Diversity, and the Field of Computer Science

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Today we are lacking a breadth of diversity in the field of computer science. According to an article published by The Stanford Daily, most of the college students majoring in computer science are either of Caucasian or Asian descent. Also, there is a significant gap in the number of men and women who hold computer science degrees. US News published a study in 2014, that found that only 18% of the individuals who completed a computer science degree were women. Another group that is being excluded from computing are those who were raised in low income areas. Lastly, computer science is a field that is primarily English based. Therefore, computer science is a study that is overshadowed by male individuals who were born into wealthy Caucasian, or Asian families that speak English. So, why is diversity so important in the field of computer science? Also, why is diversity lacking in this field, and what can we do about it?

Before explaining the ins and outs of diversity in computing, I would like to depict why diversity is so essential. Diversity is an important variable when it comes to building more functional communities, and workplaces for many reasons, but I am going to illustrate just one example. Hypothetically, let us say that I have a friend named John, and the two of us must solve a complex problem together. John and I may think differently, but we are both white males who grew up in the same country, and are roughly the same age. Perhaps, we grew up in the same town, and even went to similar schools. Based off these assumptions, John and I have probably been instilled with similar gender roles, values, beliefs, and social norms. Even though John and I may have different perspectives, it is possible that we may be inclined to interpret and solve this complex problem in a similar way. On the other hand, what if I had to solve this complex problem with another individual named Mariana.

Suppose Mariana is a Latina female that was born and raised in Argentina. Mariana has come to assist in solving the complex problem at hand. Mariana has a substantially different perspective on life than I do. She initially spoke a different language, went to different schools, has been taught different values, and ultimately has a distinct interpretation of the world. She is also of the opposite sex, and has been taught to follow contrasting gender roles.

Mariana and I may have very different understandings of the problem that we need to solve. Some people may argue that since we both understand the problem differently, then we won't be able to solve the problem as easily. These naysayers may be correct in saying that we may have to spend more time solving the problem, but the final solution will be superior with diversification. We both have unique ideas from varying backgrounds, and together we can create a greater understand of what needs to be done, because we are each interpreting the problem from opposite ends of the human spectrum. Since, the team that is solving the problem has been diversified, the solution is likely to be more creative, unique, and efficient. Our ideas are less likely to be stale, overused, and boring. This is the magic of diversification.

If diversity has such an impact in the workplace, why is there a lack of it in the field of computer science? The first of many reasons that diversity is lacking has to do with the curriculums, or the lack of a curriculums being taught at K-12 schools. The regions of the United States that lack a computer science curriculum are often areas full of lower income citizens. School districts in low-income areas often receive less funding, because public schools are

heavily funded by property taxes. When funding for schools are cut, schools have fewer computers, and fewer teachers to teach computing. According to the 2015 U.S. Census on Income and Poverty, families of Asian and Caucasian descent on average had a noticeably larger median income, then families of other ethnicities. Therefore, Asians and Caucasians are more likely to live in wealthier areas that have sufficient funding to provide computer science education to students. Alongside racial minorities, there is also a small percentage of women in fields of computing.

When computer science is taught in public schools, student usually need to take math prerequisites. Numerous studies have found that girls in public schools are often discouraged when attempting to excel at mathematics. One study published by Florida State University in 2016 had found that girls are more likely than boys to be discouraged when taking math courses. Another study published by Washington State University had found that elementary school students who took a stereotyping assessment were more likely to associate boys with math, then girls with math. Girls are not receiving the attention and encouragement that they need to excel at mathematics. If fewer female students have the necessary math prerequisites to take computer science courses, then there will be fewer women in the fields of computing, because many of them were not encouraged to excel in their mathematic studies when they were younger.

The English language also plays a large role in determining who can do well in computer science. Computer scientists use different programming languages to do their jobs, and roughly one third of them are English-based. To clarify, a programming language is a set of syntactical rules that the programmer must use to tell the computer what to do. Within these rules are keywords, and these keywords are usually English words. Also, the most popular programming languages all have their roots in English speaking countries, and the documentation for these languages, or the instructions on how to use them, require a solid understanding of the English language. Therefore, to be a successful computer scientist, the individual needs to understand English. This puts an enormous learning curve on individuals who are interested in computers, but do not have a sturdy foundation in the English language, thus, causing the fields of computing to primarily consist of English speakers.

There may be issues regarding diversity in computer science, but there many are solutions to these problems. First, we can increase funding in schools for superior computer science curriculums in low income areas. Second, parents and educators should encourage their male and female students to excel at mathematic, instead of following gender stereotypes that math is for boys. Third, specialists in the field of computer science need to discover new methods for developing programming languages. Specialists need to mainstream new programming languages, or update existing ones that can entirely be translatable and understood by people who do not speak English. These are only a few example solutions. So much more can be done to diversify the world of computing.

Overall, computer science is a field that struggles to adopt people from varying backgrounds. The field is primarily dominated by wealthier Caucasian or Asian males that speak English. Diversification is important, because people from contrasting background all bring something unique to the table. Diversity can build stronger, more creative communities that outperform communities that lack a broad spectrum of people. School funding, gender stereotyping, and an English language bias are three barriers that affect diversity in computer science. The Bureau of Labor Statistics predicted that there will be 1.4 million job openings in the fields of computing by 2020 with only 400,000 CS graduates. We need more people from a

diverse range of backgrounds to fills these jobs. Educators, politicians, parents, and computer specialists alike all need to play a role in diversifying one of the fastest growing fields on Earth.

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