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Coding: a Controversy?

Most people will agree that modern society is turning more and more towards technology. The computer, the centerpiece of this phenomenon, is only as intelligent as the people who give this machine its commands. Programming, also known as coding or computer science, is the only way to give computers their instructions. A current controversy is whether or not this is a valuable skill for everybody to have. Some people think that it is not necessary, or even a bad idea, for people to learn how to program. Others believe it is incredibly crucial for this generation to have at least a basic understanding of code. It is important to see whether or not putting America's effort into a programming generation will pay for itself in the future.

There are many reasons why a society of coders is not worth the hassle. Not everybody is going to have a programming job, so there really is not any need for an excess of coders. Jeff Atwood, the cocreator of Stack Overflow, a programming resource, says that the idea of everyone learning to code "implies that [there is] a thin, easily permeable membrane between learning to program and getting paid to program professionally." He does not believe this is true; simply learning how to code is not the same as becoming a professional (Atwood). Even Linus Torvalds, the creator of the Linux operating system, says "I think [programming is] reasonably specialized, and

nobody really expects most people to have to do it" (Love). Atwood compares becoming a programmer to becoming an auto mechanic. He states that even though cars are such a big part of society, not everyone really needs to be an auto mechanic. It is the same with computers; while they are still very important, not everybody needs to become a professional programmer ("Computers are the Future"). Basically, why does everybody need to program if there are people out there to do it for them? It is a waste of time for people who are not motivated and may never find a reason to code in their lives.

In addition, teaching everybody to code may be the wrong solution for getting America ahead. Programming develops important skills, like "breaking a complex problem into component parts, rapidly learning and applying new tools and methods" (Gray). A programmer's real goal is to solve problems that are given to them (Atwood). Many critics of this coding movement think that it is the "wrong solution to the right problem." America needs more problem solvers, not computer geniuses (Gray). Chase Felker, a software engineer, believes that since the programming field changes and evolves so quickly, problem solving is the most valuable asset a programmer can have. This allows him or her to adapt. Overall, "technologies and programming languages will go out of style, and [you will] need a flexible understanding to tweak your habits for the next thing" (Felker). While the rules for each programming language are very different, the higherlevel thinking is the same. This is why it seems like it is no use to learn programming languages; the important part is the skills behind it.

Lastly, a notable reason for people not learning to code would be because the ultimate goal of programming would be to not have to program at all. Emmanuel

Straschnov, the cofounder of the developer's environment Bubble, explains, "The future I imagine is a world in which programming is selfexplanatory, where people talk to computers to build software...to turn a button red, we [should not] have to write code." Bubble is a new form of programming environment in which literal coding is not necessary. As mentioned before, it focuses more on problem solving than programming syntax, or "rules" (Straschnov). If professional coders are able to make resources like this available, coding is not something that will have to be taught rigorously to the masses. It will become more like social media, a user friendly tool. If this is how programming will eventually be, there is no need to teach coding languages to everyone in America.

However, just learning to program would be a very effective way to teach the important problem solving skills America needs. It is important to realize that "the ability to write computer code not only opens doors for employment, but the skills involved, such as sequential thinking, can be applied to anything" (Lynott). A real benefit of learning how to code would be conditioning the brain to think in the way that code is written. A programmer learns how to think in algorithms, or be able to come up with specific logic for each task. When asked how he uses his programming skills in real life, Travis Axtel, PhD, says that "It happens so often that I am not even aware of it. There is an algorithm to optimize how you tie your shoes." Problem solving wise, America is lacking, and this is causing the country to begin to fall farther and farther behind in the global competition. The U.S. Department of Education conducted a study on the effects of putting more technology in schools, and found that the kids exposed to technology gained problem solving skills; it became a natural task for them while computing

("Reasons for Bringing Technology"). NCWIT, an organization to promote women in computer science, believes that "computer science teaches students design, logical reasoning, and problem solving — all valuable well beyond the computer science classroom" ("Moving Beyond"). Perhaps this could be the boost to get America back ahead. Clearly, the skills one can learn from programming are almost essential for even a world outside of computer science.

Even if only a small portion of America's population will become professional programmers, having the skill would give someone many new job options and can even help he or she receive a noncoding job. For example, in Louisville, Kentucky, when a man took coding courses provided at his local library, it "opened up an array of career possibilities, and he was quickly hired as a frontend web developer with an advertising agency" (Silver). This all has to do with opportunity; the more skills somebody can acquire, the more likely they are to receive a job. More and more jobs in this day and age are being run by computers, so computer skills such as programming are extremely helpful in competing for occupations. The "noncomputer skills" coders learn as well are very helpful in the workplace. People are realizing that computer science students are "[learning] from the collaboration and, in the long term, can take that with them years down the road when they enter the real world to work" (Lynott). Programming is not something somebody does alone in his or her basement; it is a very cooperative and social job. Collaboration is one of the most important skills a worker can have. Another reason jobs will come easier is because "computer scientists also enjoy a wide range of career options since all industry sectors today involve computing (e.g., the arts, film,

finance, health care, journalism, manufacturing, music, security)" ("Moving Beyond"). Most economic sectors in this day and age are becoming computerized, and knowing how to code would look good on a job application. Being a professional coder is not the only route somebody can take once he or she understands computer science.

In addition, there are not nearly enough people in STEM jobs. STEM stands for science, technology, engineering, and math. NCWIT reports that "computer science-related jobs will be among the fastest growing and highest paying over the next decade...by 2016, there will be 1.5 million computing related jobs available" ("Moving Beyond"). More people are needed to fill these jobs everyday, and that is why so many computer science majors receive jobs right out of college. Even more dramatically, it is predicted that "in the year 2022, the US will be short 1 million STEM employees" (Axtell). Many of these empty jobs will be in computer science. Along with there being a lack of employees in general, there is a huge lack of minorities in the coding workforce as well. When Kimberly Bryant, an AfricanAmerican electrical engineer, signed her daughter up for a summer coding class, she found that "her daughter was one of just three girls and the only nonCaucasian" ("Black Girls CODE"). Programming is not being exposed to a variety of people at a young age; therefore, stereotypes occur that only white men can be coders. Females and other minorities in the workforce become too timid to begin a path in computer science. This would have to change in order to fill more of these empty jobs in the future.

Finally, there is now a pressing need for basic computer literacy in America now that it is run by technology. There are some students in lowerincome communities who

have no idea how to use a computer. This is a major issue, because “Jacob Sharf, a junior at UCLA...predicts that programming will soon be part of any job.” (“Computers are the Future”). Some believe that “t he answer is basic code literacy, which ultimately boils down to knowing enough to successfully communicate in the technology powered environment we live in” (Pollack). This is why it is important that kids get exposed to technology in their education (“Reasons for Bringing Technology”). Simple programming is a great way to get kids acquainted with the fundamentals of computers. This is why so many technology programs for kids are being created already. If children are taught how to code early, then it will become easier and more natural as they grow up, like math or reading.

Altogether, both sides of this issue seem very conflicting. While some say people should learn to code in order to do it professionally, the other side believes people should not learn code for that reason. One side thinks that it is problem solving that should be being taught, not programming; however, others say that teaching programming is a good way to teach those same skills. On the topic of jobs, the side for learning to program has a weakness in their argument. While there are many jobs available, is everybody in the world really going to become a programmer? It is very unlikely. However, the other point was very solid; skills learned from programming are crucial for other jobs as well. Not growing up to work at Google is an illegitimate reason to not become literate in basic computer code. On top of that, going to work at Google would not hurt the economy either, because there are so many jobs that need to be filled. It seems as if there is no real disadvantage to programming in that case.

Also, it seems to be that most of the people against code literacy among the masses are programmers themselves. It seems hypocritical, but it really comes down to a matter of selfesteem. Atwood even says, “While I love that programming is an egalitarian field where degrees and certifications are irrelevant in the face of experience, you still gotta put in your ten thousand hours like the rest of us.” Professional programmers feel that they have worked so hard to get where they are, and that could be taken away by any person who goes to an online course and learns the same skills for free. However, people need to move past that idea, because that is not the big picture. More programmers will not hurt or take away anyone’s jobs. There will be so many jobs available, that the more programmers there are, the better. Professional programmers should be using their skills for good and teaching the public how to obtain the same skills they have, not trying to keep the knowledge to themselves. What really matters is the future of modern society, and what can be done to get everybody more involved in technology.

Clearly, there really are not any disadvantages to programming being a widely known skill. While there is logic behind not wanting everybody to code, there is nothing it would be hurting. There really are only benefits, such as growth in the economy, better problem solving throughout the masses, and an increase in the technology that helps innovation everyday. It is easy to see that society is moving more toward technology than anything else, and it is important to at least expose everybody to computer literacy. There are many ways to begin to do this; the most important part is to start at a young age. There are programs just for kids being made right now, such as Scratch and Turtle Academy (Axtell). It only needs to be put into action, because “despite the chorus of

future-focused experts advocating for better computer science education, most schools aren't meeting the challenge" (Pellissier). Schools are not understanding the importance of this exposure. It is crucial to implement technology lessons into schools so that kids can expand on their technological knowledge at a young age.

For those no longer in school, there are many new ways for adults to jump into the "learn code" phenomenon. Online programming schools, such as Codecademy, offer a free way get a headstart on gaining programming skill, but this is not the only way to get started. Torvalds just suggests "[tinkering] with anything technical you can. Take things apart, see if you can put them together again" (Love). It is often hard to know where to start, but Gregg Pollack, founder of Code School (another online academy), recommends learning programming basics, such as conditionals, loops, and even web development. Again, not everybody has to become a professional, but knowing the basics will really pay off. Atwood makes an insightful statement relating to his auto mechanic analogy: "Should you know how to change oil? Absolutely. There are [also] basic things you should know when you use a computer."

Overall, it would definitely be worth it for America (and other modern societies), to really emphasize the idea that it is important for everybody to become at least slightly literate in computer programming. In comparison to arithmetic, everybody is expected to learn at least how to add and subtract; the same principle should be applied to technology. Incredibly advanced education is not required. Again in comparison, not everybody will major in mathematics, but it sure is helpful in whatever else they are studying. It is certain that more coders in this country will create a better and more critically thinking

society. America is getting left behind in the world educational and economic competition, and a programming movement can only help it get ahead.

Works Cited

Atwood, Jeff. “Please Don’t Learn to Code.” *Coding Horror*. n .p. 15 May 2012. Web. 24 Mar. 2015.
This is an opinion post from a personal blog trying to prove why it is a bad idea for everybody to learn to code. Since it is an opinion article, it cannot be that credible, but the author is the cocreator of Stack Overflow, a very common programming website. He has also had a job in computer science for 30 years. This article was written a few years ago; however, what it says is still very relevant. The information is very biased; it would make sense that he does not want everybody to be good at what he makes his living off of. It will be a helpful article because it is very centered on the con side and gives good arguments against the pro side.

Axtell, Travis. Personal interview. 25 Mar. 2015.
This was a personal interview over email with Travis Axtell about whether or not everyone should learn code, the benefits of learning it, and when people should start to learn. He recently obtained his PhD in electrical engineering, a major which involves a lot of programming knowledge. He has also mentored many kids in computer science. The information is not outdated because the interview was recent. He may be biased, being a programmer; however, programmers have very different points of view on the topic. He wants people to learn how to code, and thats why he teaches them. This was a very helpful interview because he provided information for the pro side and even gave some extra articles to help with research.

" Black Girls CODE: building confidence and tech savvy." Success. *Student Resources in Context.* Feb. 2015: 15. Web. 27 Mar. 2015.
This is a magazine news article about how little minorities are represented in computer science. It is not the most credible source being in a popular magazine. However, it was published very recently, in February 2015. The information is objective, but the article favors the argument that getting more kids into code, especially minorities, is a very good thing. This will be a helpful argument because people say that everybody should code, but minorities are never mentioned or represented.

“Computers are the Future, But Does Everyone Need to Code?” *All Tech Considered*. N PR. 25 Jan. 2014. Web. 18 Mar. 2015.
This source is an NPR article discussing both reasons to learn to code and reasons why not everybody needs to. NPR is a very reliable news radio station, and their information is usually very credible. It was posted relatively recently in the beginning of 2014. NPR
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Gray, Patrick . “ Not everyone needs to learn to code.” *Tech Republic*. CBS, 6 Nov. 2014.

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Love, Dylan. "Linus Torvalds Q&A." *Business Insider.* Business Insider, Inc. 7 Jun. 2014. Web. 18 Mar. 2015.

This source is a recorded interview which includes Torvalds' opinion on whether or not everybody needs to learn code. This source is a primary resource because it is an interview; this means it is very accurate and reliable. It was posted relatively recently in the middle of 2014. Torvalds obviously has some bias working in the field of computer science. He is also very respected because he was the founder of Linux. This is a very helpful source because it contains an experts view on the issue.

Lynott, Jerry. "Wyoming Seminary helps children get head start on computer coding." Times Leader [WilkesBarre, PA]. *Student Resources in Context.* 21 Mar. 2015. Web. 25 Mar. 2015.

This source is a newspaper article from the newspaper Times Leader. It is about new programs beginning in Wyoming to help students learn to code, and the benefits it has had. This information seems credible and has many different quotes from experts on the topic. It is a very recent news article, therefore it is very unlikely to be outdated. The article seems very objective, even though it has quotes from people who only support the pro side. It will be helpful because it shows examples of how STEM and programming classes are helping young people.

"Moving Beyond Computer Literacy." *N CWIT.org.* N ational Center for Women and Information Technology. 2009. Web. 23 Mar. 2015.

This is a web brochure created by NCWIT to explain why computer science should be taught in schools. It is very credible nonprofit organization, and it uses many different sources to back up its information. It is not as recent as some other articles, but it still contains very relevant information. It is trying to prove a point to schools, so it is biased. This makes it good information for the pro side of the argument. It will be a helpful source because it explains why coding should be taught at an early age to help the future generation live through an age of technology.

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This is a web article about how important it is for kids to start learning programming in their schools. The author is a writer on education and development, especially in kids. The article is a few years old, but still relevant. The author is biased because he is trying to convince people that coding is an important thing to be taught in schools. It will be a helpful article because it boosts the proside's reasoning that programming should be taught at an early age.

Pollack,Greg. “No,NotEveryoneNeedstoLearntoCode...”*HuffingtonPost*. HPMGNews. 16 Apr. 2014. Web. 23 Mar. 2015.

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“Reasons for Bringing Technology Into Schools.” US Department of Education. n.p. n.d Web. 23 Mar. 2015.

This source is a government archive from the US Department of Education discussing why it is important to teach children about technology in schools. Lots of research went into this project, and the rational is backed up well. While there is no publishing date, the sources used in the study are from the 1980’s and 1990’s, so it is not the most recent. The information is very objective, but it is still trying to explain why using technology is a good idea. The reason this article will be helpful is because it is the governments point of view on the issue, even if it is a little off on a tangent from the issue of whether or not everyone should learn to code.

Silver, Kate. "Get cracking on code: community courses lead to jobs." American Libraries. *Student Resources in Context.* Mar.Apr. 2015: 56+. Web. 27 Mar. 2015.

This is an academic article written in American Libraries magazine about a library which has implemented lots of programming classes into their community. It is not the most credible source, but it contains information on a real example of why coding is good. It is a very recent article in the most recent volume of the magazine. It is an objective article, but it is describing what good the programming classes has done for the community. It will be helpful because it has more real life examples of why it is important for our society to learn to code.

Straschonov, Emmanuel. “You Shouldn’t Have to Learn How to Code.” Huffington Post. TheHuffingtonPost.com, Inc. 6 Nov. 2014. Web. 29 Mar. 2015.

This is a web article about what the future really should look like in terms of programming. The author of this article is the cofounder of Bubble, a program designed to help people program new ideas, without actually learning code. This is a very recent article, written only back in November. The author is most likely biased, because he wants people to learn code using his website; however, it is good to have another opinion. This article is helpful because it adds a different point of view on the issue and an interesting solution to it.