



# **First-Year Seminars: An Effective Developmental Strategy for Remedial Mathematics?**

## **Executive Summary**

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## **Introduction**

Many students who begin college do not persist to degree completion. The National Center for Education Statistics reports that 62 percent of students who enter college at a public four-year institution graduate within 6 years (Hussar et al., 2020). The challenges are even greater for those who come to college underprepared. Many are placed into remedial or developmental courses (Ganga, Mazzariello, & Edgecombe, 2018) and the success rates for these courses are low (Bahr, 2008; Bailey, Jeong, & Cho 2010). Of students placed into developmental mathematics, only half completed developmental courses sequences (Chen, 2016). The low completion rates of developmental course sequences have both economic and social consequences for students.

Some have criticized approaches taken by post-secondary institutions to support underprepared students (Complete College America, 2012). These criticisms have resulted in a growing body of research on developmental education reforms. Much of this extant literature has focused on reforms such as remedial course placement (e.g. Hodara, Jaggars, & Karp, 2012; Hughes & Scott-Clayton, 2011; Ngo & Kwon, 2015), instructional delivery methods (emporium, face-to-face, and online; e.g. Bishop, Martirosyan, Saxon, & Lane, 2017; Zavarella, & Ignash, 2009), pathways (Rutschow & Diamond, 2015), and accelerated or co-requisite remediation models (Edgecombe, 2011; Jaggars, Hodara, Cho, & Xu, 2015). Evaluating the effectiveness of these reforms is important but may fail to consider the value other developmental programs (e.g., summer bridge, tutoring, advising). First-year seminars (FYS) are an example of an initiative outside the traditional developmental core (mathematics, reading, writing) with purported value in the literature (Kuh, 2008; Mayhew et al, 2016). These seminars are also commonly available at most colleges and universities, which make them ripe for intervention with special

populations. The purpose of this study was to explore the effectiveness of FYS for students placed into remedial mathematics.

## **Method**

Students placed into remedial mathematics between fall 2018 and spring 2020 ( $N = 845$ ) at a 4-year public institution in Texas were invited to participate in either a general FYS or a FYS offered as an online learning community for remedial mathematics. These two groups were then compared to those who chose not to participate in this high-impact practice. Because students were not required to enroll in a FYS, inverse probability of treatment weighting (IPTW) was used to minimize bias due to self-selection. Weighted groups were then compared on remedial and college-level mathematics course pass rates as well as students' overall GPA at the institution.

## **Findings**

Students who enrolled in a FYS were 2.3 times more likely to pass remedial mathematics ( $\chi^2[1] = 5.00, p = .03$ ), and 2.5 times more likely to pass the college-level mathematics course ( $\chi^2[1] = 6.05, p = .01$ ). These pass rates were also higher than those reported in other national studies (Bailey et al., 2010). Students who enrolled in a FYS also reported an overall GPA ( $\bar{x}_{gpa} = 2.54, SD = 0.60$ ) that was half a point higher than those who did not enroll in a FYS ( $\bar{x}_{gpa} = 1.97, SD = 1.17$ ). The online version of this seminar was less effective, although still an improvement from no intervention at all. However, recent trends and changes in digital learning may provide enhanced opportunities for online approaches to be more successful in the future.

## **Discussion and Implications**

Institutions should consider requiring those placed into remedial mathematics to concurrently enroll in a FYS. Because FYS are widely available on most campuses, the

institutional costs of requiring them for certain populations (i.e., underprepared students) may be less expensive than other approaches. The problem is that remedial courses do not typically count toward required credit hours for the degree. Placing additional requirements on these same students could create even further financial hardships and extend time to degree.

This study explored the effectiveness of FYS at one institution using an academically oriented seminar type, but other seminar types exist. Despite the volume of literature on FYS generally, few published studies exist exploring how these differences moderate existing relationships in the literature. Research by Permzadian and Crede (2016) is a significant step in this regard, but more research is needed to fully understand these differences, particularly given the variability in FYS across institutions. There is also a need to explore how these differences affect remedial course-taking and how they might be integrated in ways that do not create additional barriers for underprepared students.