AC 2011-1250: ENGINEERING TRANSFER STUDENTS: CHARACTERISTICS, EXPERIENCES, AND STUDENT OUTCOMES

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Diane T. Rover received the B.S. degree in computer science in 1984, and the M.S. and Ph.D. degrees in computer engineering in 1986 and 1989, respectively, from Iowa State University. Dr. Rover has been a Professor in the Department of Electrical and Computer Engineering at Iowa State since 2001. She recently served as Associate Dean for Academic and Student Affairs in the College of Engineering from 2004-2010. Prior to that, she served as associate chair for undergraduate education in the Department of Electrical and Computer Engineering from 2003-2004. She began her academic career at Michigan State University, where, from 1991-2001, she held the positions of assistant professor and associate professor in the Department of Electrical and Computer Engineering. From 1997 to 2000, she served as director of the undergraduate program in computer engineering at MSU. She also served as interim department chair in the Department of Electrical and Computer Engineering from 2000 to 2001. She was a research staff member in the Scalable Computing Laboratory at the Ames Laboratory under a U.S-D.O.E. Postdoctoral Fellowship from 1989 to 1991. Her teaching and research has focused on the areas of embedded computer systems, reconfigurable hardware, integrated program development and performance environments for parallel and distributed systems, visualization, performance monitoring and evaluation, and engineering education. She currently serves as principal investigator for NSF STEP and S-STEM grants in the college.

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Engineering Transfer Students:
Characteristics, Experiences, and Student Outcomes

Abstract

The research regarding students who transfer from community colleges into engineering majors is limited. The National Science Foundation funds millions of dollars to community colleges to build inter-institutional linkages to create seamless transition for women and minorities to pursue STEM majors.

The purpose of this mix-method study is to understand students' community college academic preparation and their subsequent academic experiences as transfer students in engineering majors at a research university in the Midwest. Using data collected from the Transfer Students' Questionnaire (TSQ), this study links survey data to students' academic transcripts from the Office of the Registrar. The TSQ instrument measures student demographic characteristics, community college experiences and four-year experiences. The community college variables include engagement with coursework, faculty interaction, and skill development. The four-year component measures academic and social engagement, adjustment issues, and level of satisfaction. Data from over 150 transfer students comprise the target population.

In addition to the quantitative data, a qualitative component will provide in-depth and rich descriptions of student experiences. Specifically, this component of the analysis will illuminate the experiences of students of how they describe the role of community colleges in preparing them for the academic rigor and transfer into an engineering major. Findings will also address how students describe the factors that facilitate their success as engineering students.
The goal of the study is to contribute to the research literature about the relationship between students' community college academic preparation and their subsequent experiences at the four year university. The authors discuss implications for practice, policy and research.

Introduction and Literature Review

The level of the economic strength of the US is based on the competent skill sets of domestic individuals in the areas of math and science. A concern regarding the preparation of individuals in these areas has caused the White House to take particular interest in ways to ensure that individuals are prepared to obtain positions in the workforce areas that are predicted to increase. President Obama has turned his attention to the role of community colleges stating that community colleges are "uniquely positioned to raise the skill and knowledge base of our workforce[1]."

Community colleges have been identified as essential in American Higher Education[2]. Additionally, community colleges have been recognized as positioned to effectively prepare future scientists and technicians. According to Tsapogas, community colleges are sectors that provide many individuals with educational experiences, especially in the fields of science and engineering degrees[3]. A study conducted in 2004, revealed that over 40 percent of recent science and engineering graduates attended community college at some point in their educational

pathways. Additionally, among the 1999 and 2000 science and engineering (S&E) graduates, almost half (or 44%) had attended a community college sometime during their postsecondary education career prior to graduating[3]. Much of the research that focuses on the experiences of community college transfer students in Engineering majors utilizes a single approach. This study will highlight student experiences at a Midwestern university utilizing a mixed-methods approach to clearly understand the overall experiences of the students. This study highlighted the experiences of students who transferred to a Midwestern university during Fall 2005-Spring 2009.

Theoretical Framework

This study utilized multi-discipline and multi-dimensional theories of sociological, psychological, and educational theories of student development. This foundation is based on scholarship in social[4], cultural[5, 6] and transfer capital[7], student transitions [7, 8], and theories of involvement[9] and socialization[5]. Situating theories of social, cultural and transfer capital as well as theories of involvement and socialization, mentoring and validation within the community college and university environments helps one to understand the holistic experiences of community college transfer students in Engineering majors.

Purpose of the study and Research Questions

This study seeks to build on current research regarding the experiences of community college transfer students in Engineering at a Midwestern university. The experiences of 157 transfer students are highlighted. The purpose of this study was to understand the background characteristics as well as the community college and university experiences of community college transfer students in Engineering majors. The following research questions guided this study.

1. What are the background characteristics of community college transfer students in Engineering at a Midwestern university?

2. What are the community college and university experiences of transfer students in Engineering at a Midwestern university?

3. How do community college transfer students in engineering majors at a Midwestern university describe their overall experiences in terms of factors that assisted in their adjustment to a Midwestern university in an Engineering major and ways the community college could assist in their adjustment and transition to a Midwestern university?

Methodology

This descriptive study used survey research techniques to investigate the background characteristics as well as the community college and university experiences of 157 community college transfer students in Engineering majors at a Midwestern university. Additionally, this study sought to understand the factors as well as things the community college could have done to assist in the adjustment of the community college transfer students in Engineering majors at

the university. Moreover, this study highlighted the advice that current transfer students would give to prospective transfer students. Academic preparation information was obtained from the registrar's office at the Midwestern university to examine community college transfer GPA, the number of credits earned prior to transfer, and community college degree earned.

Instrumentation. The Laanan Transfer Student Questionnaire (L-TSQ) was administered through Qualtrics, which is an on-line survey software. The 132-item survey collected quantitative data and consisted of questions that highlighted the students' background characteristics, community college experiences as well as university experiences. The 132-item survey included questions regarding gender, age, ethnicity; highest academic degree intended to obtain, as well as parents' highest level of education and parents' total household income last year. The community college section of the survey asked students to respond to questions regarding their perception of faculty, general courses, academic advising/counseling services. Additionally, the survey consisted of questions that highlighted the university experiences and included items such as reasons for attending a Midwestern university, as well as information regarding course learning, and experience with faculty. Transfer experiences were also highlighted in the survey. Three open-ended questions asked the transfer students to a) describe the factors that assisted in their adjustment to a Midwestern university in an Engineering major, b) describe ways the community college could assist in their adjustment and transition to a Midwestern university and c) describe advice they would give to other community college transfer students? Themes emerged regarding student experiences.

Sample. The target population for this study is taken from a larger study focusing on the academic and social adjustment of community college transfer students in STEM majors at a Midwestern university. This study is delimited to only the community college transfer students in Engineering majors who transferred to a university between Fall 2006 and Spring 2009. Consequently, this study will highlight the experiences of 157 community college transfer students in Engineering majors.

Data Analysis. Descriptive statistics were employed to examine the background characteristics as well as the community college and university experiences of community college transfer students in Engineering majors. More specifically, percentages were calculated to clearly understand the holistic experiences of the community college transfer students.

In addition to the quantitative analysis, qualitative analysis was conducted on the three open-ended questions. The open-ended questions were analyzed using Creswell's Qualitative Data Analysis[10]. The open-ended questions were coded and chunked into segments of text. The "codes [were] allowed to emerge during data analysis"[10]. Descriptions were generated from the coding process and themes were developed and interpreted.

Findings

Background Characteristics. Table 1 reports the background characteristics of the Engineering transfer students. Regarding gender, the majority (95.5%) of the students were male. In terms of age, the majority (34.9%) of the Engineering transfer students were traditional age students who were between the ages of 19-22. Regarding race and ethnicity, 77.7% of the Engineering transfer

students were White. This suggests that the majority of students were traditional age white male students. Regarding the highest level of education completed by the mother, the majority (30.3%) of the mothers of the transfer students had a high school diploma; followed closely by those with a Bachelor's degree (24.5%). Regarding the highest level of education completed by the father, the majority (23.3%) of the transfer students had fathers who had a high school diploma as well; followed closely by those with some college (19.4%).

About one fifth (24.2%) of the Engineering transfer students had parental income levels between $40,000 and $59,999, followed closely by parental income levels of between $60,000 and $79,999 for about 19.6% of the Engineering transfer students. Regarding the academic degree intended to obtain, a little more than half of females (56.4%) intended to obtain a bachelor's degree. This finding indicates that the majority of Engineering transfer students do not intend to pursue a degree beyond a bachelor's degree.

Community College Experiences. Table 2 reports the community college experiences of community college transfer students in Engineering majors. The majority of Engineering transfer students (96.8%) did not report completing an associate's degree prior to transferring to the 4-year institution. Regarding time spent studying/preparing for class, 35.6% of the Engineering transfer students spent between 1 and 5 hours studying per week; followed closely by those who spent between 6-10 hours a week studying and preparing for class (30.6%).

In terms of the academic advising/counseling services, the majority of the students agreed somewhat or agreed strongly to consulting with an academic advisor regarding transfer (67.5%), talked with an academic advisor about courses to take, requirements, and educational plans (67.5%), discussed plans with an academic advisor for transferring to a 4-year college or university (66.9%), believed that information received during the transfer process as being helpful (62.5%), and consulted with an academic advisor who identified courses needed to meet the general education/major requirements of a 4-year college/university of interest (60.5%). However, only about a little over one-third (38.2%) of the Engineering transfer students met with an academic advisor on a regular basis.

In terms of general courses, the majority of the Engineering transfer students somewhat agreed or strongly agreed that the courses developed their critical and analytic thinking (85.1%), courses were intellectually challenging (72.7%), courses prepared them for the academic standards at a Midwestern university (61.4%), courses prepared them for their major at a Midwestern university (65.3%) courses prepared them for their major at a Midwestern university (61.1%), and that courses demanded intensive writing assignments and projects (57.3%), However, a little under half (49.3%) of the Engineering transfer students believed that the courses required extensive reading and writing.

Regarding course learning, the majority of the students often or very often tried to see how different facts and ideas fit together (79.7%), thought about practical applications of the material (77.0%), explained material to another student or friend (71.0%), took detailed notes in class (70.0%), participated in class discussions (67.6%), and integrated ideas from different sources into projects (66.8%).

In terms of experiences with faculty, the majority of the Engineering transfer students often or very often felt comfortable approaching faculty (67.6%), and asked for information related to a course taken (55.4%). However, less than half of the Engineering transfer students met with an instructor after class (48.7%), sought faculty advice (39.2%), asked an instructor for comments and criticisms about work (37.2%) discussed career plans (34.6%).

In terms of the transfer process, the majority of females were proactive regarding the transfer process. Over half of the Engineering transfer students agreed somewhat or agreed strongly to speaking to academic counselors at Midwestern university about transferring and major requirements (76.5%), visiting the Midwestern university campus to learn where offices and departments were located (71.2%), researching various aspects of Midwestern university to get a better understanding of the environment and academic expectations (67.8%), visiting the admission office at Midwestern university (63.1%), and knowing what to expect at Midwestern university in terms of academics (62.4%). Only about one-third (31.8%) of the Engineering transfer students spoke to a former community college transfer students to gain insight about their adjustment experiences.

Regarding learning and study skills the majority of the Engineering transfer students somewhat agreed or strongly agreed that the community college assisted in their development of their mathematical skills (77.7%), problem solving skills (68.9%), speaking and oral presentations (64.2%), writing skills (61.9%), reading skills (58.5%), note taking skills (54.8%), test taking skills (54.8%), research skills (54.4%), computer skills (52.7%), and time management skills (51.3).

University Experiences. In terms of the transfer semester GPA, the largest percentage of Engineering transfer students (52.9%) transferred with a GPA between 2.00-2.99; followed closely by those with a 3.00-3.49 GPA (36.9%). Regarding transfer semester hours, a little under one-half (48.2%) of Engineering transfer students transferred with 61–80 credit hours. In terms of place of residence, over half of the transfer students (77.6%) lived on campus. The majority of the transfer students (32.4%) maintained a 2.00–2.99 GPA; followed closely by those with a 3.00-3.49 GPA (25.8%) and a 3.5 or higher GPA (25.7%) at Midwestern university as of Fall 2009.

In terms of the Adjustment process, the majority of the students agreed somewhat or agreed strongly that it was easy to find their way around the university campus (89%), their stress level increased when they started at the university (80.7%), adjusting to the university social environment was easy (79.6%), that they felt comfortable spending time with friends made at the community college (77.1%), it was easy to make friends at the university (73.1%), that they met with as many people and made as many friends as they would like (61.4%), adjusting to university academic standards or expectations has been easy (57.9%) and that they experienced a dip in grades (GPA) during their first semester at the university (64.8%).

However, less than half of the students, felt a sense of competition among students at the university that did not exists at the community college (49.3%), being involved with social activities at the university (39.6%), feeling comfortable making friends with transfer students than non-transfer students (37.1%), feeling overwhelmed by the size of the student body

(35.9%), feeling alienated upon transferring (30.4%), and feeling intimidated by the large class sizes (28.3%).

Regarding most important reason for attending the university, over half of the transfer students (62.2%) attended a Midwestern university to obtain a bachelor's degree. A little over one-forth (27.7%) of the Engineering transfer students attended a Midwestern university to gain skills necessary to enter a new job or occupation.

This study highlighted 4 categories of influential reasons for attending a Midwestern university which included: a) reputation, b) financial, c) outside influences and d) institutional statistics.

Reputation influential reasons. Regarding reputation, the majority (89.8%) of the students found the academic reputation of Midwestern university as an influential reasons for attending Midwestern university. A little over three-fourths (82.2%) of the transfer students found that the fact that Midwestern university graduates get good jobs as influential reasons for attending a Midwestern university. A little less than half (49.0%) of the transfer students found the Midwestern ranking in national magazines as being influential reasons for attending a Midwestern university. One-third (36.3%) of the transfer students found the fact that Midwestern university graduates gain admission to top graduate/professional schools as influential reasons for attending Midwestern university. Only one-fourth (27.9%) of the students found the reputation of the social activities at the Midwestern university as being influential reasons for attending.

Financial influential reasons. Regarding financial reasons for attending, the majority (67.3%) of the students found the cost of the university as an influential reason for attending Midwestern university. More than half (67.2%) of the students found the affordable tuition as an influential reasons for attending Midwestern university. A little more than one-third (42.2%) of the students found the offering of financial assistance as an influential reason for attending Midwestern university.

Outside influential reasons. Regarding outside influential reasons, about one-third (34.5%) of the transfer students were influenced by parents' recommendations. A little more than one-fifth of the students were influenced by an academic advisor at the previous college (27.2%), and the fact that their brother(s)/sister(s) had attended the Midwestern university (17.9%). The least amount of students (6.9%) was recruited by a representative at a Midwestern university.

Institutional Statistics. In terms of institutional stats, the majority (70.3%) of the students found the convenience and location of the institution as influential reasons for attending Midwestern university. Thirty-nine point three percent (39.3%) of the students found the size of the institution as influential reasons for attending Midwestern university.

In terms of the Midwestern university-sponsored transfer student orientation, more than half of the transfer students (57.4%) participated in the Midwestern university -sponsored transfer student orientation. The majority of the transfer students (53.2%) found the transfer student orientation to be very helpful.

In relation to the course learning, the majority of the transfer students often or very often thought about practical applications of the materials (90.9%), %), took detailed notes in class (86.0%), tried to see how different facts and ideas fit together (84.6%), explained material to another student or friend (78.5%), integrated ideas from different sources into projects (76.3%) and participated in class discussions (50.0%).

Regarding experience with faculty at Midwestern university, 45.8% of the transfer students asked for information related to a course taken, 43.1% of students felt comfortable approaching faculty, a little over one-third (38.2%) sought faulty advice. A little under one-fourth of students met with an instructor after class (23.8%), asked instructor for comments and criticisms about work (23.6%) and discussed career plans with faculty at the university (19.4%).

This study highlighted 2 categories of student perceptions at a Midwestern university which included: a) faculty and b) negative experiences as a transfer student.

Perceptions of faculty. Regarding the perception of faculty at Midwestern university, a little under three-forth of students somewhat agreed or strongly agreed that Midwestern university faculty were easy to approach (70.4%), and that Midwestern university faculty tend to be accessible to students (68.3%) and that professors a being strongly interested in the academic development of undergraduates (68.3%).

Perception of negative experiences as a transfer student. In terms of perceptions of negative experiences as a transfer students, a little over one-third (37.5%) of the students agreed somewhat or agreed strongly to perceiving there is a stigma at Midwestern university among students for having started at a community college and that most students tend to underestimate their abilities because they were a transfer student (32.6%). Less than one-forth (22.2%) of the students believe that most faculty tend to underestimate my abilities because they were a transfer student.

In regards to satisfaction of Midwestern university, almost all of the students somewhat agreed or strongly agreed that they would recommend to other transfer student to come to Midwestern university (91.0%), that they would still go to Midwestern university if they could start over (90.0%), believing that the courses taken at Midwestern university have been interesting and worthwhile (89.6%), and felt that Midwestern university is an intellectually stimulating and often exciting place to be (85.5%).

Regarding overall college satisfaction, the majority of the students were satisfied or very satisfied with their overall college experience (92.4%), decision to transfer to a Midwestern university (91.7%), leadership opportunities (86.1%), sense of belonging (84.2%), courses in their major (84.1%), interaction with other students (83.3%), academic advising (82.0%), class size (82.0%), overall quality of instruction (81.3%), sense of community (79.3%), ethnic/racial diversity of the faculty (76.6%), career counseling and advising (75.0%), amount of contact with faculty (71.1%), job placement services (70.4%), financial aid services (67.3%), and opportunities for community services (64.8%). Less than half of the students were satisfied or very satisfied with student housing (47.2%).

Open-Ended Questions

The study consisted of three open-ended questions that allowed community college transfer students in Engineering majors to: 1) comment on factors that assisted in their adjustment to a Midwestern university; 2) elaborate on things the community college has done to enhance success or ease the transition to Midwestern university and 3) give some advice to prospective community college transfer students.

The first question asked students to elaborate on factors that helped them adjust to a Midwestern university?

The Engineering transfer students discussed 3 categories of factors that assisted in their adjustment. The categories included: a) being involved in learning communities, dormitory life, campus activities and organizations and the student orientation, b) making friends, c) family and friends, as well as d) community college and university resources as factors that assisted in their adjustment to a Midwestern university.

The female transfer students in Engineering discussed how being involved in learning communities, dormitory life, campus activities and organizations and the student orientation assisted in their successful transfer to the university.

"Learning Community for transfer students was very helpful."

"Living with another transfer student helped me adjust to Midwestern university*."*
"Just going to class and getting involved in some of the organizations."

Making friends

Additionally, making friends and having friends who were in the same major and classes helped the female transfer students to adjustment to a Midwestern university.

"Having friends from my community college down here helped me adjust and making new friends helped."

"Having friends that have transferred to Midwestern university in the same major as I am really helped me to be prepared for what I was getting into."

Family and friends

Having family and friends who previously attended the university is beneficial in making the transition from a community college to a university.

"I had a firm background of what life at Midwestern university was like because of family members going here."

"My roommate that I graduated high school with came straight here has helped me blend in much faster and smoother then I think it would've naturally."

Community college and Midwestern university resources

Community college and university resources that consisted of group projects as well as departmental faculty, staff and counselors were essential in the successful transfer of female community college transfer students in Engineering.

"Group projects helped me to meet new people in my major."

"Staff and faculty of all departments were very helpful which led me to a successful transfer."

The second question asked students to discuss ways the community college could have enhanced their success or ease the transition to a Midwestern university?

When asked what the community college could have done to enhance success or ease the transition to Midwestern university, the students expressed a) nothing, needs were met, b) advisement, c) Provide more rigorous and transferable classes, d) study skills and e) Prepare for Midwestern university experiences.

Nothing, needs were met

Many of the female community college transfer students expressed how that the community college did a great job in preparing them to transfer to the university. Additionally, the students asserted that there was nothing more that the community college could have done to assist in their transition and adjustment.

"Nothing. They did all they could. The rest is up to you."

"Nothing. It was easy enough."

Advisement

Advisement was also essential in the transfer process. Having knowledge advisors and counselors helped the students to know what classes would transfer as well as what classes were needed at the university.

"I had counselors that knew what they were doing."

"My advisors advised me correctly."

Some students expressed how better advisement would be beneficial.

"Better advisors, with more knowledge of how classes would transfer and what classes I should take at community college."

"Better advising - the advisers had no clue what classes I needed to take, and some classes I took at the community college didn't transfer into my major."

Provide more rigorous and transferable classes

Many of the students believed that the classes offered at the community college should be more rigorous, thus giving the students a better idea of what to expect at the university.

"Make classes harder or grade harsher because down here it's all or nothing and community college gave more partial credit."

"Make the classes slightly more challenging."

The transfer students also expressed the need to ensure that the classes that they were taking at the community college would transfer to the university successfully.

"Schedule me more courses to transfer so I didn't feel like I was wasting my time by taking courses that wouldn't apply to my Midwestern university degree."

"I wish I would've known that some of the classes I took at DMACC wouldn't have transferred here before I took them. The people I talked to at DMACC didn't seem to know much. Also, the classes could've been a little faster paced or harder."

Study skills

Providing more opportunities for students to practice their study skills and opportunities for students to gain more hands-on experience through internships was also viewed as essential.

"More focus on in-depth multifaceted thinking."

"Provided opportunities for internships, so I could get work experience before attending the engineering career fair at Midwestern university."

Prepare for Midwestern university experiences

"Maybe push a little more interaction with the university of choice to get yourself comfortable with it."

"Hold higher academic standards and provide more challenging engineering projects. I felt that the academic standards at my community college were very similar to that of public high school."

If you could give some advice to community college students who will be transferring to Midwestern university, what would that advice be?

The last open-ended question asked students to give advice to community college students who will be transferring to Midwestern university. The students expressed a) consult with an academic advisor, b) get involved, c) make sure classes transfer, d) Enhance study skills/form study groups and e) be prepared to ask for help.

Consult with an academic advisor

"Consult with an advisor from Midwestern university *before signing up for classes at the community college."*

"I would recommend that students check with Midwestern university *frequently and ask an* Midwestern university *advisor for the classes that would transfer while they are still taking classes at their community college."*

Get involved

"Get involved and do more than just go to class and do more than just learn what is required."

"To get involved right off the bat without overloading yourself. The sooner you meet up with people and network with people the more successful you'll become."

Make sure classes transfer

"If you don't know what field you are going into, take general education classes that will transfer in. This will help with any stress associated with not having enough credits to transfer."

"Make sure that you, yourself, make sure that all the classes that you are taking at the community college will transfer here."

Enhance study skills/form study groups

"Study hard the first semester."

"That even though you have taken college credit, Midwestern university *is more difficult than any community college. Meet classmates and form study groups."*

"Plan on studying a lot more."

Be prepared and ask for help

"First thing you should do is look at the online page for each class. Especially look for homework and quiz information. I missed several assignments because I was not expecting the homework to be located there."

"Expect some of the classes to be hard than you would like, and don't forget to ask for help when you don't understand the material being taught."

Discussion

The literature is very explicit regarding the urgency to increase the representation of individuals pursuing engineering degrees in the US. The role of community colleges is gaining much attention. Understanding the experiences of community college transfer students in Engineering majors both at the community college and at the university is essential is understanding the overall adjustment of transfer students. The findings of this study indicate that overall, transfer students in Engineering majors are adjusting well to the university environment. Friends, family and community college and university resources have assisted the transfer students in making a smooth transition to the university. It is apparent that transfer students are interested in transferring and could benefit from assistance with transferring. Some students, in this study reported feeling an increased level of stress and a dip in grades upon transfer. Additionally, while students feel comfortable consulting with an academic advisor or counselor regarding transfer at the community college, they do not meet with their advisor at the community college on a regular basis. Moreover, transfer students feel more comfortable interacting with faculty at the community college than at the university. Interestingly, less than half of the transfer students perceived the courses at the community college as requiring extensive reading and writing and felt that the courses at the community college could be more rigorous. It is not surprising, then, that transfer students took more detailed notes and sought opportunities to integrate ideas and additional information more at the university than at the community college.

Implications for Research, Policy and Practice

Community colleges are in a unique position to increase the number of individuals pursuing degrees in Engineering areas. The findings suggest that encouraging students to consult with their academic advisor and ensuring that students are prepared in math and science is essential in ensuring a successful transition to the university environment. Students are interested in transferring and become equally engaged in the classroom and in extracurricular activities and organizations. The findings also suggest that the collaborations among individuals within the community college and university environments is important in ensuring that students are academically prepared to transfer.

The findings of the analysis have particularly important implications for policy and practice in that understanding the impact and the role of faculty and staff on students and the perceptions of community college faculty and staff on their role in increasing the participation of individuals in Engineering majors adds to the literature on transfer student success. Additionally, this information provides a framework consistent with the research on transfer, adjustment and student success. A clear understanding of the roles of faculty and staff as well as the experiences of transfer students pursuing Engineering majors is essential in identifying ways to assist with their overall transition and adjustment. Due to the demographic make-up of the population of this study, the findings of this study highlight the experiences of traditional age white male students. The experiences of non-traditional students, students of color and female students may vary.

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Table 1.

Engineering Transfer Students' Background Characteristics (N = 157)

Variable	%
Gender	
Female	4.5
Male	95.5
Age	
19-22 years old	34.9
23-27 years old	22.0
28-35 years old	5.7
Over 35 years old	7.2
Race/Ethnicity	
White	77.7
Non-White	22.3
Highest level of education completed by your mother	
Elementary school or less	1.9
Some high school	1.9
High school graduate	30.3
Some college	17.4
Associate's degree from two year	15.5
Bachelor's degree	24.5
Some graduate school	1.3
Graduate degree	6.5
Highest level of education completed by your father	
Elementary school or less	1.3
Some high school	3.2
High school graduate	30.3
Some college	19.4

Associate's degree from 2-year college	16.1
Bachelor's degree	18.7
Some graduate school	9.0
Graduate degree	.6
Parents total household income last year	14.6
Independent	15.7
Less than $20,000	7.2
$20,001–$39,999	15.7
$40,000–$59,999	24.2
$60,000–$79,999	19.6
$80,000 or more	17.6
Highest academic degree intended to obtain	
Bachelor (BA or BS)	56.4
Master (MA or MS)	33.3
Doctorate (Ph.D or Ed.D)	7.7
Law (JD or LLB)	.6
Other	1.9

Table 2.

Engineering Transfer Students' Community College Experiences (N= 157)

Variable	%
Associate's degree obtained	
Associate's (AA, AS, AAS, AGS)	3.2
N/A	96.8
Hours spent studying and preparing for class	
1–5 hours	35.6
6–10 hours	30.6
11–15 hours	8.7
16–20 hours	13.4
More than 20 hours	6.7
	Somewhat Agree-Strongly Agree
Academic advising/counseling services	
Consulted with AA regarding transfer	67.5
Information received was helpful in transfer process	62.5
Met with AA on a regular basis	38.2
Talked with AA about courses to take, requirements, educational plans	67.5
Discussed plans with AA for transferring to 4-year college or university	66.9
Academic Advisor identified courses needed to met the general education/major requirements of a 4-year college/university of interest	60.5
	Somewhat agree-strongly agree
General Courses	
Courses developed my critical and analytic thinking	85.1
Courses demanded intensive writing assignments and projects	57.3

Courses were intellectually challenging	72.7
Courses prepared me for the academic standards at Midwestern university	65.3
Courses prepared me for my major at Midwestern university	61.1
Courses required extensive reading and writing	49.3
	Often-Very Often
Course learning	
Took detailed notes in class	70.0
Participated in class discussions	67.6
Tried to see how different facts and ideas fit together	79.7
Thought about practical applications of the material	77.0
Integrated ideas from different sources into projects	66.8
Explained material to another student or friend	71.0
	Often-Very often
Experiences with faculty	
Sought faculty advice	39.2
Comfortable approaching faculty	67.6
Asked for information related to a course taken	55.4
Met with an instructor after class	48.7
Discussed career plans	34.6
Asked instructor for comments and criticisms about work	37.2
	Somewhat Agree-Strongly Agree
Transfer process	
Researched various aspects of Midwestern university to get a better understanding of the environment and academic expectations	67.8
I knew what to expect at Midwestern university in terms of academics	62.4
Visited the Midwestern university campus to learn where	71.2

offices and departments were located.	
Spoke to academic counselors at Midwestern university about transferring and major requirements	76.5
Visited the admission office at Midwestern university	63.1
Spoke to former community college transfer students to gain insight about their adjustment experiences	31.8
	Somewhat Agree-Strongly Agree
Learning and Study Skills	
Computer skills	52.7
Mathematical skills	77.7
Note taking skills	54.8
Problem solving skills	68.9
Reading skills	58.5
Research skills	54.4
Speaking and oral presentations	64.2
Test taking skills	54.8
Time management skills	51.3
Writing skills	61.9

Table 3.

Engineering Transfer Students' University Experiences (N = 157)

Variable	%
Transfer semester GPA	
2.00–2.99	52.9
3.00–3.49	36.9
3.5 or higher	35.3
Transfer semester hours	
1–40 hours	25.5
41–60 hours	23.1
61-80 hours	48.2
81 or more	2.4
Adjustment	Agree Somewhat-Agree Strongly
Adjusting to university academic standards or expectations has been easy	57.9
Adjusting to university social environment has been easy	79.6
I felt overwhelmed by the size of the student body	35.9
Upon transferring I felt alienated at the university	30.4
I am very involved with social activities at the university	39.6
I am meeting as many people and making as many friends as I would like at the university	61.4
The large classes intimidate me	28.3
It is easy to find my way around campus	89.0
My level of stress increased when I started at the university	80.7
I experienced a dip in grades (GPA) during my first semester at the university	64.8
It is easy to make friends at the university	73.1
I feel comfortable spending time with friends that I made at the community college I attended	77.1

I feel more comfortable making friends with transfer students than non-transfer students	37.1
There is a sense of competition between/among students at the university that is not found in community colleges.	49.3
Most important reason for attending the university	
To obtain a bachelor's degree	62.2
To gain skills necessary to enter a new job or occupation	27.7
To pursue graduate or professional school	7.4
To satisfy a personal interest (cultural, social)	2.7
Influential reasons for attending a 4-year university	Important-Very Important
Reputation	
Midwestern university has a very good academic reputation	89.8
Midwestern university graduates get good jobs	82.2
Midwestern university ranking in national magazines	49.0
Midwestern university graduates gain admission to top graduate/professional schools	36.3
Midwestern university has a very good reputation for its social activities	27.9
Financial	
I was offered financial assistance	42.2
Midwestern university has affordable tuition	67.2
Cost of Midwestern university	67.3
Outside influences	
Academic counselor(s) at my previous college advised me	27.2
A Midwestern university representative recruited me	6.9
Parents recommended that I attend a Midwestern university	34.5
My brother(s)/sister(s) attended a Midwestern university	17.9
Institutional Stats	
Convenience and location	70.3

Size of the institution	39.3
4-year university-sponsored transfer student orientation	
Yes	57.4
No	14.9
How helpful was the transfer student orientation	
Somewhat helpful	19.1
Very helpful	53.2
	Often-Very Often
Course learning	
Took detailed notes in class	86.0
Participated in class discussions	50.0
Tried to see how different facts and ideas fit together	84.6
Thought about practical applications of the material	90.9
Integrated ideas from different sources into projects	76.3
Explained material to another student or friend	78.5
	Often-Very Often
Experience with faculty at university	
Sought faculty advice	38.2
Comfortable approaching faculty	43.1
Asked for information related to a course taken	45.8
Met with an instructor after class	23.8
Discussed career plans	19.4
Asked instructor for comments and criticisms about work	23.6
	Somewhat Agree-Strongly Agree
Perceptions of a Midwestern university	
Faculty	
Midwestern university faculty are easy to approach	70.4

Midwestern university faculty tend to be accessible to students	68.3
Professors are strongly interested in the academic development of undergraduates	68.3
Negative Experiences as a Transfer Student	
Most students tend to underestimate my abilities because I am a transfer student	32.6
Most faculty tend to underestimate my abilities because I am a transfer student	22.2
There is a stigma at a Midwestern university among students for having started at a community college	37.5
	Somewhat Agree-Strongly Agree
Satisfaction of a Midwestern university	
I feel the courses I have taken at a Midwestern university have been interesting and worthwhile	89.6
Midwestern university is an intellectually stimulating and often exciting place to be	85.5
I would recommend to other transfer students to come to a Midwestern university	91.0
If I could start over again, I still would go to a Midwestern university	90.0
	Satisfied-Very Satisfied
Overall college satisfaction	
Sense of belonging to a Midwestern university	84.2
Decision to transfer to a Midwestern university	91.7
Overall quality of instruction	81.3
Sense of community on campus	79.3
Academic Advising	82.0
Career counseling and advising	75.0
Student housing	47.2

Courses in your major field	84.1
Financial aid services	67.3
Amount of contact with faculty	71.1
Opportunities for community services	64.8
Job placement services for students	70.4
Class size	82.0
Interaction with other students	83.3
Ethnic/racial diversity of the faculty	76.6
Leadership opportunities	86.1
Overall college experience	92.4