

Executive Summary

OCTOBER 2020

Effects of a Paired Online First-Year Seminar with Developmental Mathematics on College Student Academic Achievement



Project Overview

A significant challenge for college students is the lack of literary and mathematical skills required for college-level coursework. The Center for the Analysis of Post-Secondary Readiness (CAPR) reported that 68% of students who began at a community college and 40% of students who began at a public 4-year college took one or more remedial courses (Hodara, 2013). Many of those students placed into remedial courses did not complete prescribed course sequences and persist to graduation (Bailey Jeong, & Cho, 2010). This requires strategies for improving the success rates of students in these courses.

Student success courses or first-year seminars are one of several high-impact practices associated with increased

persistence, retention, and graduation rates of college students (Rutschow & Schneider, 2011). Although first-year seminars are commonly offered on most colleges and universities, they are not always required of remedial students or intentionally paired with remedial courses. The purpose of this study was to explore the effect of an intervention in which an online first-year seminar was paired with developmental mathematics to improve the pass rates of these courses as well as the overall academic achievement of these students.

Method

First-time enrolled students placed into developmental mathematics (MATH 0333) between the fall 2018 and fall 2019 semesters ($n = 645$) were invited to participate in an online first-year seminar to support their academic skill

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development. There were 208 students (32.2%) who self-selected into one of several first-year seminars at the institution. Twenty of these students selected the online section associated with the Math Frameworks Learning Community (MFLC). Curriculum for this first-year seminar was adapted from the Frameworks for Mathematics and Collegiate Learning course developed by the Dana Center at the University of Texas at Austin (Charles A. Dana Center, 2014). Students in the sample were grouped into one of three categories for comparison. The categories included (a) participation in a first-year seminar, (b) participation in first-year seminar associated with the Math Frameworks Learning Community, or (c) no participation in a first-year seminar. Inverse probability of treatment weighting (IPTW) was then used to compare students on their likelihood of passing a developmental mathematics course and their overall GPA at the institution.

Findings

The percentage of students who earned a grade of C or better was 78.8% in the first-year seminar group. This was 12 percentage points higher than the passing rate of non-participants (students who did not participate in any first-year seminar). Students in the first-year seminar associated with the Math Frameworks Learning Community also performed better than non-participants (72.0%), although this increase was not as large

as what was observed from students in other first-year seminar sections. Despite differences in the passing rates between the groups, the observed differences were not statistically significant.

Groups were also compared on the overall GPA of students at the institution. Students enrolled in a first-year seminar ($-x_{gpa} = 2.33$, $SD = 1.05$) and students enrolled in the Math Frameworks Learning Community first-year seminar ($-x_{gpa} = 2.43$, $SD = 0.76$) reported higher GPAs than non-participants ($-x_{gpa} = 2.43$, $SD = 1.04$). However, the differences between these groups were not statistically significant ($F[2,496] = 2.262$, $p = .105$). The effect size between the first-year seminar groups and non-first-year seminar groups ranged between $d = 0.26 - 0.41$.

Discussion and Implications

Although there were no statistical differences between the groups in this study, the potential value of these seminars should not be dismissed. Students who enrolled in a first-year seminar had both notably higher odds of passing their developmental mathematics course (1.9 times) as well as a GPA 0.25 points higher than their peers. The small sample sizes in this study likely reduced the ability to detect statistical differences. It is also important to highlight that the findings in this study yielded patterns that were consistent with prior research. For example, Barnes

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(2012) reported that participation in a first-year seminar was associated with higher pass rates for students dually enrolled in developmental courses as well as higher end of term GPAs for probationary students. The similarities between these findings offer some level of convergent validity, but continued collection of data from this intervention may yield greater confidence as to whether such approaches may be effective for developmental education students.

Online courses are not a panacea for developmental education, but the unique challenges of this population cannot be ignored. Students enrolled in developmental education are more likely to be non-traditional students (Hawley & Chiang, 2017), a population typically in need of the flexibility that online courses provide (Johnson, 2015). For online courses to be successful, faculty need to create opportunities for students to interact with one another (Dixon, 2010). This should include strategies such as “announcements on the homepage of the course delivery system, e-mails to students, discussion forums in which the instructor interacts, and online lectures or connect sessions and chats, to enhance engagement (Dixon, 2010, p. 8).

It has also been suggested that colleges provide readiness activities for students considering online courses (Jaggars et al., 2013). One suggestion may be

to provide students with access to a sample course unit or assignments. A potential benefit of online courses is that content and assignments are already curated for faculty and students. This project may provide those interested in delivering an online first-year seminar with sample lesson plans and activities to familiarize students with online course instruction and to prepare them for expectations when taking courses through this modality.

Citations are available at the conclusion of the full white paper:

[Designing Approaches for Student Success](#)

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