The Disconnect between Minority Students and STEM Careers


The report looks at ACT test results for the 2013 graduating class, in particular at students who said they were interested in STEM fields (science, technology, engineering and math) and the relationship between those students’ level of interest and their college readiness in math and science. Then using two interest levels – expressed interest and measured interest – it discusses the disconnect between students’ interest in studying STEM subjects and the academic success and persistence needed for STEM careers.

- Students with an expressed interest said they are considering studying STEM subjects or pursuing STEM careers.
- Students with a measured interest said they enjoyed doing the type of work involved in STEM subjects and careers. For example, “I like to fix toys” or “I enjoy problem solving.”

This report is important because it found measured interest and achievement in STEM do not necessarily lead to persistence in STEM, or to an increase in talented students who aspire to STEM majors or careers. It also found that an expressed interest in STEM is not necessarily equated with achievement or a measured interest in STEM.

Not surprisingly, *The Condition of STEM 2013* found that student achievement across all STEM fields was highest for those students with both expressed and measured interest in STEM:

- 58 percent of students with an *expressed and measured interest* in STEM met ACT college readiness benchmarks in math, and 51 percent in science
- 47 percent of students with only an expressed interest in STEM met ACT college readiness benchmarks in math; 38 percent in science
- 41 percent of students with only a measured interest in STEM met ACT college readiness benchmarks in math; 37 percent in science

To meet our education, economic, national security, and technological innovation goals, a stronger link must be made between students’ interest and students’ achievement in STEM. These numbers show that more must be done to capitalize on a wider pool of potentially “…

**Expressed and Measured Interest Results**

The more striking—and distressing—results, however, are the disparities in math and science benchmark achievement among racially and ethnically diverse students with *both* expressed and measured interest in STEM. First the overall results: 58 percent of all students with
expressed and measured interest met math benchmarks; 51 percent met science benchmarks. Results by race/ethnicity:

- 79 percent of **Asian students** with expressed and measured interest met math benchmarks; 64 percent met science benchmarks
- 64 percent of **White students** with expressed and measured interest met math benchmarks; 59 percent met science benchmarks
- 44 percent of **Hispanic students** with both expressed and measured interest met math benchmarks; 33 percent met science benchmarks
- 32 percent of **Native American students** with both measured and expressed interest met math benchmarks; 25 percent met science benchmarks
- 24 percent of **African-American students** with both measured and expressed interest met math benchmarks; 18 percent met science benchmarks

These gaps reveal stark inequities in achievement in subject areas deemed essential to emerging careers of the 21st century—those grounded in STEM skills and competencies—and subject areas in which students show interest. A key finding of the ACT report:

“The academic achievement gap that exists in general for ethnically diverse students *is even more pronounced among those interested in the STEM fields.* With the exception of Asian students, 61 percent of whom were interested in STEM, the number of ethnic minority students (African-American, Hispanic, and Native American) interested in STEM fields is low, as are their achievement levels in math and science. Among African-American students interested in STEM, the vast majority have an expressed interest only. Among measured interest only students, Hispanic students have a greater representation than other minority groups. A real opportunity exists for a meaningful discussion with these students on what STEM careers entail in terms of educational planning and achievement.”

Where and how should these critical discussions take place? Start in the classroom. Research shows that engaging students, particularly minority students, in STEM education early in the elementary school years makes a difference in students’ achievement and their intent to major in STEM—potentially by strengthening their belief that they can succeed in math. But, the positive impact of early engagement on STEM learning and STEM interest is contingent on quality and effective teaching. Numerous reports show that effective teachers are not equitably distributed among schools, particularly those schools serving high proportions of students from low-income or minority families.

Even if exposed to good STEM instruction, and even as they gain STEM skills and competencies, many students may not be able to see themselves as a part of the STEM community. Having a well-developed science identity includes competence in science, understanding of science, and recognizing oneself as a “science person” (Carlone & Johnson, 2007). This is an interactive process—complicated and challenging for students who do not have access to teachers, mentors, and peers who look like them or who reflect practices and research relevant to their communities and lives. Even those who demonstrate STEM competence and achievement may struggle to see themselves as potential scientists if they cannot link the work of science to their lives, goals, and perceptions of who does science.
What options should we consider? After-school and expanded-learning opportunities for students, particularly for students who have traditionally lacked access to rigorous math and science education, can help them gain the competencies and skills they need to achieve at the high levels.

Many high-quality programs provide STEM homework support, applied practice, and project-based learning activities and apprenticeships. These programs give students a better understanding of the field and promote students’ aspirations for STEM studies and careers. Two examples:

- Citizen Schools partners with schools and companies (e.g., Google, Cisco, Cognizant) to provide expanded-learning days to middle school students in low-income communities. Employees of its partner companies serve as volunteers, leading after school programs and workshops that connect students with leaders in the field, provide students with relevant learning experiences and give students the skills, access, and beliefs they need to succeed in school, college, and careers. Data show that students who have participated in Citizen Schools have better attendance, better grades, new skills, and transformed aspirations.

- The American Museum of Natural History’s Science Research Mentoring Program provides under-resourced youth with mentoring and counseling support and research lab experiences alongside expert researchers in the field. This program has been found to positively influence students’ career expectations, interest in STEM fields, and understanding of science. Emerging evidence suggests that students’ interest in STEM careers and activities continues into college.

Broadening participation in STEM has taken on more meaning in the 21st century and in the midst of what has become a “national learning economy.” STEM competencies are critical for success not only in STEM careers, but across an increasing number of career sectors and positions. We will not close the gap in STEM careers, if we also don’t close the gap in STEM interest, aspirations, and identity among all students. This work cannot be isolated within the walls of the classroom. Communities, businesses, organizations, and schools must come together to develop pools of diverse student STEM talent and interest, and deal with the inequity in the STEM career pipeline highlighted in ACT’s Conditions of STEM 2013 report.

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