Ethics of Professionals in Technology

Noah C. Huber

Charleston Southern University

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Abstract

With the growing world of information technology and computer programming, there is a substantial need for ethical considerations whenever developing and testing software, especially if that software has implications in the medical field. Software used in the medical field is often used for diagnostics, treatment, or patient monitoring. Inconsistencies and reliability issues can lead to inaccurate diagnoses and incorrect treatment, which can harm patients. The Therac-25 radiation therapy machine stands as a prime example of the consequences of unreliable and untested software. Due to software errors and insufficient testing, the machine delivered massive doses of radiation to patients, causing severe injury and death. From a biblical perspective, the ethical considerations should be focused on care, integrity, and protecting human life. This paper serves to analyze these ethical issues and the responsibility of developers through a biblical lens, emphasizing the importance of safety, honesty, and accountability in medical technology.

Keywords: ethical considerations, testing software, medical field, biblical lens

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Introduction

Professionals in technology are held to a high standard of ethical and moral values that are demonstrated through their actions. Software development requires extensive knowledge including rigorous testing and debugging before being implemented into the real world. In the medical field software can impact the efficiency and functionality of diagnostics, treatments, and patient monitoring. Therefore, technology and software implemented in the medical field must be reliable and consistent in its functionality. Technology or software that has issues known and unknown can pose a significant risk to patients undergoing diagnostics or treatment. From a biblical lens, it is important to understand the ethical considerations in developing software to protect human life.

Therac-25

There are several examples of medical technology and software that have failed and posed a significant risk to or harmed patients. A great example of software flaws in the medical field is the Therac-25 machine. The Therac-25 was a radiation machine designed for cancer treatments developed by Atomic Energy of Canada Limited. The machine was involved in several known accidents that occurred in the mid-1980s where some patients were given doses of radiation that caused significant harm or death because of faulty software and lack of software testing. The main problem with the Therac-25 machine originated from a single programmer, who focused on development and integration rather than software testing. Incidents like Therac-25, highlight the ethical obligations of computer professionals to rigorously test software before implementation. Extensive testing is necessary to ensure the complete functionality including switching beams before administering treatment to patients. The unfortunate downside

to rigorous testing is the increase in cost which can limit the accessibility to patients who cannot afford expensive treatment. The balance of consistent and reliable equipment and cost is a common issue that many computer professionals face. However, there is no justifiable answer for distributing software or equipment that has not been rigorously tested or developed. Unfortunately, the Therac-25 did not implement safety into the software, and the "AECL took advantage of the computer's abilities to control and monitor the hardware and decided not to duplicate all the existing hardware safety mechanisms and interlocks." (Leveson, 1993) This demonstrates an unethical practice and goes against section 1.2 in the ACM Code of Ethics. According to the ACM Code of Ethics section 1.2, "A computing professional has an additional obligation to report any signs of system risks that might result in harm." (ACM, 2023) The tragic incidents involving the Therac-25 exemplify the need for software that is reliable, rigorously tested, and developed with the safety and protection of patients as the highest priority.

Through a Biblical Lens

Software engineers and developers are held to high expectations and standards of work considering their complex certifications. Many certifications are required for software engineers to begin working on the equipment involved with medical institutions and even government applications, with most US states requiring certifications to work without violating policies or codes of conduct. From a biblical standpoint, ethics surrounding medical technology, similar to the Therac-25 demonstrate the inherent value of human life and the obligation we have to protect it. In Genesis, humans are created in the image of God and are considered sacred (Genesis 1-2, NLT). Therefore, developers should have an ethical obligation to protect life, following the biblical command to treat others as they want to be treated (Luke 6:31) and to seek the good of others (1 Corinthians 10:24, NLT).

References

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