Ethical Case Study on Startup Culture

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Abstract: A high-quality education in ethics is critical for the development of future engineers. It is essential that students study the Engineering Code of Ethics and learn to apply these codes effectively to a range of workplace scenarios. Engineers have the ability to impact human lives in a positive way, on the other hand, it is crucial to acknowledge that negligence on the part of engineers can lead to catastrophic consequences. The Engineering Code of Ethics offers a framework and guidelines for ethical conduct and teaches engineers to adhere to the highest professional standards. Adhering to this code is a matter of professional responsibility, and it is a necessary commitment to the well-being of society. Ethical case studies serve as a valuable educational tool, offering students exposure to real-world situations and providing them with an opportunity to carefully consider the associated risks and challenges. Case studies provide a platform for students to navigate the complexities of decision-making. As students prepare to begin their future careers, some will choose to work in large, established companies, while others may choose to work for new startups. With high financial pressure to produce a product and secure funding, many ethical dilemmas can arise at both small and large companies. It is important to familiarize students with ethical scenarios to raise awareness and prepare them for real-world challenges. This paper explores a particular case study focusing on startup culture, serving as an example for ethics education. Through this examination of ethical mishaps at a particular biomedical company, insight into the complexities of the situation can spark in-depth conversation and help develop strategies for handling ethical challenges.

Introduction:
Recently our School of Engineering has developed a module-based ethics curriculum. Beginning with the first year Fundamentals of Engineering course, students are introduced to the National Society of Professional Engineers Code of Ethics [1] and actively participate in thoughtful discussions based on a selection of engineering ethical case studies. As students progress through the four-year curriculum, they delve into a variety of ethical discussions and case studies integrated into their engineering courses. This gives students the opportunity to explore ethical situations that may vary across different areas of study within their field. Additionally, by spreading the ethics modules across the four year curriculum, students are exposed to a breadth of topics and hear the perspectives from different groups of students and faculty. During the senior design capstone course, students research the ethical issues related to the product that students are designing. With a module-based ethics curriculum, the students emerge prepared to handle a variety of issues that may arise in their professional career. Students will feel more confident and prepared to handle issues and contribute positively to their profession.

One topic that is relevant to students prior to applying for jobs for after graduation is an exploration of startup culture. Through exposure to different aspects of startup culture, students develop a better understanding of its dynamic landscape. They engage in discussions

surrounding the values and principles of startups including risk-taking, innovation, and accelerated growth. Students are often drawn to work for a startup for the opportunity to work at a small company, gain exposure to multiple aspects of the industry, and to be involved in creating a new device or product. Another benefit of working at a smaller firm is reduced beaurocracy. Individuals more likely to work at startups have a higher tolerance for risk and seek autonomy in their roles in the workplace [2]. Many students may join a start up in order to gain entrepreneurial experience prior to starting their own business in the future. They may seek the intellectual challenge of working on innovative products.

Startups are an excellent source for rapid development of new technology. However, there are ethical challenges that arise in all types of industry, including the startup environment. Through ethical case studies, students learn about ethical dilemmas that can arise, such as aggressive timelines, ethical implications of financial decisions, and the delicate balance between competitive aspirations and ethical integrity. In addition to engaging in case study review, professionals from the startup realm are invited to share their firsthand experiences and insights through guest lectures. Through interactive discussions, students gain exposure to the real-world issues faced by startups. This review of a real-life case study also highlights the impact of a corporation's actions on the society and the consequences of releasing a product that can harm others, malfunction, or provide unreliable data.

Entrepreneurs tend to be risk takers, are creative and innovative [3]. Risk taking is essential for entrepreneurs because there is no guarantee of success in this field. There is high risk, but there can be high reward. The high risk in startups stems from financial uncertainty, competition, and the potential for failure. However, within this risky landscape, there is a chance of high reward. It is possible to redefine industries and achieve great success. Working at a startup can be highly educational since employees are exposed to a variety of different aspects of the business. Employees in startup companies are immersed in a dynamic environment where they can gain experience from many aspects of the business. Unlike traditional positions, startup employees take on multiple roles, gaining insight into various operations and acquire skills that foster professional growth. This exposure to the variety of responsibilities expands skill sets and is beneficial.

The pressure for startups to earn money early on is a clear and present risk. This may be at a stage when they haven't sufficiently developed or validated the technology. When the startup is a new app or software, the risks can be much lower compared to a new healthcare technology. Secrecy in startups is critical in the early stages to avoid sharing trade secrets. However, expecting people to trust a new healthcare device is tricky if there is no publicly available data supporting the product's performance. Some industries, such as healthcare, should not move as quickly as others [4]. In addition, since startup companies are very new, this means that there is a lack of established policies or professional codes in place. The pressure to monetize the

technology without thorough research and development of the underlying technology poses significant risk. Optimism and efficiency concerns may compromise product quality, reliability, and long-term sustainability can be compromised. This pressure can undermine the company and erode trust in stakeholders. While the pursuit of revenue is critical, it must coexist with a commitment to thorough research, development, and integrity.

Details on the Case Study and Assignment

Students are introduced to a case study of Theranos Inc. Theranos Inc was a startup company that claimed to have developed a blood testing device that requires a fraction of the sample of blood that can be obtained from less painful methods compared to standard venipuncture. The company claimed that the devices could perform multiple tests on the small blood sample very quickly. Later, these claims were proven false. The company was dissolved 15 years after it was founded. The company underwent criminal investigations after the Wall Street Journal published a series of articles about the company [5, 6]. The former CEO just began a prison sentence in May 2023. In the Medical Device course, typically taken by juniors, seniors, and graduate students, the Engineering Code of Ethics is reviewed in the week prior to the case study and students are asked to summarize the main points of the code.

One week after reviewing and discussing the Code of Ethics, students watch the documentary "The Inventor: Out for Blood in Silicon Valley". After viewing the documentary, the students are provided writing prompts that encourage reflection on the ethical issues raised in the film. Additionally, students are encouraged to explore and compose their own reflections on ethical considerations.

Writing Prompts:

1) Research what protections exist for whistleblowers and briefly describe them.
Research the risks for whistleblowers and describe them. Knowing the level of protection and risks for whistleblowers, would you choose to whistleblow if in an unethical situation? If you were in the whistleblower's shoes, how would you choose to whistleblow? What choices do you have? Would you go to a regulatory agency like Erika Cheung, the lab associate in the film? Or would you contact a reporter like Tyler Shultz, the research engineer in the film?

2) If the employees of an organization are typically good people, why do unethical practices occur? Do you think that Elizabeth Holmes was intentionally secretive to cover faults at her company? Or do you think she was just paranoid of competitors finding her trade secrets? Do you think that since Theranos' goal was to help people, it clouded the judgement and encouraged riskier behavior?

3) Some of you may work for a startup at one point during your career. What are some conflicts that could potentially occur between management or executives and engineers or scientists in a company (like the carpeted region of Theranos vs. the tiled region). What organizational issues or corporate environment might you watch out for in your future career working for a company?

The writing assignment is followed up with an in-class discussion of the many ethical issues introduced by the documentary.

Summary and Discussion

After analyzing the case study of Theranos corporation, students highlighted several trends that existed in the organization culture of the company.

- Secrecy and information control: The company withheld crucial data and information about the product. This tendency towards secrecy can be beneficial to staying competitive, but it also carries risk.
- Lack of transparency: Similar to the pattern of secrecy, there was a lack of transparency within the organization. Transparency is essential for trust and accountability and did not promote open communication within the company.
- Communication problems: There was a lack of open communication between the engineers and scientists and the executives. The executives did not want to hear issues about the product, and this hindered collaboration and problem-solving efforts.
- Hiding of failure: The company had a tendency to ignore and conceal failures. Instead of taking failure as an opportunity to improve, the company suppressed any knowledge of failure. This in turn inhibited innovation and prevented the company from growing, and eroded trust.
- Lack of mutual respect: The lack of mutual respect for employees is a significant concern. A culture that fails to foster mutual respect leads to an environment of distrust.

In summary, these trends outline the issues within the organization that prevented the company from functioning properly in an ethical manner.

This thought-provoking documentary unravels the narrative of Theranos, a company that once promised revolutionary advancements in medical diagnostics. The documentary chronicles the ascent and eventual downfall of Theranos, shedding light on the ethical dilemmas, technological challenges, and regulatory complexities that define the medical device landscape [7]. One of the issues with this company is that their goal was to improve blood testing and diagnostics, which is a noble cause. This skewed the impression of some to assume that if the aim of the company is to do good, then there must be no ill intentions on the part of the leaders of the company. In the case of Theranos, this was not the case. Despite intending to help make early diagnoses with a less painful procedure, the devices were making incorrect measurements and potentially

misdiagnosed many people. Many supporters of the company were fooled into believing good intentions and not recognizing the risk.

By closely analyzing the Theranos case study, students gain an understanding of the multiple perspectives involved in the development, validation, and deployment of medical technologies. They see the consequences of the aspirational executives pursuing commercial success in contrast with inadequate scientific rigor. The case study serves as a cautionary tale, reminding our students of the vital importance of adhering to the highest ethical standards, maintaining scientific integrity, and rigorously validating the technologies that hold the potential to transform healthcare.

The Theranos case study prompts students to contemplate the broader implications for patients, healthcare providers, investors, and the reputation of the entire medical device industry. It ignites discussions on the role of regulatory agencies, the significance of transparency, and the responsibility of innovators to safeguard public health.

Ultimately, our inclusion of the Theranos case study into the Medical Device course enriches the curriculum. It equips students with a nuanced understanding of the pressure to innovate along with ethical considerations, and the need to uphold the highest standards of scientific rigor in the pursuit of advancements that have the power to reshape the healthcare landscape.

By being aware of some of inherent risks involved in working for a startup, students are more prepared to research the companies that they are interested in working for to ensure that the technology is sound, and that the company has ethical practices. This helps students make responsible and informed career decisions. As they embark on their professional journeys, they have a deeper understanding of the potential pitfalls, and are ready to approach their job search with a discerning lens.

In addition to recognizing when ethical issues arise, students must know how to address these issues and how to report them. It is important to understand the protection that exists for whistleblowers, which is why the students were tasked with researching the protective laws. Researching the protections available for whistleblowers is important to help employees feel more comfortable raising concerns about unethical decisions being made.

Transparency, openness, and respect are crucial to make employees feel comfortable about speaking up and raising concerns to the attention of management. If an employee does not feel comfortable bring the issue up, there may be other ways to raise the concern such as through an anonymous report.

By becoming aware of the intricacies of startup risks, students are empowered to conduct comprehensive research into prospective employers. This proactive approach extends beyond surface-level considerations and reaches the core of a company's existence. The emphasis shifts toward scrutinizing the soundness of the technology behind the company's mission. This ensures that students navigate beyond enticing promises, probing into the technology's viability and integrity.

Furthermore, reviewing this case study increases awareness of ethical practices. Students are more likely to actively seek out companies that align with their values, ethical principles, and need for transparency. The potential for ethical conflicts exists, but thorough assessment of a company's governance, conduct, and accountability can mitigate the risk. In summary, students become more attuned to ethical risks and the different ways to handle them if they arise.

[1] "Code of ethics," Code of Ethics | National Society of Professional Engineers, https://www.nspe.org/resources/ethics/code-ethics (accessed Feb. 26, 2024).

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[4] I. Lapowsky, "Theranos' scandal exposes the danger of Silicon Valley's myth-making machine," Wired, https://www.wired.com/2015/10/theranos-scandal-exposes-the-problem-with-techs-hype-cycle/ (accessed Feb. 26, 2024).

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[6] Hot startup theranos has struggled with its blood-test technology ..., https://www.wsj.com/articles/theranos-has-struggled-with-blood-tests-1444881901 (accessed Feb. 26, 2024).

[7] R. E. McGinn, "Startup ethics: Ethically responsible conduct of scientists and engineers at Theranos," *Science and Engineering Ethics*, vol. 28, no. 5, Aug. 2022. doi:10.1007/s11948-022-00393-2