

Enrichment program boosts STEM for black students but leaves Latinos behind

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Researchers trying to figure out how to get more black and Latino students into science, technology, engineering and mathematics usually focus on those students' college years.

In a new study that capitalizes on data from the National Center for Educational Statistics and methods that address causality, Cornell sociologists looked at an earlier portion of the pipeline - in high school, when students' commitment to STEM fields tends to solidify. They are the first to analyze the efficacy of Mathematics Engineering Science Achievement (MESA), one of the most well-established and widespread enrichment programs in the country. The study was published Jan. 20 in *Research in Higher Education*.

The research centers on MESA, a 48-year-old enrichment program operating throughout the United States that uses classes, hands-on competitions, academic support and industry involvement to help first-generation, low-income and socioeconomically disadvantaged students from middle school through college become more involved in STEM fields.

"For years we've been scouring the literature," said lead author Steven Alvarado, assistant professor of sociology, "and we haven't found anything about how or if MESA is effective on the things it wants to be effective for: increasing the STEM engagement outcomes of minority and other underrepresented students."

The researchers found the program improved [black students'](#) high school STEM engagement but had little impact on black and Latino students' aspiration to major in a STEM field in college.

Black students in the study who participated in MESA in the fall of their freshman year were more likely to take one or more Advanced Placement (AP) classes in a STEM subject later on in high school. But MESA participation had no effect on whether Latino students in the study took AP STEM classes. And it failed to make black, Latino or Asian students in the study any more likely to say they would declare a STEM major in college.

"One could say this is a progressive outcome, because black students are actually being affected in a behavioral manner - they're taking more AP STEM classes. And that could be preparing them for success in STEM in college," said Alvarado, who studies inequality in race and ethnicity, education, neighborhoods, health, immigration and criminal justice contact in the United States.

However, MESA's success comes with a major qualifier when it comes to improving Latino students' STEM engagement in high school and in college, Alvarado said. "In that way, it's falling short of its mission," he said.

Alvarado and doctoral candidate Paul Muniz, M.A. '17, analyzed data from the High School Longitudinal Study. The nationally representative data traces the STEM progress of more than 25,000 students through high school and into their post-high school years from 2009 through 2013. The data included whether the students participated in MESA during the fall of ninth grade, which AP courses they took in high school and which fields or subject areas they said they were likely to pursue in college.

There is no silver bullet to fix some of the racial and ethnic disparities seen in STEM education, Alvarado said. "I don't think it's fair to expect that MESA solves the problem of underrepresentation of blacks and Latinos in STEM by itself," he said.

However, the findings do suggest researchers and policymakers might be able to find new ways to amplify MESA's positive effects by tying enrichment programs with what is known in sociology as "social closure" - connections such as those between parents and schools or teachers, Alvarado said.

"There should be more connections with schools, parents and communities to fill the gaps in access to opportunity and to STEM resources," he said. "Together, that could have a larger impact on reducing racial and ethnic disparities in STEM participation."

More information: Steven Elías Alvarado et al. Racial and Ethnic Heterogeneity in the Effect of MESA on AP STEM Coursework and College STEM Major Aspirations, *Research in Higher Education* (2018). [DOI: 10.1007/s11162-018-9493-3](https://doi.org/10.1007/s11162-018-9493-3)

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