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Let's Nurture Science, Math Talent

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Let's Nurture Science, Math Talent

Abstract

I recently saw the film *The Man Who Knew Infinity*, which was released in many American cities this weekend, and was struck by the beautiful telling of an inspirational story. The film, which stars Jeremy Irons and Dev Patel, is a biography of the mathematician Srinivasa Ramanujan, who was born in India at the end of the 19th century. [*excerpt*]

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Dev Patel as Srinivasa Ramanujan in "The Man Who Knew Infinity"

I recently saw the film *The Man Who Knew Infinity*, which was released in many American cities this weekend, and was struck by the beautiful telling of an inspirational story. The film, which stars Jeremy Irons and Dev Patel, is a biography of the mathematician Srinivasa Ramanujan, who was born in India at the end of the 19th century.

Though he flunked out of college twice, Ramanujan did mathematical research independently while working as a clerk in an accountant's office. He sent his results to the most prominent mathematicians in the world, most of whom ignored the work. G.H. Hardy, a professor at Cambridge University, was intrigued, though, and invited the unknown Ramanujan to come work with him in England in the midst of the First World War. The movie tells this story, so I won't risk spoiling it, but suffice it to say that Ramanujan's work was

profound and still affects large parts of mathematics today, not to mention other fields such as physics and applied chemistry.

There are many lessons one can take away from *The Man Who Knew Infinity* and from Ramanujan's story more generally, lessons about friendship, cross-cultural communication, and the relationships between science and religion, and between universities and society.

But the moral that seems most profound to me as an educator is a simple one: It is impossible to predict where talent will come from, so we in education need to work harder to identify it.

The world is filled with stories of people from unexpected backgrounds who turn out to have hidden talents that shake the world. In the music world, this is the very premise behind television shows like *American Idol*, and sports is filled with superstars who grew up in poverty.

When it comes to science, however, we have a much worse track record at identifying and nurturing talent across all races, genders, and socioeconomic classes, even within our own country. A recent study indicates that less than 10 percent of the STEM (Science, Technology, Engineering, and Mathematics) workforce in the United States identifies as either African American or Hispanic, though these two groups make up nearly 30 percent of the population. Women are only a quarter of the employees in scientific jobs in the United States.

Our failure to notice and nourish talent in underrepresented groups starts long before people enter the workforce. There is growing evidence that white students, particularly those from wealthier backgrounds, are significantly more likely to be identified as academically gifted.

And even those of us who are skeptical about high-stakes standardized tests should be concerned about the recent results from the National Assessment of Educational Progress: Only 1 percent of black, 3 percent of Latino, and 10 percent of white fourth graders achieved advanced scores in mathematics.

A number of efforts are underway to find scientific talent in unexpected places. One example is the Navajo Math Circles project, in which mathematicians work with teachers in the Navajo Nation to help their students develop a deeper understanding of mathematics. Another is the National Science Foundation's S-STEM Program, which helps colleges and universities provide scholarships to talented students who wish to study scientific disciplines.

I help run one of these programs at Gettysburg. This fall we are bringing in our first dozen students, who are either first-generation college or from groups that are traditionally underrepresented in the sciences. As with most S-STEM programs, we recognize that providing financial resources is critical, but it is also very important to mentor students and nurture their abilities, especially since many of them have not attended the best high schools. We plan to offer a series of workshops to get them up to speed, while also providing a cohort of peers in the sciences, mentors drawn from among older students and faculty, and opportunities to do research with faculty in addition to their course work.

We would all benefit from a more diverse STEM workforce. Our world faces too many challenges to allow the potential of true geniuses like Ramanujan to be left hidden in some notebooks no one will ever read.

Issues of diversity and equity cannot be solved overnight, but there are many steps that can be taken at all levels of our educational system to help all students thrive, and in the process unearth the truly exceptional talents that are out there.

We must invest the time, energy, and, yes, money, it takes to give all students first-rate educational opportunities and the kind of mentoring that inspires them to do their best, just as Hardy did for Ramanujan. What story could have a better moral than that?

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