Evidence of Improved Student Outcomes in Gateway Courses Following ACUE Certification at Georgia Southern University and North Carolina A&T State University

Technical Report

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Executive Summary

In 2022, ACUE launched the Faculty Mindset Research Project funded by the Gates Foundation to study the impact of faculty development on faculty self-efficacy and mindsets. As part of this project, faculty teaching gateway courses at Georgia Southern University (GSU) and North Carolina A&T University (NCAT) participated in ACUE courses in Effective Teaching Practices (ETP) and Effective Online Teaching Practices (EOTP) between spring and fall of 2022. Findings from the Faculty Mindset Project demonstrated improved faculty mindsets among instructors teaching gateway courses.

Building on these findings, we assessed student outcomes in sections taught by the ACUE-certified instructors who participated in the Faculty Mindset Project, focusing on completion rates, passing rates, DFW rates, and average grades.

Methods

Using a Difference-in-Differences (DID) approach, this evaluation compares changes in student outcomes before, during, and after faculty certification in ACUE's Framework. As in the Mindset project, this analysis focuses on gateway courses, which are critical to student success and retention, particularly for first-year students. By examining both the combined dataset from NCAT and GSU, as well as separate analyses for each institution, this report provides a comprehensive assessment of the potential impact of the ACUE certification.

Key Findings

- **Improved Completion Rates:** At GSU, completion rates improved significantly more among sections taught by certified faculty during the ACUE course period than in comparison sections, both overall and specifically among first-year students, with larger benefits for female students.
- **Higher Passing Rates:** Among first-year students in the combined sample, passing rates improved significantly more in sections taught by certified faculty during the ACUE course and in the post period than in comparison sections. At NCAT, passing rates improved among sections taught by certified faculty during the ACUE course period, but the difference in trends between ACUE and comparison sections was not significant post-ACUE. At GSU, no significant impacts of certification were found for passing rates overall, though a positive impact was noted for first-year students in the post period.

- **Reduced DFW Rates:** In the combined sample, DFW rates decreased significantly more in sections taught by certified faculty relative to comparison sections in the post-ACUE period. The same pattern of results was seen when analyses were restricted to only first-year students.
- **Higher Average Grades:** In the combined sample, average grades increased significantly more among sections taught by certified faculty relative to comparison sections both during the ACUE course period and in the post-ACUE period, with first-year students and Black/African American students experiencing a greater impact in the during period. The same overall impacts on grades were seen at NCAT, with first-generation and Pell-eligible students experiencing larger gains during the ACUE course period.

ACUE certification demonstrated positive effects on student outcomes, particularly among first-year students in gateway courses. Improvements in passing rates, DFW rates, and average grades were most evident for this group, suggesting that comprehensive faculty development focused on effective teaching practices can have a meaningful impact on student performance, especially during the critical transition period of the first year. Overall, the findings support the potential of ACUE's certification to foster improved academic outcomes in the context of gateway courses, particularly for first-year students and students from underserved populations.

About ACUE

The Association of College and University Educators (ACUE) is dedicated to student success through high-quality instruction. In partnership with higher education institutions, we offer the only nationally recognized Effective Teaching certification, endorsed by the American Council on Education (ACE), supported by a vibrant online community of practice focused on advancing teaching excellence.

ACUE-certified faculty deliver exceptional teaching in every class, resulting in higher student engagement, improved achievement, and stronger retention—outcomes that enhance institutional impact and support long-term student success. Learn more at acue.org.

Introduction

Instructional quality is a key factor influencing student success in higher education. Several studies have found that improved teaching is associated with better student performance, with effects that can extend well beyond a single course and with impact across multiple semesters (Braga et al., 2016; Brodaty & Gurgand, 2016; Carrell & West, 2010; De Vlieger et al., 2017). As a result, there is increasing interest in identifying and supporting effective teaching practices as a means to improve student outcomes (Freeman et al., 2014), and faculty professional development has become a central strategy in these efforts. This focus is especially critical at Historically Black Colleges and Universities (HBCUs), where effective teaching and faculty–student relationships are

particularly impactful, as these are closely tied to academic development, persistence, and degree aspirations (Flowers, 2003). Furthermore, faculty support at HBCUs has been found to predict students' engagement in their academic work, highlighting the essential role that teaching practices and faculty–student relationships play in student success at these institutions (Wilson et al., 2015).

ACUE offers comprehensive professional development courses aimed at improving faculty's use of effective teaching practices, grounded in its Effective Teaching Practice Framework. This framework outlines key instructional skills and knowledge that faculty across disciplines should possess to enhance student achievement (ACUE, 2016). To ensure accountability, ACUE evaluates its programs' effectiveness through a multilevel accountability framework, which assesses outcomes in six levels of evaluation: (1) faculty engagement, (2) faculty learning, (3) faculty implementation, (4) student engagement, (5) course-level student outcomes, and (6) institutional outcomes (MacCormack et al., 2018). The present evaluation focuses specifically on level 5 of this framework, which examines the impact of ACUE faculty on course-level student outcomes.

Several evaluations have examined the influence of ACUE faculty on student outcomes and have consistently found positive effects, with a meta-analysis showing an average positive effect (Pippins et al., 2023). These evaluations have shown positive impacts on completion rates (Lawner & Snow, 2020; Lawner et al., 2019b), success rates (Hecht, 2019; Lawner & Snow, 2018), passing rates (Lawner & Snow, 2020; Pippins et al., 2021a), and average grades (Hecht, 2019; Lawner & Snow, 2019a, 2019b; Lawner et al., 2019a; Pippins et al., 2021a, 2021c, 2021d), including one study that focused specifically on gateway courses (Pippins et al., 2021a). Positive effects have also been observed on students' subsequent course outcomes (Pippins et al., 2021b) and academic performance across all their courses (Lawner et al., 2021).

This present evaluation builds upon the Faculty Mindset Research Project funded by the Gates Foundation, which focused on changing the mindsets of instructors in gateway courses across several institutions through their participation in ACUE courses (Pippins et al., 2023). The project aimed to equip faculty with the tools and confidence needed to implement effective teaching practices while fostering a growth mindset (Dweck, 1999, 2006; Dweck & Leggett, 1988) and increasing self-efficacy—critical factors that directly influence teaching effectiveness, as instructors' self-efficacy affects their instructional practices and student outcomes (Allinder, 1994; Berman et al., 1977; Tschannen-Moran & Hoy, 2001; Woolfolk & Hoy, 1990). The Faculty Mindset Research Project thus sought to examine how comprehensive faculty development could influence instructors' beliefs about their teaching abilities and the malleability of their students' potential.

The results of the Faculty Mindset Research Project demonstrated significant improvements in faculty self-efficacy across multiple dimensions, including confidence in using effective teaching practices, adjusting instruction based on student feedback, and delivering clear explanations, among others. Faculty also experienced a noticeable positive shift in their mindsets, becoming more aware of the impact their teaching could have on students and adopting a more growth-oriented perspective toward their instructional roles. Similarly, student surveys also showed a significant increase in students' perceived academic self-efficacy and growth mindsets at the

end of the semester, though these findings are based on retrospective pre/post responses and were not compared to a control group (Pippins et al., 2023). However, while these improvements were evident, the Faculty Mindset Research Project did not assess the impact on student course outcomes. The current evaluation aims to explore the potential impact of ACUE certification on student outcomes at institutions that participated in the Faculty Mindset Research Project and to understand how comprehensive faculty development might influence key student success indicators in the context of gateway courses. This follow-up evaluation focuses on the two institutions that participated in the previous project and agreed to participate in the follow-up study—North Carolina A&T University (NCAT) and Georgia Southern University (GSU).

NCAT is a public, land-grant HBCU located in Greensboro, North Carolina. As one of the nation's leading HBCUs, NCAT serves over 14,000 students, offering a wide range of undergraduate, graduate, and doctoral programs, focusing on STEM disciplines. GSU, located in Atlanta, Georgia, is a public research university that serves over 50,000 students across its seven campuses, offering a wide range of undergraduate, graduate, and doctoral programs in more than 250 degree programs across 10 academic colleges and schools.

Both the Mindset study and the present study focus specifically on gateway courses due to their critical role in students' academic progression and persistence. These courses often serve as foundational stepping stones for students as they move into more advanced coursework, making them essential in shaping students' long-term academic success (Koch, 2017). By focusing on gateway courses, this study provides insights into how comprehensive faculty development may influence teaching practices that are especially important for first-year students who are navigating their initial academic experiences.

The evaluation employs a difference-in-differences (DID) approach to assess the impact of ACUE-certified faculty on student outcomes, focusing on key metrics such as completion rates, passing rates, DFW rates (Ds, Fs, and withdrawals), and average course grades. Analyzing the combined dataset from NCAT and GSU enables a broader understanding of the impact of ACUE certification across different institutional contexts. Additionally, separate analyses for each institution were conducted, since the universities each have unique characteristics, such as differences in faculty composition, student demographics, and institutional policies. This dual approach ensures that the findings reflect both the generalized impact of ACUE certification and the specific nuances of each institution.

In recognition of the role that student self-selection may play in evaluating instructional effectiveness, the analysis also includes an additional examination restricted to first-year students. First-year students typically have less knowledge about faculty reputations or teaching styles, making them a particularly useful group for isolating the effects of teaching practices without the confounding factor of student selection bias. Given that first-year students are often enrolled in gateway courses, improving outcomes for this group is critical for promoting long-term academic success. Focusing on first-year students in this evaluation provides a clearer understanding of the direct effects of ACUE certification on teaching and learning in foundational courses.

Methods

Data Description & Preparation

Datasets

The data includes student-level and course section-level information collected from gateway courses taught between spring 2021 and fall 2023. For NCAT, the variables included student demographic information (age, gender, race/ethnicity, college generational status, Pell eligibility, class standing, international status, and student status), course characteristics (course format, student headcount, course department, and course title), student outcomes (completion, passing, DFW, and final course grade), and instructor demographic and employment characteristics (gender, race/ethnicity, international status, tenure status, course load, and instructional status). For GSU, the variables included student demographic information (age, gender, race/ethnicity, college generational status, class standing, international status, student status, remedial English course participation, remedial math course participation, and English proficiency test), course characteristics (course format, student headcount, course department, and course title), student outcomes (completion, passing, DFW, and final course grade), and instructor demographic and employment characteristics (gender, race/ethnicity, international status, tenure status, years at the institution, and course load).

Data Preparation

To ensure an accurate assessment of the ACUE courses and comparability between course sections taught by ACUE and non-ACUE faculty, within the ACUE group, only faculty members who completed their ACUE course and earned the certification in the ACUE Framework were included in the data analysis. Faculty who started the ACUE course but did not complete certification were excluded, ensuring that the analysis accurately reflected the impact of the ACUE certification on teaching practices and student outcomes. This approach enabled a clearer comparison between ACUE-certified faculty and non-ACUE faculty in the control group. Additionally, 13 faculty members certified in the ACUE Framework were excluded for not implementing any of the practices learned during the ACUE course (nine at NCAT and four at GSU), and two certified faculty members were excluded due to having data available for only one of the time frames (one at each school), making it difficult to assess the impact of the ACUE course over time. To ensure comparability between courses taught by ACUE faculty and non-ACUE faculty, at each school, course sections from departments that did not have a mix of ACUE and non-ACUE faculty teaching gateway courses were excluded from the analysis.

NCAT Analytic Sample Description

The final analytic sample for NCAT consisted of 50 instructors certified in ACUE's Effective Teaching Practice Framework, with data encompassing 142,698 non-unique students enrolled in 4,432 sections taught by a total of 554 instructors. The dataset segmented by time frames included 45,223 student enrollments in the baseline period, 47,649 student enrollments in the during period, and 49,826 student enrollments in the post period.

GSU Analytic Sample Description

The final analytic sample for GSU comprised 49 ACUE faculty, with data including 167,355 non-unique students enrolled in 3,966 sections taught by 680 instructors. The dataset segmented by time frames included 62,853 student enrollments in the baseline period, 54,771 student enrollments in the during period, and 49,731 student enrollments in the post period. Table 1 provides a comparison of the number of non-unique student enrollments and sections taught by ACUE faculty and non-ACUE faculty in each time frame at the two institutions.

Combined Dataset Description

The combined dataset from NCAT and GSU includes only variables present in the datasets of both institutions; thus, it excludes the student characteristics of Pell eligibility, remedial English course participation, remedial math course participation, and English proficiency test, as well as total years at the institution of the instructor. The data was segmented into the three periods mentioned: baseline (spring 2021–fall 2021), during ACUE (spring 2022–fall 2022), and post-ACUE (spring 2023–fall 2023).

The combined analytic sample, after the data preparation process of both samples, is substantial, consisting of 310,053 non-unique student enrollments across 8,398 sections taught by 1,234 instructors, including the 99 faculty members who completed the ACUE course in either Effective Teaching Practices (ETP) or Effective Online Teaching Practices (EOTP). This extensive dataset allows for a comprehensive analysis of the impact of ACUE faculty compared to non-ACUE faculty across both institutions. Table 1 provides a comparison of the number of non-unique student enrollments and sections taught by ACUE faculty and non-ACUE faculty in each time frame at the two institutions.

Table 1: *Number of Student Enrollments and Course Sections by Faculty Type, Time Frame, and Institution*

		GSU		NCAT	
Time Frame	**Faculty Type**	**Non-Unique Student Enrollments**	**Course Sections**	**Non-Unique Student Enrollments**	**Course Sections**
Baseline	ACUE	8,855	192	6,350	185
	Non-ACUE	53,998	1,303	38,873	1,242
During ACUE	ACUE	8,702	196	7,092	209
	Non-ACUE	46,069	1,132	40,557	1,269
Post ACUE	ACUE	7,944	167	6,731	197
	Non-ACUE	41,787	976	43,095	1,330
Total	ACUE	25,501	555	20,173	591
	Non-ACUE	141,854	3,411	122,525	3,841
Grand Total		**167,355**	**3,966**	**142,698**	**4,432**

Analytic Sample Characteristics

Instructor Characteristics

The results of multiple linear regression analyses to determine potential differences in the proportions of instructor characteristics across the sample show that institutional affiliation (NCAT vs. GSU) and participation in the ACUE course were significantly related to variations in faculty tenure status, gender, race/ethnicity, and international status. Faculty at NCAT had a lower proportion of tenured faculty and female, Asian, and White instructors, but a higher proportion of male, Black, other race/ethnicity, and international instructors compared to GSU. Similarly, the proportion of faculty participating in the ACUE course was higher among female, Asian, other race/ethnicity, and international instructors but lower among male, Black, and White instructors. Interaction effects between NCAT and ACUE participation showed an increase in the proportion of tenured, male, Black, Asian, and international instructors, while decreasing the proportions of female, other race/ethnicity, and White instructors. See Table 2 for further details on these differences in instructor demographics.

Table 2: *Regression Results for Differences in Instructor Demographic Proportions by Institution and ACUE Participation*

Demographic Characteristics		Institution (NCAT vs. GSU)	ACUE Participation (ACUE vs. Non-ACUE)	Interaction (NCAT x ACUE)
Tenure Status	**Tenure Track (vs. Non-Tenure Track)**	Lower proportion *b* = -0.31***	Lower proportion *b* = -0.18***	Higher proportion *b* = 0.39***
Instructor Gender	**Female Instructors (vs. Others)**	Lower proportion *b* = -0.01***	Higher proportion *b* = 0.29***	Lower proportion *b* = -0.08***
	Male Instructors (vs. Others)	Higher proportion *b* = 0.01***	Lower proportion *b* = -0.28***	Higher proportion b = 0.08***
	Unknown/ Unreported Gender Instructors (vs. Male and Female)	Higher proportion *b* = 0.001***	Lower proportion *b* = -0.01***	Marginally lower proportion *b* = -0.00 (*p* = .068)
Instructor Race/ Ethnicity	**Asian**	Lower proportion *b* = -0.03***	Higher proportion *b* = 0.04***	Higher proportion *b* = 0.03***
	Black	Higher proportion *b* = 0.52***	Lower proportion *b* = -0.03***	Higher proportion *b* = 0.09***
	Other Race/Ethnicity	Higher proportion *b* = 0.10***	Higher proportion *b* = 0.05***	Lower proportion *b* = -0.09***
	White	Lower proportion *b* = -0.59***	Lower proportion b = -0.06***	Lower proportion b = -0.03***
International Status	**International Instructors**	Higher proportion *b* = 0.09***	Higher proportion *b* = 0.04***	Higher proportion *b* = 0.07***

Note. Coefficients (b) represent percentage point changes in the proportion of instructors. A positive value indicates an increase, while a negative value indicates a decrease, relative to the reference group (GSU or non-ACUE).

Additionally, differences in average instructor course load were examined. Multiple linear regression analysis results indicate significant differences in the average instructor course load based on institutional affiliation (NCAT vs. GSU) and participation in the ACUE course. Instructors at NCAT, on average, had a slightly higher course load compared to those at GSU, $b = 0.09$, $SE = 0.01$, $p < .001$, 95% CI [0.07, 0.10]. However, ACUE participants had a significantly lower course load compared to non-ACUE faculty, $b = -0.46$, $SE = 0.02$, $p < .001$, 95% CI [-0.49, -0.42]. The interaction between institution and ACUE participation showed that instructors who were both NCAT and ACUE participants had a significantly higher course load, $b = 0.52$, $SE = 0.03$, $p < .001$, 95% CI [0.47, 0.57]. See the distribution of instructor demographics by institution and faculty type in Figures 1–3.

Figure 1: *Faculty Distribution by Tenure Status*

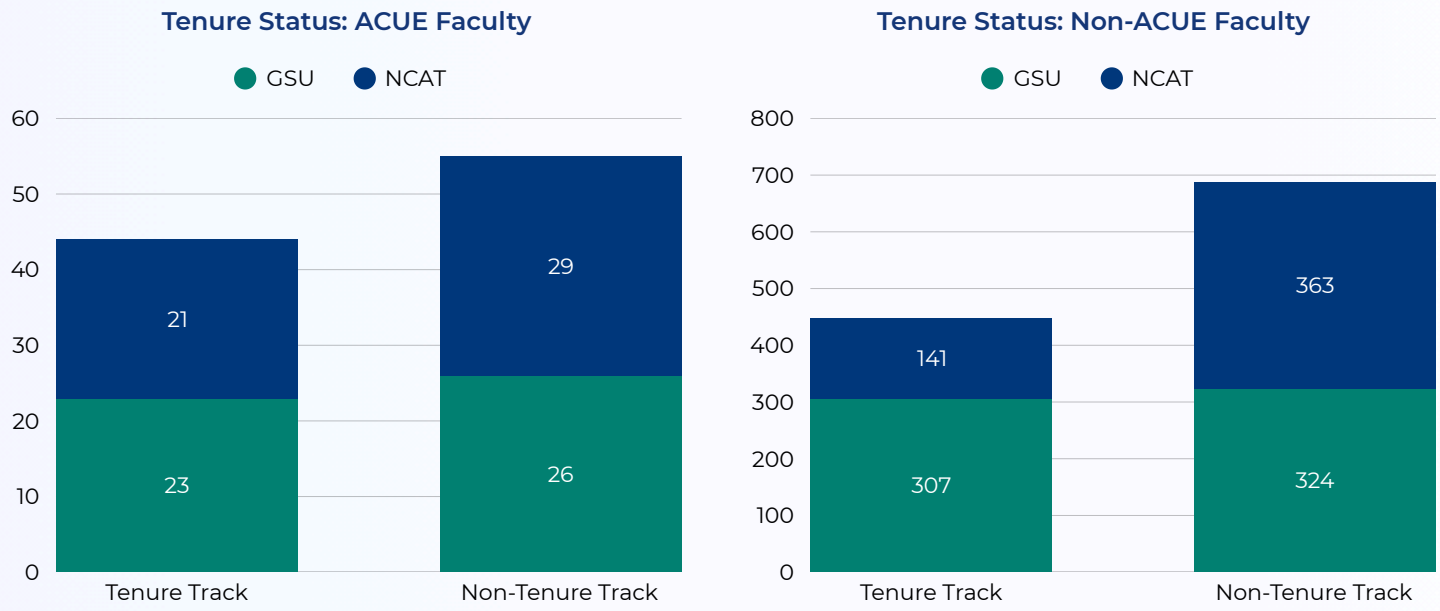
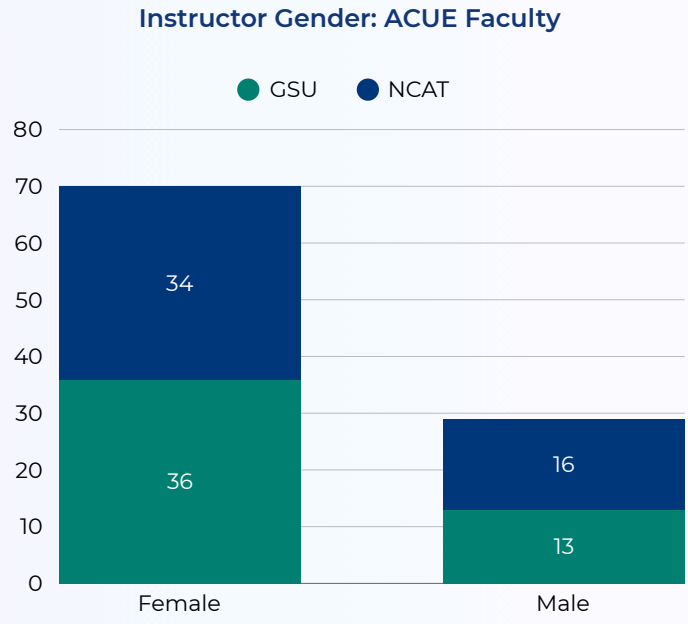


Figure 2: *Faculty Distribution by Gender*



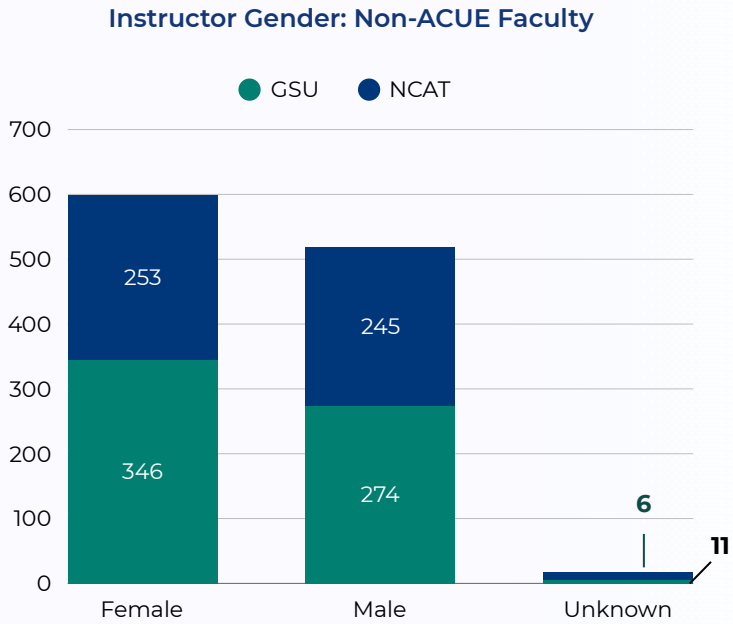
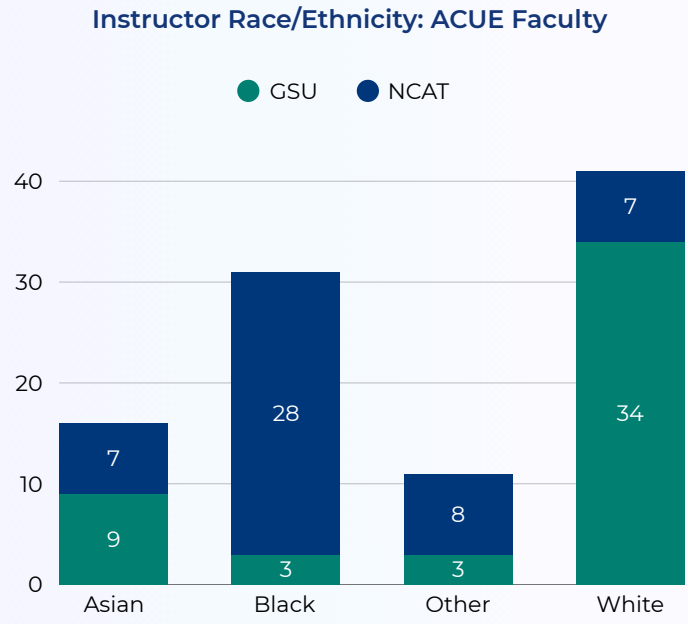
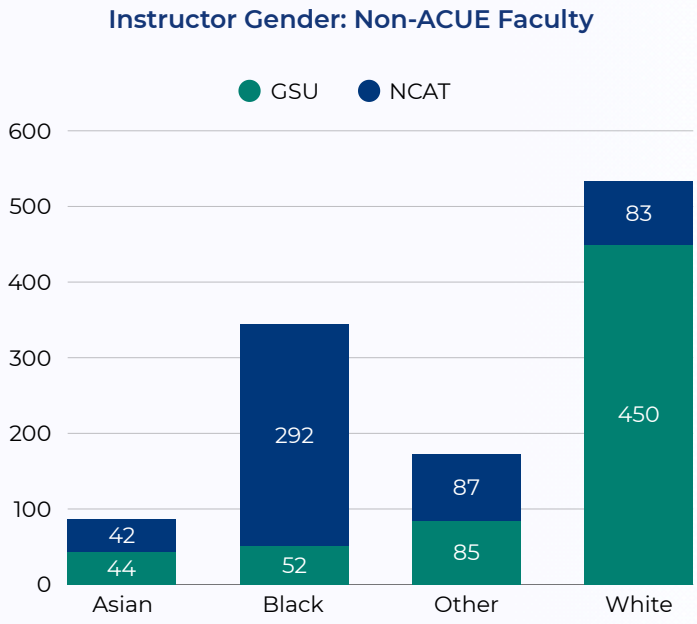


Figure 3: *Faculty Distribution by Race/Ethnicity*





Student Characteristics

The results of multiple linear regression analyses indicate significant differences in student demographics based on institutional affiliation (NCAT vs. GSU) and participation in the ACUE course. NCAT is associated with higher average student age and higher proportions of female, Black, and full-time students. However, NCAT has lower proportions of Hispanic, other minority, White, international, first-year, and online students. Participation in the ACUE course is linked to higher average student age, higher proportions of female and first-generation students, and higher online enrollment. Interaction effects between NCAT and ACUE show important differences in student composition such as a decrease in first-year students. See Table 3 for details on these differences in student characteristics.

Table 3: *Regression Results for Differences in Student Demographics by Institution and ACUE Participation*

Demographic Characteristics		Mean (*SD*) Across Combined Sample	Institution (NCAT vs. GSU)	ACUE Participation (ACUE vs. Non-ACUE)	Interaction (NCAT x ACUE)
Age		19.75 (*SD* = 3.74)	Higher *b* = 0.11***	Higher *b* = 0.22***	Lower *b* = -0.34***
Student Gender	**Female Students (vs. Male Students)**	0.60 (*SD* = 0.49)	Higher proportion *b* = 0.08***	Higher proportion *b* = 0.10***	Lower proportion *b* = -0.09***
Student Race/ Ethnicity	**Black/ African American Students**	0.54 (*SD* = 0.50)	Higher proportion *b* = 0.59***	Higher proportion *b* = 0.02***	Lower proportion *b* = -0.02***
	Hispanic/ Latino Students	0.07 (*SD* = 0.25)	Lower proportion *b* = -0.04***	Lower proportion *b* = -0.01***	Higher proportion *b* = 0.01*
	Other Ethnic/ Racial Minority Students	0.07 (*SD* = 0.26)	Lower proportion *b* = -0.01***	Not significant *b* = -0.00, *p* = .284	Not significant *b* = -0.00, *p* = .861
	White Students	0.32 (*SD* = 0.46)	Lower proportion *b* = -0.54***	Lower proportion *b* = -0.01***	Higher proportion *b* = 0.01***

International Status	International Students	0.01 (*SD* = 0.09)	Lower proportion *b* = -0.01***	Lower proportion *b* = -0.00***	Higher proportion *b* = 0.00*
Student Status	Full-Time Students	0.92 (*SD* = 0.27)	Higher proportion *b* = 0.06***	Lower proportion *b* = -0.01***	Higher proportion *b* = 0.02***
College Generational Status	First Generation Students	0.22 (SD = 0.42)	Higher proportion b = 0.05***	Higher proportion b = 0.01***	Lower proportion b = -0.01***
Class Standing	First-Year Students	0.54 (SD = 0.50)	Lower proportion b = -0.11***	Lower proportion b = -0.12***	Higher proportion b = 0.08**
Instructional Mode	Online/ Hybrid Students	0.37 (SD = 0.48)	Lower proportion b = -0.12***	Higher proportion b = 0.03***	Lower proportion b = -0.05***
Course Section Size		36.91 (*SD* = 29.41)	Lower *b* = 9.69***	Higher *b* = 4.36***	Not significant *b* = -2.13, *p* = .249

Note. Coefficients (b) represent percentage point changes in the proportion of instructors. A positive value indicates an increase, while a negative value indicates a decrease, relative to the reference group (GSU or non-ACUE).

As displayed in Table 3, the average age across all student enrollments in the sample was 19.75 years (SD = 3.74). Black/African American students made up 54.4% of the total enrollments, followed by White students (31.5%), Hispanic/Latino students (6.8%), and students of other races/ethnicities (7.3%). Most enrollments were full-time students (92.0%) and first-year students (53.9%). Likewise, most students in the sample were female (60.0%). See the distribution of student demographics by institution and faculty type in Figures 4–7.

In addition to the student and faculty demographic information reported in Tables 2 and 3, the data included course characteristics (e.g., course name, department, and term offered).

Figure 4: *Student Distribution by Gender*

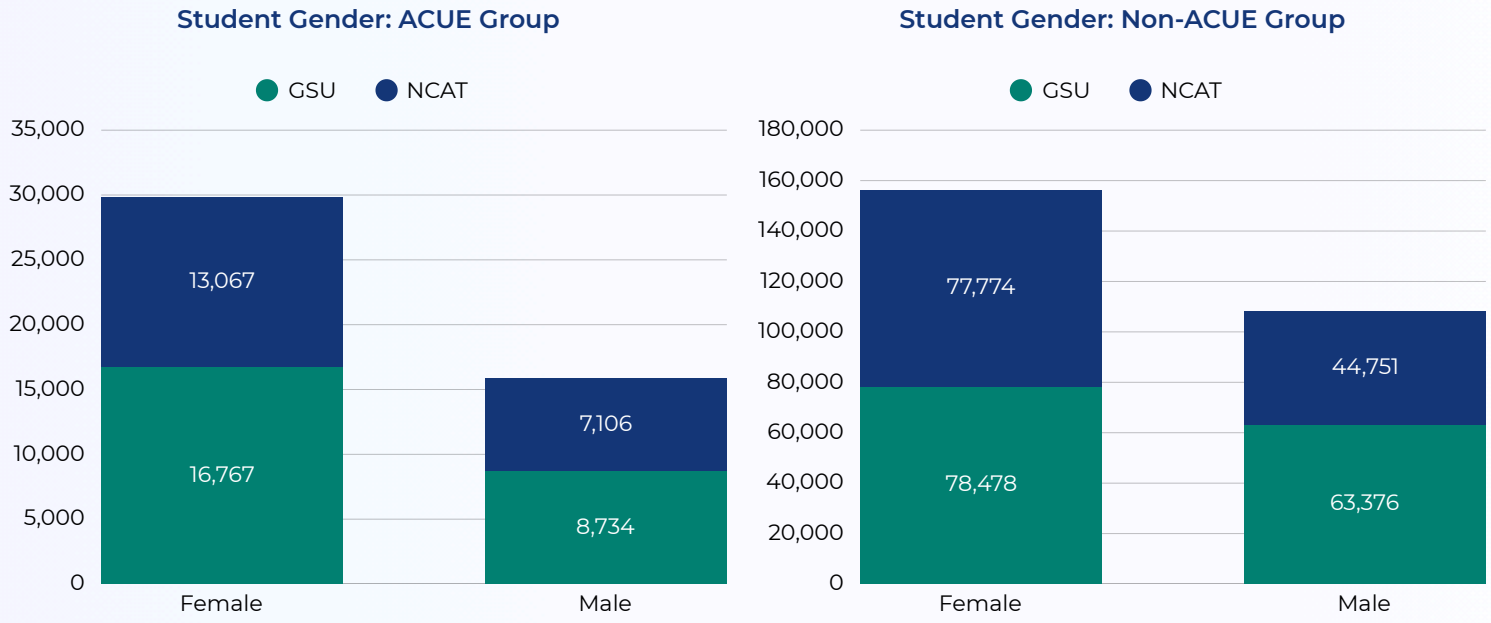


Figure 5: *Student Distribution by Race/Ethnicity*

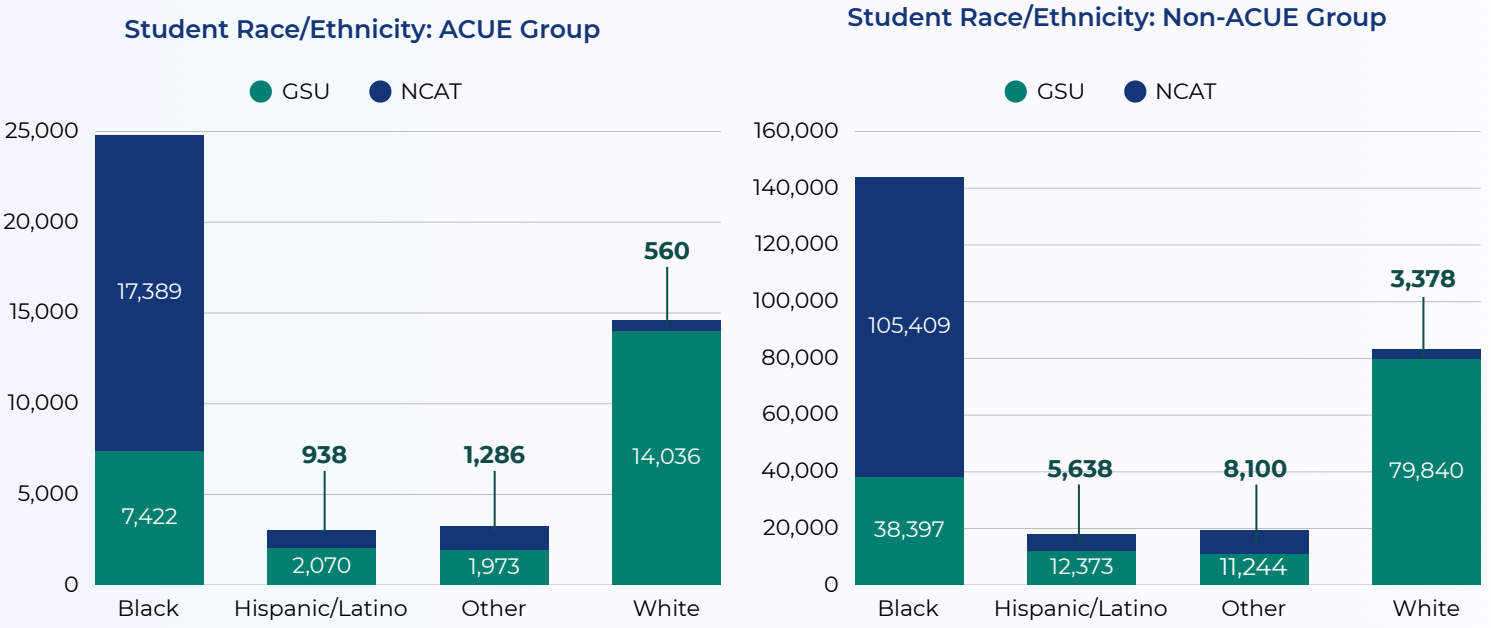


Figure 6: *Student Distribution by Class Standing*

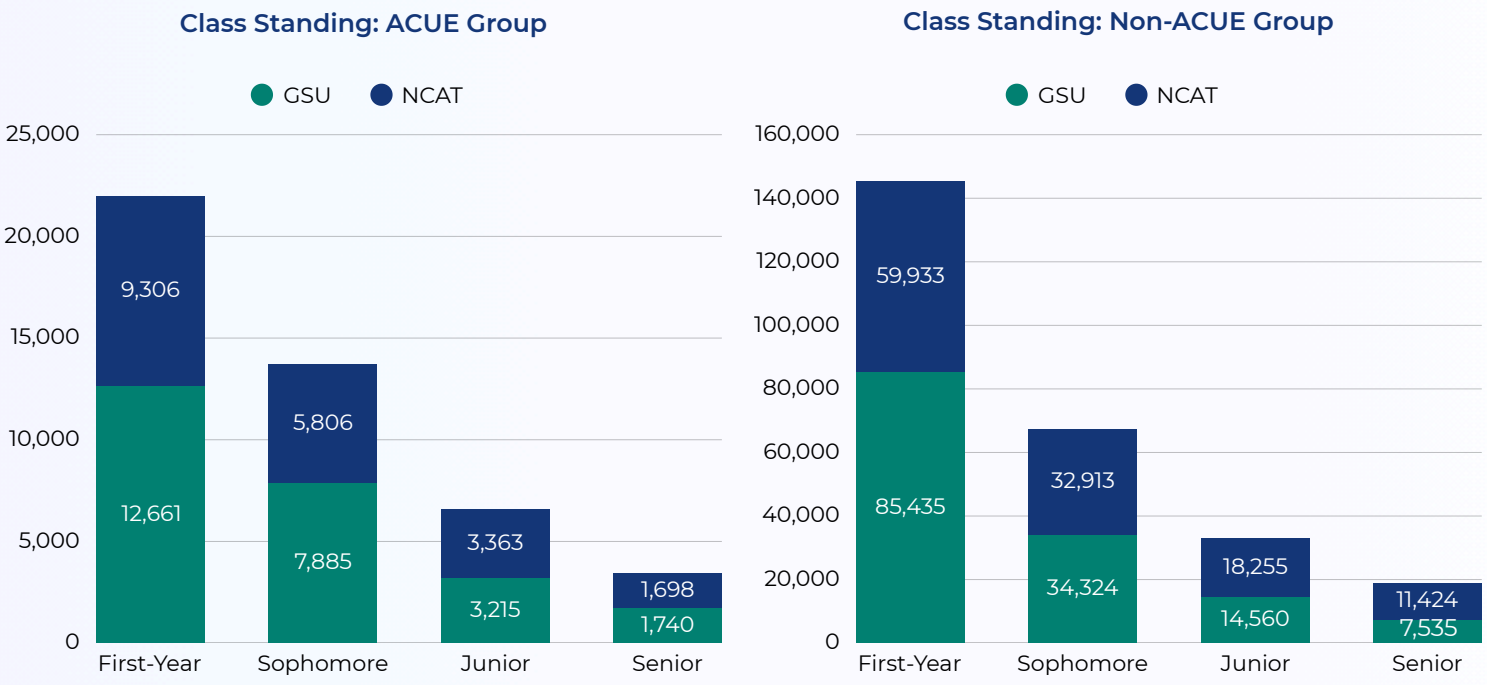
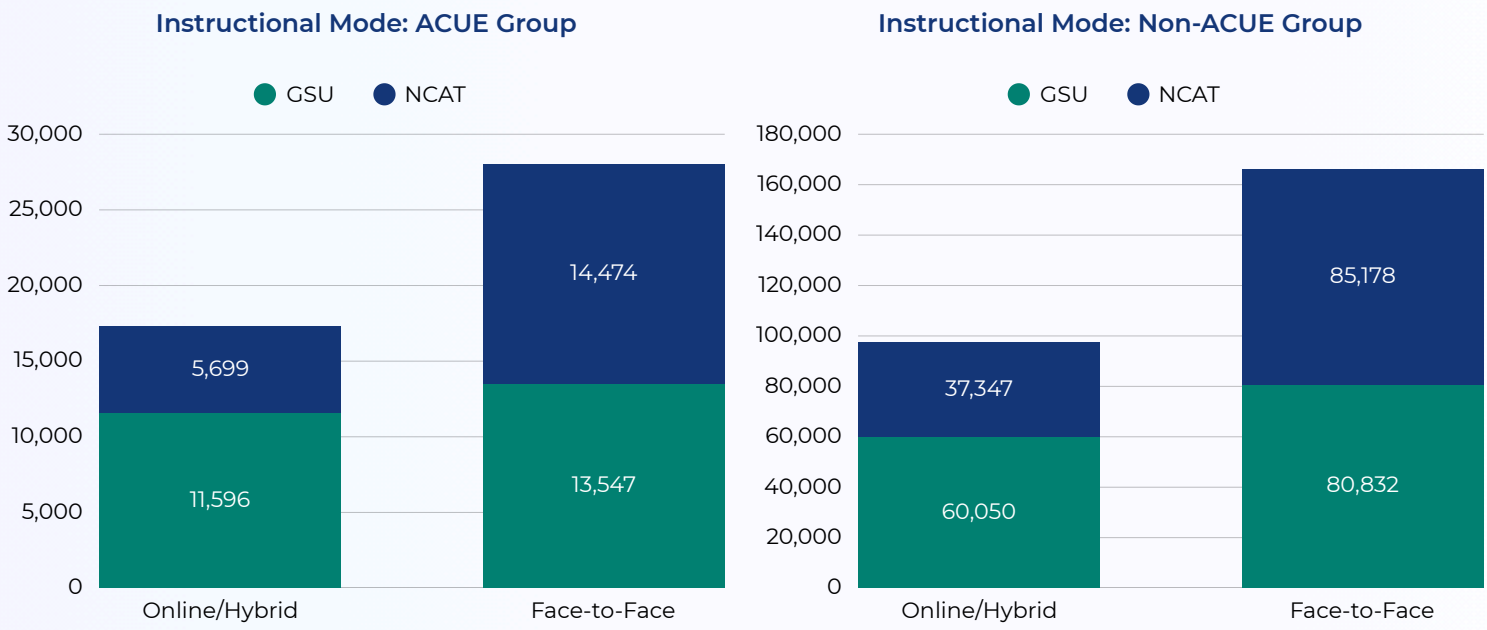


Figure 7: *Student Distribution by Instructional Mode*



Measures

The course outcomes of interest for the analysis were students' course completion, passing, DFW grades, and course grades. Course completion, passing, and DFW were all created as binary variables. The course completion variable was coded as 0 for all students who withdrew from a course after the add/drop period (i.e., received a W, WE, or WF as a final mark); otherwise, it was coded as 1, regardless of whether they received a passing or failing final grade in the course. The passing variable was coded as 1 for all students with marks A, B, C, D, or P1 and coded as 0 for students who received an F mark; analyses of passing excluded students who withdrew before receiving a final grade. The DFW variable was coded as 1 for students who received marks D, F, or W; otherwise, it was coded as 0. For final course grades, outcomes were converted from an alphabetic scale to a 4-point numeric equivalent (A = 4.0, A- = 3.7, B+ = 3.3, B = 3.0, B- = 2.7, C+ = 2.3, C = 2.0, C- = 1.7, D+ = 1.3, D = 1.0, D- = 0.7, F = 0). Students who withdrew from the course before receiving a final grade or who received a P1 (i.e., pass) were not included in the course grade analyses estimating average grade points.

Analytic Approach

To determine the impact of ACUE faculty on student outcomes across both NCAT and GSU, a difference-in-differences (DID) approach was applied to compare changes over time in key student outcomes. The analyses were first conducted on the combined dataset from both institutions, followed by separate analyses for each institution in order to provide a comprehensive assessment of the impact of ACUE faculty on student outcomes and examine how these effects varied across different student populations and contexts. The student outcomes of interest included completion rates, passing rates, DFW rates, and average grades in gateway course sections taught by ACUE faculty compared to those in similar gateway courses taught by non-ACUE faculty.

Completion rates were examined only for GSU due to a COVID-19 grading policy reversion at NCAT during the same period. This policy allowed students to opt for pass/fail grades instead of letter grades and provided greater flexibility in withdrawing from courses without penalty. It remained in effect until 2022 when the ACUE course took place, resulting in differing grading and withdrawal policies between the baseline and ACUE periods. Consequently, changes in completion rates across time frames are difficult to fully interpret for NCAT and the combined dataset, as this confounding factor complicates attributing potential changes in completion rates directly to ACUE certification.

Combined Dataset Analysis

For the combined dataset, binary outcomes (passing and DFW rates) were analyzed using binomial logistic regression, and average grades were analyzed using ordinary least square regression. To enhance interpretability, linear probability models were used to estimate the marginal effects of the parameters of interest. Control variables were included to account for differences in faculty demographics (gender, race/ethnicity, international status, tenure status, and course load), student demographics (gender, race/ethnicity, age, college generational status, class standing, international status, and student status), student headcount per course section, instructional modality, academic year, and institution. The racial/ethnic groups used in this analysis were Black, Hispanic, White, and other, where "other" included all racial/ethnic groups representing less than 5% of the sample.

Main effects were included for faculty type (dummy coded as 1 for ACUE faculty and 0 for non-ACUE faculty) and time frame (baseline, during-ACUE, and post-ACUE). The key parameters of interest were the two-way interactions between faculty type and time frame (ACUE*during and ACUE*post), which captured changes in student outcomes over time for sections taught by ACUE faculty relative to those taught by non-ACUE faculty. Additionally, three-way interactions were analyzed to assess how these effects varied across student demographic groups, including race/ethnicity, gender, college generational status, and class standing.

Follow-up analyses were also conducted by restricting the sample to first-year students. This additional analysis was aimed at minimizing potential bias related to unobserved sorting of students into courses based on faculty type, as first-year students are less likely to have prior knowledge about faculty reputation. By focusing on first-year students, we aimed to ensure that the observed effects were more directly attributable to the ACUE certification rather than student selection behaviors. The sample of first-year students included 59,320 students in the baseline period, 55,755 students in the during period, and 52,260 students in the post period, with 21,967 of these students taught by ACUE faculty.

NCAT Analysis

The same methods and model structure were applied to the NCAT sample as in the combined dataset analysis. The key differences were in the control variables and the racial/ethnic groups analyzed. At NCAT, the analysis controlled for Pell eligibility, and the racial/ethnic groups were simplified into Black/African American students and other/Non-Black/African American students, as no other racial group represented more than 5% of the sample. Follow-up analyses restricted to first-year students included 21,610 students in the baseline period, 23,751 students in the during period, and 23,878 students in the post period.

GSU Analysis

The GSU sample also used the same methods and model structure as the combined dataset analysis. However, GSU included additional controls for remedial course requirements in math and English and English proficiency test participation during university applications, while Pell eligibility was excluded due to the lack of data. The racial/ethnic groups analyzed were the same as in the combined dataset, i.e., Black, Hispanic, White, and other. The first-year student sample included 37,710 students in the baseline period, 32,004 students in the during period, and 28,382 students in the post period.

Results

Combined Sample

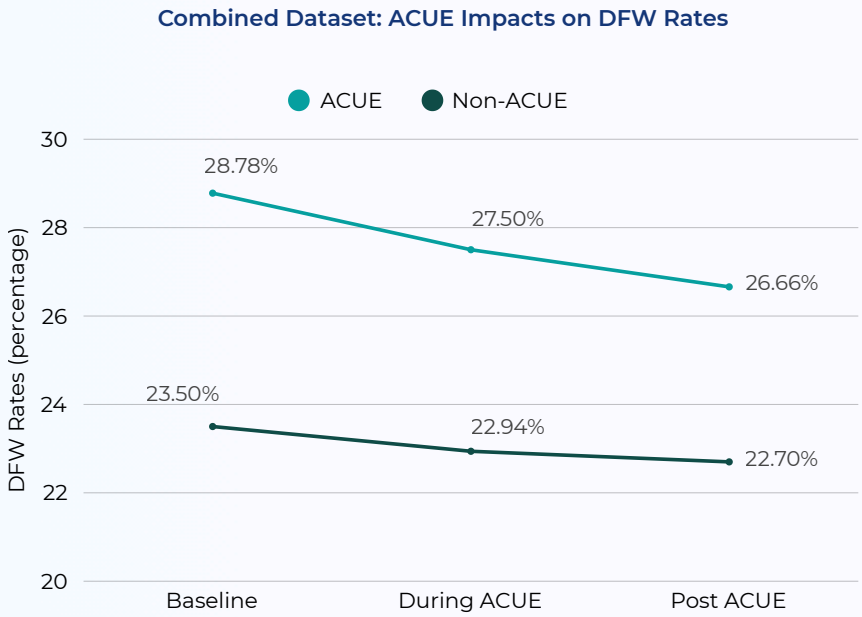
Passing Rates

The DID estimates for the impact of ACUE faculty on changes over time in student passing rates were not statistically significant in the during period, *b* = 0.06, *SE* = 0.04, 95% CI [-0.02, 0.14], *p* = .127, but showed a marginally significant interaction in the post period, *b* = 0.08, *SE* = 0.04, 95% CI [-0.00, 1.16], *p* = .052, relative to the comparison group.

DFW Rates

The DID estimates for the impact of ACUE faculty on changes over time in DFW rates were not statistically significant in the during period, *b* = -0.03, *SE* = 0.03, 95% CI [-0.91, 0.03], *p* = .269. However, the estimates were statistically significant in the post period, *b* = -0.06, *SE* = 0.03, 95% CI [-0.12, -0.00], *p* = .039, relative to the comparison group. Specifically, DFW rates of students taught by ACUE faculty decreased, on average, 7.4% (see Figure 8).

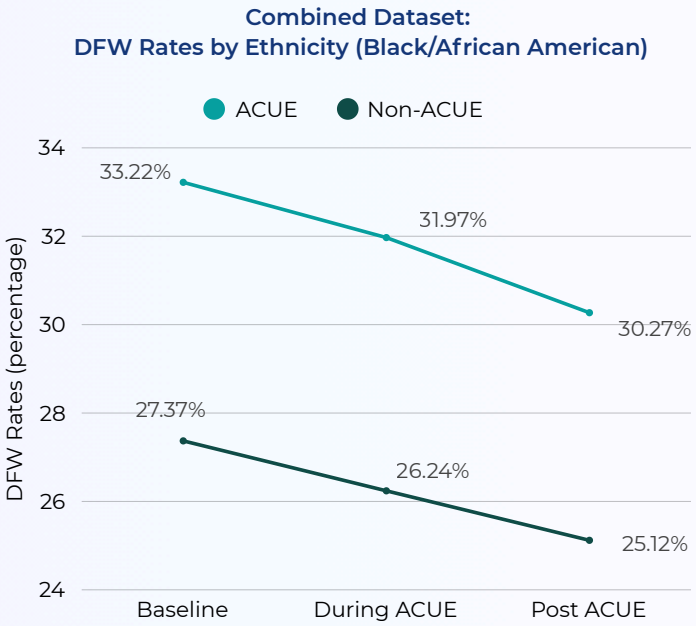
Figure 8: *Impact of ACUE Faculty on DFW Rates*

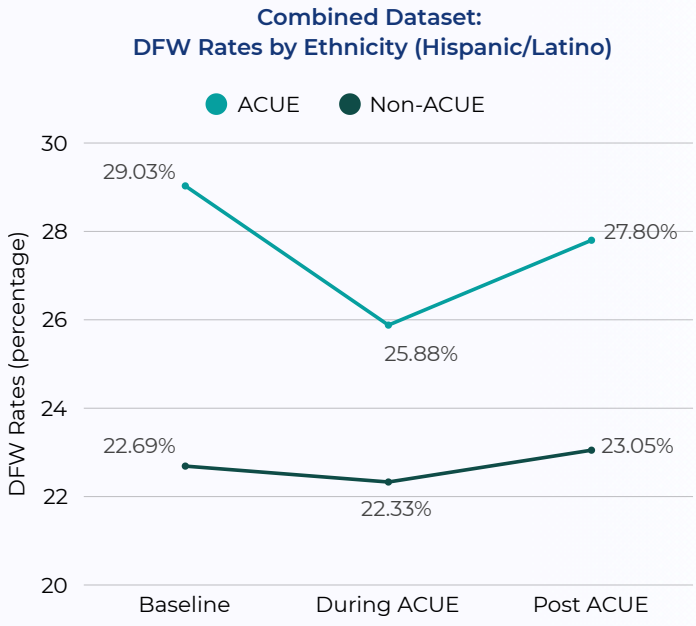


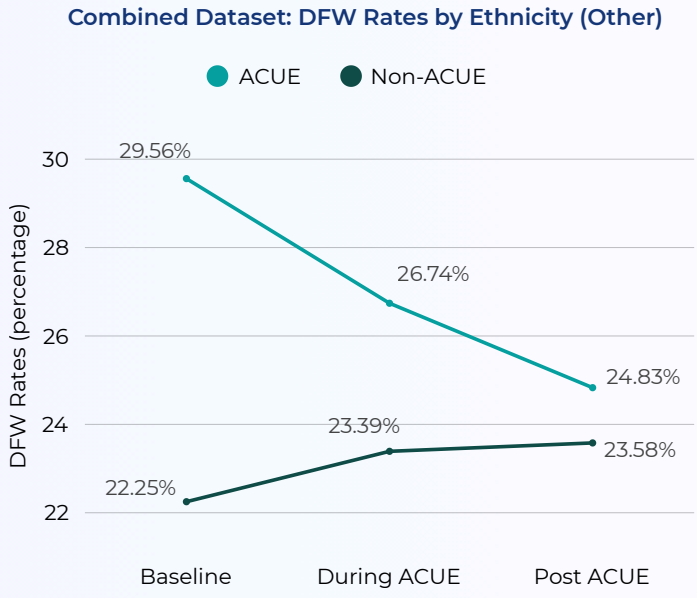
Interactions With Student Ethnicity/Race

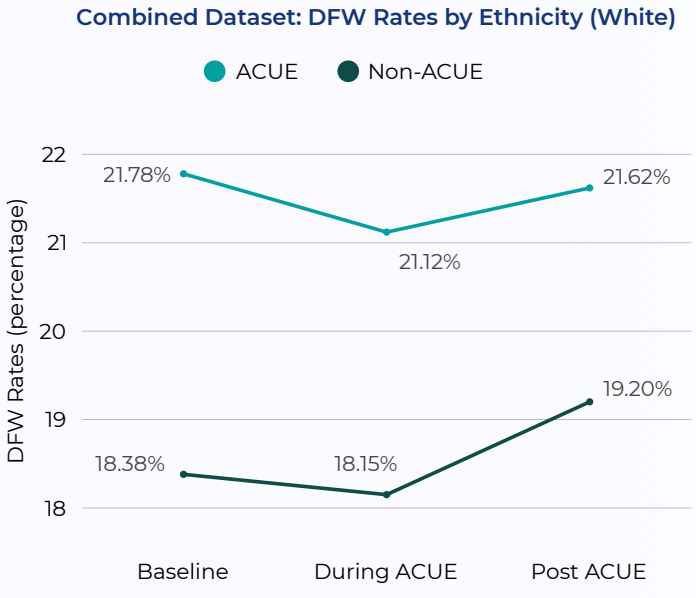
Follow-up analysis adding interactions with student ethnicity/race found a significant interaction between students of "other" ethnicities/races, faculty type, and the post period, b = -0.26, SE = 0.13, 95% CI [-0.51, -0.01], p = .040, with impacts trending in a positive direction. Interactions for Black/African American students, b = 0.04, SE = 0.07, 95% CI [-0.09, 0.18], p = .531, and Hispanic/Latino students, b = -0.02, SE = 0.13, 95% CI [-0.28, 0.24], p = .881, were not significant. These results suggest that the impact of ACUE faculty on DFW rates was larger for students of "other" ethnicities/races compared to White students (see Figure 9).

Figure 9: *Impact of ACUE Faculty on DFW Rates by Race/Ethnicity*









Non-Significant Interactions for DFW Rates

Follow-up analyses revealed no significant interaction effects between faculty type, time point, and the following examined student characteristics for DFW rates:

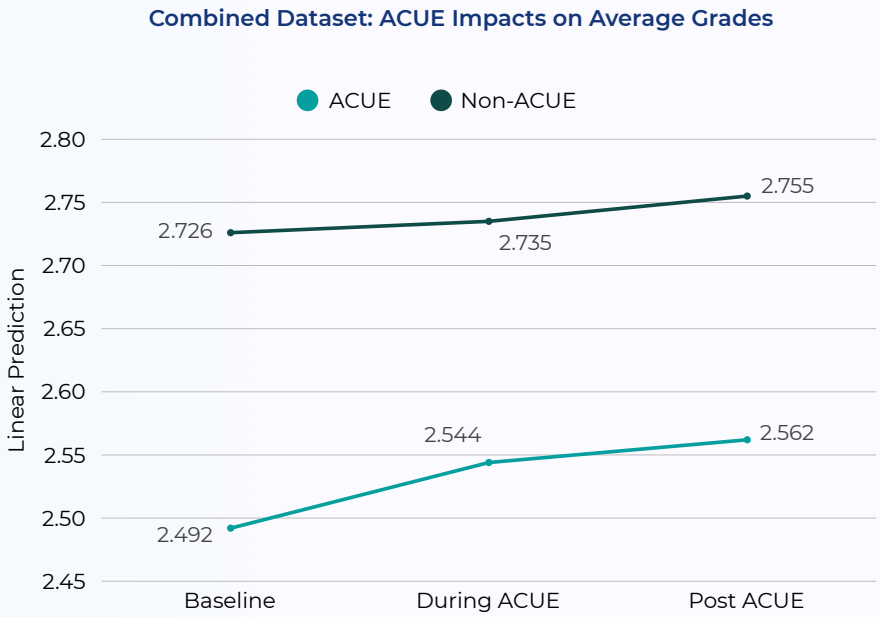
- **Student Gender:** No significant interaction was found, b = 0.03, SE = 0.06, 95% CI [-0.09, 0.15], p = .637.
- **College Generational Status:** The interaction was not significant, b = 0.03, SE = 0.07, 95% CI [-0.11, 0.18], p = .639.
- **Class Standing:** No significant interaction was observed, b = 0.00, SE = 0.06, 95% CI [-0.12, 0.12], p = .974.

These findings indicate that the impact of ACUE faculty on DFW rates did not differ significantly across these student subgroups.

Average Course Grades

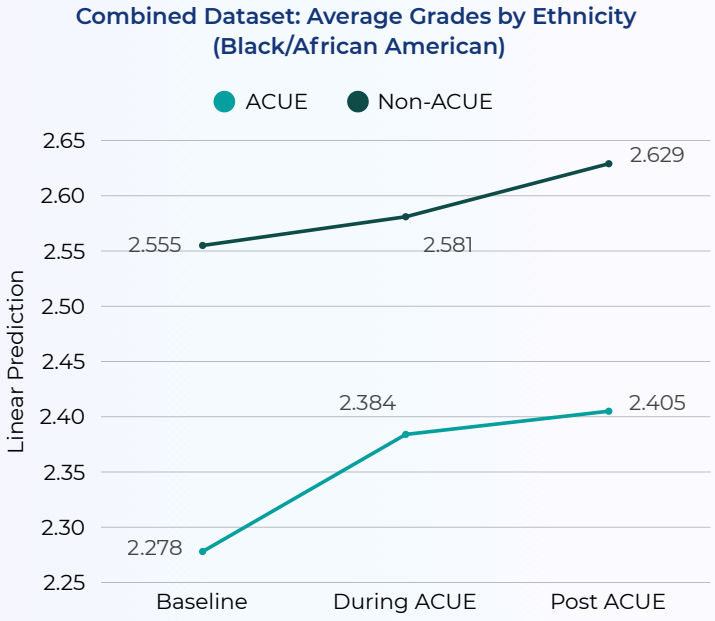
The DID estimates for the influence of ACUE faculty on changes in course grades were statistically significant in both the during period, b = 0.04, SE = .02, 95% CI [0.01, 0.08], p = .015, and the post period, b = 0.04, SE = .02, 95% CI [0.01, 0.08], p = .019, relative to the comparison group, indicating larger increases in average grades in course sections taught by ACUE faculty compared to students in the non-ACUE group during these two time frames (see Figure 10).

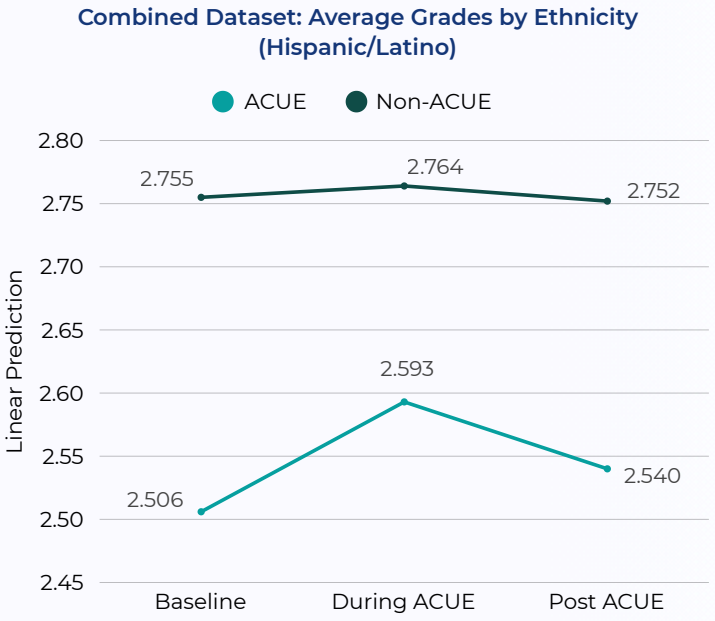
Figure 10: *Impact of ACUE Faculty on Average Grades*

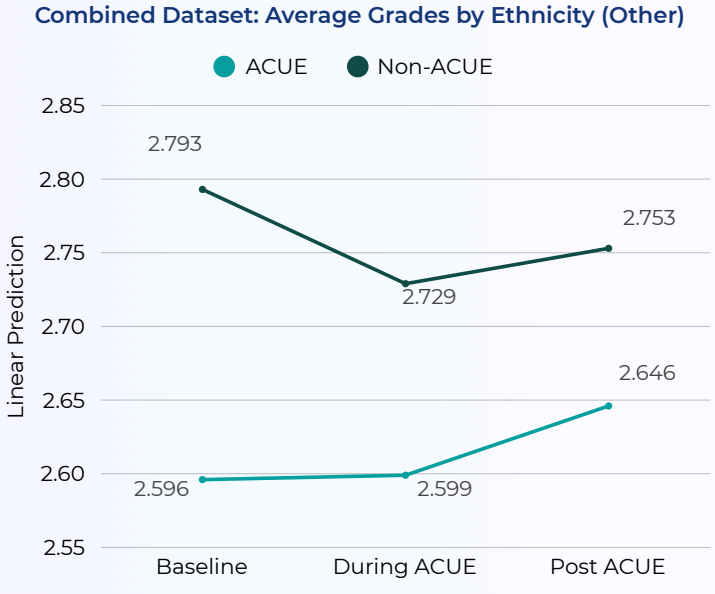


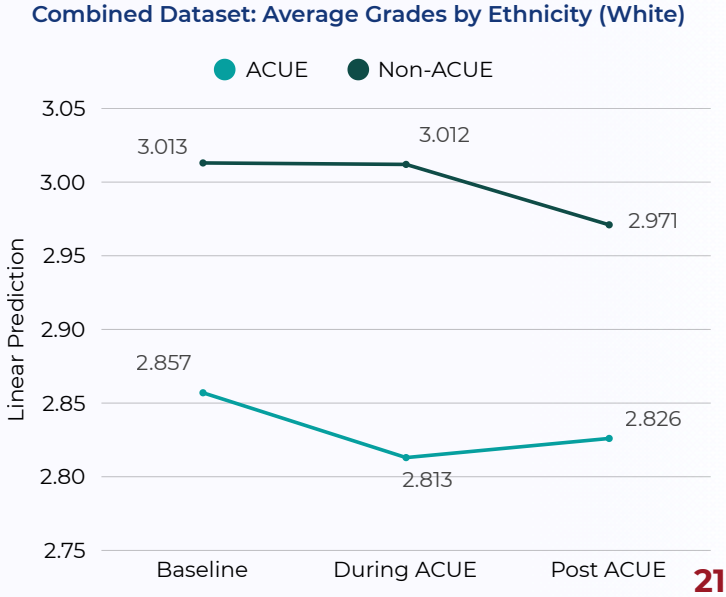
Follow-up analysis adding interactions with student ethnicity/race found a significant interaction between Black/African American students, faculty type, and the during period, *b* = 0.12, *SE* = 0.04, 95% CI [0.05, 0.20], *p* = .002, with impacts trending in a positive direction. Interactions for Hispanic/Latino students, *b* = 0.12, *SE* = 0.08, 95% CI [-0.04, 0.28], *p* = .128, and students of "other" ethnicities/races, *b* = 0.11, *SE* = 0.08, 95% CI [0.04, 0.26], *p* = .152, were not significant in the during period. Interactions with student ethnicity/race, faculty type, and the post period were not significant among Black/African American students, *b* = 0.04, *SE* = 0.04, 95% CI [-0.04, 0.12], *p* = .285, Hispanic/Latino students, *b* = 0.03, *SE* = 0.08, 95% CI [-0.13, 0.18], *p* = .735, or students of "other" ethnicities/races, *b* = 0.08, *SE* = 0.07, 95% CI [0.07, 0.23], *p* = .279. These results suggest that the impact of ACUE faculty on grade points was larger for Black/African American students compared to White students during the ACUE course (see Figure 11).

Figure 11: *Impact of ACUE Faculty on Average Grades by Race/Ethnicity*





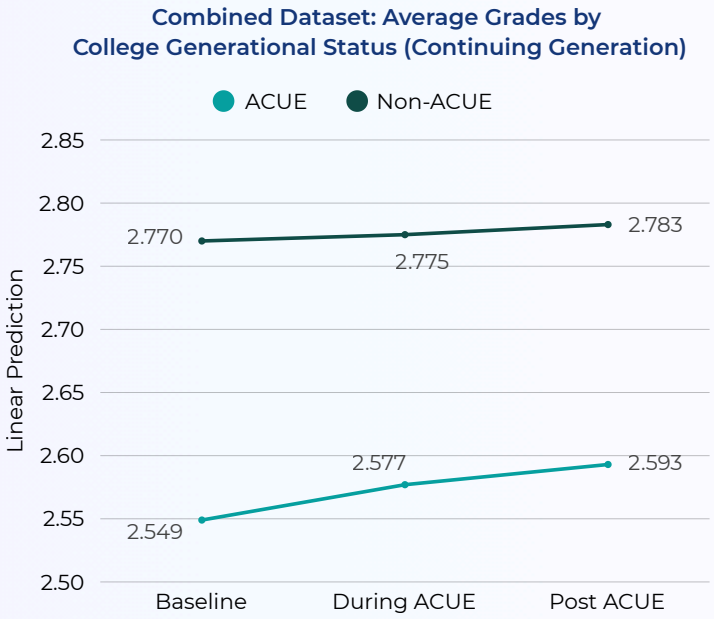


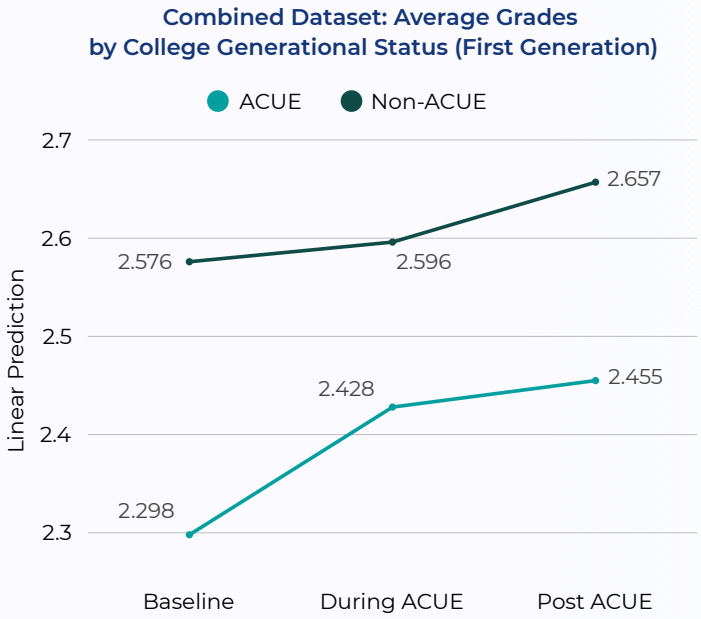


Interactions With College Generational Status

Follow-up analysis adding interactions with college generational status found a significant interaction between first-generation college students, faculty type, and the during period, $b = 0.09$, $SE = 0.04$, 95% CI [0.00, 0.17], $p = .048$, with impacts trending in a positive direction. Interactions for first-generation students in the post period, $b = 0.05$, $SE = 0.05$, 95% CI [-0.04, 0.13], $p = .323$, was not significant. These results suggest that the impact of ACUE faculty on grade points was larger for first-generation students compared to continuing-generation students in the period during the ACUE course (see Figure 12).

Figure 12: *Impact of ACUE Faculty on Average Grades by College Generational Status*

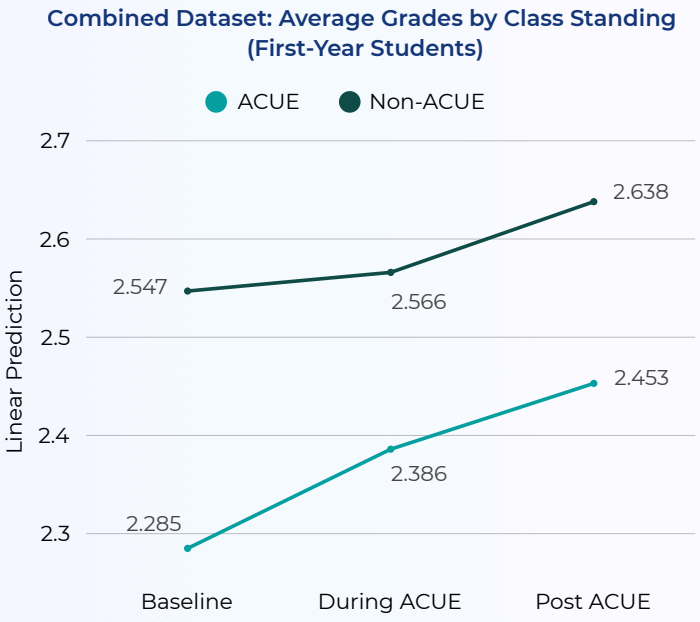


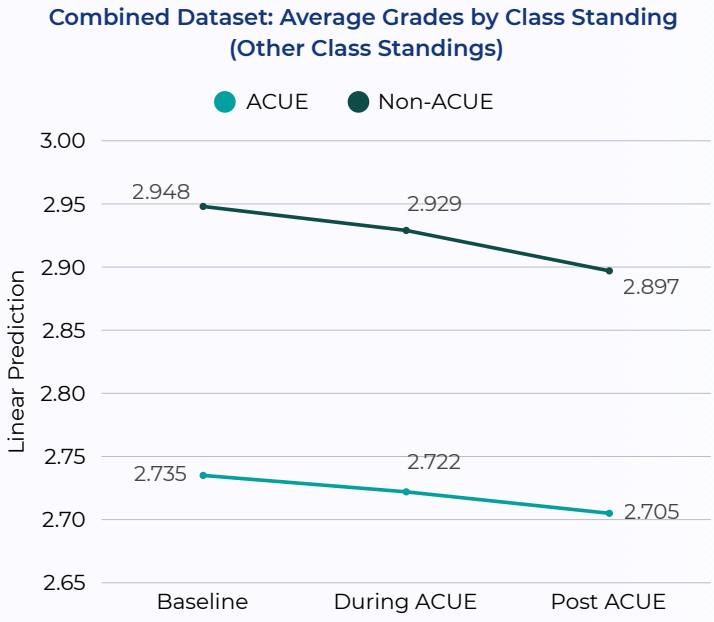


Interactions With Class Standing

Follow-up analysis adding interactions with class standing found a significant interaction between first-year students, faculty type, and the during period, *b* = 0.08, *SE* = 0.04, 95% CI [0.01, 0.15], *p* = .035, with impacts trending in a positive direction. The interaction for first-year students in the post period, *b* = 0.06, *SE* = 0.04, 95% CI [-0.02, 0.13], *p* = .122, was not significant. These results suggest that the impact of ACUE faculty on grade points was larger for first-year students compared to students of other class standings during the ACUE course period (see Figure 13).

Figure 13: *Impact of ACUE Faculty on Average Grades by Class Standing*





Non-Significant Interactions for Final Course Grades

Follow-up analyses revealed no significant interaction effects between faculty type, time point, and the following student characteristics for average final course grades within the combined dataset:

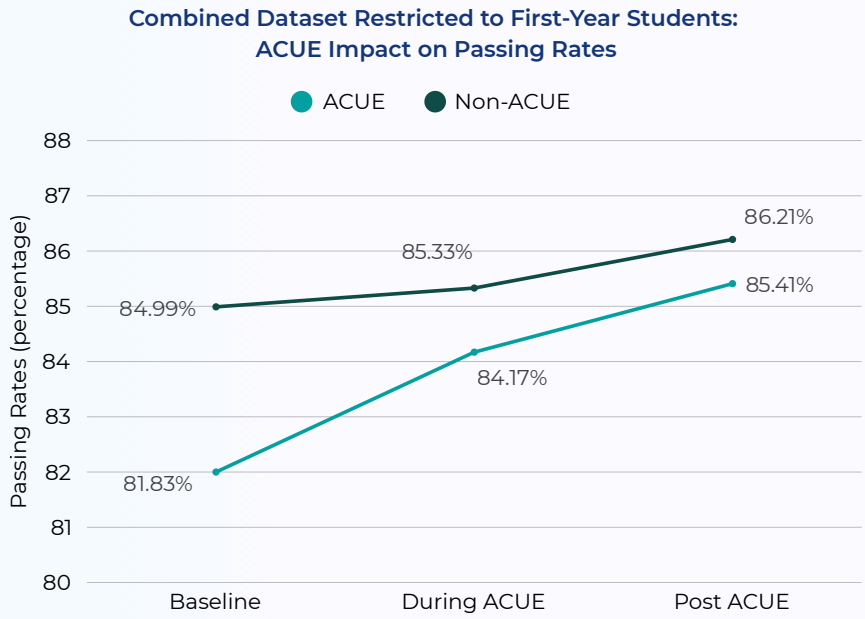
- **Student Gender:** The interaction for male students during the ACUE course period was not significant, *b* = 0.02, *SE* = 0.04, 95% CI [-0.05, 0.09], *p* = .603, nor was it significant in the post period, *b* = 0.02, *SE* = 0.04, 95% CI [-0.05, 0.09], *p* = .589, indicating no significant variation in passing rates by gender.

Findings Among First-Year Students in the Combined Dataset

Passing Rates

The DID estimates for the impact of ACUE faculty on changes over time in first-year students' passing rates were statistically significant in the during period, *b* = 0.14, *SE* = 0.05, 95% CI [0.04, 0.24], *p* = .005, and in the post period, *b* = 0.17, *SE* = 0.06, 95% CI [0.06, 0.28], *p* = .002, relative to the comparison group. Specifically, passing rates of first-year students taught by ACUE faculty increased, on average, 2.86% in the during period and 4.37% in the post period (see Figure 14).

Figure 14: *Impact of ACUE Faculty on Passing Rates Among First-Year Students*



Non-Significant Interactions for Passing Rates

Follow-up analyses revealed no significant interaction effects between faculty type, time point, and the following student characteristics for passing rates among first-year students:

- **Student Gender:** The interaction for male students during the ACUE course period was not significant, *b* = 0.14, *SE* = 0.10, 95% CI [-0.06, 0.35], *p* = .171, nor was it significant in the post period, *b* = 0.04, *SE* = 0.11, 95% CI [-0.18, 0.26], *p* = .692.
- **Student Race/Ethnicity:** The interactions for Black/African American students during the ACUE course, *b* = 0.05, *SE* = 0.12, 95% CI [-0.19, 0.29], *p* = .669, and post period, *b* = -0.07, *SE* = 0.13, 95% CI [-0.32, 0.19], *p* = .618, were not significant. Similarly, the interactions for Hispanic/Latino students during the ACUE course, *b* = 0.33, *SE* = 0.22, 95% CI [-0.09, 0.76], *p* = .127, and post period, *b* = -0.01, *SE* = 0.23, 95% CI [-0.46, 0.43], *p* = .950 were not significant. The interactions for students of "other" racial/ethnic groups during the ACUE course, *b* = 0.02, *SE* = 0.21, 95% CI [-0.39, 0.43], *p* = .924, and post period, *b* = 0.16, *SE* = 0.24, 95% CI [-0.31, 0.63], *p* = .502, were also not significant.

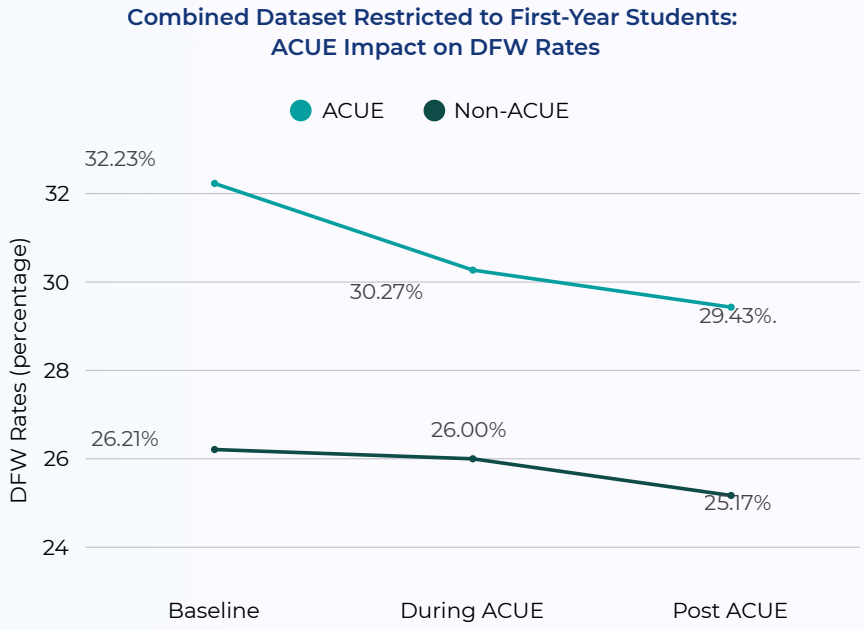
- **College Generational Status:** The interaction for first-generation students during the ACUE course period was not significant, *b* = 0.18, *SE* = 0.11, 95% CI [-0.04, 0.40], *p* = .109, nor was it significant in the post period, *b* = -0.01, *SE* = 0.13, 95% CI [-0.26, 0.24], *p* = .926.

These findings suggest that the ACUE certification's impact on passing rates did not differ across these subgroups among first-year students.

DFW Rates

The DID estimates for the impact of ACUE faculty on changes over time in first-year students' DFW rates were statistically significant in the during period, *b* = -0.08, *SE* = 0.04, 95% CI [-0.16, -0.00], *p* = .039, and showed a marginally significant interaction in the post period, *b* = -0.08, *SE* = 0.04, 95% CI [-0.16, 0.00], *p* = .058, relative to the comparison group. These results provide evidence of a differential improvement in DFW rates among first-year students over time between ACUE faculty and non-ACUE faculty, with a decrease, on average, of 6% during the ACUE course among students taught by ACUE faculty (see Figure 15).

Figure 15: *Impact of ACUE Faculty on DFW Rates Among First-Year Students*



Non-Significant Interactions for DFW Rates

Follow-up analyses revealed no significant interaction effects between faculty type, time point, and the following student characteristics for DFW rates among first-year students:

- **Student Gender:** The interaction for male students during the ACUE course period was not significant, *b* = -0.01, *SE* = 0.08, 95% CI [-0.17, 0.15], *p* = .901, nor was it significant in the post period, *b* = 0.06, *SE* = 0.09, 95% CI [-0.10, 0.23], *p* = .454.

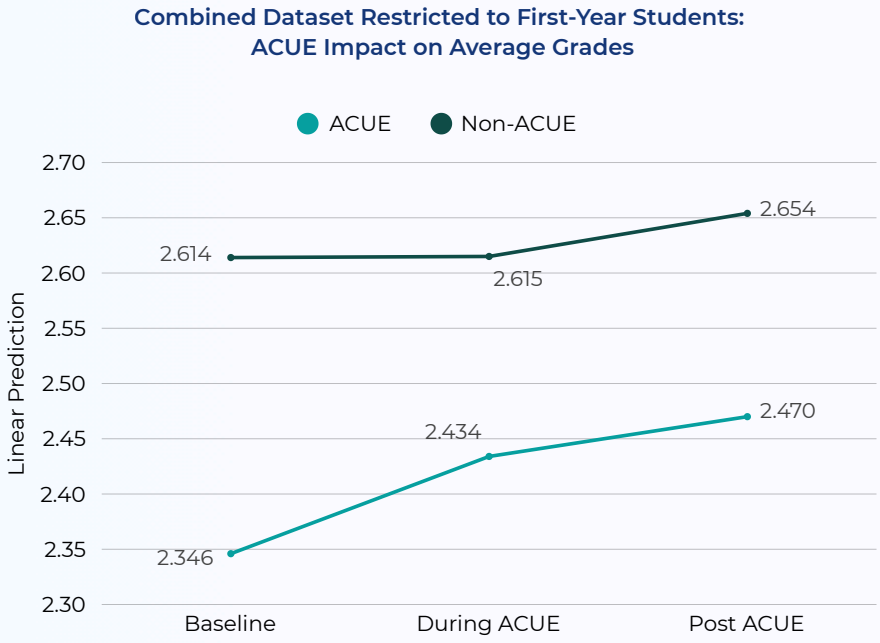
- **Student Race/Ethnicity:** The interactions for Black/African American students during the ACUE course, *b* = 0.07, *SE* = 0.09, 95% CI [-0.12, 0.25], *p* = .477, and post period, *b* = -0.05, *SE* = 0.09, 95% CI [-0.24, 0.14], *p* = .600, were not significant. For Hispanic/Latino students, the interactions during the ACUE course, *b* = -0.16, *SE* = 0.17, 95% CI [-0.50, 0.18], *p* = .354, and post period, *b* = -0.08, *SE* = 0.17, 95% CI [-0.42, 0.26], *p* = .647, were also not significant. Similarly, for students of "other" racial/ethnic groups, the interactions during the ACUE course, *b* = -0.11, *SE* = 0.17, 95% CI [-0.43, 0.22], *p* = .519, and post period, *b* = -0.27, *SE* = 0.17, 95% CI [-0.61, 0.07], *p* = .118, were not significant.
- **College Generational Status:** The interaction for first-generation students during the ACUE course period was not significant, *b* = -0.01, *SE* = 0.09, 95% CI [-0.19, 0.17], *p* = .914, nor was it significant in the post period, *b* = 0.01, *SE* = 0.10, 95% CI [-0.19, 0.20], *p* = .943.

These findings suggest that the ACUE certification's impact on DFW rates did not differ across these subgroups among first-year students.

Average Course Grades

The DID estimates for the impact of ACUE faculty on changes over time in average course grades were statistically significant in the during period, *b* = 0.09, *SE* = 0.03, 95% CI [0.04, 0.14], *p* = .001, and in the post period, *b* = 0.08, *SE* = 0.03, 95% CI [0.03, 0.14], *p* = .001, relative to the comparison group, indicating larger increases in average grades among first-year students in course sections taught by ACUE faculty compared to students in the non-ACUE group during both time frames (see Figure 16).

Figure 16: *Impact of ACUE Faculty on Average Grades Among First-Year Students*



Non-Significant Interactions for Final Course Grades

Follow-up analyses revealed no significant interaction effects between faculty type, time point, and the following student characteristics for average final course grades among first-year students:

- **Student Gender:** The interaction for male students during the ACUE course period was marginally significant during the ACUE course period, *b* = 0.10, *SE* = 0.05, 95% CI [-0.00, 0.21], *p* = .053, but not significant in the post period, *b* = 0.06, *SE* = 0.06, 95% CI [-0.05, 0.17], *p* = .280.
- **Student Ethnicity/Race:** None of the three-way interactions between time frame, ACUE faculty, and student race/ethnicity were statistically significant. For Black/African American students, the interaction was marginally significant during the ACUE course period, *b* = 0.10, *SE* = 0.06, 95% CI [-0.02, 0.21], *p* = .093, but not significant in the post period, *b* = 0.07, *SE* = 0.06, 95% CI [-0.05, 0.18], *p* = .262. For Hispanic/Latino students, the interaction was not significant during the ACUE course period, *b* = 0.15, *SE* = 0.11, 95% CI [-0.06, 0.37], *p* = .168, or the post period, *b* = 0.05, *SE* = 0.11, 95% CI [-0.17, 0.27], *p* = .677. Similarly, for students of "other" racial/ethnic groups, the interaction was not significant during the ACUE course period, *b* = 0.09, *SE* = 0.11, 95% CI [-0.12, 0.30], *p* = .415, or the post period, *b* = 0.09, *SE* = 0.11, 95% CI [-0.12, 0.31], *p* = .393.
- **College Generational Status:** The interaction for first-generation students during the ACUE course period was marginally significant, *b* = 0.11, *SE* = 0.06, 95% CI [-0.00, 0.23], *p* = .060, but not significant in the post period, *b* = 0.07, *SE* = 0.07, 95% CI [-0.06, 0.19], *p* = .306, suggesting a potential marginal impact of ACUE faculty on final grades for first-generation students during the course period.

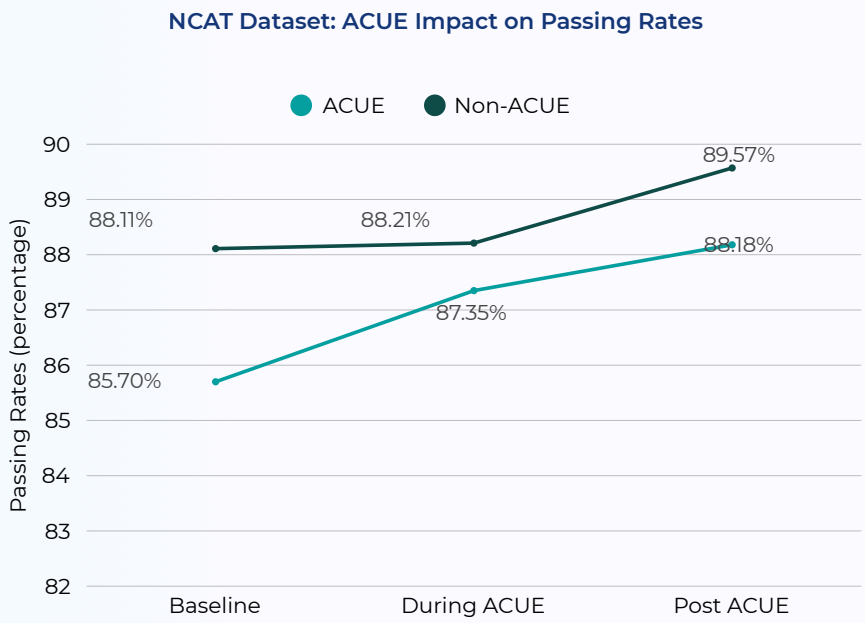
These findings suggest that the ACUE certification's impact on final course grades did not differ across these subgroups among first-year students.

North Carolina A&T University (NCAT)

Passing Rates

The DID estimates for the impact of ACUE faculty on changes over time in student passing rates were statistically significant in the during period, *b* = 0.13, *SE* = 0.01, 95% CI [0.20, 0.24], *p* = .022. However, the estimates were not statistically significant in the post period, *b* = 0.08, *SE* = 0.06, 95% CI [-0.04, 0.19], *p* = .191, relative to the comparison group. Specifically, passing rates of students taught by ACUE faculty increased, on average, 1.9% from the baseline period to the during period (see Figure 17).

Figure 17: *Impact of ACUE Faculty on Passing Rates at NCAT*



Non-Significant Interactions for Passing Rates

Follow-up analyses revealed no significant interaction effects between faculty type, time point, and the following student characteristics for passing rates within NCAT:

- **Student Gender:** No significant interaction was observed for male students during the ACUE course period, b = 0.06, SE = 0.12, 95% CI [-0.17, 0.29], p = .598.
- **Student Ethnicity/Race:** The interaction for non-Black/African American students during the ACUE course period was not significant, b = 0.04, SE = 0.17, 95% CI [-0.29, 0.37], p = .820.
- **College Generational Status:** The interaction for first-generation students during the ACUE course period was not significant, b = 0.20, SE = 0.12, 95% CI [-0.05, 0.44], p = .113.
- **Pell Eligibility:** No significant interaction was found for Pell-eligible students during the ACUE course period, b = 0.18, SE = 0.15, 95% CI [-0.11, 0.46], p = .226.
- **Class Standing:** The interaction for first-year students during the ACUE course period was not significant, b = -0.01, SE = 0.11, 95% CI [-0.23, 0.21], p = .915.

These findings suggest that the ACUE certification's impact on passing rates did not differ across these student subgroups within NCAT.

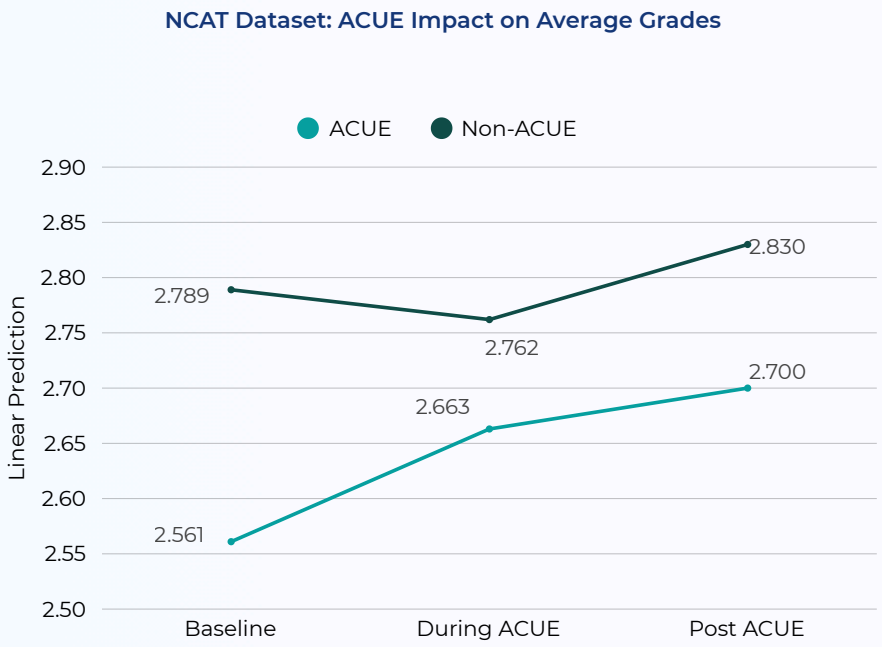
DFW Rates

The DID estimates for the impact of ACUE faculty on changes over time in student DFW rates were not statistically significant in the during period, *b* = -0.02, *SE* = 0.04, 95% CI [-0.11, 0.07], *p* = .631, or in the post period, *b* = -0.07, *SE* = 0.05, 95% CI [-0.16, 0.02], *p* = .128, relative to the comparison group.

Average Course Grades

The DID estimates for the influence of ACUE faculty on changes in course grades were statistically significant in both the during period, *b* = 0.13, *SE* = .03, 95% CI [0.08, 0.18], *p* < .001, and in the post period, *b* = 0.10, *SE* = .03, 95% CI [0.05, 0.15], *p* < .001, indicating higher average grades in course sections taught by ACUE faculty relative to the comparison group in these time frames (see Figure 18).

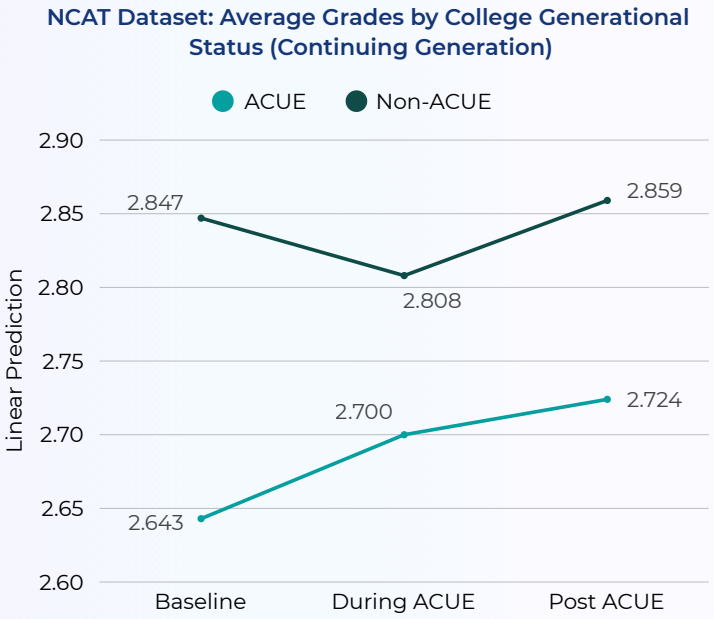
Figure 18: *Impact of ACUE Faculty on Average Grades at NCAT*

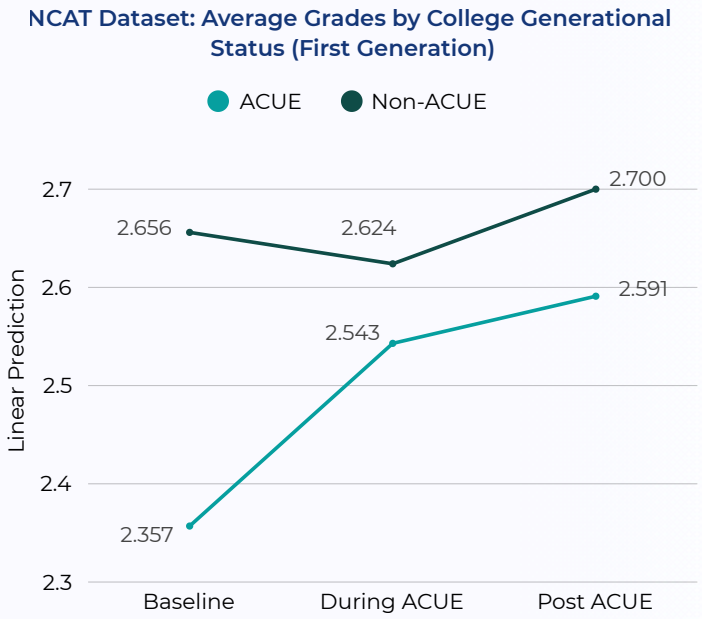


Interactions With College Generational Status

Follow-up analysis adding interactions with college generational status found a significant interaction between first-generation college students, faculty type, and the during period, *b* = 0.12, *SE* = .06, 95% CI [0.00, 0.24], *p* = .045 (see Figure 19). However, this interaction in the post period was only marginally significant, *b* = 0.12, *SE* = .06, 95% CI [-0.00, 0.24], *p* = .051, with impacts trending in the positive direction.

Figure 19: *Impact of ACUE Faculty on Average Grades at NCAT by College Generational Status*

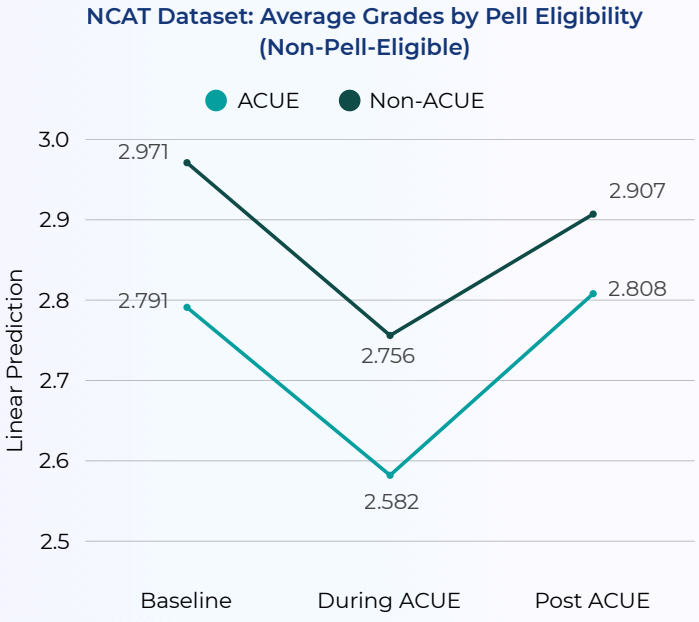


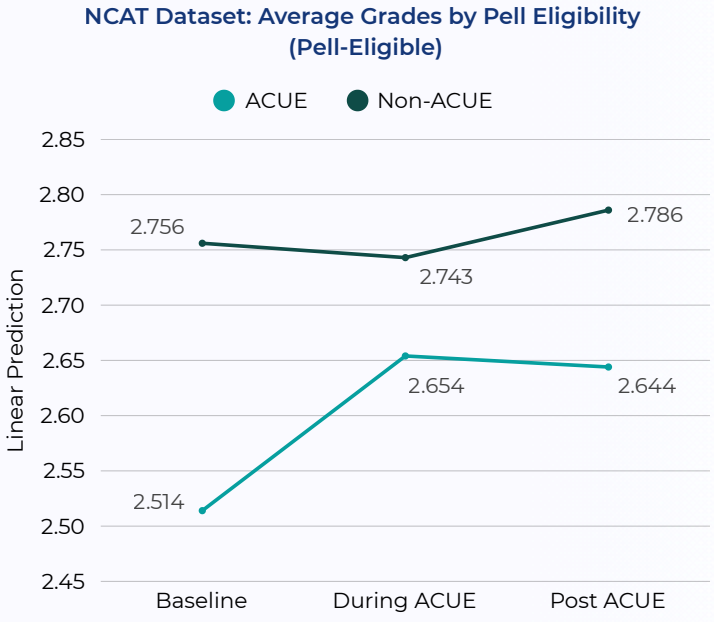


Interactions With Pell Eligibility

Similar analysis adding interactions with Pell eligibility found a significant interaction between Pell-eligible students, faculty type, and the during period, b = 0.15, SE = .07, 95% CI [0.01, 0.28], p = .027, with impacts trending in the positive direction (see Figure 20). However, this interaction in the post period was not significant, b = 0.02, SE = .06, 95% CI [-0.09, 0.13], p = .728.

Figure 20: *Impact of ACUE Faculty on Average Grades at NCAT by Pell Eligibility*

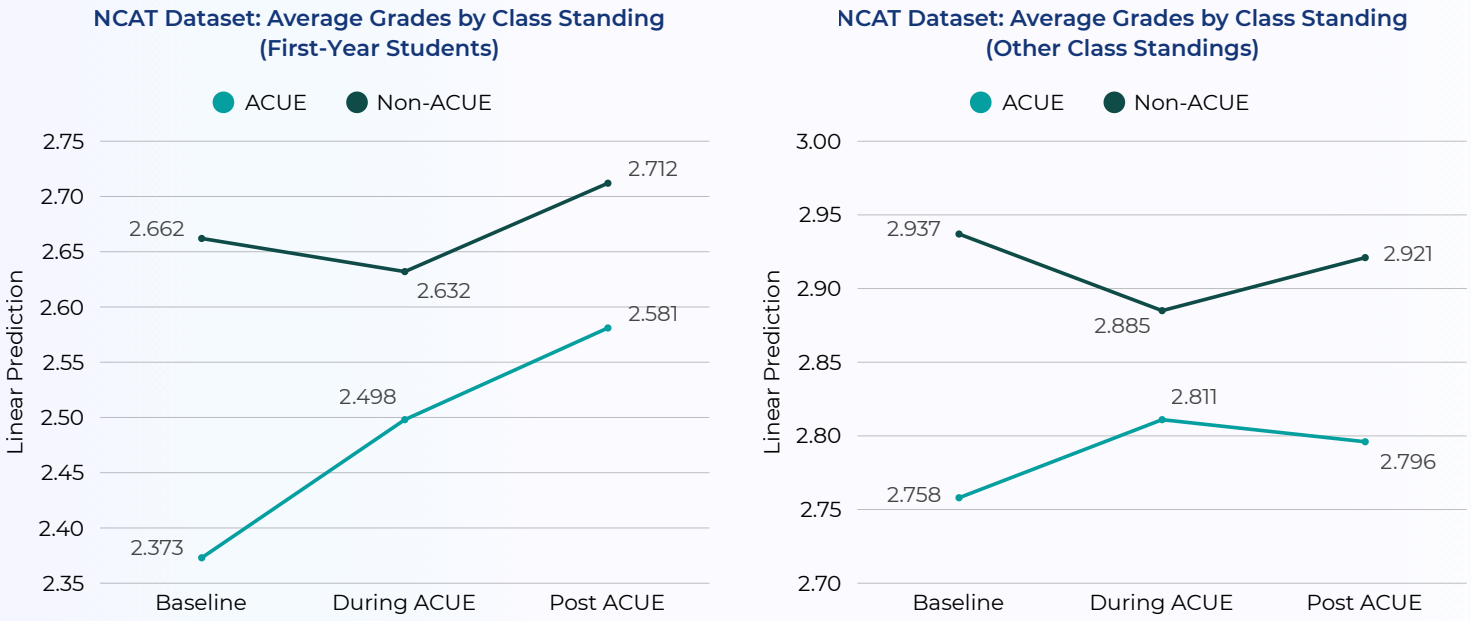




Interactions With Class Standing

Follow-up analysis adding interactions with class standing did not find a significant interaction between first-year students, faculty type, and the during period, *b* = 0.05, *SE* = 0.05, 95% CI [-0.05, 0.15], *p* = .330. However, there was a significant interaction for first-year students in the post period, *b* = 0.10, *SE* = 0.05, 95% CI [0.00, 0.20], *p* = .041, with impacts trending in a positive direction. These results suggest that the impact of ACUE faculty on grade points was more positive for first-year students compared to students of other class standings the year following the ACUE course (see Figure 21).

Figure 21: *Impact of ACUE Faculty on Average Grades at NCAT by Class Standing*



Non-Significant Interactions for Final Course Grades

Follow-up analyses revealed no significant interaction effects between faculty type, time point, and the following student characteristics for average final course grades within NCAT:

- **Student Gender:** The interaction for male students during the ACUE course period was not significant, *b* = -0.04, *SE* = 0.05, 95% CI [-0.14, 0.07], *p* = .474, nor was the interaction in the post period, *b* = -0.07, *SE* = 0.05, 95% CI [-0.17, 0.04], *p* = .227.
- **Student Ethnicity/Race:** The interaction for non-Black/African students during the ACUE course period was not significant, *b* = -0.01, *SE* = 0.07, 95% CI [-0.15, 0.14], *p* = .911, nor was the interaction in the post period, *b* = -0.03, *SE* = 0.07, 95% CI [-0.17, 0.11], *p* = .688.

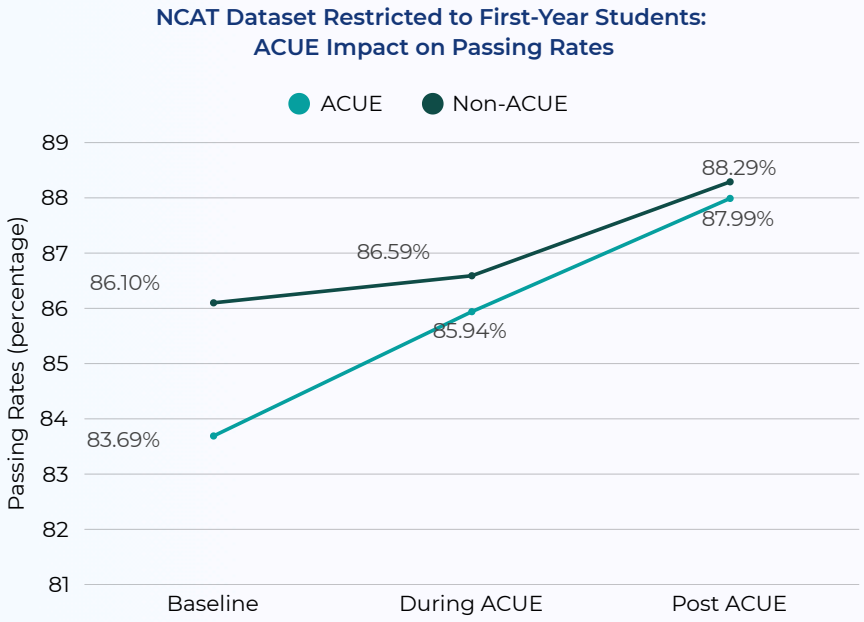
These findings suggest that the ACUE certification's impact on final course grades was consistent across these student subgroups within NCAT.

Findings Among First-Year Students at NCAT

Passing Rates

The DID estimates for the impact of ACUE faculty on changes over time in first-year students' passing rates showed a marginally significant interaction in the during period, *b* = 0.14, *SE* = 0.08, 95% CI [-0.02, 0.29], *p* = .080. There was a statistically significant interaction in the post period, *b* = 0.17, *SE* = 0.08, 95% CI [0.00, 0.33], *p* = .044, relative to the comparison group. Specifically, passing rates of first-year students taught by ACUE faculty increased, on average, 5.1% from the baseline period to the post period (see Figure 22).

Figure 22: *Impact of ACUE Faculty on Passing Rates Among First-Year Students at NCAT*



Non-Significant Interactions on Passing Rates

Follow-up analyses revealed no significant interaction effects between faculty type, time point, and the following student characteristics for passing rates among first-year students at NCAT:

- **Student Gender:** The interaction for male students was not significant in the post period, *b* = 0.09, *SE* = 0.17, 95% CI [-0.24, 0.41], *p* = .598.
- **Student Race/Ethnicity:** The interaction for students of "other"/non-Black/African American racial/ethnic groups was not significant in the post period, *b* = 0.41, *SE* = 0.25, 95% CI [-0.09, 0.90], *p* = .108.
- **College Generational Status:** The interaction for first-generation students was not significant in the post period, *b* = 0.13, *SE* = 0.18, 95% CI [-0.21, 0.47], *p* = .456.
- **Pell Eligibility:** The interaction for Pell-eligible students in the post period was marginally significant, *b* = 0.41, *SE* = 0.21, 95% CI [0.00, 0.82], *p* = .050, indicating a marginal impact of ACUE faculty on passing rates for Pell-eligible students.

These findings suggest that the ACUE certification's impact on passing rates did not differ across these subgroups among first-year students at NCAT.

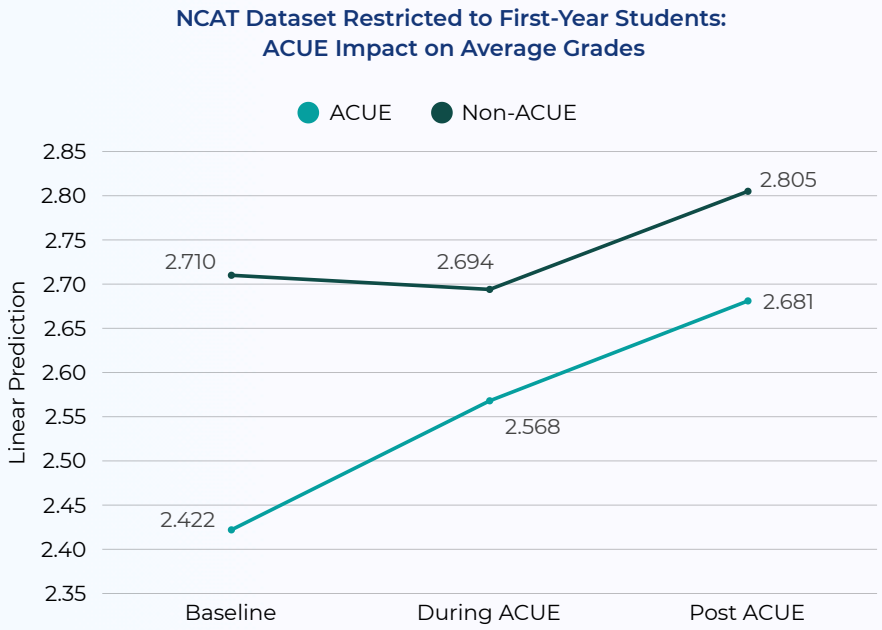
DFW Rates

The DID estimates for the impact of ACUE faculty on changes over time in first-year students' DFW rates were not statistically significant in the during period, *b* = -0.02, *SE* = 0.06, 95% CI [-0.14, 0.11], *p* = .818. However, there was a marginally significant interaction in the post period, *b* = -0.13, *SE* = 0.07, 95% CI [-0.26, 0.00], *p* = .054, relative to the comparison group.

Average Course Grades

The DID estimates for the influence of ACUE faculty on changes in course grades were statistically significant in both the during period, *b* = 0.16, *SE* = .04, 95% CI [0.09, 0.24], *p* < .001, and in the post period, *b* = 0.16, *SE* = .04, 95% CI [0.09, 0.24], *p* < .001, indicating higher average grades in course sections taught by ACUE faculty relative to the comparison group in both time frames (see Figure 23).

Figure 23: *Impact of ACUE Faculty on Average Grades Among First-Year Students at NCAT*



Non-Significant Interactions for Final Course Grades

Follow-up analyses revealed no significant interaction effects between faculty type, time point, and the following student characteristics for average course grades among first-year students at NCAT:

- **Student Gender:** The interaction for male students during the ACUE course period was marginally significant, *b* = 0.16, *SE* = .08, 95% CI [0.00, 0.32], *p* = .050, but not significant in the post period, *b* = 0.08, *SE* = .08, 95% CI [-0.08, 0.23], *p* = .350, indicating a potential marginal effect on final course grades during the ACUE course period but no significant differences in the post period.
- **Student Race/Ethnicity:** The interaction for students of "other"/non-Black/African American racial/ethnic groups during the ACUE course period was not significant, *b* = 0.14, *SE* = 0.11, 95% CI [-0.09, 0.34], *p* = .230, nor was it significant in the post period, *b* = 0.10, *SE* = 0.11, 95% CI [-0.12, 0.32], *p* = .362.

- **College Generational Status:** The interaction for first-generation students during the ACUE course period was marginally significant, *b* = 0.17, *SE* = 0.09, 95% CI [-0.01, 0.35], *p* = .059, as was the interaction in the post period, *b* = 0.17, *SE* = 0.09, 95% CI [-0.00, 0.34], *p* = .055, suggesting a potential marginal impact of ACUE faculty on average grades for first-generation students.
- **Pell Eligibility:** The interaction for Pell-eligible students during the ACUE course period was not significant, *b* = 0.17, *SE* = 0.12, 95% CI [-0.07, 0.41], *p* = .173, nor was it significant in the post period, *b* = 0.08, *SE* = 0.09, 95% CI [-0.09, 0.26], *p* = .341.

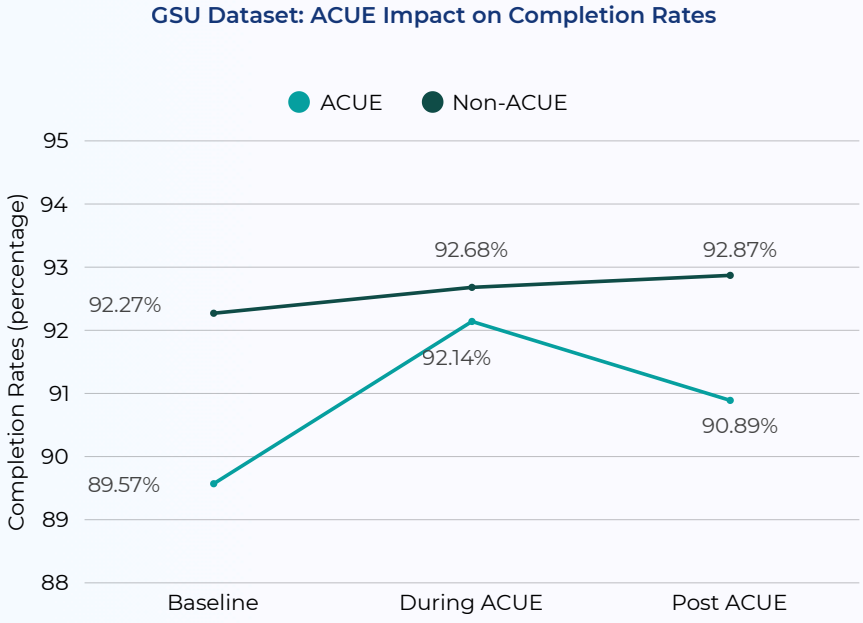
These findings suggest that the ACUE certification's impact on average course grades did not differ across these subgroups among first-year students at NCAT.

Georgia Southern University (GSU)

Completion Rates

The DID estimates for the impact of ACUE faculty on changes over time in student completion rates were statistically significant in the during period, *b* = 0.26, *SE* = 0.03, 95% CI [0.13, 0.39], *p* < .001. However, the estimates were not statistically significant in the post period, *b* = 0.06, *SE* = 0.07, 95% CI [-0.07, 0.19], *p* = .333, relative to the comparison group. Specifically, completion rates of students taught by ACUE faculty increased, on average, 2.9% from the baseline period to the during period (see Figure 24).

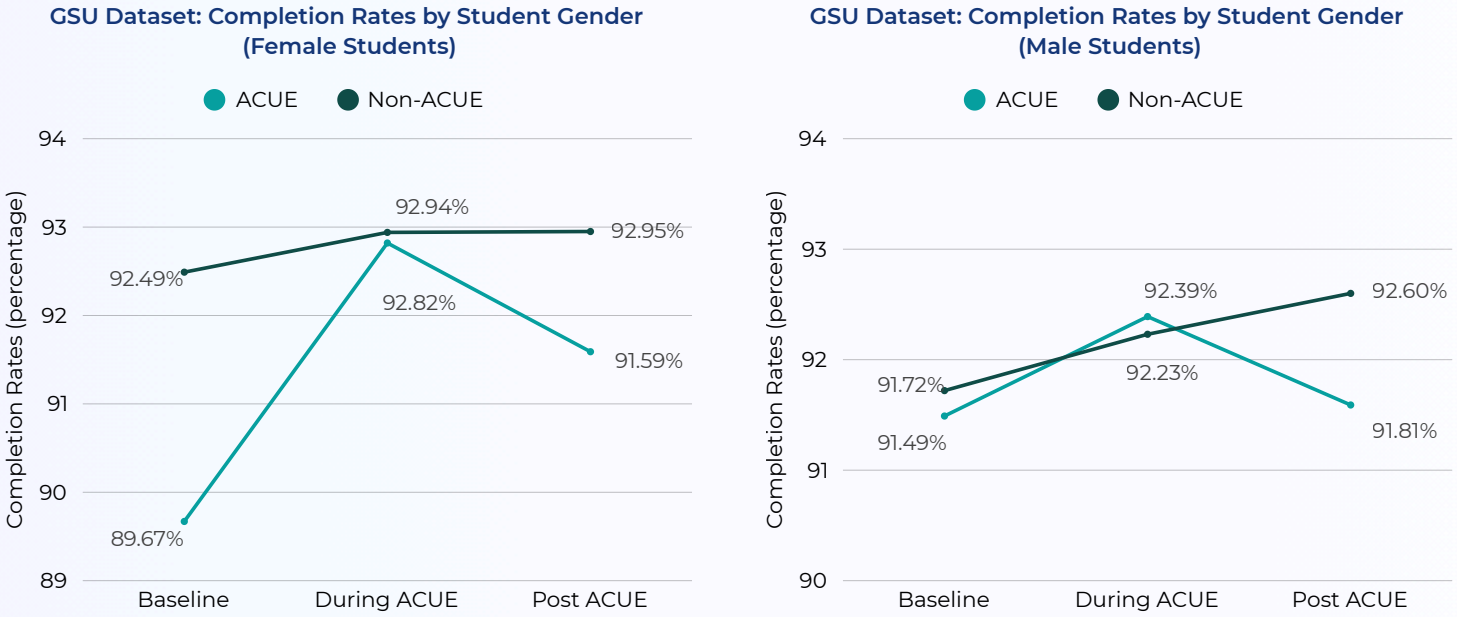
Figure 24: *Impact of ACUE Faculty on Course Completion at GSU*



Interactions With Student Gender

Follow-up analysis adding interactions with student gender found a significant interaction between male students, faculty type, and the during period, b = -0.28, SE = .14, 95% CI [-0.55, -0.01], p = .039, indicating a larger impact on female students (see Figure 25).

Figure 25: *Impact of ACUE Faculty on Course Completion at GSU by Gender*



Non-Significant Interactions for Completion Rates

Follow-up analyses revealed no significant interaction effects between faculty type, time point, and the following student characteristics for completion rates within GSU:

- **Student Ethnicity/Race:** The interaction for Black/African American students during the ACUE course period was not significant, b = -0.05, SE = 0.15, 95% CI [-0.34, 0.24], p = .732, nor was the interaction for Hispanic/Latino students, b = -0.35, SE = 0.26, 95% CI [-0.86, 0.17], p = .182. However, the interaction for students of "other" racial/ethnic backgrounds was marginally significant, b = 0.47, SE = 0.26, 95% CI [-0.04, 0.98], p = .068.
- **College Generational Status:** The interaction for first-generation students during the ACUE course period was not significant, b = -0.05, SE = 0.15, 95% CI [-0.35, 0.25], p = .755.
- **Class Standing:** The interaction for first-year students during the ACUE course period was not significant, b = 0.01, SE = 0.13, 95% CI [-0.25, 0.27], p = .937.

These findings suggest that the ACUE certification's impact on completion rates was largely consistent across these subgroups, with only marginal differences for students of "other" racial/ethnic backgrounds.

Passing Rates

The DID estimates for the impact of ACUE faculty on changes over time in student passing rates were not statistically significant in the during period, *b* = -0.02, *SE* = 0.06, 95% CI [-0.13, 0.08], *p* = .659, or in the post period, *b* = 0.07, *SE* = 0.06, 95% CI [-0.44, 0.19], *p* = .219, relative to the comparison group.

DFW Rates

The DID estimates for the impact of ACUE faculty on changes over time in student DFW rates were not statistically significant in the during period, *b* = -0.04, *SE* = .04, 95% CI [-0.12, 0.04], *p* = .338, or in the post period, *b* = -0.04, *SE* = .04, 95% CI [-0.13, 0.04], *p* = .310, relative to the comparison group.

Average Course Grades

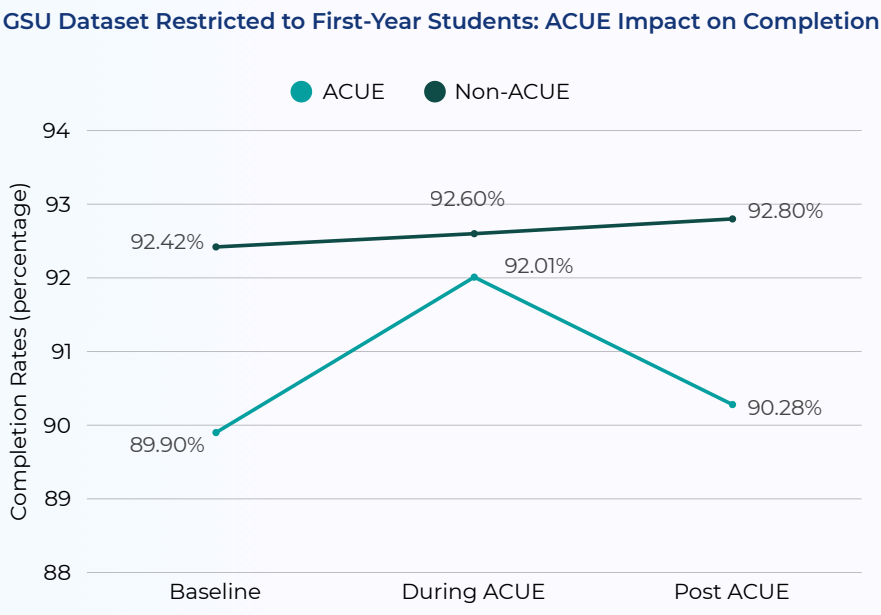
The DID estimates for the influence of ACUE faculty on changes in course grades were not statistically significant in both the during period, *b* = -0.03, *SE* = .03, 95% CI [-0.08, 0.02], *p* = .208, and the post period, *b* = -0.02, *SE* = .03, 95% CI [-0.07, 0.03], *p* = .428, relative to the comparison group.

Findings Among First-Year Students at GSU

Completion Rates

The DID estimates for the impact of ACUE faculty on changes over time in first-year students' completion rates were statistically significant in the during period, *b* = 0.24, *SE* = 0.09, 95% CI [0.06, 0.41], *p* = .009. However, there was no significant interaction in the post period, *b* = -0.01, *SE* = 0.09, 95% CI [-0.18, 0.16], *p* = .891, relative to the comparison group. Specifically, completion rates of first-year students taught by ACUE faculty increased, on average, 2.4% from the baseline period to the during period (see Figure 26).

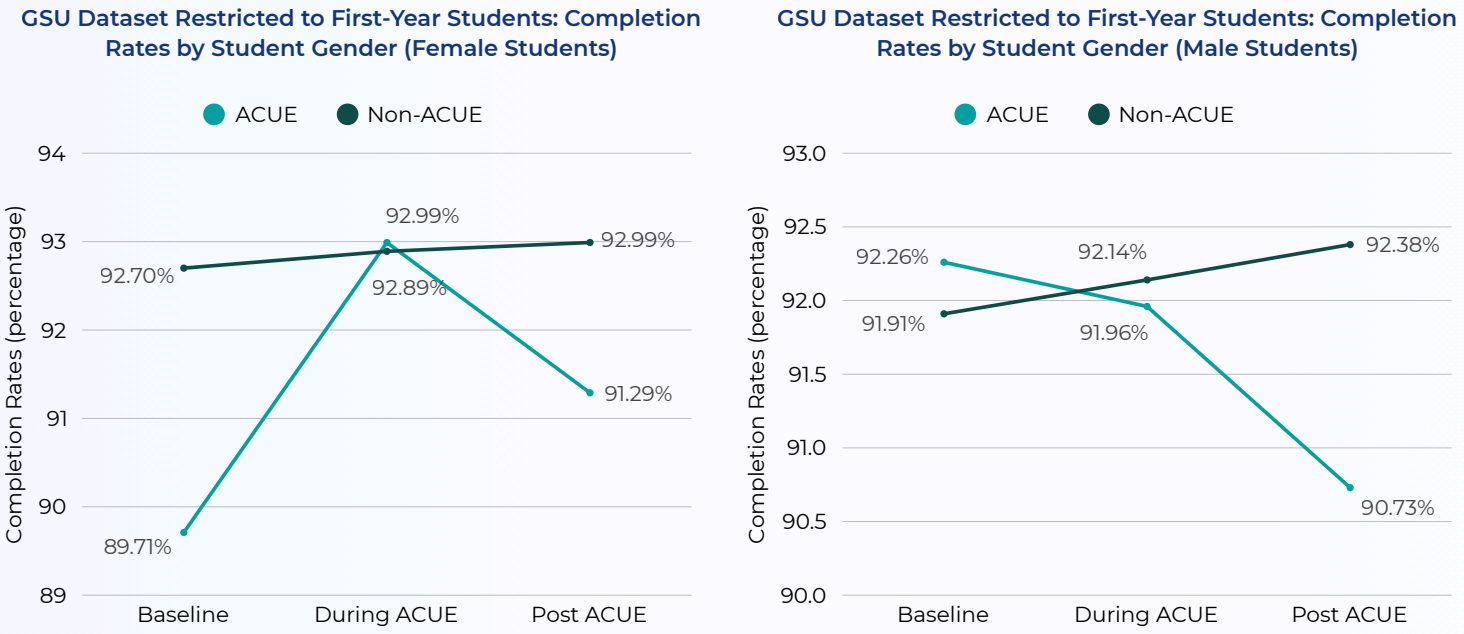
Figure 26: *Impact of ACUE Faculty on Course Completion Among First-Year Students at GSU*



Interactions With Student Gender

Follow-up analysis adding interactions with student gender found a significant interaction between male students, faculty type, and the during period, *b* = -0.47, *SE* = .18, 95% CI [0.11, 0.83], *p* = .011, indicating that female students experienced larger impacts (see Figure 27).

Figure 27: *Impact of ACUE Faculty on Course Completion Among First-Year Students at GSU by Gender*



Non-Significant Interactions for Completion Rates

Follow-up analyses revealed no significant interaction effects between faculty type, time point, and the following student characteristics for completion rates among first-year students at GSU:

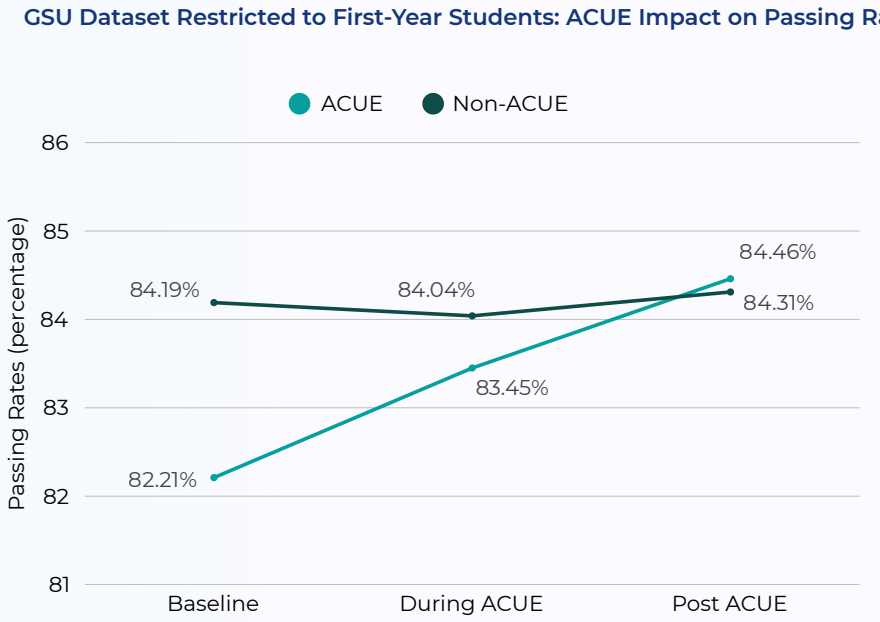
- **Student Race/Ethnicity:** The interaction for Black/African American students during the ACUE course period was not significant, *b* = -0.04, *SE* = 0.20, 95% CI [-0.43, 0.35], *p* = .846. Similarly, the interaction for Hispanic/Latino students was not significant, *b* = -0.33, *SE* = 0.36, 95% CI [-1.04, 0.38], *p* = .365, nor was the interaction for students of "other" racial/ethnic groups, *b* = 0.48, *SE* = 0.33, 95% CI [-0.17, 1.13], *p* = .149.
- **College Generational Status:** The interaction for first-generation students during the ACUE course period was not significant, *b* = -0.09, *SE* = 0.20, 95% CI [-0.49, 0.31], *p* = .675.

These findings suggest that the ACUE certification's impact on completion rates did not differ across these subgroups among first-year students at GSU.

Passing Rates

The DID estimates for the impact of ACUE faculty on changes over time in first-year students' passing rates were not statistically significant in the during period, *b* = 0.10, *SE* = 0.07, 95% CI [-0.03, 0.24], *p* = .134. However, there was a significant interaction in the post period, *b* = 0.16, *SE* = 0.08, 95% CI [0.01, 0.31], *p* = .034, relative to the comparison group. Specifically, passing rates of first-year students taught by ACUE faculty increased, on average, 2.7% from the baseline period to the post period (see Figure 28).

Figure 28: *Impact of ACUE Faculty on Passing Rates Among First-Year Students at GSU*



Non-Significant Interactions for Passing Rates

Follow-up analyses revealed no significant interaction effects between faculty type, time point, and the student characteristics examined on passing rates among first-year students at GSU:

- **Student Gender:** The interaction for male students in the post period was not significant, *b* = 0.05, *SE* = 0.15, 95% CI [-0.25, 0.36], *p* = .728.
- **Student Race/Ethnicity:** The interaction for Black/African American students in the post period was not significant, *b* = -0.01, *SE* = 0.17, 95% CI [-0.34, 0.33], *p* = .968. Similarly, the interactions for Hispanic/Latino students, *b* = -0.08, *SE* = 0.26, 95% CI [-0.60, 0.43], *p* = .746, and for students of "other" racial/ethnic groups, *b* = -0.25, *SE* = 0.29, 95% CI [-0.83, 0.32], *p* = .386, were not significant.
- **College Generational Status:** The interaction for first-generation students in the post period was not significant, *b* = -0.07, *SE* = 0.20, 95% CI [-0.45, 0.31], *p* = .718.

These findings suggest that the ACUE certification's impact on passing rates did not differ across these subgroups among first-year students at GSU.

DFW Rates

The DID estimates for the impact of ACUE faculty on changes over time in first-year students' DFW rates showed a marginally significant interaction in the during period, *b* = -0.09, *SE* = 0.05, 95% CI [-0.20, 0.01], *p* = .084, indicating a slight decrease in DFW rates for students in course sections taught by ACUE faculty. However, there was no significant interaction in the post period, *b* = -0.01, *SE* = 0.06, 95% CI [-0.12, 0.10], *p* = .846, relative to the comparison group.

Average Course Grades

The DID estimates for the impact of ACUE faculty on changes over time in average course grades were not statistically significant in the during period, *b* = 0.01, *SE* = 0.04, 95% CI [-0.06, 0.08], *p* = .798, or in the post period, *b* = 0.02, *SE* = 0.04, 95% CI [-0.05, 0.09], *p* = .543, relative to the comparison group.

Discussion

The findings from this evaluation provide insights into the impact of ACUE certification on student outcomes across both North Carolina A&T University (NCAT) and Georgia Southern University (GSU). By applying a difference-in-differences (DID) approach, we examined changes over time in key student outcomes (completion rates, passing rates, DFW rates, and average course grades) in gateway courses taught by faculty certified in ACUE's Effective Teaching Practices Framework compared to those taught by non-certified faculty. While results varied across the combined dataset and the individual institutional analyses, some consistent patterns emerged.

The analysis of the combined dataset revealed overall improvements in student outcomes during and after the ACUE course period attributable to ACUE certification. DFW rates in sections taught by ACUE faculty decreased by 7.4% from baseline to the post period. This suggests that ACUE certification was effective in reducing course withdrawals and failing or very low grades, leading to improved course retention and academic success over time. Additionally, average course grades improved significantly more in ACUE sections relative to comparison sections, with an increase of 0.05 points during the ACUE course and 0.07 points in the post period in sections taught by ACUE-certified faculty. While these grade increases appear small, they represent meaningful improvements across a large student population. Additionally, Black/African American students experienced a larger improvement in grades during the ACUE course compared to White students, highlighting the potential of ACUE faculty to support historically underrepresented groups and reduce achievement gaps.

Among first-year students, the impact of ACUE certification was generally more pronounced. Passing rates increased by 2.9% during the ACUE course period and 4.4% in the post period among students taught by ACUE faculty, and these increases were significantly larger than those in comparison sections. DFW rates for first-year students also declined significantly more in sections taught by ACUE-certified faculty, dropping by 6% during the ACUE course period.

Additionally, first-year students saw larger gains in average course grades, with increases of 0.08 points during the ACUE course and 0.13 points in the post period. These findings are particularly relevant because they demonstrate the ACUE certification's effectiveness in improving retention and academic success, especially for first-year students who are more vulnerable to academic challenges during the transition to college, with higher DFW rates negatively impacting their overall academic trajectory and likelihood of completing their degree. By improving passing rates and reducing DFW grades, ACUE faculty help first-year students stay on track in critical gateway courses, supporting long-term academic success, higher retention, and potentially higher completion rates in future courses.

At NCAT, there was a significant impact of ACUE certification on passing rates during the ACUE course period, with passing rates in sections taught by ACUE-certified faculty increasing by 1.9%. Among first-year students, there was a significant impact of ACUE certification on passing rates in the post period, with rates in sections taught by ACUE-certified faculty rising by 5.1% in the post-ACUE course period.

Similarly, the analysis revealed significant impacts of ACUE certification at NCAT on average course grades during both the ACUE course period and the post period. Students in sections taught by ACUE-certified faculty were predicted to increase their average grades by 0.09 points during the course and by 0.12 points in the post period, indicating that students taught by ACUE faculty performed better academically even after certification. These improvements reflect the sustained benefits in student performance, suggesting that students tended to perform better overall. The impact on grades was particularly beneficial among first-generation and Pell-eligible students, who experienced larger increases in average grades compared to continuing-generation and non-Pell-eligible students respectively, highlighting the potential of ACUE certification to narrow achievement gaps among student populations that experience more systemic barriers in higher education. In the case of first-year students at NCAT, the impact was even more pronounced, with a predicted increase in grades of 0.15 points during the ACUE course period and of 0.26 in the post period. This suggests that first-year students, in particular, benefited from the improved teaching practices, as they showed greater gains in academic performance compared to their peers.

The results for GSU also showed some positive impacts, particularly in completion rates during the ACUE course period. Completion rates increased by 2.9% among those taught by ACUE-certified faculty, an impact that was particularly pronounced for female students compared to their male counterparts. Among first-year students, the increase in completion rates was similar at 2.4%, with this impact being particularly beneficial for female students. This highlights the potential of ACUE certification to support student retention, especially among first-year students who are typically at higher risk of withdrawal.

However, no significant effects were found for passing rates, DFW rates, or average course grades in the overall GSU analysis. Nevertheless, among first-year students, there was a positive impact on passing rates in the year following the ACUE course, with passing rates increasing by 2.7%. This suggests that ACUE certification may have a stronger impact on first-year students taught by ACUE faculty in the year following the ACUE course, as these instructors may continue to apply and refine their use of effective teaching practices while students adapt to the transition to a college environment. These findings point to the potential of ACUE certification in supporting the academic success of first-year students, even in cases where broader improvements in grades and other outcomes may be constrained by baseline performance levels.

Limitations

Several limitations must be considered when interpreting the results of this study. First, the absence of certain control variables, such as Pell eligibility data at GSU, restricted our ability to fully account for financial factors that could influence student outcomes within this institution and when combining the two samples. Some other control variables, such as remedial course participation, instructors' years at the institution, and whether students took an English proficiency test during their university application, were not available in both the NCAT and GSU datasets and therefore could not be included in the combined analysis, although they were used in the individual analysis. The absence of these controls reduces the ability to fully account for student and institutional differences, potentially impacting the comparability of student performance across the two universities in the combined analysis. However, the inclusion of several other control variables, including student demographics, instructor demographics and employment characteristics, and course characteristics, helps mitigate the impact of missing controls by accounting for a significant portion of the variation in student outcomes, which strengthens the robustness of the findings despite the limitations posed by the unavailable variables. This ensures that the analysis still provides a meaningful assessment of ACUE certification's impact across both institutions.

Another important limitation of the study is the reversion of the COVID-19 grading policy at NCAT, which allowed students to opt for pass/fail grades instead of letter grades. This policy, in place until 2022, limited our ability to assess impacts on completion rates, not only at NCAT but also in the case of the combined sample, where the differing grading policies between institutions would have introduced further inconsistencies.

Conclusion

The findings from this evaluation highlight the positive impact of ACUE-certified faculty on student outcomes at NCAT and GSU, seeing particularly significant impact among students who face greater barriers to success such as first-generation and Pell-eligible students.

While the results varied between institutions, the positive effects were more pronounced at NCAT, suggesting that ACUE certification may be especially effective in an HBCU context. Further research and ongoing support for faculty are needed to maintain and expand the positive impacts of ACUE certification across diverse educational contexts.

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