

Measuring Commuter Student Support and Success through Academic Integration

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Abstract—This Research Work In Progress Paper presents an initiative to understand engineering commuter student support and success using a validated instrument to measure academic integration. There are many calls to increase the number of engineering students who graduate with a degree; however, there is little work in uncovering the support mechanisms that work for engineering commuter students. Therefore, this WIP paper looks to start to build a case for studying engineering commuter students in more detail by first looking at differences between how residential and commuter students integrate academically.

Academic integration is defined by how students are able to access, effectively interact with, and are supported by engineering faculty and staff. Academic integration is an important construct, which contributes to a student's persistence and ultimate graduation. However, it is unknown if there are differences between the way residential and commuter engineering students access the support structures provided for them. Therefore, this paper answers one research question: How do residential and commuter engineering students differ in regards to academic integration in a first-year engineering context?

During the spring semester of 2018, 175 first-year engineering students participated in a questionnaire with multiple items, one of which was the construct of academic integration. I measure academic integration using the engineering student integration instrument which consists of five Likert-type questions on a six-point scale ranging from 'strongly disagree' to 'strongly agree.'

Results show differences between residential and commuter engineering students with regards to

academic integration. Measures of reliability and validity show the construct is acceptable.

Keywords—*engineering commuter students; integration; student support*

I. INTRODUCTION

There is a multitude of calls and efforts to increase the rate at which engineering students graduate with a degree [1-3]. Additionally, there are as many efforts and programs to support students to succeed such as academic assistance or retention programs [4], yet until recently there were little ways in which to measure the effectiveness of the support students receive. If students can be supported, and are provided with proper support, students have a higher likelihood of graduation [5].

The purpose of this paper is to understand if and how there are any differences between first-year engineering residential and commuter students with regards to academic integration, and what might be the implications and rationale of any differences. This paper is an initial starting point in understanding the broader scope of engineering commuter students and the supports they require for successful completion of an engineering degree.

II. ENGINEERING COMMUTER STUDENTS

A large majority, over 80%, of students nationally commute to campus or live in apartments close by are not part of the traditional residential experience [6]. In particular, commuter students are defined as those who do not live in university-owned housing. They also may have multiple responsibilities which limit their time on-campus interacting with faculty, staff, and peers [7-8]. These multiple responsibilities coupled with commuting to campus decreases the likelihood of overall engagement compared to those who live on campus [9], yet social engagement is considered an important aspect of the college experience to commuter students [10]. In one study, however, commuter students reported moderate

satisfaction with academic involvement, social involvement, and campus environment, and highlighted the importance of their academic pursuits [11]. Unfortunately, even though commuter students report engagement as an important construct, they are not as satisfied as they could be with their involvement on campus. However, there are no studies conducted on engineering commuter students.

With the dearth amount of commuter student literature, there is even less research on engineering commuter students, and this paper looks to jump-start a case to study this unique population of engineering students. In a highly collaborative environment such as engineering, it is even more critical that engineering commuter students put forth time to be on-campus interacting with peers, and taking advantage of the support structures in place for them. Therefore, this study looks to fill a gap in prior work by studying engineering student integration comparing residential and commuter engineering students.

III. STUDENT INTEGRATION

Student integration, both academic and social, became prominent with Tinto's [12] model of institutional departure. Recent research in the field of student support and success has uncovered and operationalized the construct of student integration into multiple sub-areas: Academic, social, professional, and university integration [13]. Academic integration is defined by how students are able to access, effectively interact with, and are supported by engineering faculty and staff. Academic integration is an important construct, which contributes to a student's persistence and ultimate graduation. This paper only addresses the area of academic integration.

As previously noted, engagement on campus and an emphasis on academics are important to commuter students. There is no prior work uncovering how engineering commuter students can access and be supported by engineering faculty and staff, and the college overall.

Therefore this work in progress research paper looks to begin to fill this gap by determining if the academic support mechanisms in place are sufficient and effective for both residential and commuter students alike.

IV. METHODOLOGY

This paper looks to answer one research question: How do residential and commuter engineering students differ in regards to academic integration in a first-year engineering context?

To measure academic integration I used the engineering student integration instrument [14], a five-item six-point Likert-type questionnaire scaled from strongly disagree (1) to strongly agree (6). Academic integration was one of many constructs measured in the questionnaire totaling 63 questions. The five items for academic integration are listed in Table 1.

Table 1: Academic integration preface and items

Academic Integration Questions
For questions 4-8, we are interested in your opinion on these items related to your academic experience as an engineering student. There are no right or wrong answers. To what extent do you agree or disagree with the following statements:
Q4: My interactions with engineering faculty are generally positive.
Q5: I can effectively communicate with engineering faculty and staff.
Q6: I have sufficient access to resources that can help me succeed academically.
Q7: I have sufficient access to engineering faculty/staff.
Q8: Overall, the STEM College supports me academically.

The questionnaire resulted in 175 participants agreeing to allow their data to be used for research purposes from a pool of over 200 first-year engineering students within one institution. Because there were 63 questions, students were given ample time to complete the questionnaire, therefore, survey fatigue is not a concern. Table 2 shows the breakdown of participants living situation. As noted previously, commuter students in this study are defined by their university-owned residential status. Therefore students within walking distance to campus (n=13) are considered in the commuter category.

Of the 175 participants, 51 are residential and 124 commuter students.

Table 2: Residential and commuter student information

Living Situation	N
I live on-campus in a residence hall or apartment	51
I live off-campus but walk to campus	13
I commute to campus and live more than 5 miles away	111

V. RESULTS

The instrument was reviewed for reliability using Cronbach's alpha which resulted in an alpha score of 0.85 and is considered a good alpha score [15]. As this is the first time this instrument was used it is essential to calculate the alpha score for reliability purposes.

A simple comparison between residential and commuter students using a t-test was conducted to determine if there were any significant difference between the two populations.

On average, residential students experienced higher levels of academic integration ($M=5.00$, $STD=0.60$), than commuter students ($M=4.76$, $STD=0.72$). This difference was significant $t(1.97)=-2.15$, with a p -value of .033, and a small effect size of $r=.16$.

VI. DISCUSSION & CONCLUSION

From the questionnaire administered, the results indicate a statistically small difference in the academic integration of first-year engineering commuter students and residential students. Residential students had a higher self-reported perception of academic integration than engineering commuter students. This is consistent with prior literature claiming that commuter students do not spend the necessary time on-campus [6] and therefore do not integrate into various aspects of college life (e.g., academic integration). However, now there is a way in which to measure integration and quantify any differences, which will hopefully lead to the testing of the institutional support provided for students to determine their effectiveness.

It is clear more rigorous research is needed on engineering commuter students to determine whether the support being provided holistically to

students and engineering students alike are what commuter students need. This work is a first step in filling the gap in the limited prior research of commuter students, and more so engineering commuter students.

VII. FUTURE WORK

A follow-up to this paper will analyze multiple constructs to determine if any differences occur between residential and commuter engineering students in the area of integration. Additionally, more analysis on how academic integration predicts course grades and persistence is needed.

There is also an opportunity to more thoroughly define what a commuter student is and how commuter student status relates to that of a non-traditional student. Much research conflates non-traditional students and commuter students when in actuality there are commuter students who consider themselves traditional students who happen to commute.

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