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Meta-Analysis finds Positive Average Effect of ACUE-Certified Faculty on Several Student Outcomes

Analysis of ACUE Evaluations shows significant average effect, translating into an increase in students' course completion rates, a decrease in DFW rates, as well as an increase in average course grades when taught by ACUE-credentialed faculty.

In 2022, ACUE's research team partnered with Elizabeth Tipton, Ph.D. (Northwestern University), to conduct a meta-analysis with the aim of better understanding the effect of ACUE on faculty effectiveness across partnering college and universities. The primary research question was:

- What is the average effect of the ACUE's course in Effective Teaching Practices on faculty effectiveness, as measured by student's academic outcomes?

To answer this question, the analysis reviewed 68 effect estimates from 11 recent evaluations of the ACUE course in Effective Teaching Practices. These evaluations comprise 8 unique institutional partners, representing a range of institutional types that includes two- and four-year colleges and universities of various sizes and geographic locations. The meta-analytic model indicates a positive average effect of the ACUE course (d = 0.06, p < .01, 95% PI [0.00, 0.13]) on faculty effectiveness, as measured by student course outcomes.

Key Findings

- The result from the intercept-only meta-regression reveals an **average effect size of .0627α,** p < .01.
  - The average effect size can be translated into an anticipated average effect of:
    - **1-percentage point increase in course completion rates**
    - **3-percentage point decrease in DFW rates, and**
    - **.06-point increase in students' average course grades** (on a 4.0 scale).

Methodology

To address our research questions, we compiled a list of the 68 effect estimates across 11 public-facing and forthcoming evaluations of the ACUE course across 8 unique institutions—three institutions evaluated the effect of the ACUE course on multiple cohorts over time. Moreover, the institutions for which evaluations were conducted represented a variety of two- and four-year colleges and universities across the United States. See Table 1 for a list of these institutions.

All effect estimates come from evaluations that were conducted between 2018 and 2022 and included data from fall 2015-spring 2020. Additionally, all evaluations adopted a difference-in-difference approach to evaluate the effect of the ACUE course. Using the approach, authors were able 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 were compared across three different time periods, including the terms before, while, and after subsets of faculty completed the ACUE course.

Importantly, some evaluations were conducted using student level data while others used course level data. The different levels of data used across evaluations—in addition to varying missingness in student, course, and faculty level characteristics across datasets—led to the decision to perform a meta-analysis to understand the average effect of the ACUE course.

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The meta-analytic approach employed random-effects meta-regression given the variation in sample size, student populations, covariates, and matching across evaluations. This variation suggests the potential for a distribution of true effects sizes instead of an identical effect size across evaluations. We assess the variation in effect sizes attributable to both between-study error (treatment effect heterogeneity) and within-study error (sampling variability). Furthermore, we use robust variance estimation (RVE) methods that allows us to include all dependent effect sizes in a single meta-regression model. This is important because each evaluation measures several outcomes that are a construct of grades, including course completion rates, passing rates, success rates, DFW rates, and final course grades. We modeled the dependence structure of the effect sizes using a Correlated and Hierarchical Effect (CHE) working model, which makes the simplifying assumption that there is a single, known correlation (ρ) between pairs of effects from the same evaluation that is the same across all evaluations. We then implemented inverse variance weighting based upon this working model, and used RVE to estimate standard errors and conduct hypothesis test (for more information, see Pustejovsky & Tipton, 2021). Additional details of the methodology will be provided in a forthcoming technical report.

TABLE 1—COLLEGES AND UNIVERSITIES INCLUDED IN SAMPLE	
1	BROWARD COLLEGE (2)
2	CITY COLLEGE OF SAN FRANCISCO
3	MIAMI DADE COLLEGE
4	PURDUE UNIVERSITY–NORTHWEST
5	TEXAS WOMAN'S UNIVERSITY
6	UNIVERSITY OF ARKANSAS–PULASKI TECHNICAL COLLEGE (2)
7	UNIVERSITY OF NEVADA–RENO (2)
8	UNIVERSITY OF SOUTHERN MISSISSIPPI

Notes. The numeric value in parentheses that succeeds some college names indicates the number of evaluations conducted with the school.

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.

Elizabeth Tipton is an Associate Professor of Statistics, the Co-Director of the Statistics for Evidence-Based Policy and Practice (STEPP) Center, and a Faculty Fellow in the Institute for Policy Research at Northwestern University. Tipton's research focuses on the design and analysis of field experiments, with a particular focus on issues of external validity and generalizability in experiments; meta-analysis, particularly of dependent effect sizes; and the use of (cluster) robust variance estimation.

References

Pustejovsky, J. E., & Tipton, E. (2022). Meta-analysis with robust variance estimation: Expanding the range of working models. *Prevention Science, 23*(3), 425-438.