



Improving Performance at the University of Arkansas – Pulaski Technical College:

The Effect of ACUE Faculty on Passing and DFW Rates



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Executive Summary

In recent years, there has been a growth in literature examining interventions aimed at improving students' postsecondary performance. While many interventions directly target students in out-of-class time (e.g., advising), institutions partnering with the Association of College and University Educators (ACUE) have focused on increasing students' access to evidence-based teaching, aiming to improve students' postsecondary performance through faculty development. Prior evaluations have found beneficial effects of "ACUE faculty" on various student outcomes (Hecht, 2019; Lawner, Chasteen, et al., 2021; Lawner & Snow, 2018, 2019a, 2019b, 2020; Lawner, Snow, & Burt, 2019; Lawner, Snow, MacCormack, & Waltje, 2019; Pippins, Chasteen, et al., 2021a, 2021b; Pippins, Hartigan, et al., 2021).

This evaluation uses student-level data to examine the impact that faculty at the University of Arkansas – Pulaski Technical College (UA-PTC) who took ACUE courses have on student academic outcomes. UA-PTC is a public 2-year community and technical college located in North Little Rock, Arkansas, serving over 6,000 students across the Central Arkansas region. UA-PTC began partnering with ACUE in the spring 2018 semester, when one cohort of faculty (cohort A) earned the ACUE certification in Effective College Instruction; an additional cohort of faculty (cohort B) completed their certification in the 2018–2019 academic year. This evaluation focuses on these two cohorts of ACUE faculty.

To measure the impact of ACUE faculty at UA-PTC, this evaluation employs a differences-in-difference (DID) approach to compare the changes in course outcomes—course completion rates, passing rates, DFW rates, and grades—of students in course sections taught by ACUE faculty to the changes in course outcomes of students in matched course sections taught by non-ACUE faculty. Differences are compared across three different time periods, including the terms before, while, and after subsets of faculty earned ACUE certification.



The evaluation found ACUE faculty in cohort A had a beneficial effect on students' likelihoods of receiving passing and DFW grades; the effect on DFW rates was greater for Black students. Additionally, ACUE faculty in cohort B had a significant effect of ACUE on students' likelihood of receiving DFW grades and average course grades; the effects were greater for Hispanic students. Taken together, these findings provide suggestive evidence that college instructor quality can be improved. They also add to the growing evidence of a beneficial impact of ACUE faculty, in particular, on students' postsecondary outcomes. This suggests that faculty development can provide a powerful intervention for institutions to meet their student success goals.

About ACUE

The Association of College and University Educators' (ACUE) mission is to ensure student success and equity through quality instruction. In partnership with colleges, universities, higher education systems, and associations, ACUE prepares and credentials faculty in the evidence-based teaching practices that improve student achievement and close equity gaps. Numerous and independently validated studies confirm that students are more engaged, learn more, and complete courses in greater numbers—more equitably with their peers—when taught by ACUE-credentialed faculty. ACUE's online, cohort-based credentialing programs are delivered through institutional partnerships and open-enrollment courses endorsed by the American Council on Education.¹

Background

College faculty are pivotal in influencing students' academic achievement and college engagement early in students' college years (Braxton et al., 2000; Condon et al., 2016; De Vlieger et al., 2018). Within this relationship, instructional quality has been identified as an important mediator (Carrell & West 2010; Braga et al., 2016; Hoffmann & Oreopoulos 2009). The relationship between

¹ To learn more, visit acue.org.



college instructor quality and student outcomes has encouraged researchers to identify effective teaching practices (e.g., Freeman et al., 2011) in which to train college faculty and improve their instructional quality.

To formally train college faculty in evidence-based teaching practices, ACUE developed and offers courses based on the Effective Practice Framework—a consensus statement of the teaching skills and knowledge that every college educator should possess to teach effectively, regardless of discipline (Candio Sekel, n.d.). ACUE’s courses are designed to improve instructional practices and consequently impact student outcomes, through six levels of sequential outcomes (MacCormack et al., 2018): (1) faculty engagement, (2) faculty learning, (3) faculty implementation, (4) student engagement, (5) course-level student outcomes, and (6) institutional outcomes. The current paper evaluates the impact of the ACUE certification on level 5.

Several previous evaluations have found beneficial impacts of “ACUE faculty”—instructors who earn ACUE certification by engaging in a full-year or microcredential ACUE courses in Effective Teaching Practices—on students’ concurrent course outcomes, including completion rates (Lawner & Snow, 2020; Lawner, Snow, MacCormack, & Waltje, 2019), success rates (Hecht, 2019; Lawner & Snow, 2018), passing rates (Lawner & Snow, 2020; Pippins, Chasteen, et al., 2021a), and average grades (Hecht, 2019; Lawner & Snow, 2019a, 2019b; Lawner, Snow, & Burt, 2019; Pippins, Chasteen, et al., 2021a; Pippins, Hartigan, et al., 2021; Pippins, Lawner, & Snow, 2021).² Positive effects have also been found on students’ subsequent course outcomes (Pippins, Chasteen, et al., 2021b) and academic performance across all their courses (Lawner et al., 2021). These findings have consistently emerged using different data types (course-level and student-level), implementing a variety of data methods (differences-in-difference and fixed effects), and focusing on a variety of institutions (2-year and 4-year colleges as well

² Success rates as measured by earning grades A–C or a P (Pass) in courses.



as those with diverse student populations). Helping us to better understand the impact of ACUE across different types of institutions, this evaluation is the first that focuses on a predominantly Black institution (PBI)—the University of Arkansas – Pulaski Technical College (UA-PTC).

This evaluation uses student-level data to examine the impact that faculty at UA-PTC who took ACUE courses have on student academic outcomes. UA-PTC is a public 2-year community and technical college located in North Little Rock, Arkansas. Serving over 6,000 students, UA-PTC plays a key role in the education and workforce-training pipeline in the Central Arkansas region. However, while many UA-PTC faculty are working professionals with direct industry experience, they by and large had not previously been equipped with the practices needed to teach those vocations to students.

In 2017, UA-PTC began partnering with ACUE to equip all of its instructors with evidence-based teaching practices. In the spring 2018 semester, one cohort of faculty (cohort A) completed the ACUE course in Effective Teaching Practices; an additional cohort of faculty (cohort B) completed the full-year course in the 2018–2019 academic year. This evaluation focuses on these two cohorts of ACUE faculty, employing a differences-in-difference (DID) approach to measure their impact on students' course outcomes—course completion rates, passing rates, DFW rates, and grades—in the years while and after faculty earned the ACUE certification.

Methods

Participants and Procedures

Faculty at UA-PTC first began taking ACUE courses in spring 2018, when 27 faculty (cohort A) received the ACUE certificate in Effective College Instruction.³ In the following 2018–2019 academic year, an additional 26 UA-PTC faculty (cohort B) became ACUE-certified after taking the full-year ACUE

³ In this paper, we use “faculty” to refer to a variety of non-students who were employed by UA-PTC and had teaching responsibilities.



course. To evaluate the impact of these two cohorts of ACUE faculty on their students' outcomes, UA-PTC's Office of Institutional Research provided student-level course outcome data (i.e., transcript data) for all course sections taught by the cohorts of ACUE faculty and for a set of matched course sections taught by non-ACUE faculty. These matched course sections were chosen based on, in order of importance, the course section being taught, the full-time/part-time status of the instructor, and the instructor's continuous years of service at the institution. For ACUE faculty who taught multiple sections of the same course, generally a single appropriate section taught by a non-ACUE faculty was matched to all the sections for that ACUE faculty.⁴ Additionally, the same course section taught by a non-ACUE faculty could have been matched to course sections taught by multiple different ACUE faculty. Thus, there are more ACUE course sections than match course sections.

Because the cohorts were evaluated separately, the data requested for each evaluation was distinct. For cohort A (spring 2018), the student-level course data collected to evaluate the impact of ACUE faculty included all course sections taught by 26 ACUE faculty and a set of matched course sections between fall 2016 and spring 2019.⁵ Because faculty in cohort A earned their certificate in spring 2018, data from three semesters—fall 2016, spring 2017, and fall 2017—are considered baseline data. Data from spring 2018 are considered to be during the ACUE course, and data from the 2018–2019 academic year are considered to be post-certified data.⁶

Figures 1 and 2 compare the proportions of ACUE and non-ACUE faculty in cohort A's analytic sample by full/part-time status and gender, respectively. Figure 1 shows that ACUE faculty in cohort A

⁴ In instances when a unique course title was not simultaneously taught by both ACUE and non-ACUE faculty (such as if ACUE instructors taught all the course section of a given course title), courses were attempted to be matched to courses on the same "level" (e.g., 1000s), only drifting into higher/lower levels if absolutely necessary.

⁵ Of the 27 ACUE faculty certified in spring 2018, one did not teach courses throughout the terms in the analysis years.

⁶ Summer terms are dropped from the analysis.



are more likely to be full-time faculty than the non-ACUE faculty who taught matched course sections.

Additionally, Figure 2 suggests ACUE faculty in cohort A are just as likely to be female as the non-ACUE faculty who taught matched course sections. We control for both characteristics in all analyses.

Figure 1

Faculty Share by Full/Part-Time Status, Cohort A Sample

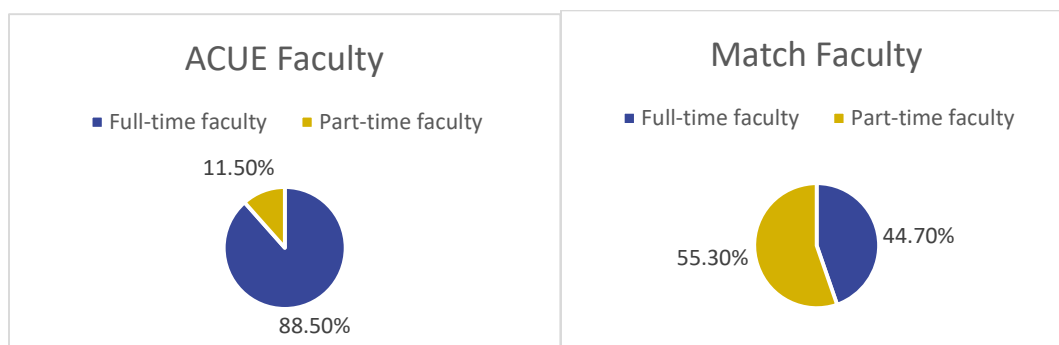
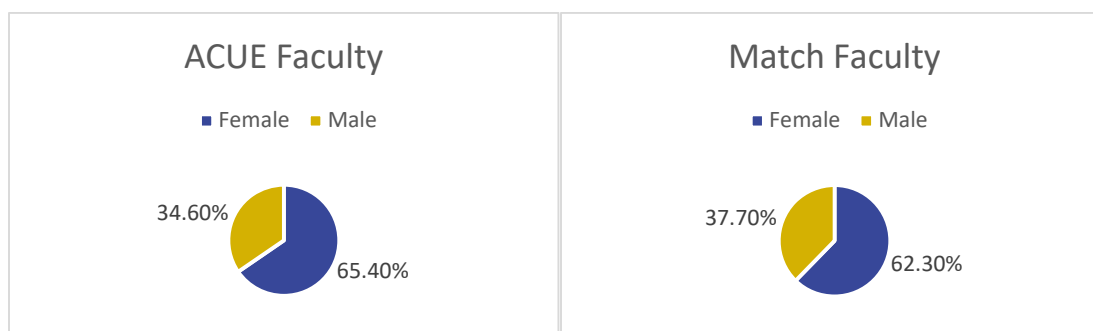


Figure 2

Faculty Share by Gender, Cohort A Sample



As shown in Table 1, the sample for the cohort A evaluation comprised 26,502 student enrollments, including 8,461 non-unique student enrollments from 451 sections taught by ACUE faculty and 6,015 non-unique student enrollments from 326 matched sections in the baseline period (fall 2016–



fall 2017); 2,734 non-unique student enrollments from 145 sections taught by ACUE faculty and 1,843 non-unique student enrollments from 101 matched sections during the ACUE course (spring 2018); and 4,385 non-unique student enrollments from 236 sections taught by ACUE faculty and 3,064 non-unique student enrollments from 171 matched sections in the post-ACUE period (fall 2018–spring 2019).

Table 1

Number of Student Enrollments and Course Sections by Faculty Type and Time Point for Cohort A (Spring 2018)

Time point	Faculty type			
	ACUE		Non-ACUE	
	Non-unique student enrollments	Course sections	Non-unique student enrollments	Course sections
Baseline	8,461	451	6,015	326
During ACUE	2,734	145	1,853	101
Post ACUE	4,385	236	3,064	171

As shown in Table 2, the average age across student course enrollments in the sample for cohort A was 25.74 years ($SD = 9.53$).⁷ Black students made up 44% of total course enrollments, followed by White (40%), “Other” race/ethnicity (10%), and then Hispanic students (6%). The majority of enrollments were made up by female students (64%), more than half (63%) by Pell-eligible students, and a quarter (25%) by students who identified as first-generation in college.

⁷ Descriptive statistics were averaged across all enrollments instead of at the unique student level. Averages over unique students were quantitatively similar to those reported in Tables 2 and 4.

Table 2 <i>Descriptive Statistics for Course Sections Taught by Cohort A and Matched Sections</i> <i>(N = 26,502)</i>		
Variable	Mean	SD
Female (%)	.64	.48
Black (%)	.44	.50
White (%)	.40	.49
Hispanic (%)	.06	.25
Other (%)	.10	.30
Age	25.74	9.53
Pell-eligible (%)	.63	.48
First-generation – Yes (%)	.25	.43
First-generation – Unknown (%)	.43	.50
Completion rate (%)	.88	.32
Passing rate (%)	.84	.36
DFW rate (%)	.29	.45
Course grade	2.74	1.33

For cohort B, the student-level course data collected to evaluate the impact of ACUE faculty included all course sections taught by 26 ACUE faculty and a set of matched course sections between fall 2017 and spring 2020. Because faculty in cohort B earned their certificate in the 2018–2019 academic year, data from the 2017–2018 academic year is considered baseline data. Data from 2018–2019



academic year are considered to be during the ACUE course, and data from the 2019–2020 academic year are considered to be post-certificate data.

Figures 3 and 4 compares the proportions of ACUE and non-ACUE faculty in cohort B’s analytic sample by full/part-time status and gender, respectively. Figure 3 shows that ACUE faculty in cohort B are more likely to be full-time faculty than the non-ACUE faculty who taught matched course sections. Conversely, Figure 4 suggests ACUE faculty in cohort B are just as likely to be female as the non-ACUE faculty who taught matched course sections. We control for both characteristics in all analyses.

Figure 3

Faculty Share by Full/Part-Time Status, Cohort B Sample

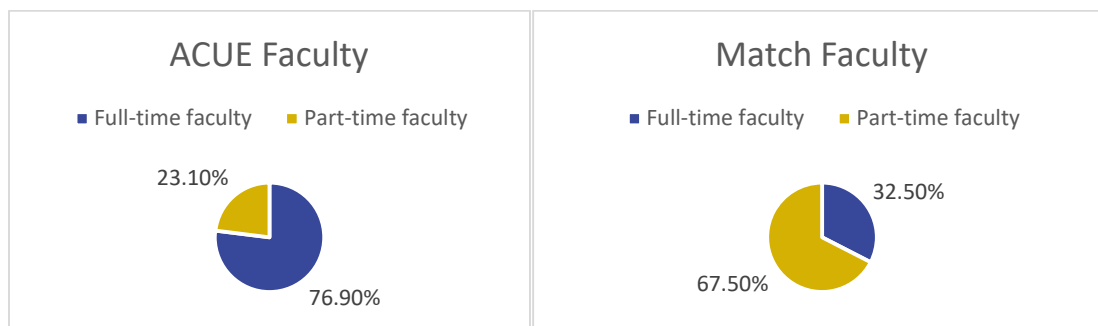
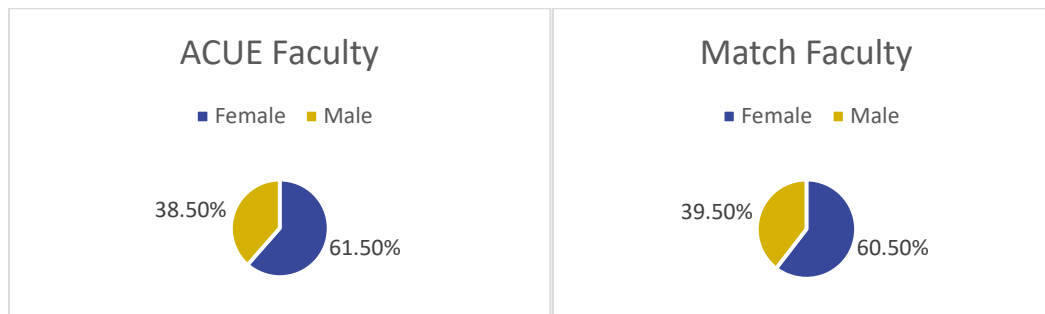




Figure 4

Faculty Share by Full/Part-Time Status, Cohort B Sample



As shown in Table 3, the sample for the cohort B evaluation comprised 23,163 student enrollments, including 4,647 non-unique student enrollments from 258 sections taught by ACUE-certified faculty and 3,743 non-unique student enrollments from 208 matched sections in the baseline period (fall 2017–spring 2018); 4,469 non-unique student enrollments from 255 sections taught by ACUE-certified faculty and 3,464 non-unique student enrollments from 196 matched sections during the ACUE course (fall 2018–spring 2019); and 3,878 non-unique student enrollments from 218 sections taught by ACUE-certified faculty and 2,962 non-unique student enrollments from 170 matched sections in the post-ACUE period (fall 2019–spring 2020).

Table 3

Number of Student Enrollments in Course Sections by Faculty Type and Time Point for Cohort B (2018-19)

	Faculty type			
	ACUE		Non-ACUE	
Time point	Non-unique student enrollments	Course sections	Non-unique student enrollments	Course sections
Baseline	4,647	258	3,743	208
During ACUE	4,469	255	3,464	196
Post ACUE	3,878	218	2,962	170

The demographics of the student course enrollments in the sample for cohort B were comparable to those for cohort A. As shown in Table 4, the average age across student enrollments in the sample for cohort B was 25.27 years ($SD = 9.41$). White students made up 43% of the total course enrollments, followed by Black (41%), “Other” race/ethnicity (11%), and then Hispanic students (5%). The majority of enrollments were again made up by female students (64%), with an equivalent proportion being Pell-eligible students; more than one-third (36%) were first-generation college students.

Table 4 <i>Descriptive Statistics for Course Sections Taught by Cohort B and Matched Sections</i> <i>(N = 23,163)</i>		
Variable	Mean	SD
Female (%)	.64	.48
Black (%)	.41	.49
White (%)	.43	.49
Hispanic (%)	.05	.22
Other (%)	.11	.31
Age	25.27	9.41
Pell-eligible (%)	.64	.48
First-generation – Yes (%)	.36	.48
First-generation – Unknown (%)	.24	.43
Completion rate (%)	.90	.29
Passing rate (%)	.82	.38
DFW rate (%)	.29	.45
Course grade	2.71	1.44

Along with student characteristics and course outcomes reported in Tables 2 and 4, the data for cohorts A and B included faculty characteristics (e.g., full-time or part-time status, gender, years at university) and course characteristics (e.g., course name, number, department, term offered).



Measures

The course outcomes assessed were course completion, passing rates, DFW rates, and course grades. Students who dropped a course before the end of the add/drop period were excluded from all analyses. Course completion, passing rates, and DFW rates were all constructed as binary variables. Course completion was coded as 1 for all students who did not withdraw from a course, regardless of whether they received a passing or failing final grade in the course; it was otherwise coded as 0. Passing was coded as 1 for all students with marks A, B, C, or D. As students who withdrew from courses were not included when passing was the outcome, passing was coded as 0 for students who received marks F or NC. Conversely, DFW was coded as 1 for students who received marks D, F, NC, W, WC, or WX; otherwise, DFW was coded as 0. For outcomes on final course grade, course grades were converted from an alphabetic scale to a numeric equivalent (A = 4, B = 3, C = 2, D = 1, F = 0). Students with grades that could not be converted to a numeric scale (e.g., NC) were not included in analyses when course grades were used as an outcome.

Results

Data Analysis Plan

To estimate the effect of ACUE faculty on students' academic outcomes at UA-PTC, we employ a differences-in-difference (DID) approach that compares the changes in course outcomes of students in course sections taught by ACUE faculty to the changes in course outcomes of students in matched course sections taught by non-ACUE faculty. These changes are measured between the terms before and while faculty complete the ACUE course, as well as the terms before and after faculty have completed the ACUE course. When using binary outcome measures—course completion rates, passing rates, DFW rates, and grades—we estimated effects using binomial logistic regression (e.g., Stock & Watson, 2012). We also estimated the marginal effects of our parameter of interest using linear



probability models for ease of interpretation. When estimating the effect on course grades, we used ordinary least squares regression.

All analyses controlled for observed student, faculty, and course characteristics. We simplified race/ethnicity into four categories: Black, White, Hispanic, and “Other.” The category “Other” combined students who identified as Asian, Native Hawaiian or other Pacific Islander, Nonresident Alien, Two or More Races, or whose race/ethnicity was unknown. White students were used as the reference group because White students made up the highest proportion of students at UA-PTC across the analysis years.⁸ For gender, female was used as the reference group because the highest proportion of enrollments were by female students. College generational status was a three-level categorical variable that included indicators for first-generation, not first-generation, and unknown college generational status. Notably, a high proportion of students had unreported first-generational statuses as UA-PTC did not begin systematically collecting this data until later years.

Faculty instructional status was either full-time or part-time faculty, with the former used as the reference group. Full-time faculty also made up over 85% of faculty in analyses for both cohort A and cohort B. To control for course characteristics, the course information provided in transcripts (course name, number, term, etc.) was used to produce a count of the number of students enrolled in a given course section in a semester. Main effects were also included for whether a faculty was an ACUE faculty (dummy coded 1 for ACUE faculty and 0 for non-ACUE faculty) and time periods. As previously described, time periods in each evaluation corresponded to the baseline, during ACUE, and post-ACUE terms, respectively. The parameters of interest were the two-way interactions between faculty type and during period, as well as faculty type and post period. These parameters captured the change over these

⁸ White students made up the highest proportion of unique students enrolled at UA-PTC in both years, although Black students made up the highest proportion of student course enrollments in the analytic sample for cohort A.



time periods in student outcomes in course sections taught by ACUE faculty relative to course sections taught by non-ACUE faculty.

When the interactions between faculty type and post period were significant at the 5% alpha level, follow-up analyses were conducted to examine the main effect of time among course sections taught by ACUE faculty and separately among course sections taught by non-ACUE faculty. There was also interest in understanding whether impacts are larger for students from marginalized groups. Therefore, when an interaction between faculty type and post period was significant at the 5% alpha level, additional analyses were conducted that separately examined interactions with race/ethnicity and Pell eligibility.⁹ In these analyses, the effect of interest is the three-way interaction between the demographic variable, post period, and faculty type.

Cohort A (Spring 2018)

Completion Rates. The DID estimates from our binomial logistic regression indicated no evidence of an effect of ACUE faculty on students' likelihood of completing their courses in either the during period, $b = .00$, $OR = 1.03$, $SE = .11$, 95% CI [0.83, 1.27], $p = .777$, or the post period, $b = .01$, $OR = 1.17$, $SE = .11$, 95% CI [0.97, 1.41], $p = .102$.

Passing Rates. The DID estimates from our binomial logistic regression indicated a beneficial and statistically significant effect of ACUE faculty on students' likelihood of receiving passing grades in the post period, $b = .03$, $OR = 1.25$, $SE = .11$, 95% CI [1.06, 1.48], $p = .009$. The effect suggests that students were 3.2 percentage points more likely to pass their courses than otherwise predicted had faculty not taken the ACUE course. Conversely, there was no evidence of an effect of ACUE faculty on students'

⁹ In previous evaluations, we have also measured heterogeneity by college generational status. However, because UA-PTC did not begin systematically collecting first-generation status until later years, a high proportion of students across the samples have an unknown first-generation status (see Tables 2 and 4). For this reason, we do not report the results from heterogeneity tests on college generational status.



likelihood of receiving passing grades in the during period, $b = -.00$, $OR = 0.97$, $SE = .11$, 95% CI [0.79, 1.21], $p = .812$.

Interactions With Race/Ethnicity. Follow-up analysis adding interactions with race/ethnicity found no significant interaction between Black students, faculty type, and the post period, $b = .03$, $OR = 1.19$, $SE = .23$, 95% CI [0.81, 1.73], $p = .374$. There was also no significant interaction between Hispanic students, faculty type, and the post period, $b = -.02$, $OR = 1.03$, $SE = .42$, 95% CI [0.47, 2.28], $p = .939$, nor between “Other” race/ethnicity students, faculty type, and the post period, $b = .04$, $OR = 1.35$, $SE = .42$, 95% CI [0.73, 2.48], $p = .339$.

Interaction With Pell Eligibility. Analysis adding interactions with Pell eligibility found no significant interaction between Pell-eligible students, faculty type, and the post period, $b = .01$, $OR = 1.08$, $SE = .20$, 95% CI [0.75, 1.55], $p = .698$.

DFW Rates. The DID estimates from our binomial logistic regression indicated a beneficial and statistically significant effect of ACUE faculty on students’ likelihood of receiving DFW grades in the post period, $b = -.03$, $OR = 0.85$, $SE = .06$, 95% CI [0.75, 0.97], $p = .014$. The effect suggests that students were 3.4 percentage points less likely to receive DFW grades their courses than otherwise predicted had faculty not taken the ACUE course. Conversely, there was no evidence of an effect of ACUE faculty on students’ likelihood of receiving passing grades in the during period, $b = .01$, $OR = 1.03$, $SE = .08$, 95% CI [0.88, 1.21], $p = .693$.

Interactions With Race/Ethnicity. Follow-up analysis adding interactions with race/ethnicity found a significant interaction between Black students, faculty type, and the post period, $b = -.07$, $OR = 0.73$, $SE = .10$, 95% CI [0.55, 0.96], $p = .027$. Additional follow-up analyses showed that the interaction between Black students and the post period was significant within the matched sections, $b = .09$, $OR = 1.50$, $SE = .18$, 95% CI [1.19, 1.90], $p = .001$, but was insignificant within the ACUE faculty group, $b = .03$,



$OR = 1.09$, $SE = .11$, 95% CI [0.89, 1.33], $p = .391$. This implies that ACUE faculty helped offset what, otherwise, might have been a rise in DFW rates for Black students. There was no significant interaction between Hispanic students, faculty type, and the post period, $b = .03$, $OR = 1.16$, $SE = .35$, 95% CI [0.64, 2.10], $p = .632$, nor between “Other” race/ethnicity students, faculty type, and the post period, $b = -.05$, $OR = 0.80$, $SE = .19$, 95% CI [0.50, 1.27], $p = .343$.

Interaction With Pell Eligibility. Analysis adding interactions with Pell eligibility found no significant interaction between Pell-eligible students, faculty type, and the post period, $b = -.02$, $OR = 0.91$, $SE = .13$, 95% CI [0.69, 1.21], $p = .527$.

Average Grades. The DID estimates from our OLS regression indicated no evidence of an effect of ACUE faculty on students’ average course grades in either the during period, $b = .05$, $SE = .05$, 95% CI [-0.04, 0.14], $p = .252$, or the post period, $b = .06$, $SE = .04$, 95% CI [-0.02, 0.14], $p = .157$.

Cohort B (2018–2019)

Completion Rates. The DID estimates from our binomial logistic regression indicated no evidence of an effect of ACUE faculty on students’ likelihood of completing their courses in either the during period, $b = .01$, $OR = 1.17$, $SE = .13$, 95% CI [0.94, 1.45], $p = .157$, nor the post period, $b = .01$, $OR = 1.14$, $SE = .13$, 95% CI [0.91, 1.42], $p = .250$.

Passing Rates. The DID estimates from our binomial logistic regression indicated no evidence of an effect of ACUE faculty on students’ likelihood of receiving passing grades in their courses in either the during period, $b = .03$, $OR = 1.15$, $SE = .10$, 95% CI [0.96, 1.37], $p = .129$, or the post period, $b = .01$, $OR = 1.07$, $SE = .10$, 95% CI [0.88, 1.29], $p = .489$.

DFW Rates. The DID estimates from our binomial logistic regression indicated a beneficial and statistically significant effect of ACUE faculty on students’ likelihood of receiving DFW grades in both the during period, $b = -.06$, $OR = 0.76$, $SE = .05$, 95% CI [0.66, 0.87], $p < .001$, and the post period, $b = -.05$,



$OR = 0.76$, $SE = .06$, 95% CI [0.66, 0.89], $p < .001$. These effects suggest that students were 5.6 percentage points and 5.2 percentage points less likely to receive DFW grades their courses in the during and post periods, respectively, than otherwise predicted had faculty not taken the ACUE course.

Interactions With Race/Ethnicity. Follow-up analysis adding interactions with race/ethnicity found a marginally significant interaction between Hispanic students, faculty type, and the during period, $b = -.11$, $OR = 0.55$, $SE = .18$, 95% CI [0.28, 1.06], $p = .073$. However, there was no significant interaction between Black students, faculty type, and the during period, $b = -.06$, $OR = .78$, $SE = .12$, 95% CI [0.57, 1.06], $p = .112$, nor between “Other” race/ethnicity students, faculty type, and the during period, $b = -.06$, $OR = 0.72$, $SE = .19$, 95% CI [0.44, 1.20], $p = .205$.

Follow-up analysis adding interactions with race/ethnicity also found a significant interaction between Hispanic students, faculty type, and the post period, $b = -.19$, $OR = 0.38$, $SE = .15$, 95% CI [0.17, 0.84], $p = .017$. Additional follow-up analyses showed that the interaction between Hispanic students and the post period was significant within the matched sections, $b = .19$, $OR = 2.57$, $SE = .82$, 95% CI [1.38, 4.80], $p = .003$, but was insignificant within the ACUE faculty group, $b = -.02$, $OR = 0.91$, $SE = .25$, 95% CI [0.53, 1.56], $p = .737$. This implies that ACUE faculty helped offset what, otherwise, might have been a rise in DFW rates for Hispanic students. There were no significant interactions between Black students, faculty type, and post period, $b = -.02$, $OR = 0.95$, $SE = .16$, 95% CI [0.69, 1.32], $p = .775$, nor between “Other” race/ethnicity students, faculty type, and post period, $b = .03$, $OR = 1.19$, $SE = .31$, 95% CI [0.71, 1.99], $p = .517$.

Interaction With Pell Eligibility. Analysis adding interactions with Pell eligibility found a marginally significant interaction between Pell-eligible students, faculty type, and the during period, $b = -.06$, $OR = 0.77$, $SE = .12$, 95% CI [0.57, 1.05], $p = .096$, but no significant interaction between Pell-eligible students, faculty type, and the post period, $b = -.05$, $OR = .82$, $SE = .13$, 95% CI [0.59, 1.13], $p = .218$.



Average Grades. The DID estimates from our OLS regression indicated a beneficial and statistically significant effect of ACUE faculty on students' average course grades in both the during period, $b = .14$, $SE = .05$, 95% CI [0.05, 0.23], $p = .002$, and the post period, $b = .18$, $SE = .05$, 95% CI [0.09, 0.28], $p < .001$.

Interactions With Race/Ethnicity. Follow-up analysis adding interactions with race/ethnicity found a marginally significant interaction between students categorized under "Other" race/ethnicity, faculty type, and the during period, $b = .30$, $SE = .16$, 95% CI [-0.01, 0.61], $p = .055$. However, there were no significant interactions between Black students, faculty type, and the during period, $b = .16$, $SE = .10$, 95% CI [-0.04, 0.36], $p = .127$, nor between Hispanic students, faculty type, and the during period, $b = .29$, $SE = .20$, 95% CI [-0.10, 0.69], $p = .147$.

Follow-up analysis adding interactions with race/ethnicity also found a significant interaction between Hispanic students, faculty type, and the post period, $b = .57$, $SE = .26$, 95% CI [0.05, 1.09], $p = .031$. Additional follow-up analyses showed that the interaction between Hispanic students and the post period was significant within the matched sections, $b = -.51$, $SE = .22$, 95% CI [-0.93, -0.08], $p = .019$, but was insignificant within the ACUE faculty group, $b = .12$, $SE = .16$, 95% CI [-0.19, 0.43], $p = .457$. This implies that ACUE faculty helped offset what, otherwise, might have been a decline in average grade points for Hispanic students. The interactions between Black students, faculty type, and post period, $b = -.00$, $SE = .11$, 95% CI [-0.21, 0.21], $p = .974$, and between "Other" race/ethnicity students, faculty type, and post period, $b = -.04$, $SE = .16$, 95% CI [-0.35, 0.28], $p = .814$, were insignificant.

Interaction With Pell Eligibility. Analysis adding interactions with Pell eligibility found no significant interaction between Pell-eligible students, faculty type, and the during period, $b = .10$, $SE = .09$, 95% CI [-0.08, 0.29], $p = .275$, nor between Pell-eligible students, faculty type, and the post period, $b = .11$, $SE = .10$, 95% CI [-0.09, 0.30], $p = .282$.



Academic Disruptions Throughout COVID-19

As a precaution due to the COVID-19 pandemic, UA-PTC announced on March 11, 2020 that all locations would cancel all face-to-face classes from March 12 to March 29. Instruction was subsequently delivered online throughout the remainder of the semester.¹⁰ Considering the post-ACUE period for cohort B overlaps with the onset of the pandemic in spring 2020, we conducted follow-up analyses on DFW rates and average course grades treating fall 2019 and spring 2020 separately as the post-ACUE period.

When examining DFW rates, follow-up analyses using only fall 2019 as the post-ACUE period showed a significant interaction between faculty type and the post-ACUE period, $b = -.08$, $OR = .67$, $SE = .06$, 95% CI [0.56, 0.81], $p < .001$. In comparison, follow-up analyses that use only spring 2020 as the post-ACUE period showed a marginal significant interaction between faculty type and the post-ACUE period, $b = -.03$, $OR = .86$, $SE = .08$, 95% CI [0.73, 1.03], $p = .099$. The observed patterns when separating the post-period terms are similar as described when considering the terms together although there is some evidence to suggest that the impact of ACUE on DFW rates might have been attenuated due the academic disruption caused by COVID-19.

When examining average course grades, follow-up analyses using only fall 2019 as the post-ACUE period showed a significant interaction between faculty type and the post-ACUE period, $b = .17$, $SE = .06$, 95% CI [0.05, 0.29], $p = .006$. Similarly, follow-up analyses that use only spring 2020 as the post-ACUE period showed a significant interaction between faculty type and the post-ACUE period, $b = .19$, $SE = .06$, 95% CI [0.07, 0.31], $p = .002$. The observed patterns when separating the post-period terms are

¹⁰ To view the announcements from UA-PTC, visit: <https://uaptc.edu/footer-navigation/news-blog/2020/03/11/all-ua-pulaski-tech-locations-to-cancel-classes-beginning-thursday-march-12-as-covid-19-precaution>. See also <https://uaptc.edu/footer-navigation/news-blog/2020/03/20/ua---pulaski-tech-to-shift-all-classes-online-for-remainder-of-spring-semester>



the same as described when considering the terms together and provide evidence that the impact of ACUE on average course grades was persistent despite the academic disruption caused by COVID-19.

Discussion

This evaluation found a beneficial impact of ACUE faculty on student academic outcomes at UA-PTC. Among students taught by the first cohort of faculty (cohort A), there was a significant effect on students' likelihoods of passing courses and receiving fewer DFW grades; the beneficial effect on DFW grades was greater for Black students. Exploratory analyses suggest that the gap in DFW rates between Black and White students widened over time among students enrolled in matched course sections, while the gap remained comparatively stable among Black and White students enrolled in ACUE-faculty-led course sections. Overall, results for cohort A suggest that an additional 120 students passed their courses and 145 fewer students received DFW grades in their courses than would have otherwise.

Among students taught by the second cohort of faculty (cohort B), there was a significant effect on students' likelihood of receiving DFW grades and on their average course grades; while evidence suggests that these effects were greater for Hispanic students, these heterogeneity effects should be interpreted with caution given the small proportion of Hispanic students in the sample. Overall, results for cohort B suggest that 250 fewer students in the during period and 201 fewer students in the post period received DFW grades in their courses than would have otherwise. Furthermore, average grades were .14 grade points higher in 2018–2019 (2.65 instead of 2.51 on a 4.0 scale) and .18 grade points higher in 2019–2020 (2.79 instead of 2.61) among course sections taught by ACUE faculty than otherwise expected. Lastly, in analyses of both cohorts, post-period effects do not appear to differ in the terms before and after COVID-19 led to cancellations in face-to-face classes.

Because the effects associated with ACUE vary by measured outcomes, time period, and cohort, future research should consider why some effects (e.g., improved average grades) appear for one cohort



and not the other. Future research should also consider the extent to which estimates may be impacted by the problem of multiple comparisons (Shaffer, 1995). There was also no effect over time of ACUE faculty on students' completion rates for either cohort A or cohort B.

The impacts found in this evaluation add to prior evidence demonstrating a beneficial impact of ACUE faculty on students' course outcomes (Hecht, 2019; Lawner, Chasteen, et al., 2021; Lawner & Snow, 2018, 2019a, 2019b, 2020; Lawner, Snow, & Burt, 2019; Lawner, Snow, MacCormack, & Waltje, 2019; Pippins, Chasteen, et al., 2021a, 2021b; Pippins, Hartigan, et al., 2021). There are multiple reasons why the ACUE course might lead to improved passing and DFW rates as well as grades, which is primarily believed to be broadly stronger instruction by ACUE faculty that leads to better student learning.

One limitation of the current study is that the analyses do not account for clustering of outcomes, such as within sections, courses, or faculty. This non-independence of observations can affect the standard errors and thus statistical significance. However, given that faculty teach multiple courses and sections, and those courses include some sections taught by ACUE faculty and others taught by non-ACUE faculty, it is unclear whether sections should be considered nested within faculty or vice versa. Choosing a method of clustering is additionally complicated because students are not unique to courses; rather, they may be taught by both ACUE faculty and non-ACUE faculty. In these cases, the interdependence of observations makes it more difficult to find significant differences because it means that the observations across groups are more similar to each other. Furthermore, the benefit of the ACUE course on students' growth mindset, for example, could carry over into those students' outcomes in their other courses. Therefore, the complicated nature of the data makes for a more conservative test of the ACUE impact in some ways, and a more liberal test in other ways—variations that could balance each other out. However, future research should account for at least one aspect of the clustered nature of the data.



References

Braga, M., Paccagnella, M., & Pellizzari, M. (2016, July). The impact of college teaching on students' academic and labor market outcomes. *Journal of Labor Economics*, 34(3), 781–822.

<https://www.jstor.org/stable/26553224>

Braxton, J. M., Bray, N. J., & Berger, J. B. (2000). Faculty teaching skills and their influence on the college student departure process. *Journal of College Student Development*, 41(2), 215–227.

Candio Sekel, J. (n.d.). The essentials of college instruction: ACUE's course in Effective Teaching Practices: A comprehensive bibliography. Association of College and University Educators & American Council on Education. [https://acue.org/wp-](https://acue.org/wp-content/uploads/2018/07/ACUE_Bibliography_v3fnoMarks.pdf)

[content/uploads/2018/07/ACUE_Bibliography_v3fnoMarks.pdf](https://acue.org/wp-content/uploads/2018/07/ACUE_Bibliography_v3fnoMarks.pdf)

Carrell, S. E., & West, J. E. (2010, June). Does professor quality matter? Evidence from random assignment of students to professors. *Journal of Political Economy*, 118(3), 409–432.

<https://doi.org/10.1086/653808>

Condon, W., Iverson, E. R., Manduca, C. A., Rutz, C., & Willett, G. (2016). *Faculty development and student learning: Assessing the connections*. Indiana University Press.

De Vlieger, P., Jacob, B., & Stange, K. (2019). Measuring instructor effectiveness in higher education. In

C. M. Hoxby & K. Stange (Eds.), *Productivity in Higher Education* (pp. 209–258). University of Chicago Press. [https://www.nber.org/books-and-chapters/productivity-higher-](https://www.nber.org/books-and-chapters/productivity-higher-education/measuring-instructor-effectiveness-higher-education)

[education/measuring-instructor-effectiveness-higher-education](https://www.nber.org/books-and-chapters/productivity-higher-education/measuring-instructor-effectiveness-higher-education)

Freeman, S., Haak, D., & Wenderoth, M. P. (2011, Summer). Increased course structure improves performance in introductory biology. *CBE—Life Sciences Education*, 10(2), 175–186.

<https://www.lifescied.org/doi/pdf/10.1187/cbe.10-08-0105>



Hecht, D. (2019). *A study of ACUE professional development at Rutgers University-Newark*. Center for Advanced Study in Education, The Graduate Center, City University of New York.

https://acue.org/wp-content/uploads/2019/09/091218_ACUE_CASE_technical-report.pdf

Hoffmann, F., & Oreopoulos, P. (2009). Professor qualities and student achievement. *The Review of Economics and Statistics*, 91(1), 83–92. <http://dx.doi.org/10.1162/rest.91.1.83>

Lawner, E. K., Chasteen, A., Lester, K. F., Pippins, T., & Snow, M. (2021, July). *Cumulative academic impact of students having multiple course experiences with instructors who have completed one or more ACUE microcredential courses*. Association of College and University Educators.

<https://acue.org/wp-content/uploads/2023/07/USM-Technical-Report-Cumulative-Impact-2021.pdf>

Lawner, E. K., & Snow, M. (2018). *Teaching makes the difference: Higher student success rates at Delta State University*. Association of College and University Educators. [https://acue.org/wp-](https://acue.org/wp-content/uploads/2018/09/ACUE_StudentImpactReport_DeltaState_122018_v7.pdf)

[content/uploads/2018/09/ACUE_StudentImpactReport_DeltaState_122018_v7.pdf](https://acue.org/wp-content/uploads/2018/09/ACUE_StudentImpactReport_DeltaState_122018_v7.pdf)

Lawner, E. K., & Snow, M. (2019a, February 22). *Improved learning at democracy's college: Findings from Miami Dade College, part B*. Association of College and University Educators.

https://acue.org/wp-content/uploads/2019/03/ACUE_MDC-Tech-Report_100120.pdf

Lawner, E. K., & Snow, M. (2019b, August 26). *Strong instruction, sustained: Higher student evaluations and grades at the University of Nevada, Reno*. Association of College and University Educators.

https://acue.org/wp-content/uploads/2019/09/ACUE_UofNevadaReno_spreads_proof_052820.pdf

Lawner, E.K., & Snow, M. (2020, May 15). *Advancing academic equity at Broward College: Improved course completion and passing, particularly among Pell-eligible and Black students*. Association



of College and University Educators. [https://acue.org/wp-](https://acue.org/wp-content/uploads/2020/06/ACUE_Broward-Tech-Report_100120.pdf)

[content/uploads/2020/06/ACUE_Broward-Tech-Report_100120.pdf](https://acue.org/wp-content/uploads/2020/06/ACUE_Broward-Tech-Report_100120.pdf)

Lawner, E. K., Snow, M., & Burt, T. (2019, January 9). *Grades up: Quality teaching at the heart of student success in San Francisco*. Association of College and University Educators. [https://acue.org/wp-](https://acue.org/wp-content/uploads/2019/06/ACUE_CCSF-Grades-Up-Report_100120.pdf)

[content/uploads/2019/06/ACUE_CCSF-Grades-Up-Report_100120.pdf](https://acue.org/wp-content/uploads/2019/06/ACUE_CCSF-Grades-Up-Report_100120.pdf)

Lawner, E. K., Snow, M., MacCormack, P., & Waltje, J. (2019). *Better in Texas! Impact of ACUE-credentialed faculty on student course completion*. Association of College and University Educators. [https://acue.org/wp-](https://acue.org/wp-content/uploads/2019/03/ACUE_StudentImpactReport_TWU_050719_v2.pdf)

[content/uploads/2019/03/ACUE_StudentImpactReport_TWU_050719_v2.pdf](https://acue.org/wp-content/uploads/2019/03/ACUE_StudentImpactReport_TWU_050719_v2.pdf)

MacCormack, P., Snow, M., Gyurko, J., & Candio Sekel, J. (2018). *Connecting the dots: A proposed accountability method for evaluating the efficacy of faculty development and its impact on student outcomes*. Association of College and University Educators. [https://acue.org/wp-](https://acue.org/wp-content/uploads/2018/07/WP3_Connecting-the-Dots.pdf)

[content/uploads/2018/07/WP3_Connecting-the-Dots.pdf](https://acue.org/wp-content/uploads/2018/07/WP3_Connecting-the-Dots.pdf)

Pippins, T., Chasteen, A., Lester, K. F., Lawner, E. K., & Snow, M. (2021a, July). *Gateway to gains: Improved grades, passing and DFW rates in gateway courses taught by ACUE faculty at the University of Southern Mississippi*. Association of College and University Educators.

<https://acue.org/wp-content/uploads/2023/07/USM-Technical-Report-Gateway-to-Gains-2021.pdf>

Pippins, T., Chasteen, A., Lester, K. F., Lawner, E. K., Snow, M. (2021b, July). *What happens next? Better subsequent course grades and DFW rates after taking gateway courses with ACUE faculty at the University of Southern Mississippi*. Association of College and University Educators.

<https://acue.org/wp-content/uploads/2023/07/USM-Technical-Report-What-Happens-Next-2021.pdf>



Pippins, T., Lawner, E. K., & Snow, M. (2021). *A lasting impact: Improved grades at Texas Women's*

University. Association of College and University Educators. https://acue.org/wp-content/uploads/2022/12/TWU-3-year-cohort-A-Technical-Report_final_pdf.pdf

Pippins, T., Hartigan, L., Lawner, E. K., & Snow, M. (2021). *Worth the wait: Improved grades in sections*

taught by ACUE faculty at Purdue University Northwest in the year after they earned their credential. Association of College and University Educators. https://acue.org/wp-content/uploads/2022/12/PNW-Cohort-B-Technical-Report_3.2021_PDF.pdf

Shaffer, J. P. (1995, February). Multiple hypothesis testing. *Annual Review of Psychology*, 46(1), 561–

584. <https://doi.org/10.1146/annurev.ps.46.020195.003021>

Stock, J. H., & Watson, M. W. (2012). *Introduction to econometrics* (Vol. 3). Pearson.