Not a day goes by that I don’t read an article or speech about the need to invest in “STEM” education, to invest in our future, for our students, for our national competitiveness, etc.

STEM stands for Science, Technology, Engineering, and Math - all of which are critically important for students to learn (regardless of the economy or jobs). Our governments tout STEM because of the growth opportunities, without looking at where the growth really is.

Within all the noise about the “STEM job gap,” our focus should be on computer science — on the software and digital hardware that is revolutionizing the world around us and disrupting every industry known to man. This subcategory of STEM gets <1% of the educational funding, and isn’t even available in 90% of schools. Yet it is responsible for the growth and opportunity in STEM. The charts below show that if you remove computer science from STEM, what would remain is too many students, not enough jobs, and a predominantly gender-balanced or even slightly female-dominated field.

Every time I hear STEM (Science Technology, Engineering, and Math), I wish we could focus the conversation on computer science. Why? Because of three reasons I explain below:

1) The job gap and growth opportunity is in computer science, not in STEM

See the chart below. Computer science is the only STEM field where there are more jobs than students. The data below comes from the U.S. government, comparing jobs data and projections from the Bureau of Labor Statistics to student data from the National Science Foundation. (In the chart, computer science is categorized alongside mathematics, but if you separated them, the distinction would be even greater in favor of CS).
Despite all of the excitement and energy around STEM, it turns out that when you exclude computer science from STEM, you see that the remaining STEM fields have too many students, and not enough jobs. Our nation’s schools produce more students graduating with degrees in architecture, mathematics, life science, social sciences, physical sciences, and even many sub-fields of engineering, than the available and projected jobs in these fields. In fact, if you exclude computer science from STEM, what remains is a set of fields with over 600,000 annual graduates, vying for fewer than 150,000 annual new open jobs.

When computer science drives 60 percent of new jobs in STEM, you may wonder, why would one exclude computer science? Isn’t that a ridiculous thing to suggest? It turns out that is exactly what 90 percent of US schools do — 90% of our public schools teach science and math, but they don’t teach computer science.

Now when you look at only computer science, you see a field where the annual job growth is almost 3x the rate of students graduating with bachelor’s degrees. Computing jobs are growing in every state, and in every industry. A study of job growth since the 2009 recessions shows jobs in software and computing companies as a core driver of the recovery. And this picture only shows a fraction of the growth opportunity, because two thirds of computing jobs are outside of the tech industry. Across all fields (not only STEM), computer science occupations are at the very top of the highest demand list, with the lowest unemployment rate across all fields (see page 6 of this report). Computer science is now impacting everything from banking to retail to manufacturing to entertainment – across every industry in our country, there are not enough computer scientists to fill open jobs.

2) The gender gap is in computer science, not in STEM

Google recently released detailed charts about the diversity gap in their workforce, and LinkedIn shared similar data, and so did Yahoo. Both tell a similar story: tech companies hire more men than women. For years authors have diagnosed this problem as a STEM problem, and talk about fixing the gender gap in STEM by addressing the education of pipeline of students in STEM fields.

If you examine the chart below, and the detailed analysis from the accompanying blog post, you will see that there is no gender gap in STEM. When it comes to university degrees, the biggest gender gap by far is in computer science and engineering, where the predominantly male population is also in the workforce of tech companies. If you removed computer science out of STEM (the way most public schools do), you’ll find that there are more women than men in STEM, and of course not enough jobs for them, as highlighted above.
Note: it turns out that we do have a ethnic diversity gap across all of STEM. In most STEM fields, African American and Hispanic students are under-represented relative to their % of the U.S. population. However, this issue is most extreme in computer science.

3) **Most parents, students, and even schools don’t know what STEM is**

If you ask parents and students what STEM is, they mostly don’t know. By contrast, far more people are familiar with terms like biology or chemistry. I ran a simple online survey asking this question from random Americans on the Web, with these results: 77 percent of respondents didn’t know what STEM is. They do know what computer science is.
Meanwhile, there’s a huge disconnect about the meaning of STEM depending on the audience. When politicians, businessmen, or leaders talk about the importance of STEM, what they’re mostly referring to is the new stuff — the new technologies, innovations, advancements, and inventions that are driving growth and national competitiveness.

But when STEM is translated into practice by the public education system in the U.S., they translate it into the topics that are already being taught in today’s schools: algebra, geometry, calculus, biology, chemistry, and physics. One hundred percent of US public schools teach math and science. But 90 percent do NOT teach computer science, and when they’re encouraged to teach STEM, or to increase funding for STEM, they turn to the courses they already teach.

Most students won’t become software engineers, but can still benefit from computer science.

Although the data above focuses on jobs, I believe that basic computer science is a foundational study that is applicable to all students — not just for the few who want access to the highest-demand, highest-paying jobs in the country. Understanding how technology works, how the Internet works, and learning to solve problems with computational thinking, these skills are as important as learning how electricity works, how digestion works, or solving problems using algebra.

In the words of Steve Jobs, computer science is a liberal art. It’s a shame that most of our schools don’t even offer a single course in this field.

How can we fix this? Ask for computer science.

I run a nonprofit called Code.org, focused on bringing computer science to more schools — by offering free curriculum, teacher-training, and support to schools that want to add it to their course options. The biggest obstacle to our work is that not enough school district administrators feel the need to teach computer science. They need to hear from parents that it’s important. If you are a high school parent, ask your school district to offer computer science as a proper course, alongside algebra, biology, or chemistry. Don’t ask for technology, or for computers, for STEM, or even for coding. Ask for computer science.

If you’re a voter, you can help too. Sadly, federal and state policies make it harder for the billions of dollars in STEM funding to be applied towards computer science. Code.org urges departments of education to categorize computer science as a proper math and science — so far 12 states in the U.S. have changed policies in the last year. And we’ve urged the U.S. Congress to pass a modest bill to make it easier for STEM funding to be directed towards computer science. You can learn more about this bill and help support it here.

The easiest way to create change is with language. Unfilled jobs are in computer science; the biggest area of economic growth is in computer science; the foundational field that isn’t being taught in our schools is computer science. When you hear “STEM,” try focusing the conversation on “computer science.” That’s where the opportunity lies.

Thank you for your help.

Hadi Partovi, Code.org

Photo: death to the stock photo