Learning about yourself in school[1]

Hi, thank you for having me. My name is Sungmin; I'm a PhD student in economics. I'm here to tell you about my research which grew out of the training from this great department. My work is about education as learning about yourself.

You must have heard people say that going to school is not just about gaining knowledge or diploma; it's about finding out who you are. We've all sat at a dinner table where you heard this from either your parents or relatives or you told this to your children. Some people think it's a cliché, while others think it has some truth. So how much of this is really true?

My research quantifies this value of "finding yourself." I have a mathematical model that describes students and an educator. Imagine you are a high school student who is not perfectly sure whether you'd be better off pursuing a science major or something else in college. Your high school offers an advanced science class that lets you "get a taste" of college-level science curriculum. So you go ahead and take that class. You receive what I call a "noisy signal": you realize by the end of the semester whether science is a good fit for you or not, although that signal might not always be accurate. The signal could be anything, from getting good grades, receiving compliments from your teacher, or just reading the textbook and finding yourself getting fascinated by the subject.

My theory says that it's best for the student that the education system is encouraging toward science only if the student is believed to be sufficiently talented in the subject. That is because, if students with insufficient talent decide to pursue science, they might struggle to graudate, struggle to find a good job, or even *a* job. So the teacher should be discouraging toward science if the student does not seem sufficiently talented: be harsher on them and rather tell them to pursue something else if they don't seem good enough.

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Well duh, you might say—isn't that obvious? I'd say it's not so obvious that we are doing that in practice in American high schools. I have data about high school students' beliefs, their college major decisions, and their future income, so I can infer how encouraging the high school science classes are. My estimates tell me that the classes are highly science-encouraging, even though the overall student population has low chances of having science talent.

Let me fill you in with some numbers. On average, most 9th grade students in the United States have only about 15 to 30 percent chance of later turning out to have science talent. Only 15 to 30 percent! It means that even the best student in 9th grade has only about 30 percent chance of being successful later in science. Despite that, the current structure of science classes look like this: if you are truly talented in science, you get an accurate signal to pursue science about 90 percent of the time. In contrast, if you are not talented in science, you get an accurate signal to pursue something else only 75 percent of the time. What does this mean? A quarter of students with no talent in science are being wrongly encouraged into pursuing science despite their lack of talent, resulting in lower income and less favorable job prospects.

Well, it's good that the classes are somewhat informative—the signals are not a complete noise; they tell students something. My estimates tell me that the current science education has a value of increasing students' future income by about 5 percent, by helping them choose college majors that are better fit for them. But I argue that we can do better. If we accept the fact that the majority of American high school students do not have good fit with the sciences, if we restructure our classes so that we are harsher on students and reserve encouragements to only those truly talented, we would have fewer students "mismatched" in the labor market, struggling. I estimate that the impact of this change in the course of science education to be 7 percentage points in students' future income. That is, we can bump up the value of these classes from a 5-percent increase to a 12-percent increase.

In conclusion, I argue that we should make science education more accurate on true science talent, such as by using more rigorous course material, examination, and grading standards, not less. Thank you very much.