Book Review

Wade L. Robison

Ethics Within Engineering: An Introduction

—Reviewed by
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Index Terms—Design solutions, error-provocative design, ethical design, role morality.

In Ethics Within Engineering: An Introduction, Wade L. Robison provides a thorough examination of the role of ethics in design and engineering. Drawing from a wide variety of cases, Robison argues that ethics are already embedded in an engineer’s design decisions and offers engineers and technical and professional communicators (TPC) methods for thinking through the implications of design decisions. Robison’s discussion of ethics complements discussions of usability and user experience by arguing that “ethical considerations are at the core of engineering” (p. 5). The core of his argument is that “engineers are in a position to do great harm,” but they should “do no unnecessary harm!” (p. 14). Through the case studies he chooses and his conversational writing, Robison’s book succeeds in illustrating how ethics is embedded in every design decision.

Robison notes that the aim of this book “is to show that ethical considerations enter into all design solutions and thus are integral to the intellectual core of engineering” (p. xvi). As such, his target audience is engineering students and faculty. However, more general TPC readers and educators will find parallels between his discussions of ethics and morals with TPC’s usability concerns. To illustrate his argument, Robison uses a range of examples from software engineering to medicine to font selection, making this book useful to both his target audience of engineers and others working in design or TPC.

Robison begins with a discussion of error-provocative designs, those that lead to a situation in which “the artifact is going to provoke the person into making a mistake” (p. 23). In Chapters 2 and 3, Robison builds on his examination of error-provocative design by challenging the idea of “operator error” in faulty designs. In Chapter 2, he lists “the artifact, the operator, or the circumstances” as the elements that can cause an accident. In Chapter 3, he expands on his examination of error-provocative designs by considering the Columbian airliner crash from 1996. The airliner crashed due to an error-provocative software design that caused the plane to head to a different airport than the one that the pilot intended, a situation that resulted in the plane crashing into a mountain. Robison uses this case to demonstrate the challenge of assigning responsibility by considering the artifact, operator, and circumstances. Through this case, Robison complicates his initial discussion of error-provocative designs by providing an example of an error-provocative design (the software error) and asking the reader to consider whether the pilot was responsible.

In Chapter 4, Robison considers “how artifacts can cause harm” using the example of designing a stove top. Robison notes that stove-top design is a typical design problem given to engineering students, and he uses this design problem to illustrate key parts of his argument, such as “The choices we make in solving a design problem reflect values” (p. 85) and “Some of these values are ethical values” (p. 86). In brief, Robison uses the stove-top example to show how ethical considerations permeate design solutions, entering into what seem to be even the most mundane decisions engineers make. (p. 57)

Chapter 5 examines the role of moral responsibility and intentionality. In particular, he argues that even without intent, engineers (and other
professionals) should, at minimum, be competent. And he introduces the concept of internal and external role morality. Role morality, in the case of engineering, means that a “person takes on a set of role-specific relations having to do with the practice of engineering.” Internal morality means “to cause no unnecessary harm.” And external morality involves engineers “wearing another hat as an employee, contractor, or manager” (pp. 118–119). Ultimately, Robison argues, engineers (and other professionals) are trained to think in the manner of their field, but may find themselves needing to think as those performing other roles (e.g., managers).

Chapters 6 considers harm caused by designs outside of “error-provocative designs,” such as the harm caused by adopting a design solution without considering the ways in which people will actually use the artifact. In Chapter 7, he considers what he calls “unprovocative harms,” those that occur without user error (p. 156). Here, he uses examples such as the early design of airbags, which were designed to save median-sized male users, but did not take other sizes or genders into consideration. He uses these examples to make the argument that “Engineers ought always presume that both they and their design solutions could be better” (p. 192).

In Chapter 8, Robison discusses role morality in more detail. In particular, he draws on the example of the Challenger and the Morton-Thiokol manager’s declaration that “It’s time to take off your engineering hat and put on your management hat” to further demonstrate his point that we have patterns of thinking and that those patterns affect our decision making (p. 227). Chapter 9 covers common criticisms of considering ethics alongside engineering, such as “We are not responsible for everything” (p. 255). Educators in engineering and TPC will find Chapters 8 and 9 useful for illustrating how complicated even mundane decisions can become.

Throughout the book, Robison focuses on ethics and morality in engineering, but one of the most significant contributions to TPC, in particular, is the book’s relevance to usability. We often talk about incorporating usability into design decisions from the beginning of a design project rather than at the end. Robison is arguing that ethical considerations of how artifacts will be used are already embedded in the design process, even if the engineers or designers do not realize that fact. The examples that Robison uses to build his argument—from discussions of error-provocative designs to discussions of role responsibility and intentionality—echo TPC’s concerns with usability and user experience.