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CONTRIBUTORS

Opinion | What it truly means to be gifted

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Ten-year-old actress Mckenna Grace plays math genius Mary Adler in the movie Gifted. "I've worked with exceptional students who can solve the same problems tackled by the fictional Mary Adler. Not a single one ... myself included, was a child prodigy," writes Richard Hoshino.

Wilson Webb / Fox Searchlight

By Richard Hoshino

Mary Adler is a seven-year-old whiz-kid, able to multiply large numbers in her head and instantly calculate square roots. She devours textbooks on differential equations, and solves calculus problems that stump MIT math professors.

How does she do this?

Is it because Mary is the one-in-a-billion prodigy, destined for greatness, inheriting her genes from her mother and grandmother, who themselves were genius mathematicians?

This is what *Gifted* would have you believe, the Hollywood movie that perpetuates the stereotype that only certain people can excel in mathematics. The storyline implies that giftedness is a result of nature rather than nurture, of winning a genetic lottery rather than devoting thousands of hours to deliberate practice.

But Hollywood got it wrong.

As the former coach of Canada's team to the International Math Olympiad, I've worked with exceptional students who can solve the same problems tackled by the fictional Mary Adler. Not a single one of these math olympians, myself included, was a child prodigy.

Instead of inheriting a gift, we developed our grit.

We did this thanks to innovative teachers who stretched us far beyond the low bar set by an uninspired curriculum. We wrestled with open-ended questions that forced us to synthesize our knowledge across many areas of mathematics. We spent time thinking deeply as we re-created key mathematical insights ourselves, rather than simply memorizing and regurgitating formulas to pass an exam.

Decades later, we are contributing to Canada in diverse sectors, through our professional work in technology, health care, law, and education. We succeeded because we received authentic mathematical experiences that developed our problem-solving skills.

In that way, we were truly gifted.

We gift young children with opportunities to engage deeply in other subjects, by having them paint their own art, compose their own songs, and write their own stories — even though few will reach the heights of Emily Carr, David Foster, or Margaret Atwood. We do this because we recognize that all students, regardless of ability level, can grow through education, rather than act as if art, music, and creative writing are only accessible to natural-born geniuses.

So why do we view mathematics differently?

Maybe it's because we don't believe children are capable of problem-solving. And so it's easier to have our students just reproduce the rules and formulas of European white men from 2,000 years ago.

As a result, far too many of our students spend their formative years doing what no mathematician would call mathematics: subtracting logarithms, graphing trigonometric functions, and solving equations using the quadratic formula. It's a watered-down version of the real thing, the equivalent of learning and teaching art using paint-by-numbers.

In an essay famous among math educators, high school teacher Paul Lockhart laments how our North American math curriculum is stripped of authentic experiences that deprive students of "such a natural, satisfying means of human expression." After all, if music is more than jiggling symbols around according to a fixed set of rules, then surely so is mathematics, humanity's other universal language.

What then are authentic mathematical experiences?

Here's just a small sample:

- An elementary student learned ratios by making pancakes for seven people using a recipe for four.

- A middle school student figured how interest rates work to help her family make better financial decisions.

- A team of high school students learned the relationship between a cylinder's volume and surface area, and wrote to the president of Campbell's Soup to explain how their company could cut manufacturing costs by making their can's diameter equal to its height.

- A university student — with the most severe math anxiety I've ever seen — designed and implemented a roommate-matching algorithm for all incoming first-year undergraduates.

These young people engaged in the problem-solving process: getting stuck, finding and resolving cognitive obstacles, developing conceptual understanding, and communicating solutions supported by quantitative evidence.

Through these experiences, these students developed their confidence, creativity, and critical-thinking skills, preparing them well in this post-truth age of alternative facts and fake news.

Let's empower all of our students this way.

Hollywood teaches us that those who excel in math are natural geniuses, or that individuals who engage deeply with the subject are socially awkward and mentally unstable.

Let's write a different story together, a story that's more hopeful and true.

And then all of our students will be gifted.

Richard Hoshino is a mathematics professor at Quest University Canada, a liberal arts and sciences university in Squamish, B.C.

Opinion articles are based on the author's interpretations and judgments of facts, data and events. More details

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