major – Engaging video(s) to introduce engineering majors
- Orientation – Information about orientation dates, locations, and expectations
- Links to Campus Resources – links to, financial aid, student support services, veteran's affairs, TRIO programs, parking services, tutoring opportunities, etc.
- Discussion Boards – allow transfer students to communicate and connect prior to arrival at Mississippi State University
- Opportunities to meet other students – Organization fairs and interest meeting dates in Canvas calendar; list of engineering student organizations and information for initial meetings each semester
- Locations – Map of campus, with engineering interest points, highlighted; map of home department building, with advisor's office and student study area highlighted
- First day checklist – list of what students should do before arriving for first class day

- Traditions – Description of engineering traditions to promote belonging
- Answers to Frequently Asked Questions – engaging videos to answer common transfer student questions; note we are inspired by Arizona State’s comical yet informative videos (e.g. <https://vimeo.com/14554654>)[13]

Transfer students have two first-year experiences - one at the community college level and one at the four-year institution; they are expected to twice break away from their community of old to embrace their new community [14]. To do so successfully, social and academic integration is key. A student’s sense of belonging hinges upon many factors, including access to institutionally provided activities and informal interactions with peers [15]. However, the process of integration into a new community that is made up of native university students who have been integrating themselves for two years already is a difficult one. Tinto’s model of social and academic integration to increase persistence [14], [15] is the basis for the following programming:

Co-curricular activities are important to student success in college. Students tend to seek informal resources rather than utilizing formal systems [16]. However, no current student organizations focus specifically on engineering transfer students. We propose a formal, registered student organization at MSU open to all transfer students. Initially, a graduate student, who is a prior MSU undergraduate transfer student and funded by the BETS project, will lead and establish *All BETS On Me* by creating bylaws, recruiting members, and establishing leadership roles, including the president, vice president, and secretary. Within two years, ownership of *All BETS On Me* will transition fully to undergraduate members. Initially, monthly meetings and activities will be designed by the BETS Leadership Team. Initial meeting events include: 1) “Welcome to Mississippi State University!” community building at the beginning of each semester, 2) Mississippi State University “hidden curriculum” (e.g., social norms for interacting with faculty, expectations for out of class work (homework, studying), how-to for finding paid undergraduate research positions), 3) professional development (e.g., preparing for industry, why to choose graduate school). Additionally, members of *All BETS On Me* will review lists of recent admissions regularly sent from the dean’s office to welcome and offer informal assistance to newly admitted transfer students from their hometown or previous community college.

Conclusions

Based on survey results, existing barriers to a successful transfer student transition focus on financial and social barriers. The BETS program aims to remove these barriers to student success with scholarship support, an onboarding Canvas page, and a student organization dedicated to engineering transfer students.

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