**EMCS2600: The Future of Cybersecurity: Technology and Policy**

Post-Work: Assignment - Final Paper

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**Topic**: *The Human Dimension of making software more secure. What types of practices, procedures, and protocols need to be implemented to maximize the security effectiveness of software engineers?*

#### Historical Seeds Of Software Engineering As a Practice And The Impacts on Software Engineering Culture

Software engineering is not an old thing, but it already has a history that impacts its current trajectory and the people who work in it. Microsoft was founded in 1975 but really didn’t become a player in the space until 1985 when it released Windows. So within 35 years, a little over one generation, we already have enough history in software engineering as an industry to create an impact. In a biopic documentary “Inside Bill's Brain: Decoding Bill Gates”, Gates reflects on his management style during this time and how he propelled the creation of the most influential piece of software in the 20th century. Throughout the film Gates reflects on how he drove his developers ( and himself ) to work in 24-hour shifts, creating features based on their marketability or keeping up with their competition. This reckless, “code around the clock” culture was driven by Gates himself and mimicked by Apple and almost every small team of engineers trying to build the next great thing. Gates is of course driven by a need to prove himself and beat his competition, IBM, “the old guard of mainframe computing.” The employees and even his friends at this point in his career are just the means to his end: win at all costs.

Microsoft does indeed win, and it makes Gates a billionaire. His methods are quickly validated by his corporate and financial success. This is Microsoft’s model: Build at a break-neck speed, release ahead of the competition and repeat. Engineers with the ability to build complex features lighting fast, answer questions on the spot and work without sleep are highly prized assets. While it can be argued that these are all nice to have qualities in an engineer, if the same engineer was tasked to build the Space Shuttle or the controls on a Nuclear Bomb, there would probably be many other qualities that would be prioritized. For Gates, however, speed, instant answers and the ability to work non-stop served him because he was rushing to be the first one to fill the space. Later on Mark Zuckerberg ( Facebook ) and Travis Kalanick ( Uber ) would demonstrate that this model never went away. It continues to exist and persist in start-up culture.

Software Engineering culture from its early days with Microsoft is built on the rush to be first. Engineers that conform to this mission are valued. Anything that gets in the way of this mission, to coin an aeronautical term, is “drag”. As we will see in modern iterations of this model, security and privacy are an afterthought.

#### The Hidden Impact Of White Supremacy On Software Engineering Culture

“The Emancipation Proclamation was an executive order issued by President Lincoln on January 1, 1863. In a single stroke, it changed the legal status, as recognized by the U.S. government, of 3 million slaves in designated areas of the Confederacy from "slave" to "free" ... By June 1865, the Union Army controlled all of the Confederacy and had liberated all of the designated slaves.”[[1]](#footnote-0) In African American culture this date June 19th, known by its popular name “Juneteenth” is the “real” day freedom was granted because it took 6 months to convey the message. Or was it? What followed during Reconstruction were Jim Crow laws, “state and local laws that enforced racial segregation in the Southern United States. All were enacted in the late 19th and early 20th centuries by white Democratic-dominated state legislatures after the Reconstruction period. The laws were enforced until 1965.”[[2]](#footnote-1) So, just ten years before Microsoft was created, African Americans just found freedom from the yoke imposed on us since the 1600’s. Unlike the Emancipation Proclamation, the real end of Jim Crow didn’t happen 6 months later, some might argue that it has never happened. Furthermore and more importantly the model we have for corporations is a strange mirror of the plantation structure. This structure places the power and responsibility of the success of the organization in the hands of one person, the CEO/President. The board and the shareholders are the absentee owners who demand financial results, much like the owners did from the overseers.

I would argue that this top-down concentration of power and pressure on one person often brings out the worst in people like it did in chattel salvery. It was effective in achieving a dubious goal when the other people in the equation were believed to be less than human. However since our morality and sense of humanity have evolved, our organizational structures have not. This is not to say that every CEO is evil. However, it does explain the persistence of oppression. The model forces leaders to produce results and narrowly evaluates their success on financial benchmarks. Under these circumstances, the worst part of human nature tends to rule the day. Someone wanting to move fast and produce results without recognizing the humanity of their employees is less likely to take the time to recognize the humanity and vulnerability of their users. This empathy for employees and humanity is an important part of providing security.  **Empathy is probably the most overlooked component of security.** Pentesters and Red Teams think like and have empathy for criminals in order to predict and emulate their behaviors. Conversely, Blue Teams and those implementing the defenses in an organization need empathy for the safety, privacy, and security of the users. A corporate model that shares a deep history with slavery is the worst starting place. The model is effective in making money, no doubts there at all. This is the model that built our nation and made us the richest country on the planet. Its weaknesses in our connected world are more apparent than ever. The “overseer” cannot see everything, the “overseer” cannot protect us from everything. His or her drive to make money for the corporation and fulfill their obligation to the board and the shareholders often clouds their vision to create safety and security for the user and the greater community.

Bill Gates and Mark Zuckerberg are perfect examples of this point. Both of them have tremendously different personalities but fell into the same trap of producing results at the expense of users and the larger community. Bill and Mark are not white supremacists, but they are using a model inherited from and created by white supremacists. This realization begs the question, how can we alter, change or modify this model and facilitate organizational dynamics that empower engineers and encourage empathy for users and the greater community? Is this change a vector of transformational leadership, or is the focus on the leader just another version of the same failed top down one person model?

#### Shifting the Center of Control

Recently my mother passed away in a car accident which has forced me to reflect on many things, one being her role in our family. My mother wasn’t just **my** mother, she “mothered” many people in our family, including her own mother in her old age and even her siblings. She was a quiet force for good in our family, never overstating her power and influence. Mom never repeated herself when giving advice. She had a quiet and powerful way of letting her opinion be known. Others in the family came to her with their concerns, their problems and their prayers. She was truly the leader of the family but not like the overseer we see in corporate America. She only stepped in to correct when absolutely necessary.

Tim Westegren the CEO of Pandora and one of my role models had this same spirit and leadership style. I often describe Tim as one of the most peaceful CEO’s I have ever met. While others seemed to be practicing corporate Karate, Tim was practicing corporate Tai Chi. He allowed people in the organization to operate within their professional expertise and he dispelled fear whenever he spoke. While most organizational communication in the old model thrives on fear, because it derives from the anxiety and fear of the overseer CEO, Tim’s model thrived on understanding, trust and empathy. In this model all of the departments, including security have an equal seat at the table. The drive to create revenue is distributed across Sales and Marketing but their voices are not amplified unnaturally by the CEO. The board still serves as a check on the C-suite but doesn’t narrowly evaluate the mission based on financial results. All of this relieves the unnatural pressure on the CEO and creates room for empathy. Pandora transformed me as a person and also as an engineer. When I created my own company for a short time I used this model to continually empower the people and ideas with the most promise to implement what was best for the application, the users and the community.

#### Creating Security Empathy in Agile

Understanding how the culture of engineering affects the structure of teams, and how the structure of teams affects the prioritization of security tasks in software engineering requires a big shift in perspectives. The old model driven by one person and one goal tends to ignore the interconnectedness of software as a group effort. Agile as a practice has a lot of space in its rituals to accommodate requests from multiple stakeholders and many different types of pressures ( limited time, limited resources, etc ). When a practitioner of Agile evaluates these mandates and pressures they are encouraged to prioritize based on the impacts to the user, by thinking as the user. This practice of thinking as the user, helps to build empathy and shifts the users role in the greater equation away from being just a source of revenue. Furthermore when an engineer thinks like a user it can result in a marked difference in the way they build software. Now they are not just building a feature for sale, but instead building something they would use themselves. How would they protect their own data? How would they protect their own privacy? And maybe all of the engineers are not capable of having deep empathy for the users. This is fine! But maybe in the new model driven by trust in professionals to lead themselves, and a focus on the user’s humanity as a reflection of our own we can see a prioritization of skills among engineers who are able to empathize with the users and thereby passionately prioritize security.

Red Teams are able to execute on this very well. In the OpsSec / DevSec community we have fun imitating the personas in organized crime. The Black Hat and Def Con conferences encourage engineers to think like bad guys, and reward members that are able to think like a person trying to break in and steal information or compromise a system. The agile development process can do the same for defense, by rewarding people who build applications to develop safeguards against common mistakes in user behavior and prioritizing security over convenience and speed. If I argued and laid out a case that most of the security vulnerabilities found in technology was the result of an application’s attempt to provide convenience to the users while inadvertently sacrificing security or privacy, I would garner a lot of agreement. This is one of the reasons IT Admins hated Microsoft for decades. Microsoft was always trying to increase sales by offering slick new features and added conveniences for users, but opened up a new way for attackers to compromise the system. This practice had nothing to do with the intelligence of the engineers at Microsoft. It was because they were stuck with a model that left little room for empathy, prioritized revenue over security and cloned engineering personas from a time when the company was in its awkward adolescence.

As software engineering culture matures, and as we are able to reflect on the brief history of our industry as it connects to the history of our nation. I am hopeful that we will re-evaluate the frameworks we use to organize teams and take the time to think carefully about what really matters. We live in a time where the first person to do something has little value if that thing doesn’t work. A company made famous for innovating this week can be the butt of every joke and out of business the next week. Security as a practice and as a mission did not play a strong role during the time software and the internet were created, but that doesn’t mean it's too late. Cultures change and evolve as they rise to challenges. In this world, frot with pandemics, war and economic uncertainty we still have the opportunity to shift our perspectives, realign our priorities and make new choices that improve safety, security and privacy across the board. My mother used to teach me, “You can fight to BE right, or you can fight for what IS right. Just don’t get them mixed up.” Being first can feel good, like being right. Fighting for what is right is a long battle, one that can take a lifetime and end without an apex or final victory. Software in many ways is the same. We can build the next cool thing and revel in the temporary glory of what we birthed. Or we can take responsibility for creating and recreating something that grows to stand the test of time with security as an integral part of its mission. When we transform our perspective and see ourselves as a user, and security becomes a practice, not an item to be checked off on a list, we will step closer to building a software engineering culture that honors our humanity as it protects everyone as we would protect ourselves.

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2. Elizabeth Schmermund (July 15, 2016). Reading and Interpreting the Works of Harper Lee. Enslow Publishing, LLC. pp. 27–. ISBN 978-0-7660-7914-4. [↑](#footnote-ref-1)