

Developmental Math: Is A Traditional Approach Serving Underprepared Students?

Lily Glushakow-Smith
Towson University

Keywords: developmental, undergraduate, higher education, math education, co-requisite

This poster presents emerging results from a data-focused investigation of the effects Developmental Mathematics courses on student success at a large, comprehensive university. A growing research base about Developmental Mathematics suggests that effective Developmental Mathematics teaching requires a multifaceted overhaul from traditional models requiring multi-semester pre-requisite course sequencing, high stakes test placement, and front facing lectures by the professor. In particular, the literature suggests that co-requisite models, improving extracurricular supports, providing holistic placement methods, accelerating the developmental pathway, and enhancing professional development are all methods to support students progressing through the developmental pathway (Childers & Shi, 2021; Emblom-Callahan et al., 2019; S. S. Jaggars et al., 2014; S. Jaggars & Stacey, 2014; Miller, 2022; Park et al., 2018; Parker, 2019). Before implementing any changes, assessments need to be made on a case-by-case basis to determine which models are appropriate.

In the current study, I aimed to conduct a preliminary investigation of student success at a single university based on enrollment in a traditional algebra track developmental pathway. This institution's developmental math pathway is characterized as traditional because it is: a pre-requisite path from beginner to intermediate to college algebra; co-requisite offerings are only available to a specific subset of students; minimal active learning is utilized. My research question was: To what extent do students successfully proceed through a traditional developmental mathematics pathway? This research will add to the knowledge base of the field by contributing to the literature regarding failures of traditional pathways.

Methods

In order to examine student success rates, I accessed data from the Institutional Research board at the institution. I compiled demographic data, math course history and grades, and term GPA for all students enrolled in the algebra pathway (two sequential non-credit preparatory courses and College Algebra), during Fall 2021, Spring 2022, or Fall 2022. These data were analyzed to compare pass rates across demographics and various entry points to the pathway.

Results

Data analysis revealed that student success in this traditional developmental mathematics pathway is low. Students who enrolled in the lowest offered course only succeeded in passing college math in the minimum number of semesters seventeen percent of the time. The data also indicated that students that were failing the developmental courses had GPAs about a full letter grade lower than students that were passing the courses. These findings add to the research consensus that traditional developmental pathways do not well serve the aspirations of underprepared students. Future work will examine pathway interventions (such as course acceleration, implementation of active learning, providing more holistic placement methods, and enhancing professional development) to improve these outcomes and enable students to succeed.

References

- Childers, A., & Shi, X. (2021). Co-requisite remediation: A pilot study on expanding the placement range into co-requisite courses. *Practitioner to Practitioner*, 10(7), 4–12.
- Emblom-Callahan, M., Burgess-Palm, N., Davis, S., Decker, A., Diritto, H., Dix, S., Parker, C., & Styles, E. (2019). *Accelerating student success: The case for corequisite instruction*. 22.
- Jaggars, S. S., Edgecombe, N., & Stacey, G. W. (2014). *What we know about accelerated developmental education*. Community College Research Center, Teacher's College, Columbia University.
- Jaggars, S., & Stacey, G. (2014). *What we know about developmental education outcomes*. Community College Research Center, Teacher's College, Columbia University. <https://ccrc.tc.columbia.edu/media/k2/attachments/what-we-know-about-developmental-education-outcomes.pdf>
- Miller, B. A. (2022). *The effectiveness of redesigning undergraduate developmental mathematics: A longitudinal examination of multiple teaching methods* [D.Ed., Indiana University of Pennsylvania]. <https://www.proquest.com/docview/2656660378/abstract/ECE4E89F23244FE3PQ/1>
- Park, T., Woods, C. S., Hu, S., Bertrand Jones, T., & Tandberg, D. (2018). What happens to underprepared first-time-in-college students when developmental education is optional? The case of developmental math and intermediate algebra in the first semester. *The Journal of Higher Education*, 89(3), 318–340. <https://doi.org/10.1080/00221546.2017.1390970>
- Parker, P. (2019). *The grass grows green in virginia: A grassroots effort leading to comprehensive change in removing mathematics barriers for students*.