

Finding the Early Talent: Factors Predicting Early Advanced Math Enrollment

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Abstract

Early exposure to advanced math classes have shown higher levels of college readiness for students. However, there is evidence of a discriminatory gap among students of marginalized backgrounds in placement of these advanced courses. To examine this, three years of data from approximately 10,500 student will be used to develop and validate predictive models that examines both enrollment and performance in advanced math courses in the eighth grade. Data will come from a longitudinal study taking place in rural North Carolina. This research will use the predictive models to determine which students will be selected for eighth grade advanced math and if there is a selection bias for which eighth grade students are chosen to begin advanced math classes.

With the rigorous coursework that high schools and colleges have to offer, an early start with advanced classes set students up for success. Specifically, students enrolled in advanced math courses in junior high school have shown higher levels of college readiness (Dougherty et al., 2017). Research suggests that students who take advanced math courses in the eighth grade are more likely to take more advanced level math classes in high school (Spielhagen, 2006). Additionally, research supports evidence that policies for providing advanced math instruction in the eighth grade to students of all socioeconomic status (SES) is a potential method of closing the achievement gap related to the SES of school populations (Spielhagen, 2006).

When assessing which students are enrolled into these classes, there is evidence that a growing disparity is present in the enrollment of advanced placement classes amongst marginalized groups (Conger, Long, & Iatarola, 2009). To find the explanations of why these disparities exist within advanced placement courses, Conger et al., (2009) took a closer look at pre-high school characteristics, such as limited English proficiency and eighth grade achievement scores, to find any inconsistencies in underrepresented students. They found that most of the students enrolled in advanced courses were non-poor, white females. This suggests that these resources (i.e., advanced courses) are not easily accessible to students of marginalized identities. Similar research by Spielhagen (2006) found a disparity amongst racial groups, concluding that greater percentages of black and Hispanic eighth grade students were not enrolled in an advanced mathematics course compared to their white and Asian classmates.

Different biases and stereotypes of underrepresented demographic groups may be a contributing factor as to why certain groups are not enrolled into advanced placement courses. Riegle-Crumb and Humphries (2012) explored this bias in math teachers' assessment of

students' mathematical abilities. The perspective of teachers on gender and racial stereotypes is related to how they interact with students daily and may later lead to conditional bias (Riegle-Crumb et al., 2012). The results of this study showed that teachers' perspective of mathematical ability was favored toward white males over that of minority groups. Conclusively, it is evident that students with marginalized identities do not have a fair advantage when being selected to take an advanced level math course because of the adversity and biases that surround them. The purpose of our research is to determine the extent to which a selection bias continues to exist in eighth grade students when selecting them to start an advanced math classes.

Data from 11 districts in a rural part of North Carolina will be used to develop and validate a predictive models that examines both enrollment and performance in advanced math courses in the eighth grade. More specifically, data from a longitudinal college access study will be used. The goal of this program is to increase student preparedness for postsecondary education following high school. In doing so, this program provides access to programs that are meant to increase students' readiness for college courses and collects a vast range of data on the students currently involved in the program. The study's models will examine how traditional selection measures (e.g., Math and Reading Standardized Test score and cumulative and math specific GPA) relate to student demographic characteristics and if those demographic characteristics have a direct or indirect relationships with enrollment and performance in advanced math courses in the eighth grade. The model will be created and validated using three years of student data and include over 10,500 students. Results will help school districts identify overlooked students who are potentially ready to enroll early in advance mathematic courses and help to improve marginalized groups' college readiness.

References

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