

Student Success in Competency-Based Education Courses

Insights From the Community College Sector

Willis A. Jones
University of South Florida

Contents

Introduction	1
District CBE Courses	1
Methodology.....	2
Findings	3
Conclusion and Recommendations	5
Want More Information?.....	6
Acknowledgments.....	6
Footnotes	7
References	8

Introduction

As colleges and universities consider curriculum innovations that increase efficiency and student success, competency-based education (CBE) is growing in popularity. CBE is broadly defined as courses and programs of study that give college credit to students based on subject knowledge rather than clock hours spent in the classroom (Rasmussen, Northrup, & Colson, 2017). Many argue that CBE can help colleges and universities address some of the biggest challenges facing higher education (Kelchen, 2015; Parsons, Mason, & Soldner, 2016).

Research on student success in CBE courses, however, is largely nonexistent. In this second of three research briefs, I discuss the findings of a study exploring how various characteristics correlated with community college student success in CBE courses. This project was completed in partnership with the [National Research Collaborative on Competency-Based Education and Learning](#).

District CBE Courses

This analysis was completed using data from a college community college district (hereafter called the district) in the southern region of the United States. The district contains 16 colleges across a broad geographic area and enrolls over 100,000 students. CBE courses in this district are traditional community college courses redesigned in a competency-based framework. Each course has three to five modules that students must pass. Each module begins with a pretest to measure a student's knowledge of the module materials. Students who demonstrate mastery in the pretest can progress directly to the posttest and earn credit for the module. Students who do not pass the pretest proceed through assignments and assessments at their own pace until they have demonstrated mastery of the course content. The district offers various CBE courses in STEM, the social sciences, the humanities, and workforce solutions.

CBE courses in the district are asynchronous, online, and self-paced. The courses are typically facilitated by full-time district faculty, and students are provided with CBE "success coaches" who can assist them with issues they might have in the course. CBE courses in the district also offer students flexible enrollment options. Students have the option of starting a CBE course each Monday for the first ten weeks of the semester. As a result, students can complete a course in anywhere from 6 to 15 weeks. It is important to note that CBE courses within the district are not "direct assessment," which largely abandons the use of the credit hour (Brower et al., 2017). Students in the district are required to finish a CBE course within a typical academic semester.

Methodology

I obtained data from all first-time district students enrolled in a CBE class during the 2018-19 academic year. The original dataset contained 825 first-time students enrolled in 77 different CBE courses offered by the district during the academic year. Because some students enrolled in multiple CBE classes during the academic year, the full dataset contained 1,060 student-course observations.

The dataset contained several student demographic and enrollment characteristics commonly used to predict student success in college courses, such as race, academic preparation, and Pell Grant status. The dataset also contained students' final letter grades for CBE courses. Using an OLS regression, I estimated the correlation between student characteristics and CBE course grades. The dependent variable, CBE course grade, was treated as a discrete variable with F assigned a value of 0, D assigned a value of 1, C assigned a value of 2, B assigned a value of 3, and A assigned a value of 4. Nine independent variables were included in the estimation model (see Table 1).

Several observations were dropped from the original dataset. Students who voluntarily withdrew from a CBE course were dropped from the dataset (170 observations). Because of their unique grading scale and course goals, observations from developmental courses were also dropped (90 observations). Students enrolled in CBE first-year experience courses were excluded (98 observations)¹. Finally, 11 observations were dropped because a student was administratively dropped from a CBE course, and four observations were dropped because a student did not report their sex. The final sample contained 687 student-course observations. More details on the methodology used are available upon request.

Table 1: Variable Names and Descriptions

Variable Name	Description
Enrollment status	Indicator of whether students were enrolled fulltime or parttime during the semester in which they took a CBE course; 0-partime, 1-fulltime
Race	Student self-reported race; 0-nonunderrepresented (white & Asian), 1-underrepresented minority (Black, American Indian, Hispanic, Non-residents, two or more races, race unknown) ²
Previous college credit	Measure of whether students had previous college credit before enrolling in the district; 0-some previous credit, 1-no previous college credit

Sex	Student self-identified sex: 0-female, 1-male
Academic preparation	District-developed measure of student college readiness based on high school GPA and exam scores; 0-unprepared, 1-prepared, 2-no preparedness indicator
Academic program	Measure of whether students majored in transfer or occupational/technical curriculum; 0-occupational/technical curriculum, 1-transfer curriculum
Family income	District definition of income status based on whether a student received the federal Pell Grant; 0-non low income, 1-low income, 2-no indicator of income available
Week Started	Discrete indicator of what week during a semester a student enrolled in a CBE course; range from 1 (indicating student started course first week of the semester) to 10 (indicating student started course tenth week of the semester)
Home college	Fixed-effect used to control for the home college of a student within the district

Findings

Table 2 displays findings from the regression analysis. Five variables were found to be statistically significant predictors of CBE final course grades. Underrepresented students received lower final course grades than white and Asian students. First-time college students received lower final course grades than first-time district students with some college credit. Male students received lower final course grades than female students. Academically unprepared students received lower final course grades than academically prepared students and students with no academic preparation indicator. Finally, low-income students received lower final course grades than non-low income students.

The week a student enrolled in a CBE class had no significant correlation with their final course grade. Students who enrolled in class week one, eight, or ten had similar final course grades. Enrollment status and academic program were also found to be statistically insignificant predictors of students' final CBE course grade.

Table 2: Findings from Regression Estimation

Full-Time (<i>omitted part-time</i>)	0.12 (0.16)
Underrepresented minority (<i>omitted non-underrepresented</i>)	-0.63** (0.20)
First time (<i>omitted some previous college credit</i>)	-0.46** (0.15)
Male (<i>omitted female</i>)	-0.52** (0.16)
Academically Prepared (<i>omitted unprepared</i>)	0.51** (0.16)
No Indicator of Academic Preparation (<i>omitted unprepared</i>)	0.44* (0.22)
Transfer Curriculum (<i>omitted occupational/technical curriculum</i>)	-0.09 (0.16)
Low income (<i>omitted non-low income</i>)	-0.50* (0.20)
Income Unknown (<i>omitted non-low income</i>)	-0.16 (0.23)
Week Started	-0.01 (0.03)
Constant	3.56*** (0.67)
<i>N</i>	687
<i>R</i> ²	0.146

Robust standard errors (clustered at student/class level) in parentheses

Home College Fixed Effects Included

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Conclusion and Recommendations

Underrepresented minority, first-time, male, academically underprepared, and low-income students earned significantly lower CBE course grades.

Using data from a large community college district, this report offers one of the first statistical analyses of the factors that influence student performance in CBE classes. The list of variables provided to me for this analysis was limited, so the estimation model captured only a portion of the variance in student final course grades. Therefore, the findings of this study should not be considered causal. More work is needed to better understand the student and institutional characteristics most closely associated with success in CBE courses.

Nevertheless, the findings of this study provide valuable insights for the higher education community. Many of the characteristics associated with lower grades in CBE classes (such as race, income, gender, lack of academic preparation) were similar to the variables found to influence community college student course performance in general (Allen, DeLauro, Perry, & Carman, 2017; Xu & Jaggars, 2013). Students previously found to be most academically vulnerable to lower academic success in terms of course grades and degree completion are also among the most susceptible to lower grades in CBE courses. It is important for administrators and faculty to carefully consider how CBE courses can be designed and delivered in ways that ensure equitable outcomes. Advocates of CBE often taut it as a tool for facilitating equitable educational outcomes for traditionally underserved, disenfranchised, and diverse students (Malia Krauss, 2017; James, 2019). This study's findings suggest that work needs to be done if we hope to help CBE reach that goal. To help facilitate efforts to make CBE outcomes more equitable, future research might use qualitative methods to better understand why academically vulnerable students are less successful in community college CBE classes.

The nonsignificant finding associated with when students enrolled in a CBE course is worth noting. Lack of reliance on "seat time" is an important distinction of CBE courses. Students in CBE courses can often choose their own start date and progress at their own pace (McCall, 2013). Some critics of CBE argue that the accelerated nature of CBE classes for students who enroll later in a semester can negatively impact student success (Daniel, 2000; Wlodkowski, 2003). Research has shown, however, that students in shorter, accelerated courses do just as well as students in full 15-week courses (Seamon, 2004). The findings of this study support previous research. In a module-based, self-directed CBE course, students completing the course a shorter, more compressed format did not earn significantly different grades. These findings,

however, should not be interpreted as causal given likely selection concerns that come from the fact that later enrollment in a CBE course likely correlated with omitted factors that impact students' final course grades (such as prior subject knowledge). Further research, perhaps using instrumental variable estimators, might help us better understand the causal impact of course enrollment time on final grades in CBE courses.

The findings of this study provide the higher education community with a look at what characteristics correlate with CBE course performance. However, comparing CBE students to other CBE students is just one aspect of student performance. Another important question is how students enrolled in CBE classes perform relative to students enrolled in traditional college courses. The third research brief in this series will investigate this question.

Want More Information?

AIR is active in the CBE research community and is committed to building partnerships to gather evidence regarding the effectiveness of CBE programs. Please send any questions about this research brief to Willis A. Jones, Associate Professor of Higher Education and Student Affairs, at jonesw150@usf.edu.

Acknowledgments

The American Institutes for The National Research Collaborative on Competency-Based Education and Learning at the American Institutes for Research provided grant support for this research project. The National Research Collaborative on Competency-Based Education and Learning supports research to inform responsible scaling of CBE/L practices in postsecondary settings.

The views expressed in this brief are solely the author's and do not represent the opinions of American Institutes for Research, the Lumina Foundation, or any other affiliated entities.

Footnotes

¹ First-year experience (FYE) courses are college success courses that are very different than most of the "subject" focused courses in this dataset. Therefore, they were dropped from the analysis.

² This definition comes directly from the district's definition of underrepresented minority

References

- Allen, N. J., DeLauro, K. A., Perry, J. K., & Carman, C. A. (2017). Does Literacy Skill Level Predict Performance in Community College Courses: A Replication and Extension. *Community College Journal of Research and Practice*, 41(3), 203-216.
- Brower, A. M., Humphreys, D., Karoff, R., & Kallio, S. (2017). Designing quality into direct-assessment competency-based education. *The Journal of Competency-Based Education*, 2(2).
- Daniel, E. L. (2000). A review of time-shortened courses across disciplines. *College Student Journal*, 34(2), 298-308.
- James, A. (2019). Improving Student Success for Diverse Students Utilizing Competency-Based Education. *Cultural and Pedagogical Inquiry*, 11(2), 67-77.
- Kelchen, R. (2015). *The landscape of competency-based education: Enrollments, demographics, and affordability* (AEI Series on Competency-Based Higher Education). Lumina Foundation. Retrieved from <https://www.luminafoundation.org/files/resources/competency-based-education-landscape.pdf>
- Malia Krauss, S. (2017). *How competency-based education may help reduce our nation's toughest inequities*. Retrieved from Lumina Foundation: <https://vtechworks.lib.vt.edu/bitstream/handle/10919/83258/ToughestInequities.pdf?sequence=1&isAllowed=y>
- McCall, M. B. (2013). The Kentucky community and technical college system learn on demand model. *Change: The Magazine of Higher Learning*, 45, 60-65.
- Parsons, K., Mason, J., & Soldner, M. (2016). On the path to success: Early evidence about the efficacy of postsecondary competency-based education programs. American Institutes for Research. Retrieved from <https://www.air.org/sites/default/files/downloads/report/Path-to-Success-Postsecondary-Competency-Based-Education-Programs-Oct-2016.pdf>
- Rasmussen, K., Northrup, P. T., & Colson, R. (Eds.). (2017). *Handbook of research on competency-based education in University settings*. Hershey, PA: IGI Global.
- Seamon, M. (2004). Short-and long-term differences in instructional effectiveness between intensive and semester-length courses. *Teachers College Record*, 106(4), 635-650.

Wlodkowski, R. J. (2003). Accelerated learning in colleges and universities. *New directions for adult and continuing education*(97), 5-16.

Xu, D., & Jaggars, S. S. (2013). The impact of online learning on students' course outcomes: Evidence from a large community and technical college system. *Economics of Education Review, 37*, 46-57.

Copyright © 2020 American Institutes for Research®. All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, website display, or other electronic or mechanical methods, without the prior written permission of the American Institutes for Research. For permission requests, please use the Contact Us form on www.air.org.