

Finding the *Hidden Figures*, addressing the STEM gender-gap young Madelyn Broome

On a recent Sunday morning, one of Princeton University classrooms hummed with the high-pitched chatter of excited elementary, middle, and high school students. As morning sun streamed through the windows, 41 young girls met their college-aged mentors for the first time. It was Princeton's *Hidden Figures* day, a day when girls of color and their parents travel from nearby areas for an event aimed at girls with a budding interest in science, technology, engineering, and math (STEM).

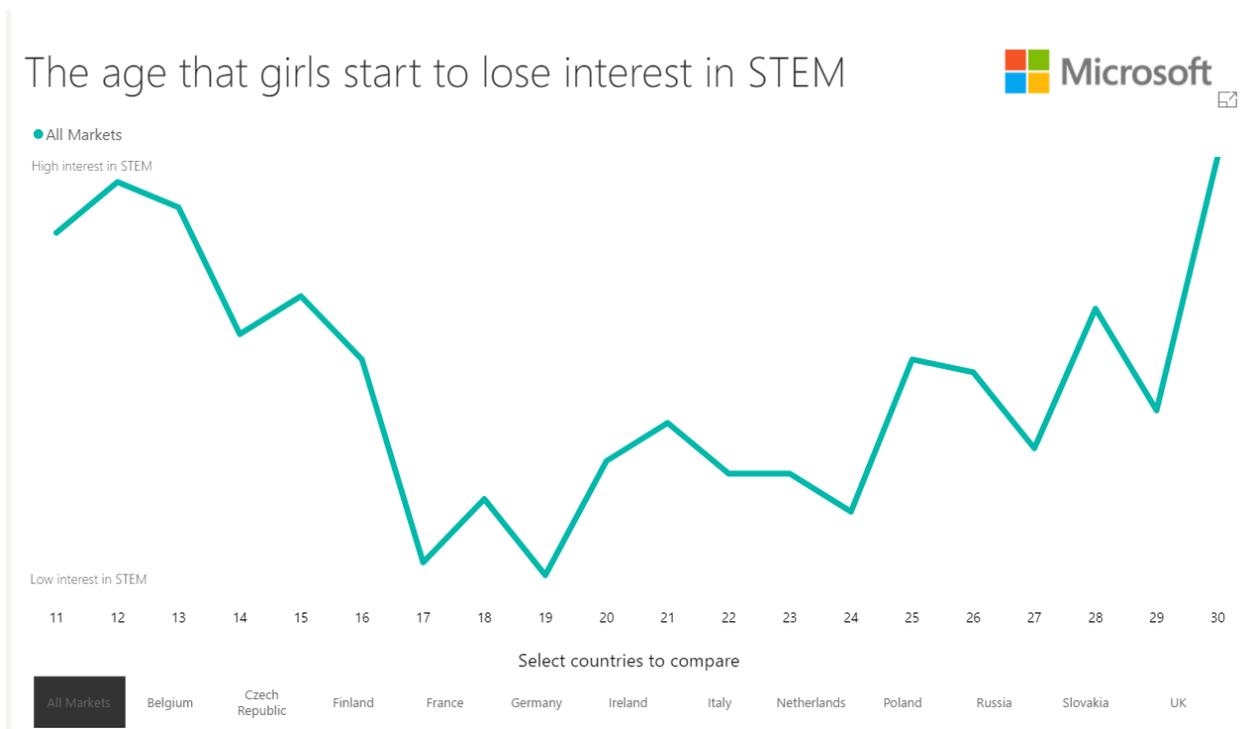
One of them, nine-year-old Sabrina, whose favorite subject is math, listened as the college mentors began explaining the film they were about to see. When Sabrina heard that math played a starring role in *Hidden Figures*, her eyes lit up with excitement, her tiny braids practically quivering against her pink-polka dot jacket. "Really!?" she gasped when her mentor told her about the movie's math-prodigy protagonist, Catherine.

And it's troubling to think that her spark may soon go out.

Statistically, by the time Sabrina and girls like her are 12, they will begin to lose interest in STEM. Even if Sabrina is an exception and maintains her interest in math, she'll be one of only a handful of women in her upper-level math classes in college, and one of even fewer minorities. Today, [women account for](#) only 43% of bachelor's degrees in mathematics and only 33% of PhD's in the field – a lower percentage than for biology, where women compose a majority, but much higher than all [other branches of STEM](#), especially physics and computer science.

The [National Girls Collective Project](#) says that, while there has been an increase in women and minorities in STEM over the past 20 years, even with the gains, women and minorities are still greatly underrepresented in STEM fields. And when girls 'lose interest' or are pressured out of the field, everyone loses. At the current pace, economists estimate that, by 2020, there will be 2.4 million unfilled STEM jobs.

A number of studies have attempted to identify why so many female future innovators are disappearing. A 2015 study led by Microsoft, a company with a vested interest in cultivating a wider-base of future software developers and engineers, conducted focus groups among a total of 11,500 girls across Europe, asking them about their interest in STEM subjects. Among the findings: a precipitous decline in interest in STEM starting at the age of 12 that continued through high school.



In addition to data about the ages at which girls lose interest in STEM, Microsoft sought to understand why girls interested in STEM turn away from it throughout their primary school years.

The responses that Microsoft collected from the surveyed girls, agree with what researchers have identified as the main factors for declining interest: lack of role models, stereotype threat (the influence of a stereotype on an individual's performance), and subsequent classroom disengagement.

That's where *Hidden Figures* comes in. The Oscar-nominated 2016 film tells the true story of Catherine Goble Johnson, Dorothy Vaughan, and Mary Jackson, three African-American women working at NASA as "computers" – the brilliant mathematicians who performed the pre-computer calculations that launched the first American into orbit. The three women battle prejudice and the ticking clock of the Space Race to ultimately earn their way to great success and regard.

The *Hidden Figures* day at Princeton draws its inspiration from similar events aimed at girls of color taking place across the US, including one put on by a Princeton student in Atlanta, said the event organizer and Princeton senior, Moni Owoade.

Owoade and her fellow organizers aren't the only one to have recognized the potential of the inspirational film. The actresses that feature in the film, as well as many charitable organizations and STEM education advocates, have seen the movie as a way to reach, resonate with, and inspire young viewers.

The film's main actresses, Octavia Spencer, Janelle Monáe, and Taraji P. Henson, have all personally funded screenings to allow minority girls and families to attend free of charge. Even

21st Century Fox, the film studio that produced the movie, got in on the charity screenings, citing the importance of “[bringing] this film to audiences that wouldn't otherwise be able to see it - audiences that might include future innovators and barrier-breakers.”

Efforts like the Hidden Figures Day -- showing girls both celebrities and college students that persevered in STEM -- can help solve the problem of role models. Other initiatives are also calling on creative solutions to address the commonly-cited reasons for girls giving up on STEM.

To battle the stereotype that STEM subjects ‘aren’t for girls’, one American company called [Goldieblox](#) has created engineering-inspired toys for girls. Pastel-colored gears, blocks, rods, and strings make up the basic Craft-struction box. With these base components, girls are able to build pre-designed structures and machines, or come up with their own.

Goldieblox is the brainchild of Stanford-grad and engineer Debbie Sterling who started the company to “disrupt the pink aisle” which is home to most girls’ toys in stores. The company has come along way from Sterling’s 2012 Kickstarter campaign, with big chains such as Target now carrying Goldieblox toys. The company also won a \$4 million dollar [30 second ad](#) during the 2014 Super Bowl (an event which typically features some of the most watched advertisements on TV). Forbes Magazine called the victory “historic” for the commercial’s refreshing and empowering message.

In the commercial, set to the tune a 1985 hit by Slade, girls flood from houses and playgrounds, carrying with them pink, “girly” toys, that they use to build a rocket. “Come on bring the toys. Girls build just like boys,” they sing defiantly as they flood the streets in pants and princess dresses alike.

To give girls more hands on experience as recommended in the Microsoft report, a coalition of US states has developed the [Next Generation Science Standards](#) (NGSS), a comprehensive recommendation calling for more explorative and hands-on methods aimed at making science less intimidating and more engaging for all students. While it’s not a recommendation for a specific curriculum, the guidelines focus on teaching and testing methods that emphasize “understanding and application as opposed to memorization of facts devoid of context.” That means teaching kids how to experiment and discover.

Creative science curriculums have the potential to better engage all students – not just the girls, notes Erin Hogeboom, community development manager of the [National Girls Collaborative Project](#). The Collective is an organization dedicated to sharing resources and increasing collaboration among educators and advocates for girls in STEM. Hogeboom says the Collective has spent the last 15 years watching the “watching the continual tipping of the needle towards gender equality” in STEM and initiatives like *Hidden Figures*, Goldieblox, and the NGSS - which are raising public awareness of the gender disparity and reaching girls both in and out of the classroom - are what’s making the difference.

If the NGSS recommendations are adopted by state governments, these standards would set in stone what many teachers have already been doing inspire their science students. Hogeboom emphasized the importance of tying what students learn in class to real world issues. And that’s not the only area of the NGSS that has the Collective’s approval: “Incorporating creativity into a curriculum,” says Hogeboom, “creates a sense of ownership over the work they [girls] are doing. It shows [STEM] is accessible to them.”

During Princeton's *Hidden Figures* day, many of the girls expressed their love of being able to explore and learn in interactive labs. As the girls waited for the final panel of the day, Isabela, a shy 13-year-old, came alive as she talked about a lab in which she had to try and fit a gummy worm through a Lifesaver candy without touching either sweet.

Before the panel began, a young Princeton University woman stood at the lectern and tried to rally the gathered girls, "How many of you like math, chemistry, computers, and all that?"

Some hands shot up instantly. Others followed more slowly.

"Come on, be proud!" she prompted. The crowd laughed and more small hands climbed skyward - like the rockets these little figures, hidden no longer, may someday launch.