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The Ultimate Goal of Ethics Education Should Be More Ethical Behaviors

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The Ultimate Goal of Engineering Ethics Education Should be More Ethical Behaviors

Abstract

Ethics has been recognized as critical to engineering, although disagreement exists concerning the form engineering ethics education should take. In part, this results from disagreements about the goals of engineering ethics education, which inhibit the development of and progress in a cohesive research agenda and educational practices. To address these issues, this paper argues that the ultimate goal of engineering ethics education should be more long-term ethical behaviors. To do so, however, engineering ethics must engage with the field of empirical moral psychology. This paper begins by considering reasons for adopting ethical behaviors as the ultimate goal of ethics education, and why this would be problematic: Behaviors are what the public cares about, as well as professional organizations, and accurately assessing the effects of education on ethical behaviors is difficult if not impossible. Instead, curricula have tended to adopt ethical understanding and reasoning as the goals of ethics education, although it is unclear that these result in more ethical behaviors. The paper goes on to consider responses to these problems: Empirical moral psychology has resources for assessing the effects of education on ethical behaviors. A growing body of cross-cultural research has identified features of ethics that are and are not shared across cultural groups, as well as factors that contribute to ethical behaviors. Rather than assessing behaviors directly, proxies for behaviors can be identified and assessed. The nature of engineering itself can be used to formulate guidelines of ethical behaviors, which would transcend national and cultural groups.

Introduction

Ethics education has been recognized as critical to engineering, reflected in an emphasis on ethics in educational accreditation guidelines, as well as funding for research than addresses ethics in engineering [1]–[3]. Curricula have tended to take an applied and case-based approach, where professional engineering codes and/or philosophical ethical theories are introduced, which are then used to resolve questions that arise in cases concerning engineering and technology [4], [5]. In recent years, however, there has been a proliferation of novel approaches, as well as disagreement concerning the form engineering ethics education should take, and criteria for determining what would count as success [1], [5]–[7]. In part, this confusion stems from disagreements about the goals of ethics education.

Ethical knowledge, sensitivity, awareness, reasoning, judgments, and behaviors have all been proposed as educational goals, and different measures have been used to assess these, although it remains unclear how these outcomes are related [1], [5], [7]–[13]. Empirical research and educational curricula have lacked a unifying theoretical framework and research agenda, impeding the development and promulgation of best practices. Having a single goal would allow for the standardization of engineering ethics education and progress in research, based on a clearer understanding of what does and does not work.

Towards that end, this paper argues that the ultimate goal of engineering ethics education should be more long-term ethical behaviors. Charles Huff characterizes this as an approach “intended to develop ethical behavior over the course of an entire scientific or engineering career” [1]. To achieve this objective, however, engineering ethics must more fully engage with the field of empirical moral psychology.

This paper is divided as follows: The first part outlines reasons for adopting ethical behaviors as the ultimate goal of ethics education, that behaviors are what both professional organizations and the public ultimately care about, moving on to consider why the adoption of ethical behaviors as an educational outcome would be contentious, that accurately assessing the effects of education on ethical behaviors is difficult if not impossible. The second part of this paper considers responses to these problems, that empirical moral psychology has insights about and resources for adequately assessing the effects of education on ethical behaviors.

Why should ethical behaviors be the ultimate goal of ethics education, and why aren't they?

Engineering education has typically adopted ethical understanding and reasoning as learning outcomes, evident, for example, in ABET and Washington Accord guidelines [2], [3] – in addition to ethical imagination, awareness, sensitivity, willpower, and others [4], [8]. However, these objectives are shortsighted.

The ultimate goal of engineering ethics education should be more long-term ethical behaviors, in the first place, since professional organizations emphasize behaviors in their ethical codes. Professional codes from different disciplines, cultures, and countries all stress behaviors, for example, *performing* services, *issuing* statements, avoiding *acts*, *conducting* themselves, and so on [14]. Codes often list character traits as well – for instance, honesty and diligence – indicating the nature and importance of *being* rather than simply *behaving* like a good engineer [6]. However, it would be difficult to understand and motivate the importance of these traits apart from behaviors, in other words, why honestly would be important were it unrelated to truth telling.

Codes represent the organizations to which they belong. Because of their collective, professional knowledge, professional organizations would be in the best position to know what it means to be a good engineer. Additionally, professional organizations are linked to the public through government institutions, mediating the relation between individual engineers and the public. Professional organizations contribute to design, production, and use guidelines that form laws and precedents [15]. Assuming governments represent their peoples, the behaviors of engineers are ultimately, therefore, what the public cares about. Even if that were not the case, these are what the public should care about.

Ultimately, only the behaviors of engineers affect the public, not their knowledge, sensitivity, awareness, reasoning, or judgments. Although these might affect behaviors – a point considered below – they are not what one should ultimately care about or, therefore, what education should ultimately aim at. For example, the amount of ethical knowledge possessed by a civil engineer means little if his behaviors result in a building collapse. Conversely, a lack of ethical awareness by a mechanical engineer is inconsequential if her actions succeed in bringing a lower-emissions vehicle to market. The question then arises of why behaviors have not been adopted as the goal of ethics education.

Adopting this goal would be relatively controversial, since accurately assessing the effects of education on long-term behaviors would be difficult if not impossible. The source of this

difficulty is two-fold: first, theoretical difficulties related to what it means to "behave ethically"; second, practical difficulties involved in assessing the effects of education on long-term behaviors.

Taking the second first, accurately assessing the effects of education on long-term behaviors would require dividing participants into experimental and control groups, exposing the former to ethics education while denying the latter, and then following both throughout their careers. Obviously, the resources required to do this would be staggering, and denying education to the control group would be ethically problematic. The second, theoretical difficulty consists in specifying what it would mean to "behave ethically."

"Ethics" can understood in different ways, raising the question of which understanding to use in assessing *ethical* behaviors specifically [16]–[19]. This is especially true in engineering. Engineering and technology give rise to novel situations, where what it means to be ethical is not always clear [15], [20]. An often-discussed example is self-driving cars – novel situations to which technology can give rise, bringing with them ethical quandaries. Teaching students how they should behave in specific situations – it has been argued – would be a futile endeavor, since the situations in which they might find themselves and how they should behave are unclear [8], [21].

Further, what it means to be "ethical" in engineering can be substantially different from commonsense understandings of the term. For instance, only performing within one's area of competence, and a commitment to life-long learning, are of critical ethical significance in engineering. If engineers perform outside their areas of competence, or fail to keep up with developments in their fields, then they could endanger the public. However, these are very different from – and have been judged by engineering students as relatively superfluous compared to – commonsense ethical principles, such as not harming others or behaving fairly [22]. Determining which understanding of ethics to use in assessing behaviors becomes even more difficult with the increasingly global natures of engineering and technology.

Engineering and technology are evermore cross-cultural and international, spanning different cultures and countries [15]. As a result, engineers and those working with technology are often separated in time space from the effects of their work with technology, making it difficult to discern their effects [15], [20]. Additionally, culture can affect ethics, such that peoples across different cultures and countries can have different understandings of ethics, and reason in different manners [23]–[28].

Finally, according to the Western tradition of liberalism, part of what it would mean to be ethical is allowing each person or group to pursue their own conception of the good and, therefore, ethics. Any attempt to decide on one conception, imposing this on others, would be bad, a form of paternalism [29], [30].

For all these reasons, behaviors have typically not been adopted as a goal of ethics education.

Why should behaviors still be the goal of education, and what can moral psychology do?

Having outlined why behaviors should be the ultimate goal of engineering ethics education, and considered why they have not, the second part of this paper responds to these reasons, and explains the role that empirical moral psychology would play in achieving this goal.

First, regarding practical difficulties, although it would be difficult to assess the effects of education on behaviors, proxies could be identified and measured, and work in empirical moral psychology could assist in this endeavor. This might include assessing ethical reasoning and understanding – as has been done [5], [10], [31]–[34] – although not necessarily.

If ethical reasoning alone resulted in more ethical behaviors, then professional ethicists – arguably the most skilled in ethical reasoning – would behave more ethically than other groups. However, research has consistently failed to find evidence to support this assumption [35]–[39]. Although a relation between ethical reasoning and behaviors exists, it is only a weak one and its nature remains unclear [40], [41].

A growing body of research has found that ethical judgments are neither exclusively nor primarily the result of ethical reasoning [19], [42], and that behaviors are affected by unconscious, environmental factors [43]. Pulling on this work, some have argued unethical behaviors are less the result of individuals making reflective, rational decisions to behave unethically and more the result of an inability to see situations and behaviors as having ethical import, resulting from the nature of human cognition, a form of bounded cognition called "ethical fading" [44], [45].

On this view, ethical fading could be combatted with "ethical framing," expectations of encountering ethical issues and a motivation to behave ethically, thereby raising awareness and facilitating action. By determining which factors are related to ethical framing, curricula would be in a position to target these factors, thereby ensuring more ethical behaviors [46]. Empirical moral psychology has a plethora of resources for better understanding and assessing the relation between behaviors and other more commonly, easily assessed learning outcomes.

However, simply because understanding and reasoning are not sufficient conditions for ethical behaviors does not mean they are unnecessary. Future work could better determine the nature of this relation, for instance, the relative contributions of ethical understanding to behaviors. Doing so would allow educators to develop and assess curricula. Just as empirical moral psychology can help to understand the relation between ethical behaviors and factors such as understanding and awareness – thereby addressing practical difficulties associated with adopting behaviors as the goal of education – so too does it have resources to explain what people mean by being "ethical" – thereby addressing theoretical problems related to making behaviors the goal of education.

First, simply because people disagree about what it means to be ethical does not mean people are correct in their claims, that any and all accounts would be true [47]. However, the extent to which people disagree is unclear. Only recently have researchers conducted largescale, empirical studies on ethics, shedding light on the extent to which people agree or disagree about what it means to be ethical, and how culture effects such differences [24]–[28], [48], [49].

On the one hand, samples from WEIRD (Western Educated Industrialized Rich and Democratic) cultures tend to be outliers on various psychological dimensions [23]. Since engineering ethics developed in the US, the field could be biased by these tendencies [50], [51]. On the other hand, to a significant extent, people across cultures agree about ethics. For example, all peoples conceive of ethics in terms of care and fairness, where harming others and behaving unfairly are unethical, although what it means to harm others and behave unfairly towards them can differ [19], [49], [52]–[54]. By better understanding these similarities and differences, educators would be in a better position to address them, crafting education and training for specific cultural and professional groups. This would be especially important in engineering.

As was mentioned above, what it means to be "ethical" within engineering can be different from commonsense understandings [22]. To an extent, people are in a poor position to judge, since technology and engineering are intrinsically novel, making it difficult to know what their effects will be ahead of time [15], [20]. However, by better understanding how people think about technology, and what they consider right and wrong, educators and policymakers would be positioned to anticipate and respond more effectively to problems as they arise [55]. For example, the Moral Machines project sheds light on how people think about the ethics of autonomous vehicles, as well as the effects of culture and nationality on these judgments [56].

Next, claiming the ultimate goal of ethics education should be ethical behaviors does not mean that curricula need to/should teach specific behaviors [8], [21]. Rather, it simply means that decisions about what is taught, assessed, and how are guided by the ultimate goal of increasing ethical behaviors. As was mentioned above, findings from empirical moral psychology can help to make these decisions, for instance, the extent to which curricula should focus on cultivating ethical reasoning or empathy, and how these two activities should be related [34], [57].

Third, liberalism's apparent neutrality regarding different, competing understandings of ethics and the good is a myth. Liberalism's neutrality is itself the result of a value judgment, guided by a conception of that which is desirable. This conception is based on an understanding of personhood in liberal terms, although it is not clear that this understanding of personhood is correct, or that it is shared across cultures [29], [58]. Regarding engineering ethics specifically, professions are never value neutral: They exist to provide society with goods deemed indispensable, such as education in the case of teaching, and health in the case of medicine. As a profession, engineering is no exception – its existence implies judgments regarding that which is valuable [15].

Finally, engineering and technology are not themselves value neutral. Engineering and technology exist to make the world a better place, or at least leave it no worse off [15], [59]. Were this not true, no one would want the goods and services for which engineers are responsible, and engineering would cease to exist. Hence, engineering and technology can be used as touchstones for formulating common, ethical guidelines [15], [60]. Although engineering and technology are affected by cultural values and national policies, in all times and places, they exist to achieve similar ends. How they do so might differ, but they are guided by common goals and, therefore, values.

Conclusion

A growing consensus exists that ethics should be central to engineering. However, there is evermore disagreement about the form engineering ethics education should take. In part, this results from disagreements about the goals of education, which can hamper the development and coordination of long-term, large-scale research agendas and educational practices. To address these issues, this paper has argued that long-term ethical behaviors should be the ultimate goal of engineering ethics education, but that engineering ethics must engage with empirical moral psychology to makes this possible.

Behaviors are what professional organizations and the public ultimately care about. These have generally not been the goal of education, since it is difficult to know what "behaving ethically" would mean, and hard to assess the effects of education on long-term behaviors. Instead, curricula have tended to focus on ethical understanding and reasoning, despite it being unclear whether these result in more ethical behaviors.

Empirical moral psychology has resources for understanding what people think about ethics, how judgments converge or diverge, why, and the relation between ethical awareness, motivation, knowledge, and behaviors. Claiming that ethical behaviors should be the goal of education does not mean that curricula should consist merely in telling people how to behave in given situations. Behavioral guidelines for ethical engineering can be derived from the value dimensions of engineering itself, which transcend and can guide engineering activities in different national and cultural contexts.

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