

Michael Ludwikowski

Dr. Sean Hayes

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### Ethics Paper: Software Testing

To properly assess the functionality and usability of your software, some amount of testing is necessary. The question is, how much testing is required to accurately test your software? When it comes to high end technology such as aircraft or health technology, the users put their lives on the line while using those products, giving more reasons for testing. Testing requires time, money, and resources to test, which can make costs go up and possible delays in the project if errors occur. However, at the same time, safety is an utmost priority in delivering a product, thus making solid testing a necessity.

Testing should ensure both reliability in its performance as well as safety and minimal risk at the same time. However, as mentioned before, additional testing can lead to a project having to get bumped up in cost, then making it more expensive to consumers and it's users. With this being said, I believe that this is still no excuse for selling a product that has not undergone proper testing that could put someone in danger just because the manufacturers did not want to drive up costs. Furthermore, if it is a system on the high end, such as the one from the **Therac-25 case**, then it should most definitely be tested so that it doesn't do the thing it was supposed to prevent, causing further harm.

Instead of increasing costs to users, you could request additional funding from the numerous health and safety organizations that promote testing it now vs seeing the results later. Additionally, you could implement it into the already existing plans such as having insurance helping to pay for the treatment. Even in the bible does it talk about looking after others and their wellbeing and safety in **Philippians 2:4**. Personally, I would not use a machine that I learned had not undergone testing to ensure safety through proper testing that could then put my life in danger. This is why I promote having a product safer overall than sorry they didn't pay for the testing when they still had the chance.

In most U.S states, a certification process is required to ensure that they are well prepared to design and build safe and reliable systems and infrastructure. Certification also plays another useful purpose, in that it holds the engineers accountable to what they are tested on, such as safety standards, especially when it comes human lives. Afterall, the very first point in the Institute of Electrical and Electronics Engineers (**IEEE**) code of ethics states that they "hold paramount the safety, health, and welfare of the public). A similar process for software engineers could also prove useful, since more and more critical systems are relying on advanced software. With these systems having more and more lives put into their hands everyday, the argument that the software engineer also would need a certificate at the least becomes more and more compelling.

Some people may argue that the fast-evolving nature of software development makes a proper certification challenging. However, the safety benefits that come from such are paramount and far outweigh those concerns. In high stakes situations, a certification and vast amounts of testing are essential to having a successful and safe system as such like self-driving cars. Just how technology continues to rapidly grow, the usage and criticality will grow as well. In my

opinion, safety is paramount and is one of the utmost important parts when releasing a product.

The developer cannot hide behind a screen and put the blame on the user anymore. In

conclusion, you cannot put a cost on a life.

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