

One-Size-Doesn't-Fit-All: Differentiated Engagement Pathways for Transfer Student Success

Rebecca Croxton and Anne Cooper Moore
University of North Carolina at Charlotte, USA

I. Introduction

Transfer students are an increasing sub-population of college and university students. However, transfer students, on average, drop out before completing their degrees at higher rates than FTIC freshman, with these trends reflected both nationally and across universities comprising the University of North Carolina System.¹ High-transfer, four-year institutions strive to understand the indicators of transfer student adjustment, retention, and success to inform policies and services to support these students to succeed in their academic goals. As the number of adults needing to complete or continue their education increases, we must develop a deeper understanding of the factors that contribute to transfer student retention and success. Which engagement activities should be promoted as critical pathways for success for this student population?

This study, a continuation of previous research conducted by the authors,² investigates undergraduate students who matriculated in summer/fall of 2012 through summer/fall of 2020 and focuses on which library, co-curricular, extracurricular, pre-entry (high school GPA, number of incoming credits, Pell grant eligibility), and demographic factors (under-represented minority status) contribute to transfer versus first-time freshman student retention and success at a large, public, research university in the southeast with a high transfer student population. In this study, the authors sought to develop a deeper understanding of which engagement factors increase odds for success for transfer students who are 1st generation or not with varying numbers of credits coming from all types of institutions both in-state and out-of-state. Findings from the study reveal the role of library and other academic support and extracurricular engagements in transfer student success and help institutions understand what engagements they should emphasize with incoming transfer students.

This study analyzes transfer versus First Time in College (FTIC) freshmen at UNC Charlotte, an urban research institution with the Carnegie Classification Doctoral Universities: Higher Research Activity and an enrollment of 30,448 (24,116 undergraduates). Incoming classes are 62 percent new freshmen (4,256) and 38 percent transfers (2,605), which means it is a higher transfer student institution.³ The university emphasizes student participation in research with faculty and in internships in the Charlotte community. According to the most recent statistics for UNC Charlotte

Authors' Note: The appendices referenced throughout this paper are available as a separate document via Niner Commons, UNC Charlotte's institutional repository (<http://hdl.handle.net/20.500.13093/work:894>).

transfer students (fall 2020), 64.4% of transfers came from the NC Community College system, 12.9% transferred from one UNC-to-UNC system university to another, 5.8% transferred from a NC private institution to one of the 16 UNC System universities, and 16.9% transferred from out-of-state.⁴

II. Literature Review

Transfers are a significant and increasing sub-population at colleges and universities. High-transfer, four-year institutions strive to understand the institutional and individual indicators of transfer student matriculation, adjustment, retention, and success to inform policies and services to support transfer students in achieving their academic goals. According to the National Center for Public Policy and Higher Education, “more than half of low-income students, approximately half of Hispanic students, and about one third of African American students begin their college careers at a two-year institution.”⁵ “A majority of students enter community colleges with the aim of transferring to a 4-year institution and earning a bachelor’s degree.”⁶

II.1 Year to Year Persistence

Transfer students overall have a “lower rate of persistence than do their counterparts who first begin their higher education in a four-year institution.”⁷ In the 2014–2015 academic year, the UNC system-wide retention rate remained flat at 87% while exceeding the national average. Transfer students graduate at lower rates when compared to native UNC System juniors, 68% compared to 85%, respectively.⁸

II.2 Major Models

Nearly all studies on student retention and success stem from Tinto’s 1993 study in which he “theorized that the intention to persevere in college depends upon the degree to which students are integrated into the academic and social spheres of the institution.”⁹ Through the lens of Tinto’s student integration theory,¹⁰ student engagement with both the formal and informal academic and social system of the university enhances student success. Such engagements include: (1) library engagement, (2) use of student academic support services, and (3) participation in co- and extracurricular activities. Another useful model for understanding the differences in engagement, retention, and graduation of transfer students in comparison to FTIC students is Hills’s theory of “transfer shock,”¹¹ which describes the significant dip in GPA in the semester following the transfer to a four-year school and leads to increased likelihood of dropping out, more credits and years to graduation, and lower post-graduate income.

II.3 Predictors of Success

Several studies indicated that “promoting the success of community college transfer students should be centered on academic engagement.”¹² A study by Flynn investigated the effects of academic and social engagement on the persistence of 8,700 students

from 1,350 colleges and universities and of baccalaureate degree completion of 8,250 students in 2004 and 2006.¹³ The study explored the interactions of student engagement behaviors with degree completion using student demographics, GPA, major, and institutional attributes. Student engagement was “directly connected with persisting”¹⁴ and “students’ educational aspirations, first-year GPA, and academic and social integration” reduced drop-out risk.¹⁵

II.4 GPA

According to Barbera, “higher GPA is almost invariably linked with persistence across different contexts.”¹⁶ Umbach investigated individual and institutional indicators of students transferring from North Carolina community colleges to four-year universities and their relationship to student success as judged by achievement, persistence, and degree completion and found that “capital accumulated while at the community college enhances the likelihood of success at the four-year institution.”¹⁷

Laanan found that community college students who have a lower GPA and less confidence in their academic abilities will encounter more difficulty in adjusting at a four-year university.¹⁸ Participating in academic campus organizations and working on projects with other students helps them feel a part of the campus.¹⁹ According to Xu, Jagers, Fletcher, and Fink, “vertical-transfer (community college to four-year institution) students had typically earned more college credits at graduation, which supports the notion that they suffer from either credit loss at the time of transfer or excess crediting requirement.”²⁰ Xu et al. also found “vertical transfer” students who resembled “native four-year” students in their accumulated college-level credits and performance at their point of entry into the same four-year institution in Virginia performed comparably in graduation with the baccalaureate when they were matched according to prior credits earned, accumulative GPA, and institution.²¹

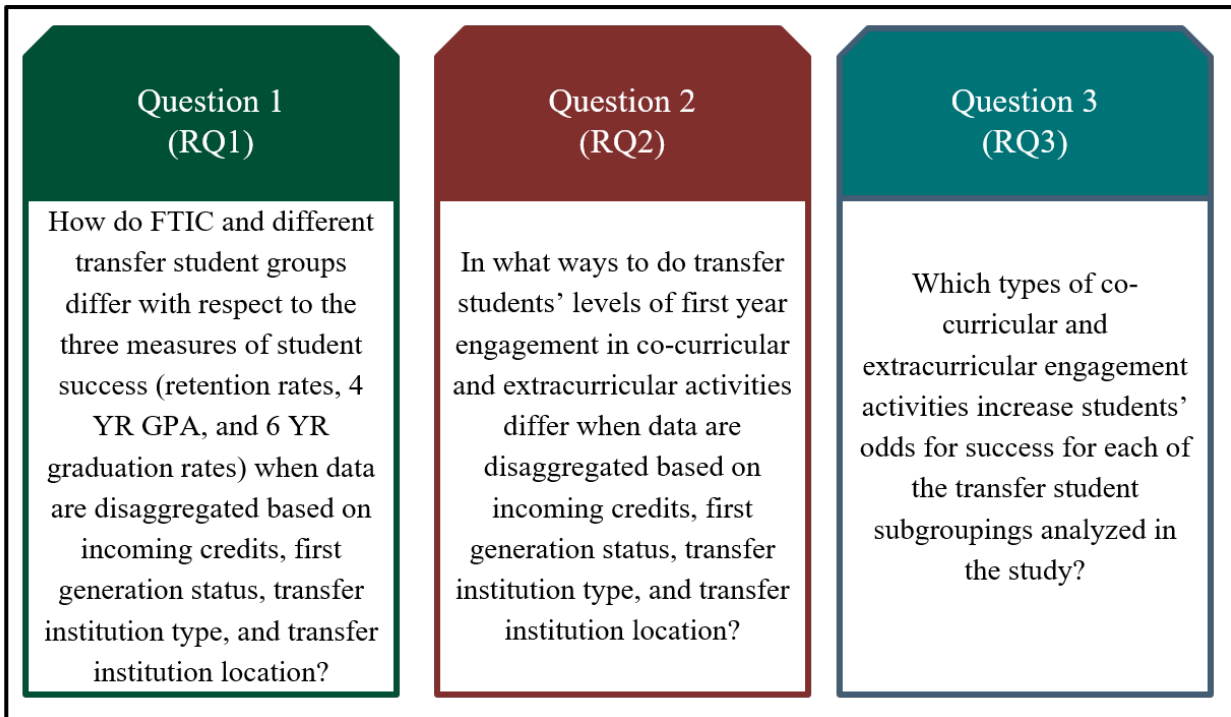
II.5 Engagement on College/University Campus

Transfer students have distinctive adjustment needs from native students.²² Hills hypothesized that “transfer shock” results from “inferior preparation.”²³ Empirical investigations into the causes of transfer shock have focused on activities of the community college to help students transfer despite inadequate resources and of the four-year institution to welcome²⁴ and integrate transfer students into a vastly larger and more complex environment.²⁵ Factors that help to overcome shock include identification with the four-year institution,²⁶ involvement,²⁷ and engagement.²⁸ Qualitative studies point to several major barriers transfer students from two-year institutions experience that impede their adjustment to the larger, four-year institution: (a) challenges in finding campus representatives to help them;²⁹ (b) more academic demands and larger class sizes; (c) difficulty making friends in comparison to native students;³⁰ (d) isolation; and (e) preference for academic-oriented activities such as research with faculty or academic clubs over extracurricular social activities such as

leisure clubs and sports.³¹ The last result indicates that Tinto’s landmark theory of social integration³² does not apply in the same manner to transfer students in that transfer students gain integration from academic and career-oriented activities rather than social activities. Laanan expanded the construct of transfer shock to suggest that transfer student success depends on their psychological, climate, and environmental adjustment at the receiving institution.³³

The research questions identified for the study are illustrated below in Figure II-1.

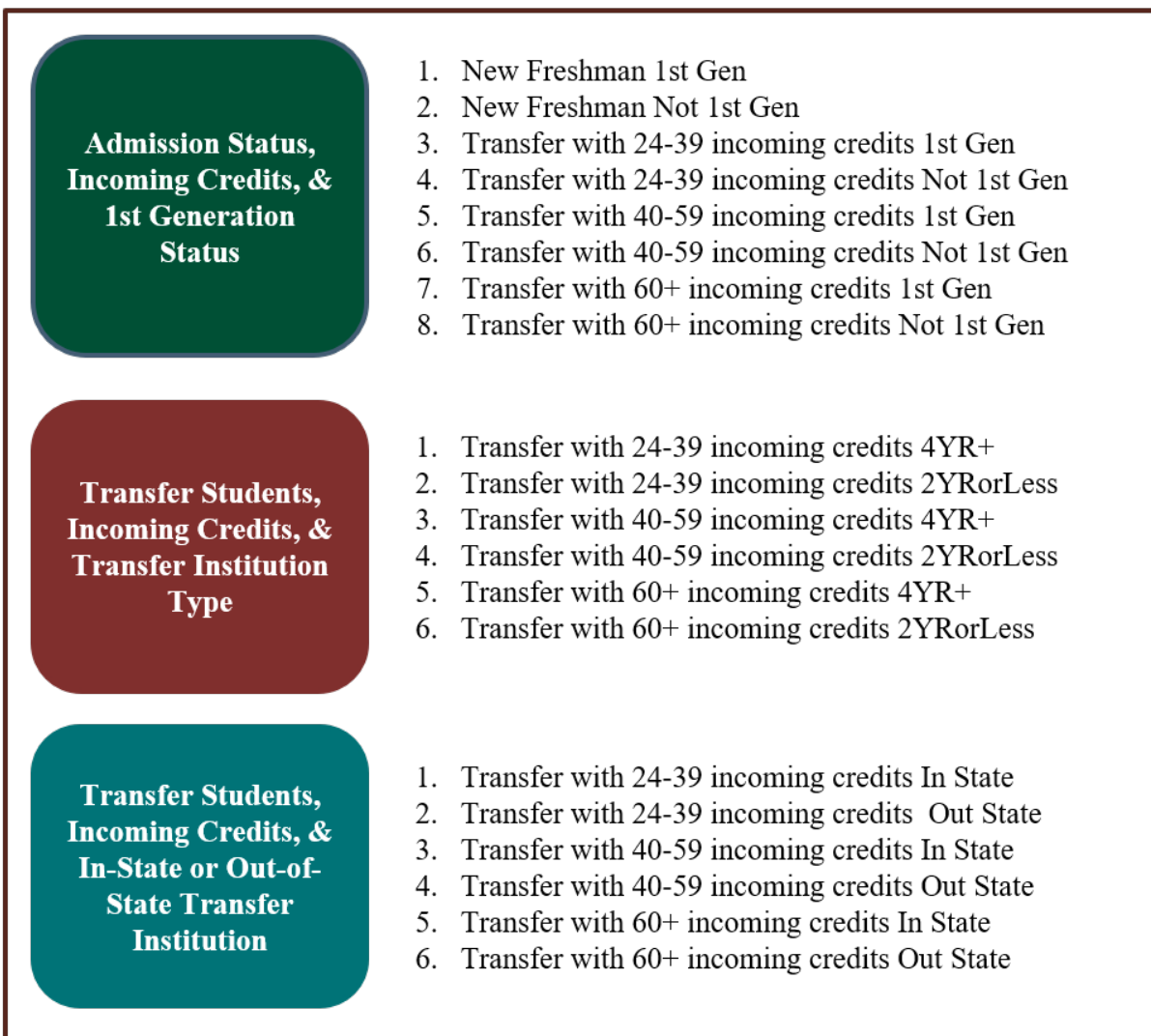
Figure II-1. Research Questions



III. Methods

This project is part of an ongoing, longitudinal study of undergraduate student engagement and success of students who matriculated in summer/fall 2012 through summer/fall 2020. The researchers conducted a comprehensive comparative analysis of students who entered the university as FTIC freshmen and transfer students, including a deeper exploration of transfer student data disaggregated by the number of incoming credits, first generation status, type of transfer institution, and in-state versus out-of-state transfer institution to understand the co-curricular, extracurricular, pre-college, and demographic factors that are associated with their success. Data were analyzed using Analysis of Variance (ANOVA) and binary logistic regression with propensity score matching related to three measures of student success: Year 1 to Year 2 Retention, 4-Year Cumulative GPA, and 6-Year Graduation.

Figure III-2. Grouping Variables and Subgroups



III.2.A RQ1

To respond to Research Question 1 (RQ1), the dependent variables used to measure success (Year 1 to Year 2 Retention, 4-Year Cumulative GPA, and 6-Year Graduation Rates) were provided by the university's Office of Institutional Research. The independent variable for RQ1 was subgroup membership as outlined in Figure III-2. Welch's Analysis of Variance (ANOVA) tests were used to assess whether significant differences for the three measures of success were present among the subgroups. Welch's one-way ANOVA was used in place of the traditional ANOVA F test, as it is a robust test that is particularly useful when there are unequal sample sizes, as was indicated in this study. For all significant ANOVAs with more than two comparison groups, Games-Howell post hoc analyses were conducted to determine the locations of

the differences. Significance thresholds for all analyses in this study were limited to $p < .05$ and effect sizes for the ANOVAs are reported using eta squared (η^2).

III.2.B RQ2

Like RQ1, the single independent variable for Research Question 2 (RQ2) was subgroup membership. First year co-curricular and extracurricular engagement at the type of activity level were used as the dependent variables. Co-curricular and extracurricular campus partners and the specific engagement activities included in the study are outlined in Table II-1. Welch's ANOVA and Games-Howell post hoc analyses were used to assess whether group differences were present for each engagement activity across the study subgroups outlined in Figure III-2.

Table II-1. Study Partners and Engagement Activities

| Study Partner | Engagement Activities in Study |
|--|---|
| Library | <ul style="list-style-type: none"> • Library Instruction • Laptop Checkouts + Desktop Logins • EZProxy + OpenAthens Authentications • Book Checkouts • Study Room Reservations |
| Career Center | <ul style="list-style-type: none"> • Advising Appointments • Career Fair Attendance • Classroom Presentations • Workshops |
| University Center for Academic Excellence (UCAE) | <ul style="list-style-type: none"> • Supplemental Instruction • Individual Consultations • Tutoring Sessions • Workshops |
| Writing Center | <ul style="list-style-type: none"> • Consultations • Classroom Presentations |
| Extracurricular Memberships | <ul style="list-style-type: none"> • Greek Life Membership • Sports Club Membership • Intramural Team Membership |

III.2.B RQ3

To answer Research Question 3 (RQ3), the three measures of success were converted into binary variables (0=did not meet the condition; 1=met the condition), as listed below, in order to run binary logistic regression analyses for each type of engagement activity for each of the study subgroups outlined in Figure III-2. This allowed the researchers to identify which engagement activities significantly increased the odds that students in each subgrouping would attain the measures of success, along with the associated odds ratios which indicated the degree to which the odds of success increased by engaging in a particular activity. Each of the engagement variables were continuous variables that reflected the total number of engagements for each type of activity during the time period associated with the success measures (Year 1 to Year 2 Retention – engagement totals in a student’s first year; 4-Year Cumulative GPA – engagement totals in a student’s first four years; 6-Year Graduation – engagement totals in a student’s first six years [or up to the point of graduation]).

Binary Student Success Variables

- Year 1 to Year 2 Retention: 0=Not Retained; 1=Retained
- 4-Year Cumulative GPA: 0=Below 2.50; 1=2.50+
- 6-Year Graduation: 0=Did not graduate within 6 years; 1=Graduated within 6 Years

Covariate (Confounding) Variables. Findings from prior research indicated that pre-entry academic readiness (ACT/SAT scores), socioeconomic status (Pell Grant status), college of enrollment, underrepresented minority status, and participation in high impact practices are frequently and significantly associated with student success, and thus were included in the present study.³⁴ The covariates in this study were derived from Banner, the campus student information system. SAT scores were converted into ACT scores using College Board concordance tables.³⁵ Pell eligibility and underrepresented minority status were formatted as binary variables. College was dummy coded for each record (0 = not in the college, 1= in the college). A High Impact Practices (HIPs) score was calculated for each student by summing their participation in the following, across the relevant periods of time: Experiential Education, Education Abroad, Learning Community Participant (Year 1), Undergraduate Research participant, and completion of the University Writing Course (UWRT) at the university with a passing grade. This study’s HIPs were identified by the researchers as aligning with those identified by the Association of American Colleges & Universities.³⁶ The confounding variables were used to create propensity scores to reduce bias due to imbalances in observed covariates. Propensity scores were then included in the binary logistic regression analysis using the steps outlined by Thoemmes and further detailed by Soria et al.³⁷ The researchers further controlled for admission status, the number of incoming credits, first generation college student status, type of transfer institution,

and if the transfer institution was in-state or out-of-state by running separate analyses for each of the subgroups.

IV. Results

This study sought to answer three research questions to more clearly understand the factors that contribute to transfer student retention and success and the role that out-of-the-classroom engagements play in this success. Comparisons between the groups and subgroups outlined in Figure III-2 were made with respect to student attainment of the three measures of success as well as levels of co-curricular and extracurricular engagement. A selected sample of results relating to these questions are described below, with statistical details for all analyses included in the [appendices](#).

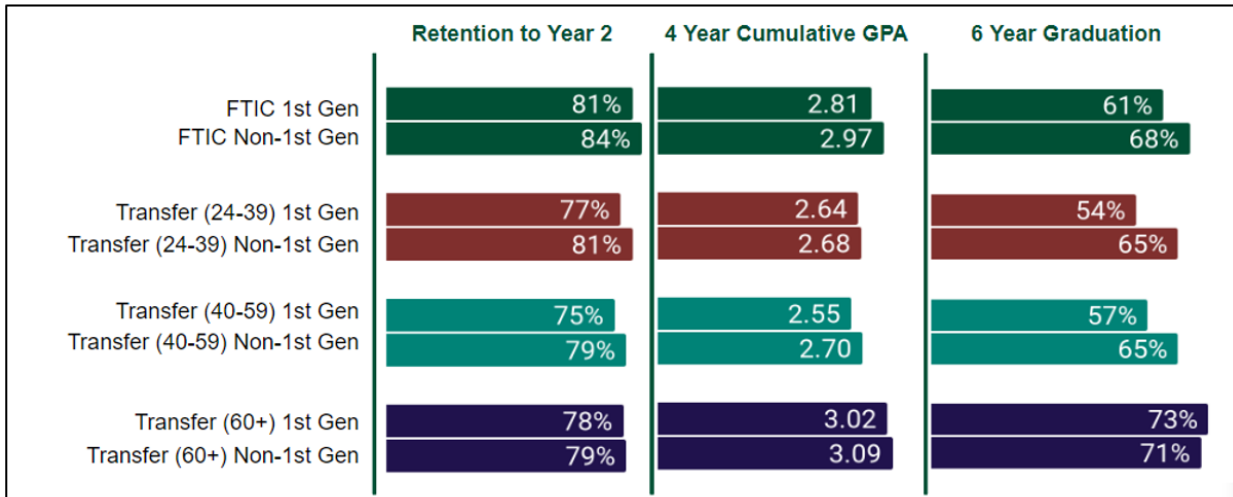
IV.1 RQ1: Significant differences were present between population subgroups across all three measures of success.

To answer RQ1, “How do FTIC and different transfer subgroups differ with respect to the three measures of success?” Year 1 to Year 2 retention rates, 4-Year cumulative GPA, and 6-Year graduation rates were compared using Welch’s ANOVAs and Games-Howell post-hoc analyses for the three grouping variables and subgroups. The results revealed significant differences between groups across all measures of success though with small effect sizes, while post-hoc analyses highlighted nuances among the study subgroups. Key findings from this analysis are illustrated in Figures IV-1, IV-2, and IV-3 and discussed below, with the full set of results related to RQ1 included in [Appendix B](#).

Key observations related to RQ1 and the population grouping variable, “Admission Status, Incoming Credits, and 1st-Generation Status,” are illustrated in Figure IV-1 and include:

- FTIC non-1st generation students were significantly more likely to be retained to the second year than students in all other groups.
- FTIC and transfer students with 60+ incoming credits, regardless of 1st generation status, earned significantly higher 4-year cumulative GPAs than transfer students with either 24–39 or 40–59 incoming credits.
- Transfer students with 60+ incoming credits, regardless of 1st generation status, had significantly higher 6-year graduation rates than students in all other population subgroupings.

Figure IV-1. Admission Status, Incoming Credits & 1st Generation Status x Success Measure Attainment

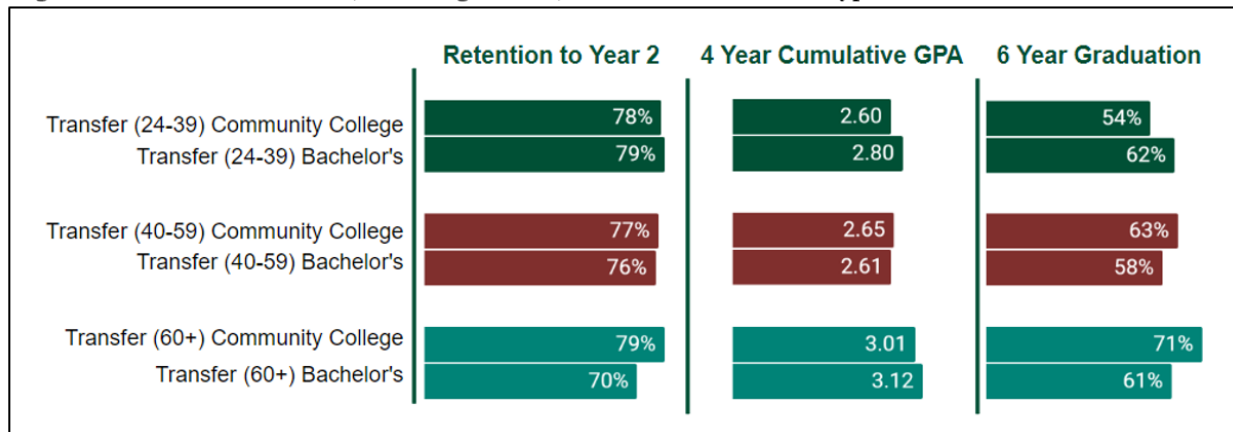


Welch's ANOVA (F) & Effect (ηp^2) sizes:

- Retention Rates: $F_{(7,9484)} = 28.7, p < .001, \eta p^2 = .005$ (negligible)
- 4 Year Cumulative GPA: $F_{(7,5808)} = 40.4, p < .001, \eta p^2 = .005$ (negligible)
- 6 Year Graduation Rates: $F_{(3,5245)} = 14.3, p < .001, \eta p^2 = .004$ (negligible)

With respect to RQ2 and the population grouping variable, “Transfer Students, Incoming Credits, and Transfer Institution Type,” the most noteworthy finding, as depicted in Figure IV-2, revealed that students who transferred from community colleges with 40 or more incoming credits graduated at noticeably higher rates than their counterparts who transferred from bachelor’s degree granting institutions.

Figure IV-2. Transfer Students, Incoming Credits, & Transfer Institution Type



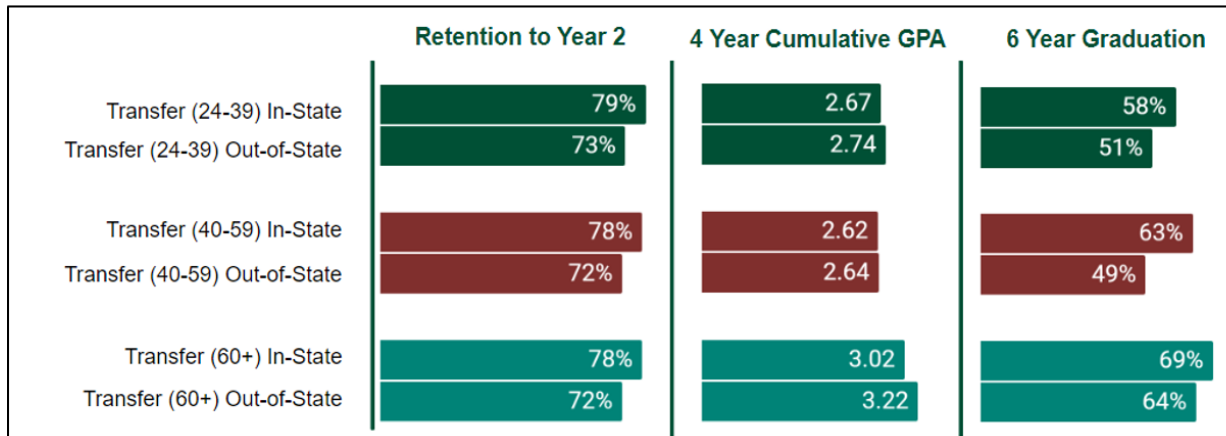
Welch's ANOVA (F) & Effect (ηp^2) sizes:

- Retention Rates: $F_{(5,8425)} = 17.3, p < .001, \eta p^2 = .004$ (negligible)
- 4 Year Cumulative GPA: $F_{(5,6254)} = 17.8, p < .001, \eta p^2 = .004$ (negligible)
- 6 Year Graduation Rates: $F_{(5,3810)} = 30.4, p < .001, \eta p^2 = .015$ (low)

Key observations related to RQ2 and the population grouping variable, “Transfer Students, Incoming Credits, and Transfer Institution Location,” are illustrated in Figure IV-3 and include:

- Transfer students from in-state institutions had noticeably higher retention and 6-year graduation rates than their counterparts who transferred from out-of-state.

Figure IV-3. Transfer Students, Incoming Credits, & Transfer Institution Location



Welch's ANOVA (F) & Effect (η^2) sizes:

- Retention Rates: $F_{(5,1293)} = 6.8, p < .001, \eta^2 = .002$ (negligible)
- 4 Year Cumulative GPA: $F_{(5,1576)} = 11.8, p < .001, \eta^2 = .004$ (negligible)
- 6 Year Graduation Rates: $F_{(5,886)} = 22.3, p < .001, \eta^2 = .013$ (low)

IV.2 RQ2: First-year engagement differed significantly based on study subgroupings.

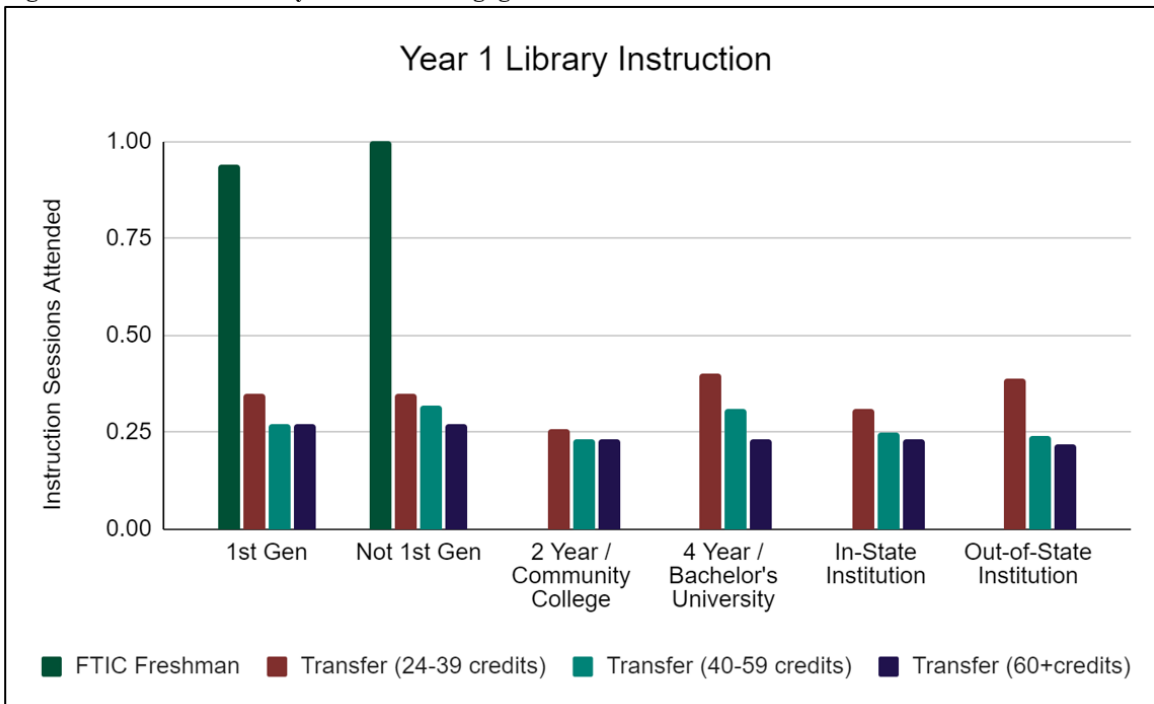
To answer Research Question 2, total first-year engagements in co-curricular and extracurricular activities were compared across the study subgroups. ANOVA analyses revealed significant differences across study subgroups, while post-hoc analyses indicated nuanced variations across the subgroups and engagement categories. The majority of effect sizes were negligible ($\eta^2 < .01$), with the remaining few classified as low ($.01 - < .05$).

Select findings related to first student engagement with the library, the University Center for Academic Excellence (tutoring center) supplemental instruction, and in Greek Life are illustrated in Figures IV-4 through IV-7 and briefly discussed below and serve as examples of how engagement patterns differ when student populations are disaggregated based upon a variety of factors. More detailed findings for all co-curricular and extracurricular engagement activities studied are included in [Appendix C](#).

With respect to library instruction in their first year, FTIC freshmen, regardless of 1st generation status, participated at significantly higher levels than students in all other

study subgroups. Also of note, students who transferred with 24–39 incoming credits participated in library instruction in their first year at higher rates than students who transferred in 40 or more credits. These findings are illustrated in Figure IV-4.

Figure IV-4. Year 1 Library Instruction Engagement

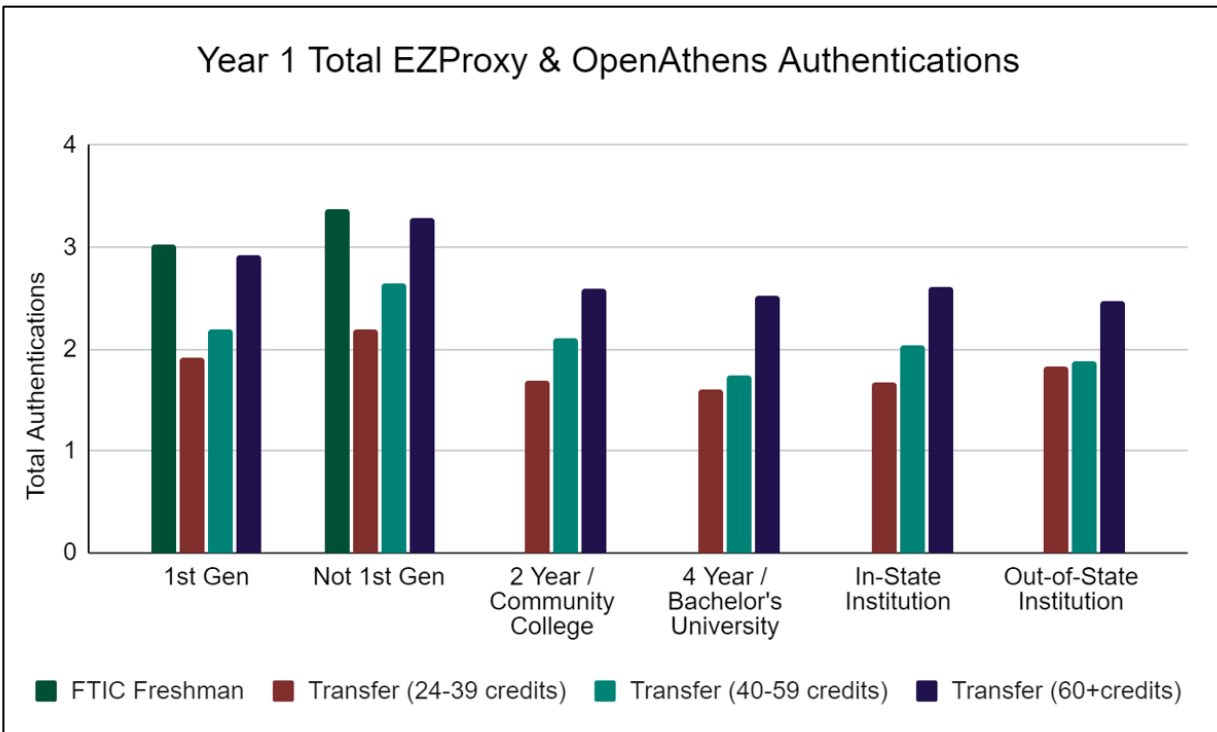


Welch's ANOVA (F) & Effect (η^2) sizes:

- Admission Status x Transfer Credits x 1st Gen: $F_{(7,9993)} = 763.16, p < .001, \eta^2 = .105$
- Transfer Students x Credits x Institution Type: $F_{(5,8219)} = 15.5, p < .001, \eta^2 = .006$
- Transfer Students x Credits x In-State or Out-of-State: $F_{(5,1950)} = 8.80, p < .001, \eta^2 = .003$

FTIC freshmen and Transfers with 60+ incoming credits, regardless of 1st generation status, authenticated to library resources via EZProxy and OpenAthens in their first year at significantly higher rates than transfer students with either 24–39 or 40–59 incoming credits. These findings are illustrated in Figure IV-5.

Figure IV-5. Year 1 Library EZProxy + OpenAthens Authentications

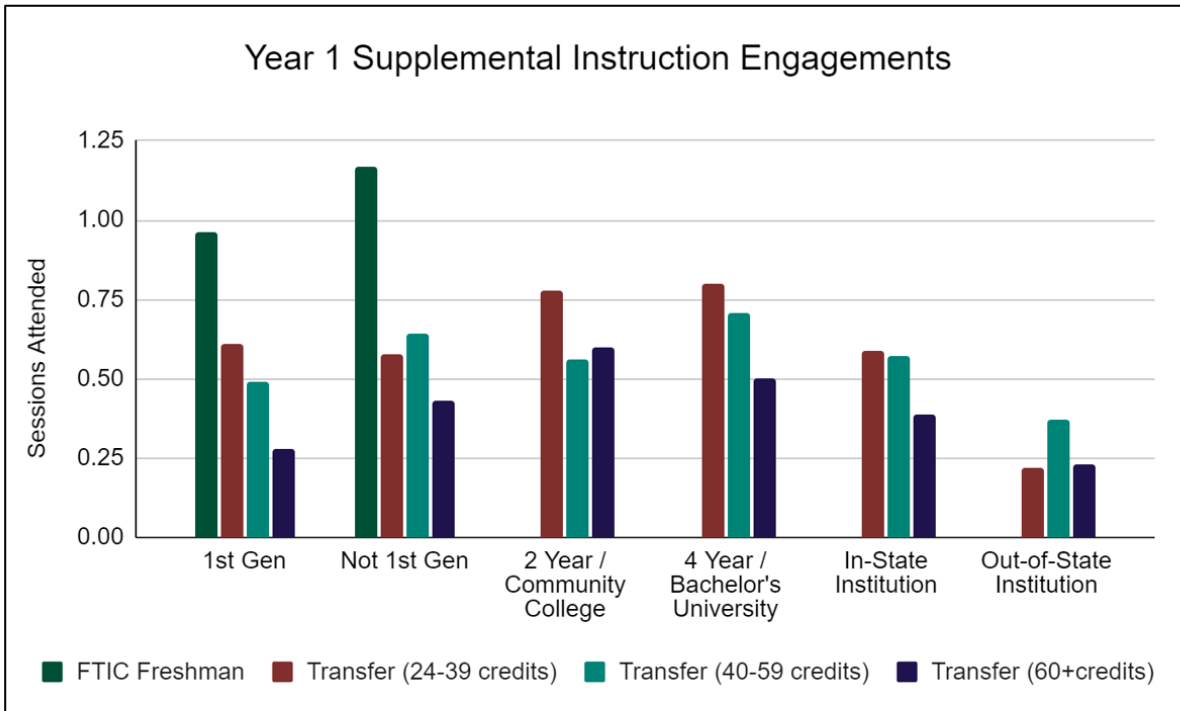


Welch's ANOVA (*F*) & Effect (η^2) sizes:

- Admission Status x Transfer Credits x 1st Gen: $F_{(7,9725)} = 42.70, p < .001, \eta^2 = .005$
- Transfer Students x Credits x Institution Type: $F_{(5,8968)} = 20.9, p < .001, \eta^2 = .004$
- Transfer Students x Credits x In-State or Out-of-State: $F_{(5,1989)} = 16.45, p < .001, \eta^2 = .004$

Engagement patterns with co-curricular campus partners also differed depending on the activity, measure of success, and population subgrouping. For example, FTIC freshmen participated in supplemental instruction offered by the University Center for Academic Excellence (UCAE) at significantly higher rates than all transfer student groups. Among transfer students, those who transferred with 24–39 credits participated in supplemental instruction at significantly higher rates than those who transferred with 40 or more credits. This may be explained, at least in part, by supplemental instruction session offerings, which are most typically for select introductory level courses. The findings related to this analysis are illustrated in Figure IV-6.

Figure IV-6. Year 1 UCAE Supplemental Instruction Engagement

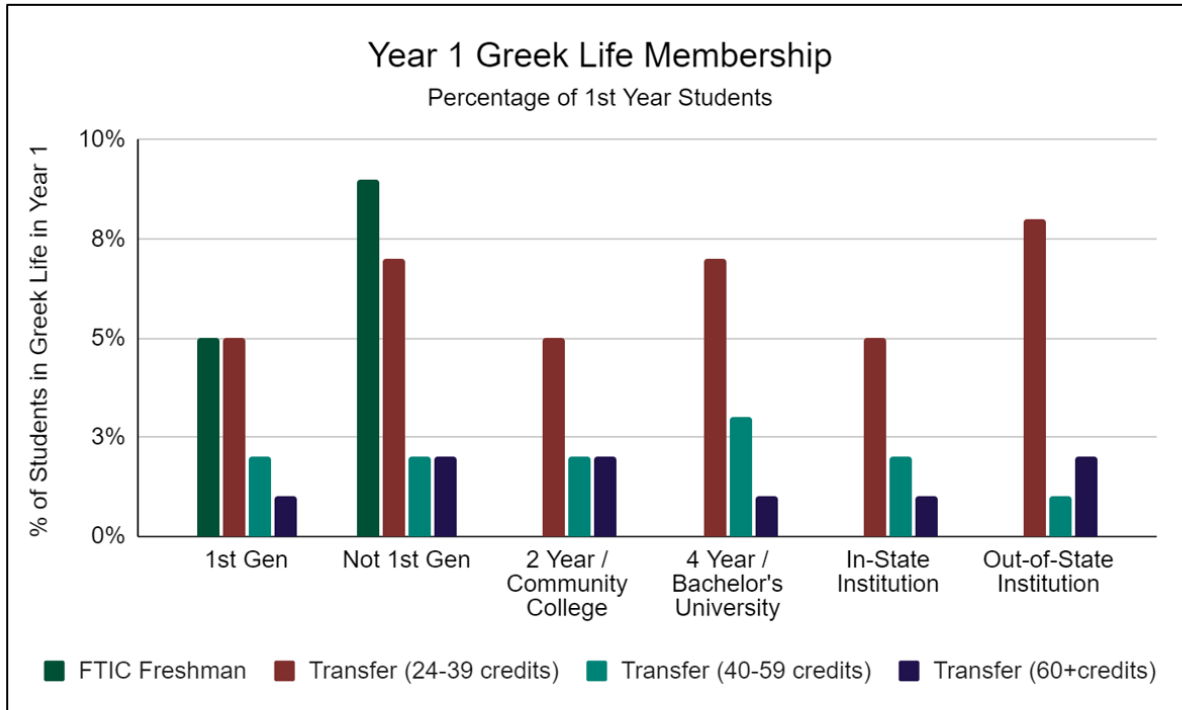


Welch's ANOVA (F) & Effect (η^2) sizes:

- Admission Status x Transfer Credits x 1st Gen: $F_{(7,2670)} = 27.22, p < .001, \eta^2 = .01$
- Transfer Students x Credits x Institution Type: $F_{(5,8492)} = 8.4, p < .001, \eta^2 = .002$
- Transfer Students x Credits x In-State or Out-of-State: $F_{(5,428)} = 3.35, p < .01, \eta^2 = .003$

Year-one extracurricular engagement also differed significantly across study subgroups. Membership in Greek Life is illustrated below in Figure IV-7 to serve as an example of the nuances that occur when population subgroups are disaggregated. Non-1st generation FTIC freshmen participated in Greek Life at significantly higher rates than all other study subgroups. Also of note, transfer students with 24–39 incoming credits participated in Greek Life at significantly higher rates than transfer students with 40 or more incoming credits across all transfer student subgroups.

Figure IV-7. Year 1 Greek Life Membership



Welch's ANOVA (F) & Effect (η^2) sizes:

- Admission Status x Transfer Credits x 1st Gen: $F_{(7,8830)} = 112.36, p < .001, \eta^2 = .016$
- Transfer Students x Credits x Institution Type: $F_{(5,5251)} = 30.6, p < .001, \eta^2 = .014$
- Transfer Students x Credits x In-State or Out-of-State: $F_{(5,1272)} = 23.38, p < .001, \eta^2 = .012$

IV.3 RQ3 Findings: Specific undergraduate co-curricular and extracurricular engagement activities increase the odds of student success.

To answer Research Question 3 (RQ3), binary logistic regression analysis with propensity score matching revealed that participation in nearly every type of engagement explored in this study significantly increased a student’s odds for success across all three measures. However, the degree to which these engagement factors contributed to success was nuanced based upon study subgroup and success measure. (See [Appendices D-G](#) for details for all study subgroups across each measure of success. In particular, see [Appendix G](#) for engagement pathways for each subgroup and measure of success.)

To illustrate the nuances among the various study subgroups and measures of success, select engagement pathways for success, each with different study populations and measures of success, are illustrated in Figures IV-8, IV-9, and IV-10.

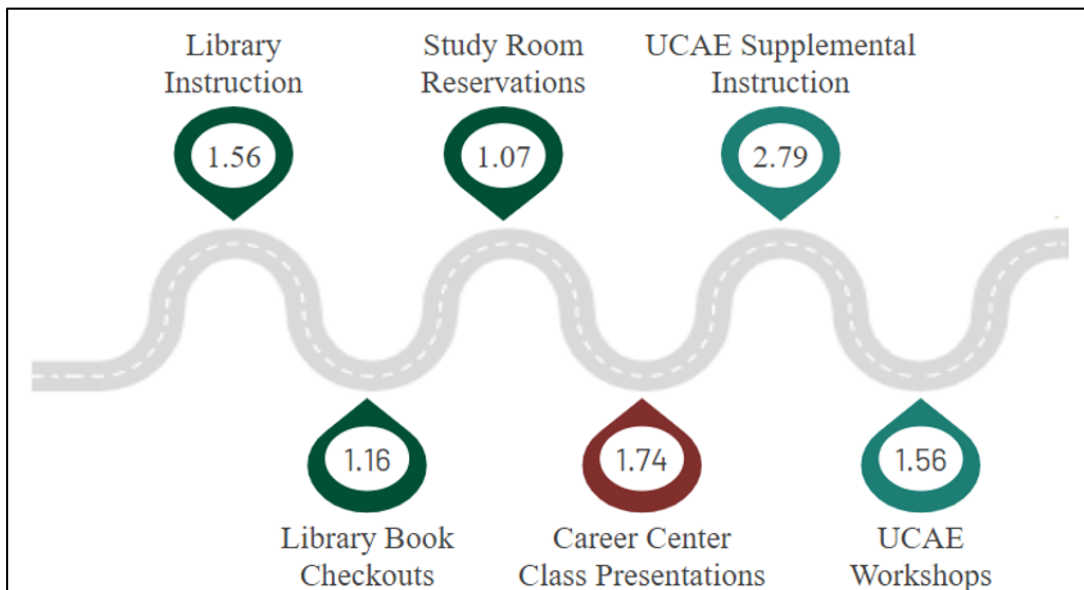
To interpret the findings in each engagement pathway below, read ...

For each [engagement activity] a student in a [specific population subgroup] participated in during their first year of study, the odds they would be retained for a second year increased [x times].

Example using Figure IV-8. For each **library instruction session** a 1st Generation Transfer Student with 60+ incoming credits participated in during their first year of study, the odds they would be retained for a second year increased **1.56 times**.

Figure IV-8 depicts the year-one co-curricular and extracurricular engagement pathway of activities that significantly increased the odds that 1st generation transfer students with 60 or more incoming credits would be retained for a second year of study. For these students, activities included participating in library instruction, checking out library books, reserving library study rooms; attending career center class presentations; and participating in supplemental instruction sessions and workshops offered by the university's tutoring center (UCAE).

Figure IV-8. Retention to Second Year Engagement Pathway for 1st Generation Transfer Students with 60 or More Incoming Credits

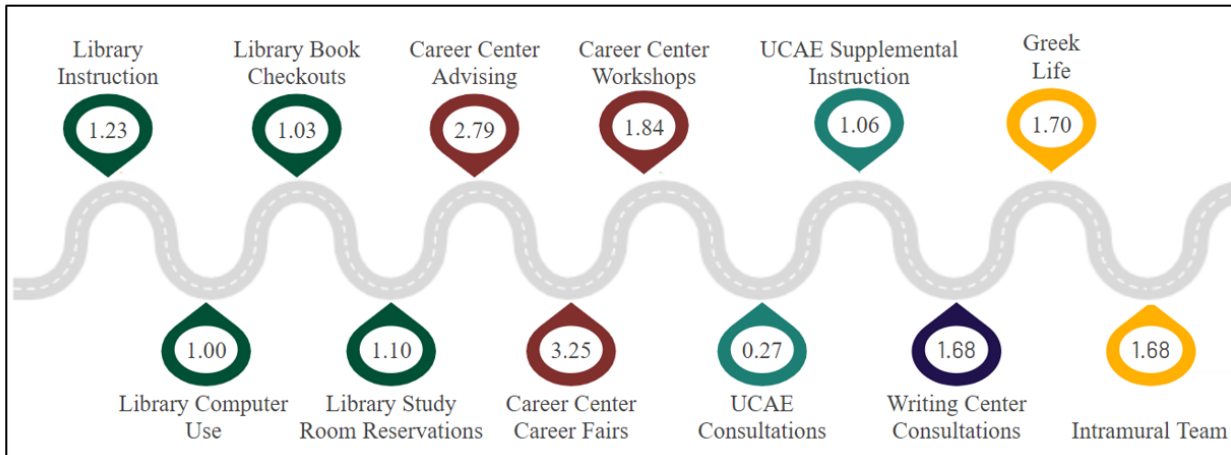


The numbers in the figure represent odds ratios (e^B).

Figure IV-9 depicts the four-year engagement pathway of co-curricular and extracurricular activities that significantly increased the odds that transfer students with 24–39 incoming credits who transferred from a community college would earn an above-average (2.50+) 4-year cumulative GPA. For this subgroup, activities included participating in library instruction, using library computers, checking out library books, reserving library study rooms; attending career center advising sessions, career fairs,

and workshops; attending consultations and supplemental instruction offered by the tutoring center (UCAE); participating in writing center consultations; and engaging in Greek Life and intramural teams.

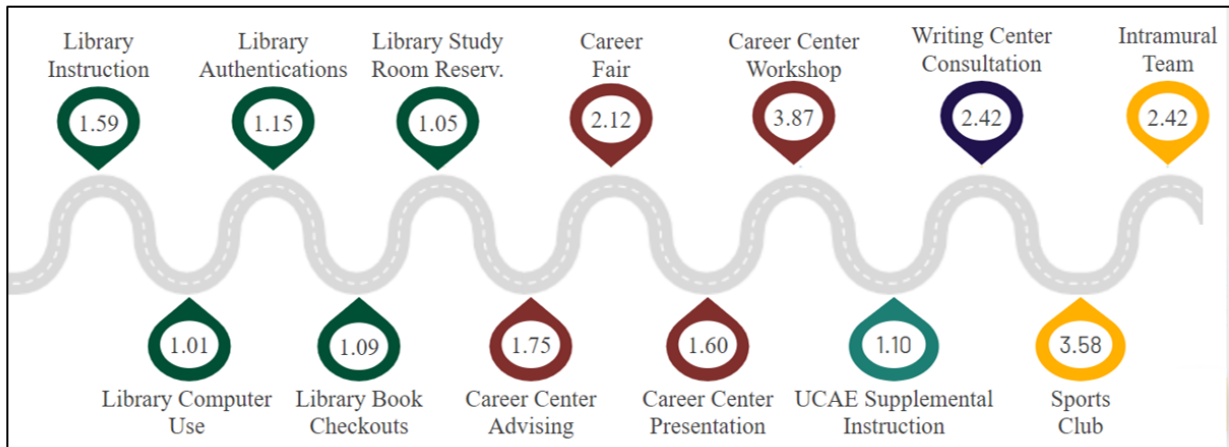
Figure IV-9. 4-Year Cumulative GPA Engagement Pathway for Transfer Students with 24-39 Incoming Credits Transferring from a Community College



The numbers in the figure represent odds ratios (e^B).

Figure IV-10 illustrates the six-year engagement pathway of co-curricular and extracurricular activities that significantly increased the odds that transfer students with 40–59 incoming credits who transferred from an in-state institution would graduate within six years. For this subgroup, activities included participating in library instruction, using library computers, authenticating to library resources via EZProxy or OpenAthens, checking out library books, reserving library study rooms; attending career center advising sessions, career fairs, classroom presentations, and workshops; attending supplemental instruction sessions offered by the tutoring center (UCAE); attending writing center consultations; and engaging in extracurricular sports clubs and intramural teams.

Figure IV-10. 6-Year Graduation Engagement Pathway for Transfer Students with 40-59 Incoming Credits Transferring from an In-State Institution



The numbers in the figure represent odds ratios (e^B).

V. Discussion

The findings from this study indicate that each of the study subgroups examined are uniquely different with respect to: (1) their attainment of the three measures of success (retention to second year, 4-year cumulative GPA, and 6-year graduation rates); (2) levels of engagement with the library and other co-curricular and extracurricular services and activities; and (3) their co-curricular and extracurricular engagement pathways for success.

With respect to the three measures of success, findings indicate that non-1st generation students have slightly higher retention rates, earn better grades, and graduate within six years at higher rates than 1st-generation students, though the degree of differences is nuanced based on study subgrouping. Among transfer student populations, students with 60 or more incoming credits earn higher grades across four years and graduate within six years at significantly higher rates than transfer students with fewer than 60 incoming credits. When the transfer student population was disaggregated by incoming credits and type of transfer institution, findings revealed that six-year graduation rates for students with 60 or more incoming credits who transferred from a community college were significantly higher than the other transfer student subgroups. Students who transferred from in-state institutions also fared better across all three measures of success than those who transferred from out-of-state.

Regarding co-curricular and extracurricular engagement, findings indicated that, in their first year, FTIC freshmen participated in library instruction at significantly higher rates than transfer students overall. This may be explained, at least in part, due to many transfer students bringing in credits that fulfill the university's writing course requirements which is where the library's greatest engagement in library instruction occurs. When looking at engagement with the library's scholarly resources, using

authentications to EZProxy and OpenAthens as a representation, transfer students with 60 or more incoming credits accessed these resources at significantly higher rates in their first year than the other transfer subgroups. This raises a question about whether transfer students with 60 or more credits are participating in courses at the university in their first year that require a greater degree of scholarly research than the other transfer subgroups, thus their increased use of library resources, or whether they participated in library instruction at their previous institutions at higher rates than those with fewer incoming credits, thus being better equipped to engage with library resources. Additional research is indicated into why transfer students with 60+ credits used library online resources more than other transfer subgroups.

With respect to students' engagement with the other campus co-curricular partner services and activities, findings are heavily nuanced depending on the population subgroupings. For example, when looking at engagement in Greek Life in year-one, non-1st generation FTIC freshmen and transfer students with 24–39 incoming credits participated at significantly higher rates than 1st-generation students. Among the transfer student subgroupings, transfer students with 24–39 incoming credits were more engaged in extracurricular activities than all other transfer student subgroups.

Lastly, the engagement pathways for student success are uniquely different for each of the three measures and across all study subgroups as illustrated in Figures IV-8, IV-9, and IV-10. Student engagement with each of the activities included in the pathways increase the odds that they will return to the university for a second year of study, earn an above-average cumulative GPA, and graduate in six years or less with a few minor exceptions. Higher odds ratios indicate an increased likelihood for success if a student engages in the associated activity.

Together, comparisons of student attainment on the three measures of success and the levels and types of engagements across the study subgroups suggest that disaggregating student engagement and success data into subgroups based on a student's admission status (FTIC or transfer) and, for transfer students, the number of incoming credits, 1st generation status, the type of transfer institution (community college or bachelor's), and transfer institution location (in-state or out-of-state) is a worthwhile investigation. Disaggregated analyses provide a more nuanced understanding of each of these populations in not only the ways they engage with the university, but also how their engagement relates to retention, academic performance, and likelihood of graduation.

VI. Conclusion

Engagement in co-curricular and extracurricular activities significantly increases the odds for success. The findings of this study provide a model of the engagements of transfer students in the library, as well as in other co-curricular and extracurricular activities, in contrast to FTIC freshmen. Results indicate how incoming students fare on retention to the 2nd year, 4-year cumulative GPA, and 6-year graduation rates after

engaging in a variety of out-of-classroom activities on campus. As part of a longitudinal project that creates a dataset of student-level data that can be mined to understand the factors that contribute to student success, this study is the first of its kind to investigate co-curricular and extracurricular engagement of 1st generation and non-1st generation FTIC freshmen and transfer students with varying ranges of credits coming from different types of transfer institutions (community colleges and bachelor's degree granting institutions) and geographic locations (in-North Carolina or out-of-North Carolina).

The results of this study confirm that the more credits transfer students have when they arrive at the university, the less likely they are to engage in extracurricular activities and the more likely they are to engage with co-curricular services, which supports the premise that they are more interested in academic-related activities and less in the social environment and out of classroom activities embraced by FTIC freshmen. Several results confirm the theory of "transfer shock"³⁸ as transfers are retained at a lower rate than FTIC freshmen from year 1 to year 2, transfers with fewer than 60 credits take longer to graduate, and transfers with 60+ credits had the highest 6-year graduation rates of the four groups (more than enough credits to overcome a one-semester adjustment period). Since transfers with more than 60 credits had the highest rate of graduation within 6 years, it appears that more courses/credits do not necessarily result in a protracted graduation rate. The results in this study confirmed findings from multiple years of previous studies.

This study found that transfer students who came from community colleges with more than 40 credits graduated at higher rates than those coming from bachelor's degree-granting institutions and transfers who came from North Carolina institutions had higher retention to the 2nd year and 6-year graduation rates than those who transferred from out-of-state institutions.

Engagement pathways demonstrate the odds ratios of retention to the 2nd year, 4-year cumulative GPA, and 6-year graduation rates following participation in specific co-curricular and extracurricular activities for FTIC freshmen and transfer students with different ranges of incoming credits. Engagement in any co-curricular and extracurricular activities increased the success of both FTIC freshmen and transfers, but the activities with the greatest odds ratios varied by subgroup.

Additional research is necessary to understand why transfers with more credits use library online resources more than transfers with fewer credits. Changes in practice are needed to get transfers with more than 40 credits into library instruction when they arrive at the university since library instruction is a significant factor in retention to the 2nd year, higher 4-year cumulative GPA, and 6-year graduation rates. The findings from this study will help libraries and universities structure support systems and services to retain transfer students and help them succeed and graduate.

Endnotes

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