

Ethical Design Decisions and Moral Overload

2 AIA LU/HSW, 2 CE/PDH

**D. M. Radcliffe, J. Van den Hoven,
G. J. Lokhorst, I. Van de Poel,
American Institute of Architects**

PDH Academy

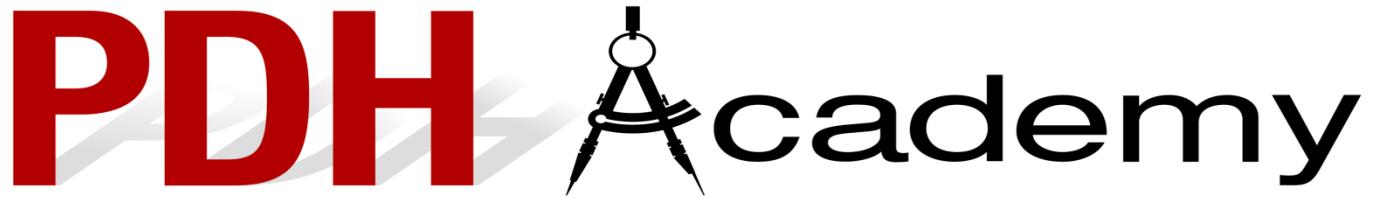
PO Box 449

Pewaukee, WI 53072

www.pdhacademy.com

pdhacademy@gmail.com

888-564-9098



Course Instructions

NOTE: The following pages contain a preview of the final exam. This final exam is identical to the final exam that you will take online after you purchase the course.

After you purchase the course online, you will be taken to a receipt page online which will have the following link: [Click Here to Take Online Exam](#). **You will then click on this link to take the final exam.**

3 Easy Steps to Complete the Course:

- 1.) Read the Course PDF Below
- 2.) Purchase the Course Online & Take the Final Exam – see note above
- 3.) Print Out Your Certificate

Ethical Design Decisions and Moral Overload Final Exam

1. An ethical decision is the act of an individual, grounded in his unique personal perspective.
True
False
2. Ethical decisions are choices that could harm the interests of others—one's stakeholders.
True
False
3. Ethical decision making in business, as in other areas of life, is governed by _____:
 - a. the state licensing board.
 - b. general ethical principles.
 - c. Congress.
 - d. professional associations.
4. Ethical issues are:
 - a. usually obvious.
 - b. often hard to recognize.
 - c. less important than financial issues.
 - d. uncommon.
5. The AIA **Code** applies to the professional activities of all classes of Members, wherever they occur.
True
False
6. AIA Members shall not sign or seal drawings, specifications, reports, or other professional work:
 - a. until a permit has been issued.
 - b. for which they do not have responsible control.
 - c. that was created more than one year earlier.
 - d. developed by an employee..
7. AIA Members speaking in their professional capacity:
 - a. shall not reveal the Code of Ethics to non-members.
 - b. must always publicly state their membership number.
 - c. should not receive cash payments for their comments.
 - d. shall not knowingly make false statements of material fact.
8. One way to deal with a moral dilemma is to look for the option that is best all things considered.
True
False

9. The reason why technical innovation can entail moral progress is that it:
- a. enlarges the opportunity set.
 - b. reduces the opportunity set.
 - c. adds to the moral obligation set.
 - d. balances with ethical values.
10. This higher order moral obligation to see to it that can be done what ought to be done can be construed as _____ an engineer's task responsibility
- a. not a part of
 - b. a small aspect of
 - c. not usually
 - d. an important aspect of

Ethical Design Decisions and Moral Overload

AIA CES Course Number: AIAPDH141

Course Description:

Architects routinely face moral dilemmas in their daily practice. This course begins with a discussion on training employees to make sound ethical decisions. It continues with a review of the AIA 2012 Code of Ethics and Professional Conduct, and concludes with a discussion of how ethics can be a source of technological development rather than just a constraint for architects and engineers. Included is a discussion on how technological progress can create moral progress rather than just ethical and moral problems.

Learning Units:

2.0 LU/HSW

Learning Objective 1:

Upon completion of this course, the student will be familiar with several aspects of ethical decisions to be considered when training employees or when examining his or her own value judgments.

Learning Objective 2:

The student will understand the concept of moral overload and be aware of several strategies for dealing with it.

Learning Objective 3:

The student will be aware of how moral progress allows better fulfillment of moral obligations.

Learning Objective 4:

The student will know that Value Sensitive Design is a viable approach to guide the design process in the right direction.

Training Ethical Decision Makers

Radcliffe, D.M. (2011, September 8). Training ethical decision makers. *Cornell HR Review*. Retrieved February 17, 2014 from Cornell University, ILR School site: <http://digitalcommons.ilr.cornell.edu/chrr/35>. Copyright by the Cornell HR Review. This article is reproduced here by special permission from the publisher. To view the original version of this article, and to see current articles, visit cornellhrreview.org.

Corporate ethics training, to be effective, must go beyond informing employees of laws and policies the firm expects them to comply with. Rather, its chief goal should be to equip and encourage employees to make sound ethical decisions.¹ Therefore, human resources managers who design and implement ethics training need to pay special attention to the nature of ethical decision making. This article identifies several aspects of ethical decisions that should be taken into account in devising or modifying an employee training program. It then offers some suggestions about what these features entail for ethics instruction.

Ethical Decision Making

We make ethical decisions every day, but few of us stop to reflect on just what this familiar activity involves. Here are some proposals about what such reflection reveals.²

- (i) ***An ethical decision is the act of an individual, grounded in his unique personal perspective.***³
Decisions are mental acts guided by our mental states, especially certain beliefs and desires, which serve as the decisions' "reasons" or "grounds." Normally, when someone seeks to influence our decision making, they do so by trying to produce in us beliefs and desires that will lead us to make the hoped-for decisions. For example, a politician intends to motivate people to vote for her by getting them to believe she is the best candidate and to desire her victory. Thus, our ethical decisions too are guided by and grounded in our beliefs and desires, and influencing our ethical decision-making requires influencing the reasons for our choices. On ethical issues, as rational agents, we want such efforts at persuasion to rely on arguments rather than psychological manipulation.
- (ii) ***Ethical decisions are choices that could harm the interests of others—one's stakeholders.***
We tend to think of ourselves as facing an "ethical" decision when our choice in a given situation could harm someone else. Anyone who has an interest that could be hurt by the decision is a stakeholder in it. When an ongoing relationship exists between a decision maker and others affected by his actions, the latter can be described

as stakeholders of the former. The stakeholders of an employee, for instance, include (among others) shareholders, superiors, subordinates, teammates, and customers—as well as his family and friends.

- (iii) ***Ethical decision situations are marked by obligations tied to the individual's roles and relationships.*** A basic fact of our lives in society is that we occupy diverse roles and have many relationships of various kinds. Attached to those roles and relationships are assorted obligations we have to others whose welfare is affected by what we do. Some of these obligations we place on ourselves, as when we make promises or enter into contracts. There are others we don't choose, such as the duty to take care of one's elderly parents. Moreover, our roles—including our jobs—and relationships are defined, at least in part, by the obligations connected with them. Being a corporate manager, for example, carries the obligation to serve the best interests of shareholders (within limits).
- (iv) ***Obligations derive from numerous social norms, which sometimes results in conflicting obligations for the decision maker.*** A person's having obligations to others is due to the existence of applicable norms that require or prohibit certain types of behavior. In today's world, individuals usually fill a number of roles and form relationships of widely varying types and durations. Hence, our social interactions are circumscribed by myriad obligations stemming from a multiplicity of norms. These include laws, regulations, contracts, codes, and policies. Inevitably, we encounter moral choice situations in which we confront competing obligations. These cases can be painful, and deciding which obligation should trump the others in the circumstances can be exceedingly difficult.
- (v) ***Ethical decision making in business, as in other areas of life, is governed by general ethical principles.*** The norms that determine our obligations also include common ethical principles—norms that represent deeply entrenched intuitions many people, in different cultures and communities, have about how we should treat each other. While these principles often guide decision making, they generally do so as tacit, unquestioned assumptions. Notable examples are the injunctions to be truthful, to keep one's word, and not to expose others to serious risk without their consent. These norms can be seen as the "glue" that holds society together or, alternatively, as provisions of the social contract which makes business and all other organized cooperation and competition possible.

(vi) **Ethical issues are often hard to recognize.** All too often, people fail to grasp that they are making decisions that affect others in ways that warrant evaluation from a moral point of view. Thus, key executives at Bridgestone/Firestone were slow to recall defective tires because they saw the growing number of claims only as a financial concern for the company, not as a safety issue for their customers.⁴ Such ethical blindness is not unusual. According to Harvard ethicist Lynn Sharp Paine, “Many leaders of corporate ethics programs say the vast majority of the problems they must deal with originate with decision makers who simply didn’t see the issues, or didn’t see them clearly enough.”⁵ A host of factors can contribute to individuals’—and groups’—failing to perceive the ethical significance of their choices. In recent decades, this has become a fertile area of research in psychology and organizational behavior, part of a broader scientific quest to understand the influences that lead people to act unethically.⁶

Some Implications

The preceding observations have some practical upshots for employee development:

- (1) **Ethics training should engage employees as decision makers, facilitating extensive dialogue among session participants, prompting them to examine critically their own and others’ responses to ethical issues posed by real-world cases.** Ethical issues call for careful evaluation of different courses of action from a variety of perspectives, with participants actively assessing—and debating—possible grounds for the decision makers’ alternatives. Citing Socrates and Confucius as exemplary moral teachers, Lynn Paine observes that they “sought to guide behavior not by issuing directives but by engaging their listeners in a collaborative process of discussion and deliberation. . . . These masters knew that moral insight is more apt to come from live interchange among informed and inquiring minds than from lists of abstract principles.”⁷ This ancient truth still holds today.
- (2) **The dialogue should be driven by decision-oriented questions.** As good teachers well know, the best way to stimulate thoughtful, probing discussion is through questions, particularly questions that invite participants to take the point of view of a decision maker and explore—through vigorous exchanges—what the decision maker should do and why. Equally important, such discussion demonstrates to employees what Paine calls “the power of questions to engage people’s moral faculties” and helps habituate them to asking incisive questions in ethical decision

making.⁸ Of course, rules and principles are important, but their greatest value is in helping decision makers identify and frame ethical issues, which can then be scrutinized using trenchant questions.⁹

- (3) **Discussion questions should focus on decision makers’ obligations to stakeholders.** For the most part, ethical deliberation is a matter of deciding what we “owe” our sundry stakeholders—what our obligations to them are, given our own roles and our relationships to those stakeholders. Consequently, in-class dialogue—setting a pattern for employees’ post-training decision making—should be informed by such questions as “Who are my stakeholders?”, “How will my decision affect them?”, and “What do I owe them?”
- (4) **Instructors should emphasize that the norms that govern business decision makers include not only laws and policies but also common ethical principles that apply to social interactions generally.** People in business are frequently tempted by the idea that, if an action is “technically legal” and doesn’t violate explicit company policies, it’s ethical.¹⁰ Another popular canard is that an employee’s overriding obligation is to maximize profits for shareholders, regardless of the impact on other stakeholders. Ethics trainers should, through dramatic examples and analogies, impress on employees that business activities are not exempted from evaluation in light of general ethical principles that hold in every domain where the actions of some people could harm others.
- (5) **Instructors should devote considerable class time to ethical choice situations in which decision makers have conflicting stakeholder obligations.** Ethical dilemmas—choice situations in which we have competing obligations—are a fact of life. When we experience them in the workplace, the stakes—for ourselves and for others—can be quite high. Furthermore, often it is not at all clear which of the conflicting obligations should take priority. To resolve ethical dilemmas in ways that are publicly defensible, we have to give close attention to the facts, rely on our imagination to envision options and consequences, and employ as best we can our skills in logical analysis. Employees will be much better prepared to handle ethical dilemmas when they have had ample practice in the classroom.
- (6) **A main goal of ethics training should be to enable employees to recognize ethical issues when they arise, including making them aware of psychological and organizational factors that can prevent such recognition—and how to counter them.** Throughout the training, when the

instructor introduces a new case study, she should ask, “What are the ethical issues here?” and “What makes them ethical issues?” Also, some training time should be used to acquaint employees with research findings on psychological and organizational phenomena that often keep people from seeing the ethical import of their choices.¹¹ This should include discussion of measures that can be taken to avoid ethical “blind spots.”¹²

Conclusion

The health of a company depends in no small part on the quality of the decision-making by its employees, from top to bottom. Because a firm’s operations affect the interests of an array of stakeholders, it is vital—to the company and its stakeholders—that employees can be trusted to identify ethical issues and resolve them responsibly. Achieving that result should be the primary aim of corporate ethics training, whose design should align with that end.

Dana M. Radcliffe is the Day Family Senior Lecturer of Business Ethics at the S.C. Johnson Graduate School of Management at Cornell University. He has taught at Cornell since 2000 and teaches classes in business ethics, corporate responsibility, and leadership. In addition, he is the School’s coordinator for ethics-related events and initiatives. He holds concurrent adjunct faculty appointments at Syracuse University, teaching ethics courses in the Maxwell School of Citizenship and Public Affairs and the L. C. Smith College of Engineering and Computer Science. Previously, Radcliffe worked in strategic real estate consulting for Deloitte & Touche in Los Angeles and San Francisco. He earned his BA in philosophy from Fort Hays State University, M. Phil. in philosophy from Yale University, MBA from the University of California, Los Angeles, and PhD in philosophy from Syracuse University.

Footnotes

1. This is in line with the Federal Sentencing Guidelines’ stipulation that an effective compliance and ethics program “promote[s] an organizational culture that encourages ethical conduct and a commitment to compliance with the law.” *2010 Federal Sentencing Guidelines Manual*, §8B2.1.(a)(2). http://www.ussc.gov/guidelines/2010_guidelines/Manual_PDF/Chapter_8.pdf
2. As will be readily evident to the reader, my analysis of ethical decisions is philosophical rather than scientific. For a comprehensive summary of recent empirical research on the topic, see Ann E. Tenbrunsel and Kristin Smith-Crowe, “Ethical Decision Making: Where We’ve Been and Where We’re Going,” *Academy of Management Annals*, Vol. 2, No. 1, 2008, 545-607. See also Linda Klebe

Treviño and Gary R. Weaver, *Managing Ethics in Business Organizations: Social Scientific Perspectives* (Stanford University Press, 2003).

3. Of course, we speak of organizations’ and groups’ making ethical decisions, but, ultimately, even corporate decisions trace back to the ethical choices of individuals, apart from which the corporate choices don’t occur.
4. Lynn Sharp Paine, *Value Shift: Why Companies Must Merge Social and Financial Imperatives to Achieve Superior Performance* (McGraw-Hill, 2003), 199.
5. *Ibid.*, 206.
6. On psychological traps, see the now-classic article by David M. Messick and Max H. Bazerman, “Ethical Leadership and the Psychology of Decision Making,” *Sloan Management Review*, Vol. 37, No. 2, 1996, 9-22. For a recent overview of the psychological research, see Max H. Bazerman and Ann E. Tenbrunsel, *Why We Fail to Do What’s Right and What to Do About It* (Princeton University Press, 2011). A penetrating study of organizational influences on ethical misconduct that fueled the 2008 financial crisis is presented by Donald Langevoort in “Chasing the Greased Pig: A Gatekeeper’s Guide to Psychology, Culture and Ethics Risk-taking in Financial Services,” *96 Cornell Law Review* 1209, 1246 (2011).
7. Paine, 201-202.
8. Paine, 201.
9. Paine, 202.
10. Perhaps the most famous—and most notorious—articulation of this view appears in Albert Carr, “Is Business Bluffing Ethical?,” *Harvard Business Review*, Vol. 46, January-February 1968, 143-153.
11. See especially Ann E. Tenbrunsel and David M. Messick, “Ethical Fading: The Role of Self-Deception in Unethical Behavior,” *Social Justice Research*, Vol. 27, No. 2, 2004, 223-236. In this seminal article, the authors argue that self-deception comes about through various “enablers,” including language euphemisms, the slippery-slope of decision making, errors in perceptual causation, and constraints induced by representations of the self.
12. Valuable resources here include Bazerman’s and Tenbrunsel’s *Blind Spots: Why We Fail to Do What’s Right and What to Do about It* and Ann E. Tenbrunsel, Kristin Smith-Crowe, and Elizabeth E. Umphress, “Building Houses on Rocks: The Role of Ethical Infrastructure in Organizations,” *Social Justice Research*, Vol. 16, No. 3, 2003, 285-307.

2012 AIA Code of Ethics & Professional Conduct

PREAMBLE

Members of The American Institute of Architects are dedicated to the highest standards of professionalism, integrity, and competence. This Code of Ethics and Professional Conduct states guidelines for the conduct of Members in fulfilling those obligations. The Code is arranged in three tiers of statements: Canons, Ethical Standards, and Rules of Conduct:

- Canons are broad principles of conduct.
- Ethical Standards (E.S.) are more specific goals toward which Members should aspire in professional performance and behavior.
- Rules of Conduct (**Rule**) are mandatory; violation of a Rule is grounds for disciplinary action by the Institute. Rules of Conduct, in some instances, implement more than one Canon or Ethical Standard.

The **Code** applies to the professional activities of all classes of Members, wherever they occur. It addresses responsibilities to the public, which the profession serves and enriches; to the clients and users of architecture and in the building industries, who help to shape the built environment; and to the art and science of architecture, that continuum of knowledge and creation which is the heritage and legacy of the profession.

Commentary is provided for some of the Rules of Conduct. That commentary is meant to clarify or elaborate the intent of the rule. The commentary is not part of the **Code**. Enforcement will be determined by application of the Rules of Conduct alone; the commentary will assist those seeking to conform their conduct to the **Code** and those charged with its enforcement.

Statement in Compliance With Antitrust Law

The following practices are not, in themselves, unethical, unprofessional, or contrary to any policy of The American Institute of Architects or any of its components:

- (1) submitting, at any time, competitive bids or price quotations, including in circumstances where price is the sole or principal consideration in the selection of an architect;
- (2) providing discounts; or
- (3) providing free services.

Individual architects or architecture firms, acting alone and not on behalf of the Institute or any of

its components, are free to decide for themselves whether or not to engage in any of these practices. Antitrust law permits the Institute, its components, or Members to advocate legislative or other government policies or actions relating to these practices. Finally, architects should continue to consult with state laws or regulations governing the practice of architecture.

CANON I

General Obligations

Members should maintain and advance their knowledge of the art and science of architecture, respect the body of architectural accomplishment, contribute to its growth, thoughtfully consider the social and environmental impact of their professional activities, and exercise learned and uncompromised professional judgment.

E.S. 1.1 Knowledge and Skill: Members should strive to improve their professional knowledge and skill.

Rule 1.101 In practicing architecture, Members shall demonstrate a consistent pattern of reasonable care and competence, and shall apply the technical knowledge and skill which is ordinarily applied by architects of good standing practicing in the same locality.

Commentary: By requiring a “consistent pattern” of adherence to the common law standard of competence, this rule allows for discipline of a Member who more than infrequently does not achieve that standard. Isolated instances of minor lapses would not provide the basis for discipline.

E.S. 1.2 Standards of Excellence: Members should continually seek to raise the standards of aesthetic excellence, architectural education, research, training, and practice.

E.S. 1.3 Natural and Cultural Heritage: Members should respect and help conserve their natural and cultural heritage while striving to improve the environment and the quality of life within it.

E.S. 1.4 Human Rights: Members should uphold human rights in all their professional endeavors.

Rule 1.401 Members shall not discriminate in their professional activities on the basis of race, religion, gender, national origin, age, disability, or sexual orientation.

E.S. 1.5 Allied Arts & Industries: Members should promote allied arts and contribute to the knowledge and capability of the building industries as a whole.

CANON II

Obligations to the Public

Members should embrace the spirit and letter of the law governing their professional affairs and should promote and serve the public interest in their personal and professional activities.

E.S. 2.1 Conduct:

Members should uphold the law in the conduct of their professional activities.

Rule 2.101 Members shall not, in the conduct of their professional practice, knowingly violate the law.

Commentary: The violation of any law, local, state or federal, occurring in the conduct of a Member's professional practice, is made the basis for discipline by this rule. This includes the federal Copyright Act, which prohibits copying architectural works without the permission of the copyright owner. Allegations of violations of this rule must be based on an independent finding of a violation of the law by a court of competent jurisdiction or an administrative or regulatory body.

Rule 2.102 Members shall neither offer nor make any payment or gift to a public official with the intent of influencing the official's judgment in connection with an existing or prospective project in which the Members are interested.

Commentary: This rule does not prohibit campaign contributions made in conformity with applicable campaign financing laws.

Rule 2.103 Members serving in a public capacity shall not accept payments or gifts which are intended to influence their judgment.

Rule 2.104 Members shall not engage in conduct involving fraud or wanton disregard of the rights of others.

Commentary: This rule addresses serious misconduct whether or not related to a Member's professional practice. When an alleged violation of this rule is based on a violation of a law, or of fraud, then its proof must be based on an independent finding of a violation of the law or a finding of fraud by a court of competent jurisdiction or an administrative or regulatory body.

Rule 2.105 If, in the course of their work on a project, the Members become aware of a decision taken by their employer or client which violates any law or regulation and which will, in the Members' judgment, materially affect adversely the safety to the public of the finished project, the Members shall:

- (a) advise their employer or client against the decision,
- (b) refuse to consent to the decision, and
- (c) report the decision to the local building inspector or other public official charged with the enforcement of the applicable laws and regulations, unless the Members are able to cause the matter to be satisfactorily resolved by other means.

Commentary: This rule extends only to violations of the building laws that threaten the public safety. The obligation under this rule applies only to the safety of the finished project, an obligation coextensive with the usual undertaking of an architect.

Rule 2.106 Members shall not counsel or assist a client in conduct that the architect knows, or reasonably should know, is fraudulent or illegal.

E.S. 2.2 Public Interest Services: Members should render public interest professional services, including pro bono services, and encourage their employees to render such services. Pro bono services are those rendered without expecting compensation, including those rendered for indigent persons, after disasters, or in other emergencies.

E.S. 2.3 Civic Responsibility:

Members should be involved in civic activities as citizens and professionals, and should strive to improve public appreciation and understanding of architecture and the functions and responsibilities of architects.

Rule 2.301 Members making public statements on architectural issues shall disclose when they are being compensated for making such statements or when they have an economic interest in the issue.

CANON III

Obligations to the Client

Members should serve their clients competently and in a professional manner, and should exercise unprejudiced and unbiased judgment when performing all professional services.

E.S. 3.1 Competence:

Members should serve their clients in a timely and competent manner.

Rule 3.101 In performing professional services, Members shall take into account applicable laws and regulations. Members may rely on the advice of other qualified persons as to the intent and meaning of such regulations.

Rule 3.102 Members shall undertake to perform professional services only when they, together with those whom they may engage as consultants, are qualified by education, training, or experience in the specific technical areas involved.

Commentary: This rule is meant to ensure that Members not undertake projects that are beyond their professional capacity. Members venturing into areas that require expertise they do not possess may obtain that expertise by additional education, training, or through the retention of consultants with the necessary expertise.

Rule 3.103 Members shall not materially alter the scope or objectives of a project without the client's consent.

E.S. 3.2 Conflict of Interest:

Members should avoid conflicts of interest in their professional practices and fully disclose all unavoidable conflicts as they arise.

Rule 3.201 A Member shall not render professional services if the Member's professional judgment could be affected by responsibilities to another project or person, or by the Member's own interests, unless all those who rely on the Member's judgment consent after full disclosure.

Commentary: This rule is intended to embrace the full range of situations that may present a Member with a conflict between his interests or responsibilities and the interest of others. Those who are entitled to disclosure may include a client, owner, employer, contractor, or others who rely on or are affected by the Member's professional decisions. A Member who cannot appropriately communicate about a conflict directly with an affected person must take steps to ensure that disclosure is made by other means.

Rule 3.202 When acting by agreement of the parties as the independent interpreter of building contract documents and the judge of contract performance, Members shall render decisions impartially.

Commentary: This rule applies when the Member, though paid by the owner and owing the owner loyalty, is nonetheless required to act with impartiality in fulfilling the architect's professional responsibilities.

E.S. 3.3 Candor and Truthfulness:

Members should be candid and truthful in their professional communications and keep their clients reasonably informed about the clients' projects.

Rule 3.301 Members shall not intentionally or recklessly mislead existing or prospective clients about the results that can be achieved through the use of the Members' services, nor shall the Members state that they can achieve

results by means that violate applicable law or this Code.

Commentary: This rule is meant to preclude dishonest, reckless, or illegal representations by a Member either in the course of soliciting a client or during performance.

E.S. 3.4 Confidentiality:

Members should safeguard the trust placed in them by their clients.

Rule 3.401 Members shall not knowingly disclose information that would adversely affect their client or that they have been asked to maintain in confidence, except as otherwise allowed or required by this Code or applicable law.

Commentary: To encourage the full and open exchange of information necessary for a successful professional relationship, Members must recognize and respect the sensitive nature of confidential client communications. Because the law does not recognize an architect-client privilege, however, the rule permits a Member to reveal a confidence when a failure to do so would be unlawful or contrary to another ethical duty imposed by this Code.

CANON IV

Obligations to the Profession

Members should uphold the integrity and dignity of the profession.

E.S. 4.1 Honesty and Fairness:

Members should pursue their professional activities with honesty and fairness.

Rule 4.101 Members having substantial information which leads to a reasonable belief that another Member has committed a violation of this Code which raises a serious question as to that Member's honesty, trustworthiness, or fitness as a Member, shall file a complaint with the National Ethics Council.

Commentary: Often, only an architect can recognize that the behavior of another architect poses a serious question as to that other's professional integrity. In those circumstances, the duty to the professional's calling requires that a complaint be filed. In most jurisdictions, a complaint that invokes professional standards is protected from a libel or slander action if the complaint was made in good faith. If in doubt, a Member should seek counsel before reporting on another under this rule.

Rule 4.102 Members shall not sign or seal drawings, specifications, reports, or other professional work for which they do not have responsible control.

Commentary: Responsible control means the degree of knowledge and supervision ordinarily required by the professional standard of care. With respect to the work of licensed consultants, Members may sign or seal such work if they have reviewed it, coordinated its preparation, or intend to be responsible for its adequacy.

Rule Members speaking in their
4.103 professional capacity shall not knowingly make false statements of material fact.

Commentary: This rule applies to statements in all professional contexts, including applications for licensure and AIA membership.

E.S. 4.2 Dignity and Integrity:
Members should strive, through their actions, to promote the dignity and integrity of the profession, and to ensure that their representatives and employees conform their conduct to this Code.

Rule Members shall not make
4.201 misleading, deceptive, or false statements or claims about their professional qualifications, experience, or performance and shall accurately state the scope and nature of their responsibilities in connection with work for which they are claiming credit.

Commentary: This rule is meant to prevent Members from claiming or implying credit for work which they did not do, misleading others, and denying other participants in a project their proper share of credit.

Rule Members shall make reasonable
4.202 efforts to ensure that those over whom they have supervisory authority conform their conduct to this Code.

Commentary: What constitutes “reasonable efforts” under this rule is a common sense matter. As it makes sense to ensure that those over whom the architect exercises supervision be made generally aware of the Code, it can also make sense to bring a particular provision to the attention of a particular employee when a situation is present which might give rise to violation.

CANON V

Obligations to Colleagues

Members should respect the rights and acknowledge the professional aspirations and contributions of their colleagues.

E.S. 5.1 Professional Environment:
Members should provide their associates and employees with a suitable working environment, compensate them fairly, and facilitate their professional development.

E.S. 5.2 Intern and Professional Development:
Members should recognize and fulfill their obligation to nurture fellow professionals as they progress through all stages of their career, beginning with professional education in the academy, progressing through internship and continuing throughout their career.

Rule Members who have agreed to
5.201 work with individuals engaged in an architectural internship program or an experience requirement for licensure shall reasonably assist in proper and timely documentation in accordance with that program.

E.S. 5.3 Professional Recognition: Members should build their professional reputation on the merits of their own service and performance and should recognize and give credit to others for the professional work they have performed.

Rule Members shall recognize and
5.301 respect the professional contributions of their employees, employers, professional colleagues, and business associates.

Rule Members leaving a firm shall
5.302 not, without the permission of their employer or partner, take designs, drawings, data, reports, notes, or other materials relating to the firm’s work, whether or not performed by the Member.

Rule A Member shall not
5.303 unreasonably withhold permission from a departing employee or partner to take copies of designs, drawings, data, reports, notes, or other materials relating to work performed by the employee or partner that are not confidential.

Commentary: A Member may impose reasonable conditions, such as the payment of copying costs, on the right of departing persons to take copies of their work.

CANON VI

Obligations to the Environment

Members should promote sustainable design and development principles in their professional activities.

E.S. 6.1 Sustainable Design:
In performing design work, Members should be environmentally responsible and advocate sustainable building and site design.

E.S. 6.2 Sustainable Development:
In performing professional services, Members should advocate the design, construction, and operation of sustainable buildings and communities.

E.S. 6.3 Sustainable Practices:
Members should use sustainable practices within their firms and professional organizations, and they should encourage their clients to do the same.

RULES OF APPLICATION, ENFORCEMENT, AND AMENDMENT

Application

The **Code of Ethics and Professional Conduct** applies to the professional activities of all members of the AIA.

Enforcement

The Bylaws of the Institute state procedures for the enforcement of the **Code of Ethics and Professional Conduct**. Such procedures provide that:

- (1) Enforcement of the **Code** is administered through a National Ethics Council, appointed by the AIA Board of Directors.
- (2) Formal charges are filed directly with the National Ethics Council by Members, components, or anyone directly aggrieved by the conduct of the Members.

- (3) Penalties that may be imposed by the National Ethics Council are:
 - (a) Admonition
 - (b) Censure
 - (c) Suspension of membership for a period of time
 - (d) Termination of membership.
- (4) Appeal procedures are available.
- (5) All proceedings are confidential, as is the imposition of an admonishment; however, all other penalties shall be made public.

Enforcement of Rules 4.101 and 4.202 refer to and support enforcement of other Rules. A violation of Rules 4.101 or 4.202 cannot be established without proof of a pertinent violation of at least one other Rule.

Amendment

The **Code of Ethics and Professional Conduct** may be amended by the convention of the Institute under the same procedures as are necessary to amend the Institute's Bylaws. The **Code** may also be amended by the AIA Board of Directors upon a two-thirds vote of the entire Board.

***2012 Edition.** *This copy of the **Code of Ethics** is current as of September 2012. Contact the General Counsel's Office for further information at (202) 626-7348. Reprinted by permission of the American Institute of Architects.*

Engineering and the Problem of Moral Overload

J. Van den Hoven, G.-J. Lokhorst, (&) I. Van de Poel
Section of Philosophy, Faculty of Technology, Policy
and Management, Delft University of Technology,
P.O. Box 5015, 2600 GA Delft, The Netherlands
e-mail: g.j.c.lokhorst@tudelft.nl

Introduction

Engineers are often confronted with moral dilemmas in their design work because they are presented with conflicting (value) requirements (cf. Van de Poel 2009). They are supposed to accommodate for example both safety and efficiency, security and privacy, accountability and confidentiality. The standard reaction to moral dilemmas is to try and weigh up the different moral considerations and establish which values are more important for the engineering task at hand, think about tradeoffs or justifications for giving priority to one of the values at play. It seems only natural to think about moral solutions to moral problems arrived at by moral means. Sometimes this is the only thing we can do. Sometimes however our moral dilemmas are amenable to a technical solution. We tend to forget that since a moral dilemma is constituted by a situation in the world which does not allow us to realize all our moral obligations in that situation at the same time, solutions to a dilemma may also be found by changing the situation in such a way that we can satisfy all our value commitments. We argue here that some moral dilemmas may very well have engineering solutions and that certain types of moral dilemmas can be tackled by means of technical innovations. Our analysis draws attention to a special feature of the responsibility of engineers, namely the responsibility to prevent situations which are morally dilemmatic and which must inevitably lead to suboptimal solutions or compromises and trade-offs from a moral point of view. We start our analysis from a familiar place: the analysis of moral dilemmas and the problem of moral overload.

We are repeatedly confronted by situations in which we cannot satisfy all the things that are morally required of us. Sometimes our moral principles and value commitments can simply not all be satisfied at the same time given the way the world is. The result is that we are morally 'overloaded'. These situations have been extensively studied in moral philosophy, rational choice theory and welfare economics and are referred to as 'hard choices', 'moral dilemmas' or 'conflicting preferences' (e.g. Kuran 1998; Van Fraassen 1970; Levi 1986). The problem that has received most of the attention is the question of how we ought to decide in these dilemmatic cases between the various options and alternatives open to the agent. There is however another aspect that has received far less attention and that is sometimes referred to as "the moral residue",

i.e. the moral emotions and psychological tensions that are associated with the things that were not done, the road not travelled, the moral option forgone. Amoral residue provides those who are exposed to it with an incentive to avoid moral overload in the future. It can therefore function as a motor for improvement, in fact as a motor for technological innovation. If an instance of technological innovation successfully reduces moral overload it constitutes an instance of moral progress, so we will argue.

Moral Overload and Moral Dilemmas

Timur Kuran (1998) has referred to situations in which we have different value commitments by which we cannot live simultaneously as situations of "moral overload". The basic idea of moral overload is that an agent is confronted with a choice situation in which different obligations apply but in which it is not possible to fulfil all these obligations simultaneously.

Kuran provides the following more detailed definition of moral overload. An agent A has to make a particular decision in a choice situation in which A can only choose one option. The options she can choose from form together the opportunity set X , which is defined by physical and practical constraints. The agent has a number of values $V_a \dots V_x$; each of these values requires her to avoid a subset of the options. More specifically the values instruct the agent to keep $v_n > v_n^*$, where v_n is the actual realisation of value V_n by an option and v_n^* a threshold that V_n should at least meet. The set of feasible options that meet all these value thresholds forms the moral opportunity set X^m (see Fig. 1).

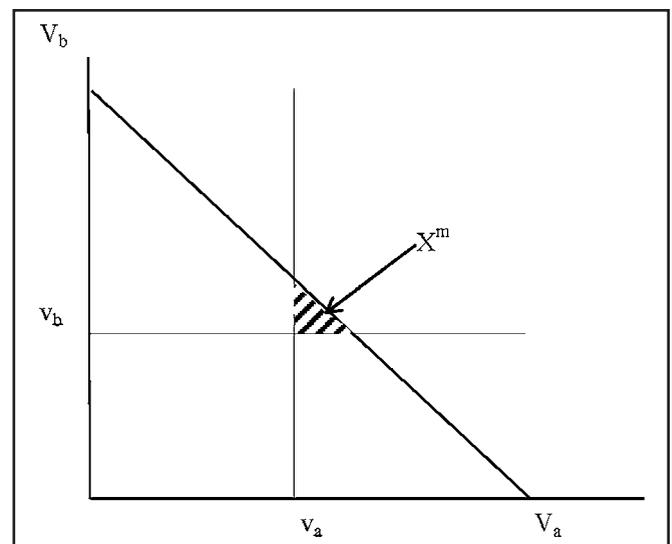


Fig. 1 The moral opportunity set X^m . Under certain conditions X^m may be empty, so creating moral overload. (The figure is based on Fig. 1 in Kuran 1998:235)

Now in some choice situations, the moral opportunity set is empty: the agent cannot live by her values. This situation is defined as moral overload. In a situation of moral overload the agent is not only confronted with a difficult choice problem, she is also forced to do something that violates her values; moral overload therefore results in a feeling of moral guilt or moral regret.

The notion of moral overload is quite similar to what others have described as a moral dilemma. The most basic definition of a moral dilemma is the following (Williams 1973:180):

- (1). The agent ought to do a
- (2). The agent ought to do b
- (3). The agent cannot do a and b

One available option of action meets one obligation but not the other. The agent again can fulfil the second obligation, but not without violating the first. Conflicting moral obligations create moral dilemmas. The nature, structure and logic of moral dilemmas has been extensively studied and has been discussed among others by Bas van Fraassen (1970), Bernard Williams (1973) and Ruth Marcus (1980).

William's definition of a moral dilemma is somewhat different from Kuran's definition of moral overload because it is defined in terms of 'oughts' instead of in terms of 'values' and because it is defined over two options a and b instead of over a larger set of options, but the basic deontic structure is obviously the same. For our current purpose, Levi's (1986:5) definition of what he calls 'moral struggle' is particularly relevant:

- (1). The agent endorses one or more value commitments P_1, P_2, \dots, P_n .
- (2). Value commitment P_i stipulates that in contexts of deliberation of type T_i , the evaluation of feasible options should satisfy constraint C_i .
- (3). The specific decision problem being addressed is recognized to be of each of the types T_1, T_2, \dots, T_n so that all constraints C_1, C_2, \dots, C_n are supposed to apply.
- (4). The decision problem currently faced is one where the constraints C_1, C_2, \dots, C_n cannot all be jointly satisfied.

Levi sees his definition of moral struggle, which is almost identical to Kuran's definition of moral overload, as a more general characterisation of moral dilemmas. It is not only more general because it applies to a set of options and a set of value commitments instead of just two options and two 'oughts' but also because the notion of value commitment is more general than the notion of 'ought.' According to Levi, value commitments may be represented as moral principles, but also as 'expressions of life goals, personal desires, tastes or professional commitments'

(Levi, 1986:5). This suggests that we also can have non-moral overload generated by conflicting non-moral value commitments in a choice situation. We may, for example, have a conflict between a prudential and a moral value or between two prudential values or two preferences.

Strategies for Dealing With Moral Overload

There are various strategies for dealing with moral overload or moral dilemmas. In this section we will discuss several of such strategies. We will see that although these strategies may be more or less adequate in the individual choice situation, they in most cases do not take away what has been called the 'moral residue.' Moral residue here refers to the fact that even if we may have made a justified choice in the case of moral overload or a moral dilemma, there remains a duty unfulfilled, a value commitment not met.

One way to deal with a moral dilemma is to look for the option that is best all things considered. Although this can be done in different ways, it will usually imply a trade-off among the various relevant value commitments. The basic idea here is that the fact that an option x does not meet value commitment P_i with respect to value V_i could be compensated by better meeting one or more of the other values. Such a strategy reduces the multidimensional decision problem to a onedimensional decision-problem.

Value commitments can, however, not always be traded off. This is sometimes expressed in terms of value incommensurability, i.e. the fact that values cannot be measured on the same scale (Chang 1997). What makes trade-offs impossible is, however, probably not just formal incommensurability, i.e. the lack of a measurement method to compare (degrees of) values on one scale, but rather substantive incommensurability, i.e. the fact that some values resist trade-offs: less of one value cannot be compensated by having more of another (Tetlock 2003; Raz 1986; Baron and Spranca 1997). No money in the world can compensate the loss of a dear friend. Another way of expressing this idea is that if trade-offs or compensations are tried there is always some residue that cannot be compensated; it is in fact this residue that creates a feeling of moral guilt or regret that is typical for moral dilemmas and moral overload. This also implies that even if we might be justified in believing that one value commitment is more important than another one in a morally dilemmatic choice, this does not take away the occurrence of a moral residue.

Making value trade-offs is not the only strategy for dealing with moral dilemmas and moral overload. We will focus here on the various strategies, social mechanisms and social institutions that Kuran (1998) discusses. He distinguishes three categories of

strategies. The first comprises strategies that allow the agent to lower the threshold for one or more of the value commitments in the particular choice situation while retaining the long-term value commitments. The second category of strategies allows the agent to avoid entering into a choice situation that is characterized by moral overload. The third category is formed by strategies that help to avoid moral overload by reformulating or revising long-term value commitments. All of these strategies can be employed by individuals but all of them also have an institutional component, i.e. they are made possible or made easier through the existence of certain social institutions that help to alleviate value conflict of individuals.

Kuran discusses three strategies of the first category that allow the agent to lower the threshold for one or more value commitment in the particular choice situation while retaining the long-term value commitment: compensation, casuistry and rationalization. Compensation is often not directly possible in the choice situation because the relevant values in a situation of moral overload resist trade-offs and are therefore not amenable to direct compensation. However, agents can and often do— as empirical evidence suggests—compensate a moral loss in one situation by doing more than is required in a next situation. Compensation may then allow agents to live by their values over the course of their life, even if they cannot live up to their value commitments in every choice situation.¹

Kuran describes casuistry, the second strategy, as ‘the use of stratagems to circumvent a value without discarding it formally’ (Kuran 1998:251). The use of such tricks is obviously one of the things that gave casuistry a bad name in the past (cf. Jonsen and Toulmin 1988). It might indeed strike one as wicked to propose this as a strategy for dealing with moral overload. It might nevertheless have some value because it helps to preserve the value commitment for future choice situations without incurring a feeling of guilt in the current choice situation.

In rationalization, the agent tries to rationalize away the conflict between two values. Take the following example. In choosing a means of transport, one may have the prudential value of ‘comfort’ and the moral value of ‘taking care for the environment’. The values conflict because the most comfortable means of transport, the car, pollutes the environment more than, for example, the train. The agent may now rationalize away the conflict by arguing that after all the train is more comfortable than a car for example because you do not have to drive yourself and have time to read. In this way, rationalization not only alleviates the felt tension between the two values, but it also affects the choice made. In the example given the agent in effect restrained her prudential value in favour of the moral value at play.

The second category of strategies aims at avoiding moral overload. Kuran suggests two strategies for doing so: escape and compartmentalisation. Escape is a strategy in which an agent tries to prevent moral overload by avoiding choices. Compartmentalisation refers to the splitting up of an individual’s life or of society in different contexts two which different values apply. In as far as compartmentalisation is successful it avoids the need to choose between two or more values in a specific choice context.

The third category comprises strategies in which the agent revises her value commitments in order to avoid moral overload. Kuran refers to this as ‘moral reconstruction’. Obviously, moral reconstruction only makes sense if an agent is repeatedly not able to live by her value commitments or if they are independent reasons to revise a value commitment, for example because it was mistaken in the first place or has become out-dated due to, for example, historical developments. In the absence of such independent reasons, moral reconstruction to avoid moral dilemmas is often dubious. As Hansson writes:

More generally, dilemma-avoidance by changes in the code always takes the form of weakening the code and thus making it less demanding. There are other considerations that should have a much more important role than dilemma-avoidance in determining how demanding a moral code should be. In particular, the major function of a moral code is to ensure that other-regarding reasons are given sufficient weight in human choices. The effects of a dilemma per se are effects on the agent’s psychological state, and to let such considerations take precedence is tantamount to an abdication of morality (Hansson 1998:413).

Nevertheless, a milder form of moral reconstruction, not mentioned by Kuran, might sometimes be acceptable. In some cases, it is possible to subsume the conflicting values under a higher order value. Kantians, for example, tend to believe that all value conflicts can eventually be solved by having recourse to the only value that is unconditionally good, the good will. One need not share this optimism, to see that it makes sometimes perfect sense to try to redefine the conflicting values in term of one higher-order value. A good example is the formulation of the value ‘sustainable development’ in response to the perceived conflict between the value of economic development and the abatement of poverty on the one hand, and environmental care and care for future generations on the other hand. In 1987, sustainable development was defined by the Brundlandt committee of the UN as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (WCED 1987).

Although higher order values, like sustainability, may be useful to decide how to act in a moral dilemma, they do often not just dissolve the dilemma. Often the

overarching value may refer to, or contain, a range of more specific component values and norms that are conflicting and incommensurable (cf. Chang 1997:16; Richardson 1997:131). This means that even if a justified choice may be made in a dilemmatic situation on basis of an overarching value, a moral residue, in the sense of a moral value or norm not (fully) met, may still occur.

As we have seen there are different ways in which people can react to moral overload. Not all replies are, however, equally morally acceptable. Casuistry and rationalisation, for example, may be psychologically functional, but they may well lead to morally unacceptable choices. Trying to avoid entering in a moral dilemma by escape or compartmentalisation may sometimes be morally desirable but is certainly not always morally praiseworthy. In some circumstances, it may also be interpreted as a way of neglecting one's moral responsibilities. As we have seen also, moral reconstruction, whiles sometimes adequate, may in other circumstances be unacceptable. Moreover, even if there a morally justified choice in a dilemmatic situation, this choice as such does usually not take away the occurrence of a moral residue.

The occurrence of a moral residue or moral guilt is thus typical for choice under moral overload. The moral residue or guilt is, however, not just an unfortunate byproduct we have to live with, but it will motivate the agent to organize her live in such a way that in the future moral overload is reduced. Marcus (1980) has in fact suggested that we have a second-order duty to avoid moral dilemmas: "One ought to act in such a way that, if one ought to do X and one ought to do Y, then one can do both X and Y." This principle is regulative; the second order 'ought' does not imply 'can.' The principle applies to our individual lives, but also entails a collective responsibility (Marino 2001) to create the circumstances in which we as a society can live by our moral obligations and our moral values. One way in which we can do so is by developing new technologies.

Moral Residues as Motors for Technological Innovation

Ruth Marcus (1980) has put forward the following second-order regulatory principle:

(BF1) One ought to act in such a way that, if one ought to do x and one ought to do y , then one can do both x and y .

To understand this principle, it is useful first to revisit the question whether, and in what sense, 'ought' implies 'can'. If OA (it is obligatory that A), then PA (it is permitted that A), and therefore MA (it is logically possible that A). In this sense, $OA \rightarrow MA$ is valid. But in many other senses, OA does not entail MA. For example, if M means "economically possible,"

or "politically possible," or "physically possible," or "biologically possible" or "possible without losing your life," or "astrologically possible," or "using only your bare hands and no any instrument whatsoever," or "possible with your left thumb," then $OA \rightarrow MA$ is invalid. In such cases, it makes sense to say that OA *should* imply MA:

(1) $O(OA \rightarrow MA)$.

According to standard deontic logic with a possibility operator, (1) is a theorem if and only if (2) is a theorem (indeed, both (1) and (2) are theorems of that system):

(2) $O(OA \& OB \rightarrow M(A \& B))$.

Formula (2) expresses principle BF1, while (1) expresses the following principle, which seems weaker but in fact has the same force:

(BF2) One ought to act in such a way that if one ought to do x , one can do x .

We will refer to "principle (BF1/BF2)" to refer to the principles (BF1) and (BF2) which can be derived from each other. In cases in which $OA \& \sim MA$, there is what Ruth Marcus calls a "moral residue" because OA cannot be fulfilled. This may cause anxiety and distress. What can one do in such cases?

One approach in such situations is to try to avoid entering into a moral dilemma or situation of moral overload in the first place. Principle BF1/BF2, for example implies that one should not make two promises that cannot be fulfilled simultaneously. More generally, the second category of strategies discussed by Kuran, which includes the strategies of escape and compartmentalisation, are relevant here (see previous section).

However, principle BF1/BF2 can also be fulfilled by a set of strategies that seems to be missing in Kuran's overview: strategies that help to avoid moral overload by expanding the opportunity set, i.e. by changing the world in such a way that we can live by all our values. We may refer to this set of strategies as 'innovation'. Innovation can be institutional or technical in nature. We are here primarily interested in innovation which has its origin in engineering, technology and applied science. Our thesis to be defended here is that technical innovation and engineering design are important, though often neglected, means for reducing or even avoiding moral overload on a collective level and dealing with dilemmatic situations and their moral tensions on an individual level. We argue that technical innovation and engineering design sometimes offer genuine ways out of moral mazes and provide opportunities to obviate moral dilemmas and reduce the regret, guilt and moral residues that are inevitably linked to them.

The crucial point is that innovation can make the impossible possible, not in the sense of "logically possible," of course, but in the sense of "feasible" or

“physically realizable.” Given technologies S and T, where S is less advanced than T, it may be the case that $\sim M^S A \& M^T A$: A is not possible with technology S but A is possible with technology T. Here $M^T A$ may be explicated as $MA \& N(MA \rightarrow T)$, where N means “necessarily”: it is possible that A, but only in the presence of T. Seen from this perspective, (BF1/BF2) admonishes us to look for more advanced technology in cases in which we cannot fulfill our obligations on the basis of current technology. If $N(MA \rightarrow T)$ is true, then principle (BF1/BF2) implies $O(OA \rightarrow T)$ and $O(OA \rightarrow OA \& M^T A)$. In other words, if OA then we should look for technology T such that $OA \& M^T A$. It is in this sense that moral residues in combination with principle (BF1/BF2) can promote technological innovation.

We provide the following examples.

- (1) Suppose that your new neighbors have invited you for their house-warming party and you feel obliged to attend (OA). But you also have to look after your baby (OB). Suppose also that there is no baby-sitter available. If your actions were limited to those that were available in Ancient Greece you would have a problem because $\sim MG(A \& B)$, where G is Greek technology. However, we now have the baby phone. It enables you to take care of your baby during your visit to the neighbors. As a result, $M(A \& B)$ is now true and both $O(A \& B)$ and (BF1/BF2) can be fulfilled. It is in this way that technology may lead to empowerment. If technology such as the baby phone did not exist, somebody should invent it.
- (2) *Trade-off between security and privacy.* As a Society we value privacy, but at the same time we value security and the availability of information about citizens. This tension is exemplified in the debates about ubiquity of CCTV cameras in public places. We either hang them everywhere and have the desired level of security (OA) in that area but give up on our privacy ($\sim OB$), or out of respect of privacy we do not hang them everywhere (OB), but settle for less security ($\sim OA$). Respect for our privacy may pull us in the direction of reticence, whereas security pushes us in the direction of making more information about individual citizens available to the outside world. Smart CCTV systems allow us to have our cake and eat it, in the sense that their smart architecture allows us to enjoy the functionality and at the same time realize the constraints on the flow and availability of personal data that respect for privacy requires ($M^T(A \& B)$). These applications are referred to as Privacy Enhancing Technologies (PET).
- (3) *Trade-off between economic growth and sustainability.* Environmental technology in Germany is among the most advanced in the world. One of the reasons why this is the case is because in Germany in the Sixties the Green Party was very influential and

articulated the obligation to reconcile economic growth with the protection of the environment. It is only because this tension between desirable production and economic growth (OA) was explicitly contrasted with cherished environmental values (OB) that an opportunity was created to find ways in which the two could be reconciled. Environmental technology is exactly the sort of smart technology that changes the world in such a way as to allow us to produce and grow without polluting the environment ($M^T(A \& B)$).

- (4) *Trade-off between military effectiveness and proportionality.* We are sometimes under an obligation to engage in military interventions which satisfy the universally accepted principles of *ius cogens* or *ius ad bellum* (OA), we at the same time foresee that these military operations may cause the death of innocent non-combatants (OB). Here we find ourselves torn between two horns of a dilemma in a particular case of a mission or on a collective level we are morally overloaded since we have two values which we cannot satisfy at the same time, i.c. destroy the enemies’ weapons of mass destruction, and on the other hand prevent innocent deaths ($\sim M(A \& B)$). Non-lethal weapons or precision/smart weapons ideally allow us to satisfy both obligations ($M^T(A \& B)$) (cf. Cummings 2006). This example only serves to exhibit the logic of the military thinking concerning advanced weapons technology. Whether the envisaged technology really delivers the goods needs to be established independently.

The list of examples of this type is extensible *ad lib*. For this reason, we propose the following hypothesis: moral residues in combination with principle (BF1/BF2) can—and often do—act as motors of technological progress.

Moral Progress and Technological Innovation

Meeting principle (BF1/BF2) can be described as moral progress because it allows us to better fulfil our moral obligations (Marino 2001). We have shown that technical innovation can be a means to fulfil principle (BF1/BF2). This implies that technological innovation can result in moral progress.

The reason why technical innovation can entail moral progress is that it enlarges the opportunity set. In the examples mentioned, technical innovation moved the boundary of the opportunity set in the upper right direction (see Fig. 2). As an effect the moral opportunity set, which was empty in the case of (moral) overload, became non-empty. Even if the moral opportunity set does not become non-empty the degree of moral overload is reduced by moving the boundary of the opportunity set in the upper right direction.

Of course, not all instances of technological innovation entail moral progress. While technical innovation may result in progress in some respects, it may at the same time represent a decline in other important value dimensions. Due to agricultural innovations, grain output in many western countries has significantly increased per area of land cultivated but it has *decreased* per unit of energy consumed (Pacey 1983:14). Another reason why technical innovation does not necessarily result in moral progress is that it may result in a ‘technological fix,’ i.e. a technical solution to a problem that is social in nature (Weinberg 1966). Technological fixes are not always undesirable or inadequate, but there is a danger that what is addressed is not the real problem but the problem in as far as it is amendable to technical solutions (see also Sarewitz 1996, especially chapter 8). It can, for example, be argued that world hunger is not primarily a problem of production capacity, which can be enlarged by technical innovation, but rather a problem of distribution of food, income and land, which is far less amendable to technical solutions.

Despite such reservations, we still think that it can be claimed that technical innovation results in moral progress in those cases in which it means an improvement in *all* relevant value dimensions. There is, nevertheless, another possible objection to this view and, that is, that it assumes a static notion of the relevant value dimensions. It has been argued that technological innovation does not only change the opportunity set but also morality, and thus the value dimensions along which we judge moral progress (Swierstra et al. 2009).

Although it is true that technology can change morality—think about the change in sexual morals due to the availability of anticonceptives—we think that technology-induced moral change at the level of

fundamental values are the exception rather than the rule. In many cases, we can therefore simply assess moral progress by the standard of current values. Nevertheless, technical innovation may sometimes make new values dimensions *relevant* that were not considered in the design of a technology. We can think of two reasons why this might occur.

One reason is that technical innovation not only enlarges the range of options but that new options also bring new side-effects and risks. This may introduce new value dimensions that should be considered in the choice situation and these new value dimensions may create new forms of moral overload. Nuclear energy may help to decrease the emission of greenhouse gases and at the same time provide a reliable source of energy, but it also creates long-term risks for future generations due to the need to store the radioactive waste for thousands of year. It thus introduces the value dimension of intergenerational justice and creates new moral overload. The design of new reactor types and novel fuel cycles is now explored to deal with those problems (Taebi and Kadak 2010).

Second, technical innovation may introduce choice in situations in which there was previously no choice. An example is prenatal diagnostics. This technology creates the possibility to predict that an as yet unborn child will have a certain disease with a certain probability. This raises the question whether it is desirable to abort the foetus in certain circumstances. This choice situation is characterised by a conflict between the value of life (even if this life is not perfect) and the value of avoiding unnecessary suffering. Given that prenatal diagnostic technologies introduce such new moral dilemmas one can wonder whether the development of such technologies meets principle (BF1/BF2). The same applies to the technologies for human enhancement that are now foreseen in the field of nanotechnology and converging technologies.

Implications for the Responsibility of Engineers

We have seen that while technological innovation might be a means to fulfil principle (BF1/BF2), not all innovations meet principle (BF1/BF2). We think this has direct implications for the responsibility of engineers that develop new technology. We suggest that engineers, and other actors involved in technological development, have a moral responsibility to see to it that the technologies that they develop meet principle (BF1/BF2).

This higher order moral obligation to see to it that can be done what ought to be done can be construed as an important aspect of an engineer’s task responsibility. This has been described as a meta-task responsibility (Van den Hoven 1998; Rooksby 2009), or an obligation to see to it (by designing an artifact) that one self or others (users or clients) can do what ought to be done.

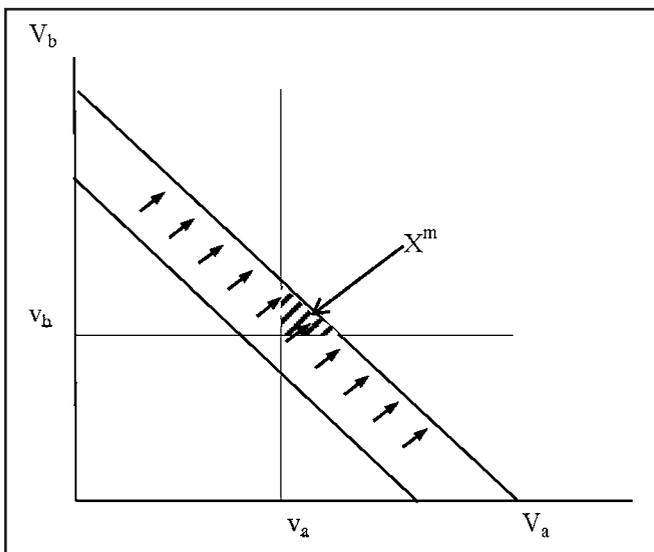


Fig. 2 By extending the opportunity set, the moral opportunity set X^m may become non-empty

An interesting way to fulfil this responsibility is the approach of Value Sensitive Design. In Value Sensitive Design the focus is on incorporating moral values into the design of technical artifacts and systems by looking at design from an ethical perspective concerned with the way moral values such as freedom from bias, trust, autonomy, privacy, and justice, are facilitated or constrained (Friedman et al. 2006; Flanagan et al. 2008; Van den Hoven 2005). Value Sensitive Design focuses primarily and specifically on addressing values of *moral* import. Other frameworks tend to focus more on functional and instrumental values, such as speed, efficiency, storage capacity or usability. Although building a user-friendly technology might have the side-effect of increasing a user's trust or sense of autonomy, in Value Sensitive Design the incorporation of moral values into the design is a primary goal instead of a by-product. According to Friedman, Value-Sensitive Design is primarily concerned with values that centre on human well-being, human dignity, justice, welfare, and human rights (Friedman et al. 2006). It requires that we broaden the goals and criteria for judging the quality of technological systems to include explicitly moral values Value Sensitive Design is at the same time, as pointed out by Van den Hoven (2005), "a way of doing ethics that aims at making moral values part of technological design, research and development". More specifically it looks at ways of reconciling different and opposing values in engineering design or innovations, so that we may have our cake and eat it (Van den Hoven 2008). Value Sensitive Design may thus be an excellent way to meet principle (BF1/BF2) through technical innovation.

Conclusion

In discussions about technology, engineering and ethics, technology and engineering are usually treated as the source of ethical problems, and ethics is treated as a constraint on engineering and technological development. We have shown that also a quite different relation exists between these realms. Ethics can be the source of technological development rather than just a constraint and technological progress can create moral progress rather than just moral problems. We have shown this by a detailed analysis of how technology can contribute to the solution of so-called moral overload or moral dilemmas. Such dilemmas typically create a moral residue that is the basis of a second-order principle that tells us to reshape the world so that we can meet all our moral obligations. We can do so, among other things, through guided technological innovation. We have suggested Value Sensitive Design as a possible approach to guide the engineering design process in the right direction.

Open Access This article is distributed under the terms of the Creative Commons Attribution Noncommercial License which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

References

- Baron, J., & Spranca, M. (1997). Protected values. *Organizational Behavior and Human Decision Processes*, 70(1), 1–16.
- Chang, R. (Ed.). (1997). *Incommensurability, incomparability, and practical reasoning*. Cambridge, Mass: Harvard University Press.
- Cummings, M. L. (2006). Integrating ethics in design through the value-sensitive design approach. *Science and Engineering Ethics*, 12, 701–715.
- Flanagan, M., Howe, D. C., & Nissenbaum, H. (2008). Embodying values in technology. Theory and practise. In J. Van, J. den Hoven, & J. Weckert (Eds.), *Information technology and moral philosophy* (pp. 322–353). Cambridge: Cambridge University Press.
- Friedman, B., Kahn, P. H. J., & Borning, A. (2006). Value sensitive design and information systems. In P. Zhang & D. Galletta (Eds.), *Human-computer interaction in management information systems: Foundations (Vol. 5, pp. 348–372, Advances in mangement information systems)*. Armonk, NY: M.E, Sharpe.
- Hansson, S. O. (1998). Should we avoid moral dilemmas? *The Journal of Value Inquiry*, 32, 407–416.
- Jonsen, A. R., & Toulmin, S. (1988). *The abuse of casuistry. A history of moral reasoning*. Berkeley: University of California Press.
- Kuran, T. (1998). Moral overload and its alleviation. In A. Ben-Ner & L. Putterman (Eds.), *Economics, values, organization* (pp. 231–266). Cambridge: Cambridge University Press.
- Levi, I. (1986). *Hard Choices. Decion making under unresolved conflict*. Cambridge: Cambridge University Press.
- Marcus, R. B. (1980). Moral dilemmas and consistency. *Journal of Philosophy*, 77, 121–136.
- Marino, P. (2001). Moral dilemmas, collective responsibility, and moral progress. *Philosophical Studies*, 104, 203–225.
- Pacey, A. (1983). *The culture of technology*. Oxford, England: Blackwell.
- Raz, J. (1986). *The morality of freedom*. Oxford: Oxford University Press.
- Richardson, H. S. (1997). *Practical reasoning about final ends*. Cambridge: Cambridge University Press.

Rooksby, E. (2009). How to be a responsible slave: Managing the use of expert information systems. *Ethics and Information Technology*, 11(1), 81–90.

Sarewitz, D. R. (1996). *Frontiers of illusion: Science, technology, and the politics of progress*. Philadelphia: Temple University Press.

Swierstra, T., Stemerding, D., & Boenink, M. (2009). Exploring techno-moral change. The case of the obesity pill. In P. Sollie & M. Duwell (Eds.), *Evaluating new technologies* (pp. 119–138). Dordrecht: Springer.

Taebe, B., & Kadak, A. C. (2010). Intergenerational considerations affecting the future of nuclear power: Equity as a framework for assessing fuel cycles. *Risk Analysis*, 30(9), 1341–1362, doi:10.1111/j.1539-6924.2010.01434.x.

Tetlock, P. E. (2003). Thinking the unthinkable: Sacred values and taboo cognitions. *Trends in cognitive sciences*, 7(7), 320–324.

Van de Poel, I. (2009). Values in engineering design. In A. Meijers (Ed.), *Handbook of the philosophy of science. Volume 9: Philosophy of technology and engineering sciences* (pp. 973–1006). Oxford: Elsevier.

Van den Hoven, J. (1998). Moral responsibility, public office and information technology. In Snellen & V.d. Donk (Eds.), *Public administration in an information age*. Amsterdam: IOS Press.

Van den Hoven, J. (2005). Design for values and values for design. *Information Age*, 4–7.

Van den Hoven, J. (2008). Moral methodology and information technology. In H. Tavani & K. Himma (Eds.), *Handbook of computer ethics*. Hoboken, NJ: Wiley.

Van Fraassen, B. (1970). Values and the heart's command. *Journal of Philosophy*, 70(1), 5–19.

WCED. (1987). *Our common future. Report of the world commission on environment and development*. Oxford: Oxford University Press.

Weinberg, A. M. (1966). Can technology replace social engineering? In A. H. Teich (Ed.), *Technology and the future* (Vol. 59, pp. 55–64). New York: St. Martin's Press.

Williams, B. (1973). *Problems of the self. Philosophical papers 1956–1972*. Cambridge: Cambridge University Press.

Footnote

1 Compensation may be made easier by social institutions in several ways. Kuran mentions redemption or the absolution from sins in Christianity as one institution. The modern welfare state also provides compensation mechanisms, e.g. social workers compensate in taking care of the elderly and those who need assistance, when family and relatives lack the time to assist as a result of their other value commitments.