Arthur Kim

The ROOTS of STEM

By: Arthur Kim

A closer look into the untold truths of STEM Education

Throughout our lives, we often experience significant advancements in technology and society. For example, the average 40 year old born in the 1980s can likely testify to how much modern smartphones and PCs are an improvement to the clunky, boxy computers of the past. But what instigates this change? Well, most people would probably say the innovation of large tech companies and the people behind it are responsible—specifically, their skills in the STEM field. However, many seem to disregard important facets lurking beyond pure brainpower which propel tech giants to success, aspects that are commonly overlooked by the general public.

Many people assume that CEOs are intellectually skilled and knowledgeable, which is what allowed them to achieve their position. While the hard facts and knowledge are useful in leading a company, this is simply a cog in the machine. Other aspects such as communication, advocacy, and marketing are equally essential to overall success, but people don't seem to acknowledge this. For example, the conferences that Apple hosts, known as WWDC, gives them a chance to present and explain their new products so that consumers know what to expect. Being transparent and forthcoming to your customers is essential to increasing sales—if people don't even know what a company is selling, they probably won't buy it. STEM education is highly emphasized in modern society and students often rush to take only the most advanced math and science classes, but the benefits that non-STEM classes, such as English and the humanities, provide skills in the real world such as public speaking and writing that aren't taught in the STEM curriculum. While STEM is an important factor to success especially in today's era, the significance of non-STEM classes is often overshadowed by its counterpart—however, non-STEM classes provide useful, real-world skills that can be used in tandem with STEM.

One of the most prominent examples of the significance of STEM is the Science Olympiad, an organization which hosts competitions around the world where students can participate in various STEM-related activities. "Yeah, it's pretty fun. We've sort of formed a community and then we talk with each other at practice and we go to tournaments and it's pretty fun," says Daniel Lief, a student at Mountain View High School participating in the Science Olympiad. There are two main types of activities: build events and written events. Build events are where students get to design, build, and test a physical mechanism that performs a certain function, like a catapult hitting a target. Written events are paper tests in which participants study beforehand, typically via memorization, and then take an exam to demonstrate their knowledge. One instance of this is codebusters, an event where students decipher an encoded quote. In Silicon Valley, however, this competition is much more competitive and rigorous than it is in other parts of the world. It is seen as one of the most prestigious programs one can be   a part of during   high school, and thus many students attempt to try out. The STEM skills that Science Olympiad provide are extremely useful in the real world, and the plethora of events that the Science Olympiad offers cater to a variety of different fields like biology, chemistry, physics, astronomy, computer science, and engineering. According to Southern Illinois University, a student who is skilled in STEM "tends to be an innovative and critical thinker" and can "apply what they've learned to real world problems" (SIU). This is, to an extent, true; in a rapidly changing world, these skill sets are needed in order to adapt to new, more difficult challenges. "You always learn a lot of stuff that you wouldn't learn in school," says Lief, "like cryptography, decrypting the cipher, learning a lot of random facts and learning some engineering stuff. Definitely stuff you wouldn't find in normal school classes."

However, this isn't the entire picture. In today's world, a lot of focus is placed on the pure intelligence and skill of a certain individual and less so on other significant factors; the foundational pillars holding these things up are often trampled over. Communication and presentation are two of the most essential skills that everybody needs to have in order to exchange ideas. This isn't to say that students are never given opportunities to practice these skills, however; programs such as the Science Olympiad encourage and even require collaboration among team members. "Teamwork is pretty important to being successful [in the Science Olympiad]," Lief notes, "because you need to have good relationships with your teammates to work together to solve problems with each other." Collaborative environments and competitions where students
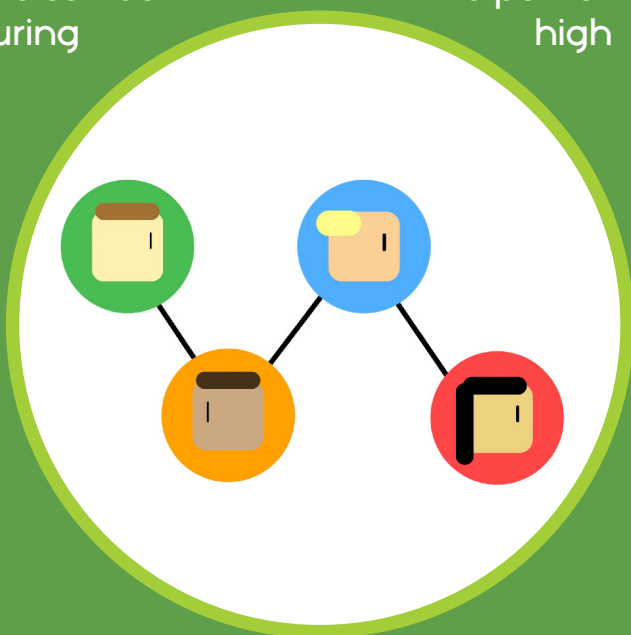
actively engage in their work are highly beneficial as they prepare students for real world situations that don't always reflect the typical school environment. According to Tulane University, classes and programs that emphasize discussion and communication can "prepare students

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to be successful in a variety of work settings" ("How Humanities Courses Can Help You") such as consulting, publishing, sales, and advertising, all of which are important aspects of a successful company. In addition to extracurricular activities, non-STEM classes such as English and History also provide essential skills in writing and analysis. Lief, who is taking American Literature Honors and AP U.S. History states, "I think US history and American Literature have taught some writing skills in those classes, which is sometimes useful in the STEM classes. Like when you have to do a free response or when you have to communicate with others and write about it." The ability to write coherently and communicate clearly is extremely important and is often needed unknowingly. A student may need to write up a lab report pertaining to a certain scientific phenomenon or a presentation about an engineering contraption.

The false assumption that all STEM-related activities are solely based on learning as much content as possible can be detrimental to how the STEM field is perceived in general. "People think [the Science Olympiad] is really serious. They hear stories about people studying so much, taking it so seriously. But at the practices, it's not as serious as people would think. You know, people are talking to each other and joking around and laughing." It is important to have a sense of community when working in a team, especially when collaborating on a difficult task. Knowing each team member makes everyone feel more comfortable and more willing to share their ideas with each other, which ultimately facilitates efficient teamwork. Michael Chai, a student at UC Berkeley, says "Being friends with my team members really made working hard and sometimes going above and beyond much easier for me." He also noted that it helped him become more open to receiving criticism from friends as opposed to strangers—it felt less personal knowing that it was for the group's best interest. Most importantly, feeling a sense of belonging will encourage others to join in as well. Everyone wants to feel welcome when joining a new activity or club, and having that strong connection between members will make that happen. The Science Olympiad addresses this aspect very well and rejects the idea of a hyper-competitive, cold atmosphere. In fact, the Science Olympiad doesn't
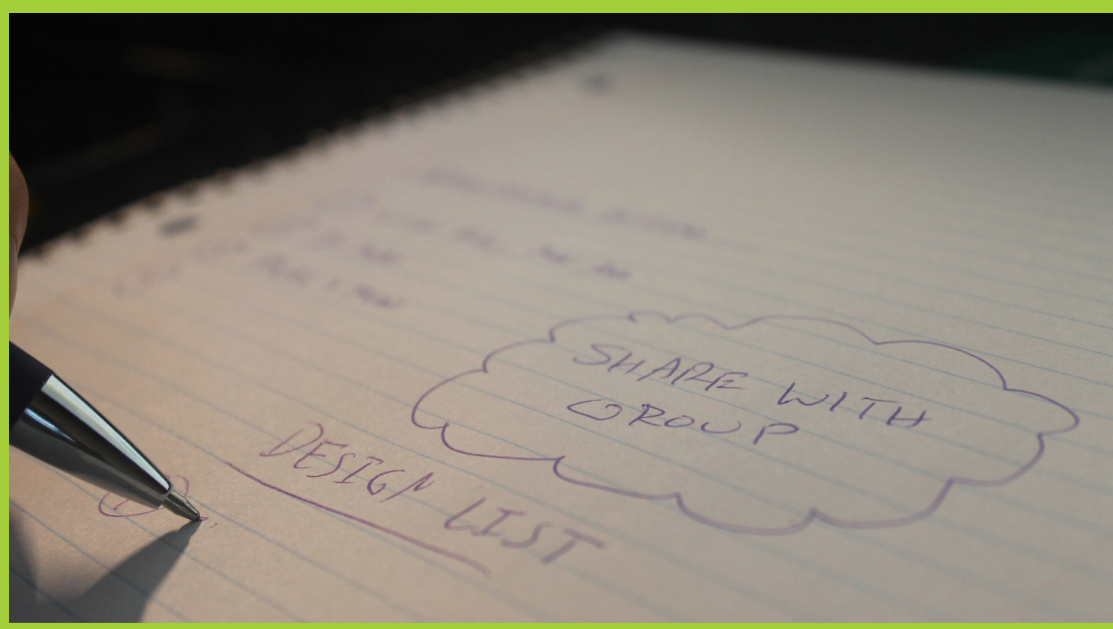
Teamwork and communication are vital to success

even require its applicants to have prior experience with STEM; anybody who is interested is able to try out. Lief remarks, "Anyone can definitely try out because months before a tryout you start attending practice and they will teach you a lot of stuff that we're interested in. You definitely don't really need experience." Anyone should be able to learn something new and STEM provides students with more opportunities that they can ease into. The STEM field incorporates a lot more than what is typically thought of, and that alone means that someone who hasn't taken one advanced course in STEM will find that their skills will be of some use. For example, in various scientific fields, students need to know vocabulary and terminology that is specific to that science subject. However, many students who aren't proficient in reading or writing may struggle with memorizing these words, which is why the process of learning vocabulary is extremely import-

ant for science. This also extends to writing; Sally Mitchell, a STEM teacher and distinguished educator, claims that one of her best students in AP Chemistry was also a talented writer (Stevens). When scientists publish papers about a new discovery, they need to make sure that it reads clearly and convincingly so that other scientists can understand what exactly is being talked about, which English helps with. The ability to definitively express ideas and communicate with others in a professional manner is vital to all STEM fields, and learning these skills along with STEM content will undoubtedly benefit students and help them achieve success.

It is unclear what the future holds in the tech industry, but we are very likely to see significant technological advancements in our lifetimes. As Lief puts it, "It's growing quite a bit, especially in technology and engineering. The new ad-

vancements are really important to the future of society." However, one thing is for certain: the value of communication, in the form of writing and speaking, will continue to increase as technology evolves and ideas become more complicated to express. Ultimately, the key to progress and growth isn't always trying to chase the latest trends or most influential industries; everybody has a choice, and that choice may contribute to a larger cause just as communication does to STEM. "It depends on what you're interested in. So I don't think there should be a heavy emphasis on either one."

ABOUT THE AUTHOR

Arthur Kim is a Junior at Mountain View High School who also attends Freestyle Academy. He is taking animation and thoroughly enjoys his experience at Freestyle. Arthur likes to code and play video games in his free time, and is also particularly fond of traveling and eating delicious food. He is also interested in game development and hopes to incorporate his skills learned at Freestyle into his future projects.

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