



Improved Course Completion Rates at Waubonsee Community College

TECHNICAL REPORT

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Executive Summary

In recent years, there has been a growing body of research focusing on interventions to improve student performance in postsecondary education. While some interventions target students directly, institutions that collaborate with the Association of College and University Educators (ACUE) are leveraging faculty development to ensure students' access to evidence-based teaching. This approach aims to improve post-secondary performance by empowering faculty members with effective teaching strategies. Faculty certified in ACUE's Framework complete modules across five competencies, with a focus on implementing the evidence-based teaching practices included in the courses. Previous evaluations have found positive impacts of ACUE-certified faculty on various student outcomes (Hecht, 2019; Lawner et al., 2021; Lawner & Snow, 2018, 2019a, 2019b, 2020; Lawner et al., 2019a; Lawner et al., 2019b; Pippins et al., 2021a, 2021b, 2021c).

This evaluation utilizes student-level data to assess the influence of ACUE-certified faculty members on student academic outcomes at Waubonsee Community College. Located in Sugar Grove, Illinois, Waubonsee Community College is a public two-year institution that serves more than 20,000 students through its four campuses and online programs. The collaboration between Waubonsee Community College and ACUE began in the 2019-2020 academic year, with one cohort of faculty members earning the ACUE certification in Effective Teaching Practices. The evaluation specifically focuses on the impact of this cohort comprising 20 ACUE-certified faculty.

To measure the impact of ACUE faculty at Waubonsee Community College, this evaluation employs a difference-in-differences (DID) approach. Specifically, the evaluation focuses on comparing changes in course outcomes, such as course completion rates, passing rates, DFW rates (withdrawal/failure rates), and grades, between students enrolled in course sections taught by ACUE-certified faculty and those in similar course sections taught by non-certified faculty. The comparison is conducted across three distinct time periods: before, during, and after faculty members obtained their ACUE certification.



The evaluation found that ACUE-certified faculty had a significant positive effect on students' completion rates in the post period. Specifically, students taught by ACUE faculty had a 1.5 percentage point higher probability of completing courses one year after the ACUE course.

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 evidence-based teaching practices that improve student achievement and close equity gaps. Numerous 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

Introduction

In higher education, the quality of instructors has a significant impact on student academic performance. Studies have shown that improvements in instructor quality are associated with positive outcomes for students (Carrell & West, 2010; Braga et al., 2016; Brodaty & Gurgand, 2016), and these improvements tend to have lasting effects across multiple semesters (De Vlieger et al., 2017). As a result, researchers have focused on identifying effective teaching practices (see, e.g., Freeman et al., 2014) and offering training programs to college faculty to enhance their instructional quality.

ACUE developed and offers professional development courses that focus on improving faculty's use of effective teaching practices that improve student achievement. These courses

¹ To learn more visit [acue.org](https://www.acue.org).



are based on the Effective Practice Framework, which outlines the fundamental teaching skills and knowledge that every college educator should possess, regardless of their discipline (ACUE, 2016). In addition, ACUE has also developed an accountability framework that enables it to evaluate the effectiveness of its programs in partnership with colleges and universities, which ensures ACUE's accountability for the quality of its courses and the impact they have on student learning outcomes (MacCormack et al., 2018). This accountability framework has 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 (see MacCormack et al., 2018). The present evaluation examines the impact of the ACUE-certified faculty on level 5.

Several evaluations have examined the influence of ACUE-certified faculty on student outcomes and have consistently found positive effects. 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; Pippins et al., 2021c; Pippins et al., 2021d). 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). These findings are held across various institutions, including 2-year and 4-year colleges with diverse student populations, strengthening the robust evidence of ACUE faculty's positive impact.

Specifically focusing on Waubonsee Community College, a comprehensive community college in Sugar Grove, Illinois, serving over 20,000 students, this evaluation utilizes student-level data to investigate the impact of ACUE certification. The evaluation centers on 20 faculty members who completed the ACUE Effective Teaching Practices (ETP) full course from fall 2019 to spring 2020. To measure the impact on student performance, a difference-in-differences (DID) approach is employed. This approach compares changes in outcomes, such as completion rates, passing rates, DFW rates, and grades, of students taught by ACUE-certified faculty over



time, against those taught by non-certified faculty, before, during, and after participating in the ACUE course.

Methodology

Participants and Procedures

Twenty faculty at Waubonsee Community College enrolled in the ETP full course in fall 2019 and became ACUE-certified in spring 2020. To evaluate the impact of this cohort of ACUE-certified faculty on their students' outcomes, Waubonsee Community College's Office of Institutional Effectiveness provided student-level course outcome data (i.e., transcript data) for all course sections taught by the 20 ACUE-certified faculty and for a set of matched similar course sections taught by non-certified faculty (153 faculty). These matched course sections were selected based on the field and level of the section being taught, the tenure of the instructor, and the instructor's years of teaching experience at the institution to make the matched sections as similar as possible in content, difficulty, and level of experience of instructors to the ones taught by the ACUE-certified faculty.

The evaluation sample consisted of 32,284 non-unique student enrollments from 1,252 sections taught by 173 instructors across three academic years. The academic years include fall 2018 - spring 2019 (baseline period, one year before faculty enrolled in the ACUE course), fall 2019 - spring 2020 (during period, when faculty participated in the ACUE course), and fall 2020 - spring 2021 (post period, one year after ACUE faculty completed the ACUE course). Within the sample, there were 5,860 non-unique student enrollments from 260 sections taught by ACUE-certified faculty and 26,424 non-unique student enrollments from 992 sections taught by non-certified faculty. Table 1 provides a comparison of the number of non-unique student enrollments and sections taught by ACUE-certified faculty and non-certified faculty for each time frame.

Table 1
Number of Student Enrollments and Course Sections by Faculty Type and Time Frame at Waubensee Community College

	Faculty type			
	ACUE		Non-ACUE	
Time point	Non-unique student enrollments	Course Sections	Non-unique student enrollments	Course Sections
Baseline	2,318	95	10,284	353
During ACUE	1,745	80	7,965	325
Post ACUE	1,797	85	8,175	314

In the baseline period, the average section size of ACUE-certified faculty was 24.4 (SD = 9.11), while for non-certified faculty it was 29.13 (SD = 13.17). In the during period, the average section size for ACUE-certified faculty decreased to 21.81 (SD = 6.21), while for non-certified faculty it decreased to 24.51 (SD = 10.08). In the post period, the average section size further decreased to 21.12 (SD = 7.87) for ACUE-certified faculty and increased to 26.05 (SD = 10.68) for non-certified faculty. Statistical analysis revealed significant differences in average section size between ACUE-certified faculty and non-certified faculty across all three periods. In the baseline period, the difference was significant with $t(12600) = 30.13, p < .001$. Similarly, in the during period, the difference was significant with $t(9708) = 10.08, p < .001$. Lastly, in the post period, the difference was significant with $t(9970) = 18.26, p < .001$.

In Figure 1, we compare the proportions of ACUE-certified and non-certified faculty in the analytic sample based on their rank. It reveals that ACUE-certified faculty are more likely to hold the position of tenured professors, while non-certified faculty are more likely to be adjunct professors. This difference is statistically significant, $\chi^2(2, N = 173) = 10.5721, p < .005$. Figure 2 examines the proportions of male and female faculty among ACUE-certified and non-certified instructors. Although the proportion of female faculty was slightly smaller among ACUE-certified faculty, there was no significant difference between ACUE-certified and non-certified faculty in terms of gender distribution. The statistical analysis showed $\chi^2(1, N = 173) = 0.0458, p = 0.831$, indicating that the likelihood of being a female instructor did not differ significantly between the two groups.

Figure 1.
Faculty Share by Rank at Waubonsee Community College

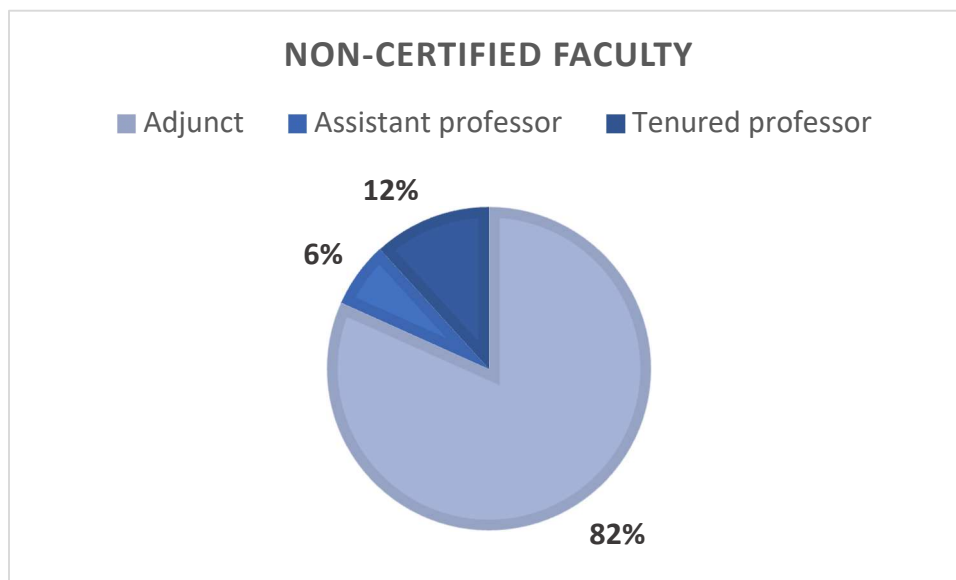
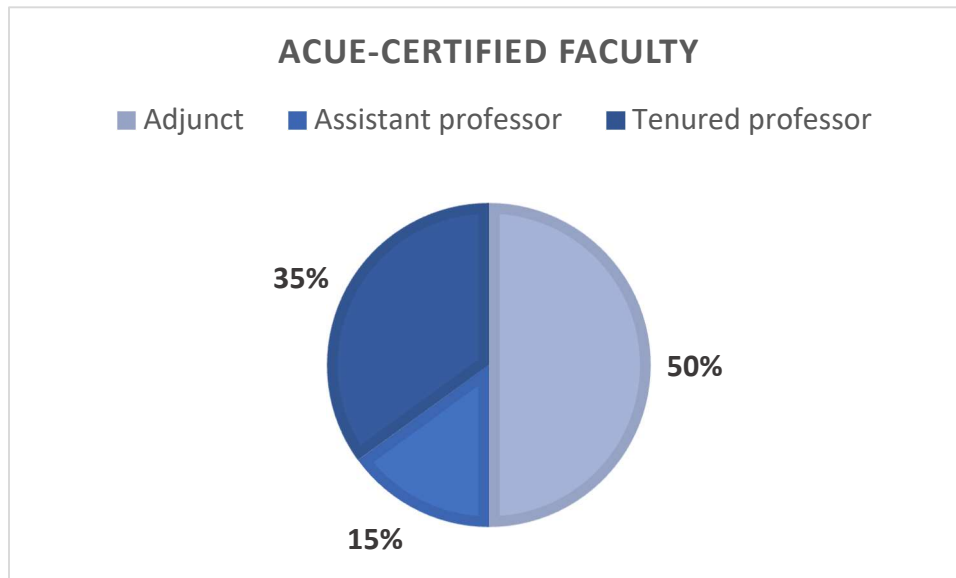
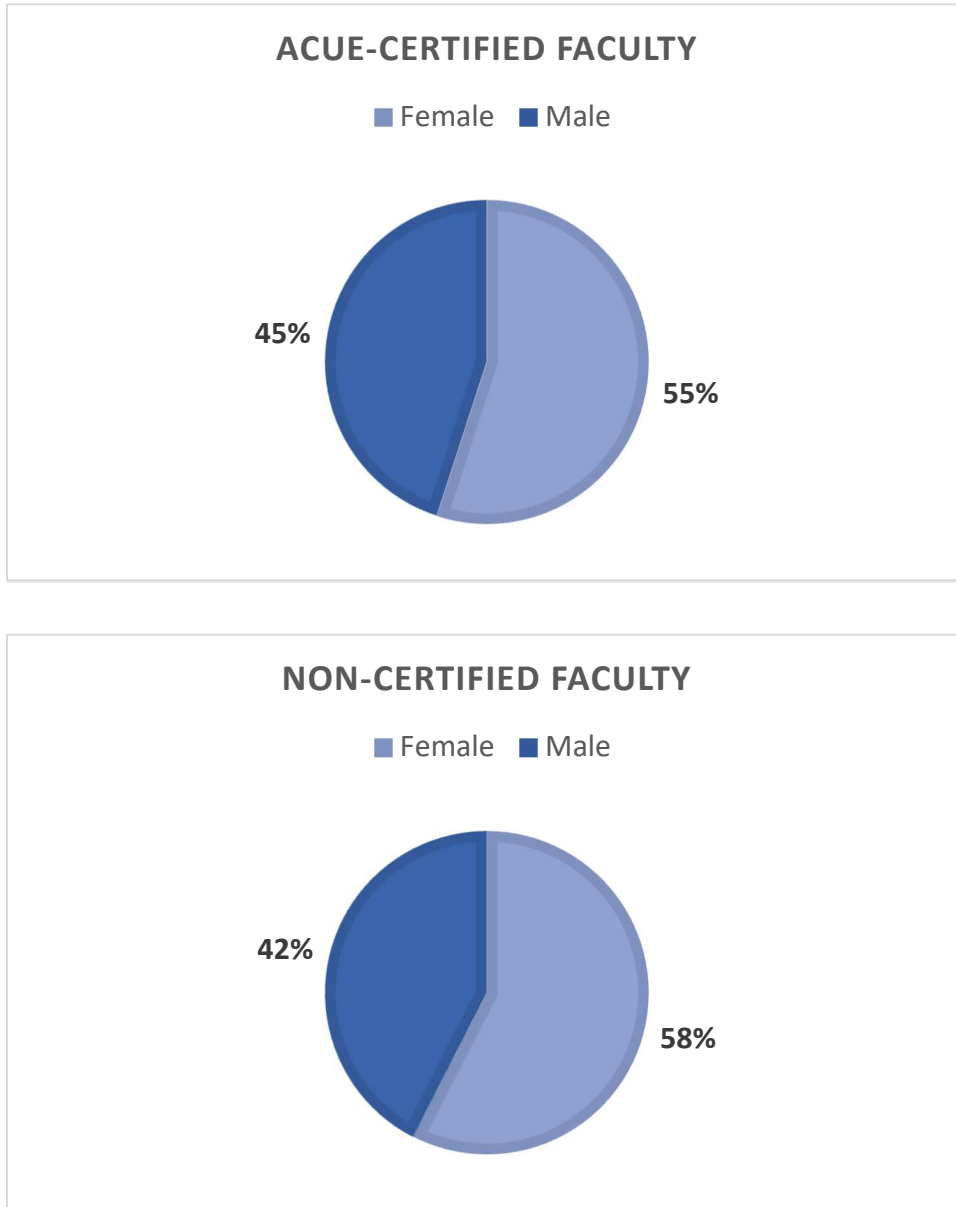


Figure 2
Faculty Share by Gender at Waubonsee Community College



As displayed in Table 2, the average age across all student enrollments in the sample was 21.75 years ($SD = 6.70$). White students made up 50.8% of the total enrollments, followed by Hispanic/Latino students (36.7%), Black students (7.5%), and students of other races/ethnicities (4.9%). Most of the enrollments were made up of Pell-eligible students

(64.1%) and first-year students (53.6%). Likewise, most students in the sample were female (57.6%).

Table 2 <i>Descriptive Statistics for Course Sections Taught by ACUE-certified faculty and Matched Sections</i> <i>(N = 32,284)</i>		
Variable	Mean	SD
Age	21.75	6.70
Female (%)	.58	.49
Black (%)	.08	.26
White (%)	.51	.50
Hispanic (%)	.37	.48
Other (%)	.05	.22
Pell eligible (%)	.64	.48
Class standing – First year (%)	.54	.50
International status – Yes (%)	.003	.06
Instructional mode – Online (%)	.42	.49
Completion rate (%)	.93	.26
Passing rate (%)	.91	.28
DFW rate (%)	.20	.40
Course grade	2.85	1.25

In addition to student demographic information and course outcomes reported in Table 2, the data included faculty demographic information (e.g., gender, tenure, years at the institution) and course characteristics (e.g., course name, department, and term offered).

Measures

The course outcomes of interest for the analysis were students' completion rates, passing rates, DFW rates, and course grades. At Waubonsee Community College, students were identified as having completed a course if they did not withdraw after the add/drop period; that is, receive a W as a final mark. Passing marks included A, B, C, and D; and DFW marks included D, F, and W. Analyses of passing excluded students who withdrew before receiving a final grade. Course completion, passing rates, and DFW rates were all created as binary variables. The course completion variable 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; otherwise, it was coded as 0. The passing variable was coded as 1 for all students with marks A, B, C, or D. As students who withdrew from courses were not included when accounting for passing rates, the passing variable was coded as 0 for students who received an F mark. 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, course outcomes were converted from an alphabetic scale to a 4-point numeric equivalent (A = 4, B = 3, C = 2, D = 1, F = 0). Students who withdrew from the course before receiving a final grade were not included in the course grade analyses estimating average grade points.

Data Analysis

To determine the impact of the ACUE-certified faculty on student outcomes at Waubensee Community College, a differences-in-differences (DID) approach was applied to compare the changes over time in the averages of the outcomes of interest. Analyses compared differences in completion rates, passing rates, DFW rates, and average grade points in course sections taught by ACUE-certified faculty against those in similar courses taught by non-certified faculty using interactions between time frames (baseline period vs. during period and baseline period vs. post period) and faculty type (ACUE-certified vs. non-certified). For binary outcomes—completion, passing, and DFW rates—the DID model was run using binomial logistic regression, and for average grade points, ordinary least square regression was used. Also, to make results easier to interpret, linear probability models were used to estimate the marginal effects of the parameters of interest.

As mentioned, main effects were included for whether a faculty was an ACUE-certified faculty (dummy coded as 1 for ACUE-certified faculty and 0 for non-certified faculty) and time frames, which 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, and faculty type and post period. These parameters captured the change over the



mentioned time frames in student outcomes in course sections taught by ACUE-certified faculty relative to course sections taught by non-certified faculty.

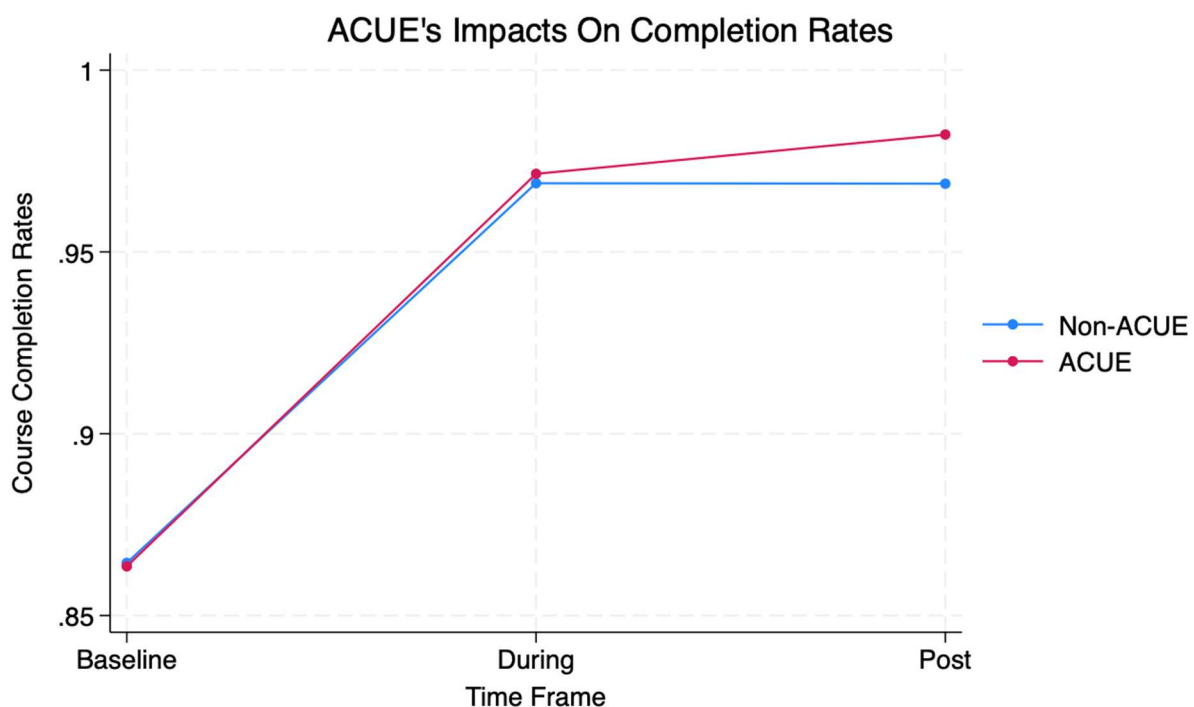
When the interactions between faculty type and time frame were significant at the 5% alpha level, follow-up analyses were conducted to examine heterogeneity effects and whether impacts are larger for students from marginalized groups. In these cases, additional analyses were conducted that separately examined interactions with race/ethnicity, Pell eligibility, and gender. In these analyses, the parameter of interest is the three-way interaction between the demographic variable, time frame, and faculty type. For these analyses, the reference groups were White students when accounting for student race/ethnicity, non-Pell-eligible students when accounting for Pell eligibility, and female students when accounting for student gender. However, none of the three-way interactions presented significant results in the present evaluation.

All analyses controlled for faculty demographics (gender and rank), student demographics (age, gender, race/ethnicity, class standing, Pell eligibility, and international student status), instructional mode, and student headcount per course section. Rank was coded as adjunct, assistant professor, and tenured professor. The race/ethnicity variable was simplified into four categories: Black, White, Hispanic, and other, with the latter combining students of ethnicities comprising less than 5% of the sample (Asian, Native Hawaiian or Pacific Islander, Native American, mixed race, international students, and students whose race/ethnicity was unknown). The Pell-eligibility variable was constructed as a binary variable, with Pell-eligible students coded as 1 and non-Pell-eligible as 0. Similarly, international status was coded as 1 for international students and as 0 for non-international students. The instructional mode variable refers to the course format and was coded as either traditional or online. It was not possible to control for faculty years of teaching experience at the institution and student college generational status because the available data for these variables were not reliable enough to be included in the analyses.

Results

Completion rates

The DID estimates for the impact of ACUE-certified faculty on student completion rates are significant in the post period, $b = 0.59$, $SE = .22$, 95% CI [0.16, 1.02], $p = .007$, but not in the during period, $b = 0.10$, $SE = .18$, 95% CI [-0.25, 0.44], $p = .579$. Specifically, completion rates of students taught by ACUE-certified faculty increased, on average, 1.5 percentage points from the baseline period to the post period, relative to students in sections taught by non-certified faculty.



Further analyses showed that students' likelihood of completing courses increased across the entire sample from the baseline period to both the during period, $OR = 4.97$, $p < .001$, and the post period, $OR = 4.95$, $p < .001$. However, the significant interaction indicates that the magnitude of improvement from baseline to the post period was larger for students of ACUE faculty. In addition, in the post period, students of ACUE-certified faculty were marginally

more likely to complete courses than students in comparison sections, $p = .085$, whereas there was no significant difference at baseline, $p = 1.00$.

Interactions with Race/Ethnicity

Follow-up analysis adding interactions with race/ethnicity found no significant interactions between Black students, faculty type, and the during period, $b = -0.77$, $SE = .56$, 95% CI $[-1.86, 0.32]$, $p = .167$, or the post period, $b = -0.23$, $SE = .77$, 95% CI $[-1.73, 1.27]$, $p = .767$. Likewise, there were no significant interactions between Hispanic/Latino students, faculty type, and the during period, $b = -0.07$, $SE = .39$, 95% CI $[-0.83, 0.69]$, $p = .861$, or the post period, $b = -0.29$, $SE = .51$, 95% CI $[-1.28, 0.70]$, $p = .567$. Finally, interactions between students categorized under “Other” race/ethnicity, faculty type, and the during period, $b = 0.29$, $SE = .25$, 95% CI $[-1.95, 2.53]$, $p = .801$, or the post period, $b = -1.10$, $SE = .83$, 95% CI $[-2.72, 0.52]$, $p = .183$, were also not significant.

Interactions with Pell eligibility

Analysis adding interactions with Pell eligibility found no significant interaction between Pell-eligible students, faculty type, and the during period, $b = 0.45$, $SE = .36$, 95% CI $[-0.26, 1.16]$, $p = .213$, nor between Pell-eligible students, faculty type, and the post period, $b = 0.37$, $SE = .44$, 95% CI $[-0.50, 1.24]$, $p = .399$.



Passing rates

The DID estimates for the impact of ACUE-certified faculty on student passing rates were not significant in either the during period, $b = -0.08$, $SE = .14$, 95% CI $[-0.35, 0.19]$, $p = .562$, or the post period, $b = -0.17$, $SE = .14$, 95% CI $[0.45, 0.11]$, $p = .228$.

DFW rates

The DID estimates for the impact of ACUE-certified faculty on changes over time in student DFW rates were not significant in either the during period, $b = -0.05$, $SE = .09$, 95% CI $[-0.23, 0.13]$, $p = .577$, or the post period, $b = -0.07$, $SE = .10$, 95% CI $[-0.26, 0.13]$, $p = .504$.

Average grades

The DID estimates for the influence of ACUE-certified faculty on changes in course grades were not significant in the during period, $b = 0.02$, $SE = .04$, 95% CI $[-0.06, 0.11]$, $p = .606$, nor in the post period, $b = -0.06$, $SE = .05$, 95% CI $[-0.15, 0.03]$, $p = .192$.

Discussion

The present evaluation observed a positive impact of ACUE-certified faculty on student academic outcomes at Waubonsee Community College the year after the ACUE course. Among students taught by the 20 ACUE-certified faculty, there was a significant effect on students' likelihood of completing courses one year after the ACUE course after accounting for faculty and student demographics, course characteristics, and overall changes happening at Waubonsee Community College. The predicted probability of course completion for students taught by ACUE-certified faculty was 1.5 percentage points higher in the post period than otherwise expected had faculty not earned the ACUE certification. These results would suggest that an additional 27 students completed their courses one year after the ACUE course than would have been otherwise the faculty had not become ACUE-certified. Heterogeneity tests were conducted to examine whether these impacts were larger for students from marginalized



groups; these analyses did not present significant results when accounting for student race/ethnicity, student gender, or Pell eligibility. There were no observed effects over time of the ACUE-certified faculty on students' passing rates, DFW rates, and final course grades.

The impact observed in this evaluation adds to prior evidence demonstrating a positive impact of ACUE faculty on students' completion rates (Lawner & Snow; 2020; Lawner et al., 2019b). An important reason why completion rates improve in course sections taught by ACUE-certified faculty might be stronger instruction, enhanced student engagement, and the creation of a supportive learning environment, these being three of the core principles around which the ACUE courses are designed. For example, students may have been less likely to withdraw from courses taught by ACUE-certified faculty because they felt more supported and had a stronger belief that they could succeed in the course.

There are some important limitations in this study that should be considered. First, it was not possible to account for faculty years of teaching experience at the institution and student college generational status because the data obtained for those variables was not reliable enough to be included in the analyses. Also, it was observed that a larger proportion of ACUE faculty were tenured professors, and a smaller proportion were adjuncts compared with non-certified faculty, which could indicate some bias in the selection of faculty to become ACUE-certified. All analyses controlled for faculty rank; however, this difference means that caution should be used when generalizing the results to groups with more adjunct faculty.

Additionally, the sample population for this study consisted of only 20 ACUE-faculty members, some of whom did not teach in certain semesters or did not have matches. As a result, the number of ACUE-faculty members available during the during and post periods was reduced to 17 and 16, respectively. Although this sample size adheres to ACUE's methodological standards for detecting significant changes over time, it is a relatively small sample. Outliers and chance variation have a larger impact on results in studies with small sample sizes. This means that the findings of a study with a small sample size may not accurately represent the larger population from which it is drawn, which can result in



misleading or inaccurate conclusions. Likewise, there were significant differences in the average section size between the ACUE-certified faculty and the non-certified faculty across all three periods. These differences limit the ability of the study to detect differences between the groups; therefore, even if there are actual significantly different results between the two groups, they may not be able to be identified due to reduced statistical power.

More importantly, the nature of this study did not allow accounting for the clustering of outcomes, such as within course sections or faculty, with this non-independence of observations potentially affecting standard errors and statistical significance. Considering that faculty teach multiple course sections and some of them are taught by ACUE-certified faculty and others by non-ACUE faculty, it is unclear whether sections should be nested within faculty or vice versa. This interdependence of observations further complicates the choice of clustering method because students are not unique to course sections which makes it difficult to find significant differences across groups. Likewise, the benefits of the ACUE course on students' growth mindset, for example, may carry over into their outcomes in other courses, making the data more complicated. Hence, the complexity of the data could make testing the ACUE impact more conservative in some ways and more liberal in others, with variations that could balance each other out. Nevertheless, future evaluations should consider at least one aspect of the clustered nature of the data to better assess the impact of ACUE-certified faculty.

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