Why Software Developers Should Take Ethics into Consideration

CSC502 Ethical Leadership in Software Development, CSU Global

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In the 1991 conference paper Ethical Considerations in Software Engineering, Gotterbarn posits software production as a social process that endows software engineers with ethical obligations—not only to other stakeholders of the product itself, but also to the profession of software engineering. Many of the ethical issues that arise in software engineering, he says, arise from lack of professional judgment. We could, therefore, argue that the main reason ethics is important for software developers is a selfish one—an engineer who demonstrates a lack of professional judgment (especially when it comes to risk) isn't an engineer anyone with good business sense wants to hire (Gotterbarn, 1991; Lurie & Mark, 2016).

Another reason software engineers should consider ethics is that software affects people's lives—and that's even more true today than it was in the '90s (Gotterbarn, 1991; Lurie & Mark, 2016). So much of 21st-century life depends on computer-based electronics that run software. It's in the control systems of the cars we drive, computer systems that filter résumés, systems that route calls to emergency services, and even the wearable insulin pumps used by many diabetic people, whose lives literally depend on getting just the right doses of insulin at just the right times. In the following sections, I will discuss three categories of ethical considerations in software development, an example of each, the types of questions developers and their teams should ask during the development process, and what it might take to incorporate ethical considerations into software development work.

Ethical Considerations in Software Development

In this section, we'll look at some specific examples of ethical considerations software developers might face. Gotterbarn (1991) distills the ethical problems software engineers may encounter into three affected categories: the end product, the product development process, and

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human interaction. In the following paragraphs, I will discuss the ethical considerations for one example of each.

The End Product

Traditionally, industry thought on "ethical" software products has started—and ended—with licensing and copyright ownership. Take, for example, SCO's smear campaign against Red Hat Linux and Linux users during the early aughts, in which they claimed Linux distributors illegally used their copyrighted Unix code (*Red Hat, Inc. v. The SCO Group, Inc.*, 2003; Shankland, 2004).

Red Hat wasn't the only company SCO targeted with their copyright infringement accusation. SCO also threatened legal action against IBM, former Unix owner Novell, and even a smattering of Linux users (Shankland, 2004). In the end, it was discovered that Linux's open-source code was written by Linus Torvalds, *not* based on stolen Unix code as SCO claimed (Shankland, 2004).

In the 19 years since Red Hat's lawsuit, open-source code has come to be widely regarded as an ethical product due to its transparency. The transparency of open-source code allows for review by anyone—not only for quality, but also for ethical considerations such as the following:

- Does the code include any risks—e.g., data security—for which a client has *not* provided informed consent?
- Does the code perform at acceptable levels of quality and correctness? How are they measured?
- Does the code satisfy the client's requirements?

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The Product Development Process

Next, let's look at an example of a product development process and related ethical considerations. The Agile methodology typically involves five stages of product development: initiation, requirements gathering, design, development, and implementation, testing, and maintenance (Figure 1). In *Professional Ethics of Software Engineers: An Ethical Framework,* authors Lurie and Mark (2016) suggest a set of ethical considerations for each of four stages of the Agile process.

Figure 1.

The Phases of the Agile Software Development Process

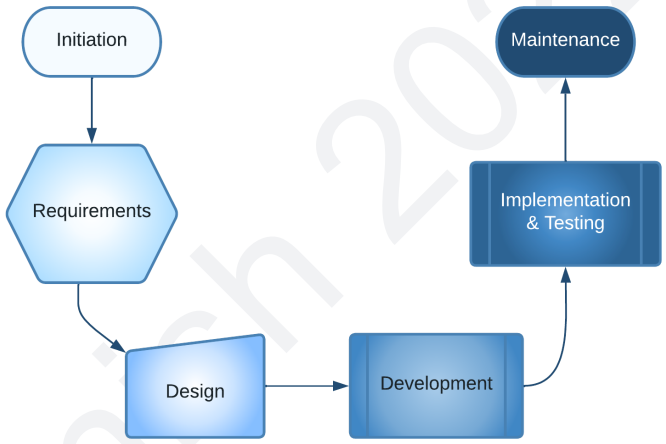

Table 1.

Ethical Considerations in Four Stages of the Agile Software Development Process

Stage	Ethical questions
Requirements gathering	➢ Have we done reasonable due diligence in learning and comparing the myriad methods for gathering requirements? ➢ Have we made a good faith effort to consider—and communicate with—all stakeholders?
Design	➢ Have we accurately differentiated between the client's wants and needs? ❗ How did we decide which requirements fell into each category? ➢ **Informed consent**—Have we made a good faith effort to

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	ensure the client understands the functional design we're proposing?
Development	➢ Have we successfully addressed all the client's needs? ❗ How did we measure success and failure? ➢ Did we make a good faith effort to address "wants" that fell within the project scope?
Implementation, testing, integration, and maintenance	➢ Did we make a good faith effort to ensure our testers were qualified? ➢ Did we verify the product satisfies all promised deliverables? ❗ How did we measure success and failure in testing? ➢ Did we make a good faith effort to ensure the client understands the integration phase and the level of support—if any—we can offer with that? ➢ Did we make a good faith effort to ensure the client understands the level of maintenance and ongoing support we can offer, if any?

Note: Data from Lurie & Mark, 2016.

Human Interactions During the Software Development Process

My final example is that of ethical considerations related to human interactions. I find these well-addressed in *A Guide to Project Management Body of Knowledge: Seventh Edition*'s section on stakeholder management (Project Management Institute, 2013). The *PMBOK® Guide* (Project Management Institute, 2013) states that the following interpersonal skills are needed to maintain stakeholder relationships and engagement:

- Taking initiative
- Honesty and integrity
- Collaboration

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- Respect
- Empathy
- Confidence

The *Guide* (Project Management Institute, 2013) offers the reasoning that these skills "ensure success," but why? I posit that it's because they keep our stakeholder interactions ethical, thereby creating and maintaining trust. Honesty, integrity, and respect are clearly ethical principles in their own right. Empathy is a skill that goes along with the principle of respect. Confidence, collaboration, and taking initiative are all related to the principles of fairness, justice, and responsibility. The only skill I would add to this list is transparency in communication. Displaying these skills shows other product and project stakeholders that we can be trusted to keep our promises, that we don't have hidden motives, that we value their perspectives, experiences, and concerns, and that we're willing to give our best effort to the work itself.

Incorporating Ethical Considerations into Software Development Work

Now that we've gone over some examples of ethical considerations for end products, development processes, and human interactions during development processes, let's discuss the incorporation of ethical considerations into software development work. Lurie and Mark (2016) cite nine common drivers of the "software crisis"—i.e., the gap between consistent production of quality software products and the need for said products—taken from previous research. In the figure below, I have combined a few of these as "effective communication" and suggested a relationship that starts with skill training *coupled with* (and not in place of) humanities education.

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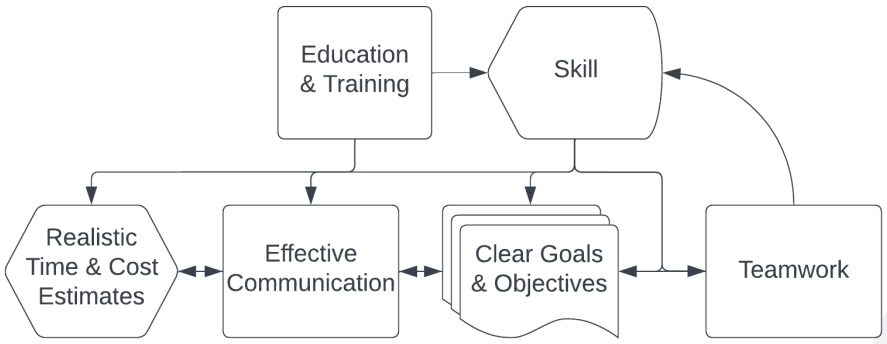
Figure 2.

Relationships Among Common Drivers of Ethical Issues in Software Development



The incorporation of ethical considerations into software development work must happen *at least* at an organizational level—preferably, at the industry level. The idea of individual developers striking out on their own to become forces for good sounds noble, but it isn't a practical way to achieve real change. As Lurie and Mark (2016) advise, an industry-level ethical framework needs to be in place to support individual organizations, teams, and developers—and, as more than one research team points out, such an ethical framework would need to be enforced via tangible consequences, no matter the level (Gogoll et al., 2021; Sharma et al., 2015; Thomson & Schmoldt, 2001). Otherwise, we risk varying levels of indifference to ethical concerns.

Conclusion

In 1991, Dr. Donald Gotterbarn identified three categories of ethical considerations in software: the development process, human interactions that occur as part of the development process, and the end product itself. More recently, authors Lurie and Mark (2016) proposed an overarching ethical framework for software development processes and end products. Although it doesn't use the word "ethics" to describe its recommendations for managing and engaging

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stakeholders, the Project Management Institute (2013) hints at an ethical baseline needed to build and maintain trust, too.

Software in the 21st century is far too ubiquitous for its developers *not* to have an appreciation for the ethical questions surrounding its development and use. Luckily, the building blocks for industry-wide ethical standards are already there. We just need to implement and enforce them.

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