



**Campus Apartment Architecture Style and Likelihood to Graduate:
An Exploratory Study at a Southern Public Liberal Arts University**

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(First published online, July 30, 2020)

Abstract

Because of increased opportunities for social interaction, undergraduate students living on campus are more likely to persist and graduate than their counterparts. Residence hall design also contributes to student interaction. This study explored the relationship between campus apartment design and graduation rates of a sophomore cohort attending a southern public liberal arts university. Initial findings indicated that students living in a communal apartment complex were more likely to graduate than those living in traditional complexes; a multivariate logistic regression found that the strongest predictors of graduation were race/ethnicity and semester credit hours earned. Implications and suggestions for future research were discussed.

Keywords: College housing, college apartment design, graduation, race and ethnicity, earned credit hours

Both Astin's (1993) theory of involvement and Tinto's (1993) model of student persistence demonstrated that student retention, persistence, and graduation rates were enhanced by students' abilities to make connections with their peers. The physical spaces on higher education campuses can facilitate those connections (Klinenberg, 2018). Students who lived on campus were more likely to have more interactions with their peers, both socially and academically, than students who lived off campus. Research has shown that on-campus residential students fared better than peers residing off campus (Astin, 1993; Tinto, 1993), but the design of residential halls also played an important role. Students in traditional residence halls, with their varied public spaces, tended to fare better than those in suite-style housing (Brandon, Hirt, & Cameron, 2008).

In addition to residence halls, some institutions of higher education have campus apartments on their grounds. Newer campus apartments have adopted architectural styles that incorporate designs (e.g. double loaded corridors, a central lobby, communal lounges, open study spaces, and recreation rooms) to enhance student interactions. The question then becomes, "Do these on-campus developments with designs intended to facilitate more interaction make a difference in graduation rates?" This study seeks to answer this question.

Literature

Student Factors

Student persistence and graduation rates are shaped by both individual-level and institutional-level attributes. Extensive research has demonstrated the importance of individual-level attributes on student retention and persistence (Dougherty & Kienzl, 2007; Hu & St. John, 2001). Certain ascriptive characteristics have been associated with more favorable student outcomes. For example, Asian and Non-Hispanic White students have higher persistence and graduation rates than their Black and Hispanic counterparts (Ohland et al., 2011). Many factors help explain the differences. Historically, Black and Hispanics students were more likely to attend racially isolated public schools which tended to have fewer resources and fewer opportunities to enroll in advanced classes (Haycock, 2002); moreover, when Black and Hispanic students attended racially heterogeneous schools, they were less likely to be enrolled in college-preparatory education tracks. Black and Hispanic students were more likely to be first-generation college students compared to their Asian and Non-Hispanic White counterparts (Fry & Lopez, 2012), and first-generation college students were more likely to drop out and less

likely to graduate than students who had parents with undergraduate degrees. All these factors contributed to the racial gaps in persistence and graduation rates.

Female students were more likely than male students to persist and graduate (Spruill, Hirt, & Mo, 2014). Scholars in the field attribute females' success in education to their values and behaviors; females are more likely to prioritize, fulfilling the good-student role as defined by educators, have friendships that include doing academic-oriented activities including information sharing related to school and other academic issues, as well as being aware of their parents' expectations and efforts at fulfilling them (Reigle-Crumb, 2010). They were more likely to engage in help-seeking behaviors (Giordano, 2003). Compared to males, females were more likely to engage in academic-centered activities with their friends (Buchmann & DiPrete, 2006) and more likely to attend class, and to come to class prepared (Jacob, 2002).

Students with higher a socio-economic status (Baca Zinn & Wells, 2000; Wood & Harris, 2015) had higher persistence and graduation rates than their counterparts. Students with higher socio-economic status were more likely to come from families where at least one parent had an undergraduate degree; their parents had cultural capital that could help them navigate their higher education experiences (O'Shea, 2016). With fewer financial stressors, students coming from more affluent households were able to focus on engaging in more student-centered activities (Terenzini, Springer, Yaeger, Pascarella, & Nora, 1996) whether academic, co-curricular, or social.

While certain ascriptive individual-level attributes have been associated with differences in persistence, performance, and graduation rates, individual-level achievement may play an important role in student success. Students who completed rigorous courses in mathematics and sciences were more likely to persist in college (Maltese & Tai, 2011), though Wolfle (2012) also found that mature-aged students (23 and over) had higher rates of fall-to-fall persistence and higher success rates in developmental math classes. High self-efficacy was strongly associated with factors predicting students' success. High self-efficacy scores have been linked to several measures of student success, including GPAs, credit hours earned, and higher rates of persistence (Barry & Finny, 2009; Hu & St. John, 2001; Kim & Hargrove, 2013; López Turley & Wodtke, 2010). Students who demonstrated success in completing complex tasks were more likely to experience an increased boost in confidence when facing subsequent challenges; that increased

confidence can translate into an increased likelihood of student persistence (Sass, Castro-Villarreal, Wilkerson, Guerra, & Sullivan, 2018).

Institutional Factors

While much of the onus of student success is placed on the individual students, researchers have demonstrated the power of institutions' administrative decisions. When institutions spend more money on instruction, academic support, auxiliary services, and student services, students tended to perform better and persisted at higher rates (Gansemer-Topf, Saunders, Schuh, & Shelley, 2004). Administrative decisions in spheres outside of academics can profoundly impact student behaviors and persistence rates. St. John, Hu, and Weber (2001) found that financial aid packages could help close that persistence gap between low-income and high-income students; financial aid packages that alleviate low-income students' need to work was directly correlated with increased participation in academic, student-centered activities, producing higher levels of engagement, persistence, and performance (Estrada et al., 2016).

In addition to financial aid, campus housing may help create vital opportunities for student integration; students living on campus reported having more opportunities to get involved in campus life, helping them to have more peer interaction, make friends more easily, and have more access to campus events (Nicpon et al., 2006); this is particularly true for young mature-aged students who desire sociality on higher education campuses but also experience social isolation, as they perceive themselves to be different from traditional-aged college students and older college student with more fragmented and non-linear pathways to higher education (Mallman & Lee, 2017). These activities can create a greater sense of belonging, which has a positive impact on retention (Sass et al., 2018). Brandon, Hirt, and Cameron (2008) found that residence hall design, with varied public spaces where students can come together aids in that integration.

Residence halls, however, are not the only form of campus housing. As enrollment rates have increased and existing housing infrastructure on college campuses has aged, institutions have built or entered into partnerships to build more campus housing that includes apartment-style facilities (Gardner, 2018). Less is known about the impact of the architectural design of these facilities. The designs of these apartment style facilities are varied, but traditional apartment-style campus housing can serve as private retreats, away from public sphere of campus life, thereby potentially undermining the purpose of campus housing to create

opportunities for student interaction and integration (Klinenberg, 2018). Thus, as new housing is built and institutions blend what they know about residence halls with campus-apartment design, it is important to compare the graduation rates of students living in campus apartments designed with features to promote student interaction with completion rates of students living in traditional, on-campus apartments. The outcomes related to such a study may help administrators make decisions regarding the design of campus apartments. This study explores the relationship between the design of campus apartments (apartments that mirror private-sector apartments complexes with limited, shared public spaces verses communal apartments designed with multiple public spaces to encourage interaction among residents) and undergraduate students' likelihood of graduating.

Methodology

This study was conducted at a southern public liberal arts university with about 6,000 students. The university is a mixed residential-commuter campus, and freshmen are required to live on campus. The student body includes nearly 28% students of color and 60% female students. Additionally, 70% of students receive some form of financial aid. Data for this study were drawn from the fall 2009 cohort of sophomores who lived in campus apartments (N=194). For this cohort of sophomores, it was their first opportunity to choose living on or off campus after the first-year residential requirement. Further, they could choose to live in either the traditional apartment complex or the communal apartment complex that was designed to enhance student interactions. The communal design included double-loaded interior corridors, a central lobby, and additional communal lounges. These attributes were not part of the traditional apartment design.

The outcome variable is whether a student graduates within four years after their initial residency in campus apartments (N=105; 54.1% of the cohort). The primary explanatory variable is the type of apartments in which a student resided in fall 2009: traditional complex (N=86; 43.9% of the cohort) and communal complex (N=108; 56.1% of the cohort). To further understand the difference in graduation, the analysis includes the following control variables: gender, race (White/non-White), age, financial aid status (Pell grant receipt), and credit hours completed at the beginning of fall 2009 semester. The cohort has 59.3% of female, 43.3% of non-White, and 64.9% of Pell Grant recipients. The mean age of the cohort is 19.9, and the mean credit hours earned is 43.

To investigate whether there was a difference in graduation rates between students who lived in the traditional apartment complex and those who lived in the communal apartments, a cross tabulation was computed, and a chi-square analysis was performed to determine if the difference was statistically significant ($p < .10$). The current study utilizes binary logistic regression to uncover how the apartment type and other explanatory variables affect the students' likelihood of graduating in four years, after their initial residency in the on-campus apartments.

Results

Table 1 shows the cross tabulation of graduation by apartment type. A higher percentage of the communal apartment residents graduated from the university within four years of their initial residency compared to their counterparts living in the traditional apartment complex (60.2%, 46.5% respectively). The chi-square of the cross tabulation is 3.605 (degree of freedom=1), and the p-value is .058, meaning that the difference in graduation is marginally significant at the $p < .10$ level.

Table 1

Cross Tabulation of Student Graduation Rate by Apartment Type

	Apartment Type		Total
	Traditional	Communal	
Graduated	40 (46.5%)	65 (60.2%)	105 (54.1%)
Not Graduated	46 (53.3%)	43 (39.8%)	89 (45.9%)
Total	86 (100%)	108 (100%)	194 (100%)

Table 2 presents the results of a binary logistic regression. The null hypothesis that coefficients are zero is rejected in this model ($\chi^2 = 17.870$, $p = .007$) indicating that the independent variables improve the prediction of graduation. The model accounts for 11.8% of the variance on the dependent variable (Nagelkerke $R^2 = .118$). Additionally, 61.3% of the cases were classified correctly for graduation by this model.

Once other explanatory variables were included in the logistic regression model, communal apartment type was no longer a statistically significant predictor for graduation. Other significant variables in the model were ethnicity (White/non-White) and credit hours earned at the beginning of fall 2009. The odds ratio (Exp(B)) for White is 1.959, indicating that

White students are about two times more likely than non-White students to graduate in four years after their initial residency in on-campus apartments. The odd ratio for credit hours earned was 1.046, suggesting that for every credit hour earned; students are 4.6% more likely to graduate.

Table 2

Logistic Regression of Likelihood of Students Graduating in Four Years after Initial Matriculation

Explanatory variables	B	S.E.	Wald χ^2	p	Exp(B)
Communal Apartment ¹	.420	.337	1.551	.213	1.521
Female ²	-.364	.331	1.208	.272	0.695
White ³	.673	.335	4.022	.045*	1.959
Age	-.258	.158	2.687	.101	0.772
Receiving Pell Grant ⁴	-.236	.328	0.517	.472	0.790
Earned Credit Hours	.045	.017	6.754	.009**	1.046
Constant	3.054	3.089	0.978	.323	21.207

Notes: *p<.05, **p<.01; Comparison groups: 1. traditional apartment, 2. male, 3. Non-White, 4. Not receiving Pell Grant.

Discussion

Initial tests of significance indicate that students living in communal-style campus apartments had marginally significant, higher graduation rates than their peers who resided in traditional-style campus apartments. Once additional variables were included in the logistic regression model, type of residence was no longer significant; race (White/non-White) and credit hours earned were the only significant predictors of graduation. These findings appear to be in line with research demonstrating students who attempt and complete more college hours are more likely to perceive themselves as successful and have a higher likelihood of retention (Slanger, Berg, Fisk, & Hanson, 2015). Worth noting in this study is that Non-Hispanic Whites at this predominantly White institution (PWI) were nearly twice as likely to graduate as their non-White counterparts. This disparity in the likelihood of graduating between Non-Hispanic Whites and Non-White students at PWIs is concerning.

Student affairs professionals need to be attentive to the experiences of students of color at their campuses, to enhance their social and academic integration. Previous research focusing on students of color attending PWIs has demonstrated that there is much work to do in this area. DeMirjyn (2011) found that Chicanas attending a PWI often experienced microaggressions, stereotyping, and isolation, yet they also indicated that sharing living space with other Latinas

and attending classes that focused on Mexican American experiences helped them feel less isolated and have more resolve to continue their education and earn a degree. While the architectural design of campus apartments was not a significant predictor of graduation rates in this study, research focusing on people of color attending PWIs demonstrated that building community and facilitating integration was critical for student retention and success (DeMirjyn, 2011; Gonzalez & Morrison, 2016), and therefore, campus apartment architectural design may be one strategy worth pursuing.

While high school dropout rates and college entry rates for African Americans and Hispanics Americans have been improving (Gramlich, 2017), persistence of students of color in higher education remains an on-going challenge, as evidenced by this study's findings. The American Association of Colleges and Universities has found that first-year seminars, academic learning communities, writing-intensive courses, active and collaborative learning, undergraduate research, study abroad, service learning, internships, and capstone courses/experiences improved student retention, especially for students of color (Finley & McNair, 2013; Kilgo, Ezell Sheets, & Pascarella, 2014). Equally important to high impact practices in the classroom, investing resources in academic support, auxiliary services, and holistic advising can positively impact student retention (Núñez & Elizondo, 2012). However, to maximize student success, investments in other areas that facilitate social integration are important, especially for students of color. Strategies to enhance integration and a sense of belonging can positively impact student persistence-rates.

Klinenberg (2018) asserted that social infrastructure is key to building community, that American university campus designers were "intent on building new communities [to foster social interaction, and to create spaces that would produce opportunities where] knowledge from different fields would circulate freely" (p. 95). Residence halls, libraries, and dining halls were designed to be social spaces. Campus apartments are not; with their kitchens and living rooms, apartments may become spaces to which students retreat from campus life and public spaces. Designing campus apartments with more communal areas may be an effective architectural strategy to encourage students to remain a part of the community.

A broader process outcome of this study was an affirmation of the value for student affairs professionals to use advanced statistical analyses for their decision making. This study attempted to determine whether apartment facility design could impact graduation rates. At first

glance, the crosstab results from the bivariate analysis showed that students who lived in the communal apartment setting graduate at higher levels than counterparts who chose to reside in a traditional apartment complex. However, this information ended up being misleading, once other individual-level variables are controlled in the logistic regression, a more advanced statistical analysis. Therefore, student affairs professionals should try to use multivariate tests of significance, to confirm their observation before planning and implementing programs to improve outcomes.

Limitations

The multivariate analysis demonstrated that the race of the student and the number of hours earned were the only significant factors that predicted the likelihood of graduating, yet it would be premature to conclude that on-campus apartment design does not significantly impact graduation rates. While graduation is the goal for our students, graduation rates may not have been the most appropriate dependent variable for assessing the impact of architectural design on students. Student integration and sense of belonging are critical for student persistence to graduation. Thus, it may have been more appropriate to ask students about their sense of belonging and their academic and co-curricular activities both at the time they moved into their campus apartments and at the end of the study. This way, we could assess if their sense of belonging and integration varied by the type of apartment housing they selected.

For students who are college-ready, affluent, and experience cultural congruence with an institution, campus apartments' architectural style may have a limited impact on integration or graduation rates. Campus architectural style may play a more important role in increasing the odds of integration and persistence to graduation for students who are less college-ready and/or for those at-risk of experiencing isolation or alienation. Examinations of the impact of architectural designs are worth conducting as more institutions seek to replace aging student housing facilities and build new ones.

Conclusion

To make evidence-based decisions, student affairs professionals should use multivariate tests of significance. Preliminary bivariate analyses of the impact of campus-apartment architecture suggested that communal-style apartments were associated with higher rates of graduation, yet a multivariate analysis suggested a more complicated relationship among institutional-level attributes, student-level attributes, and student success. As the cost of higher

education increases and access to financial resources for institutions of higher education become more limited, institutions must prioritize how they spend their increasingly limited resources. One way they can do that is by conducting longitudinal studies using multivariate models of their student populations.

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