

Instructor's Guide to *Ethics for the Information Age*
Eighth Edition

Michael J. Quinn

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Preface

This booklet has supplementary information for instructors using the eighth edition of *Ethics for the Information Age*. It gives practical suggestions for running a successful class, points out other resources available via the Web, and contains answers to all of the review questions in the book. If you identify any errors in this manual, or if you have any ideas for additional exercises, I would appreciate hearing from you.

Michael J. Quinn
College of Science and Engineering
Seattle University
901 12th Avenue
Seattle, WA 98122

michaelq02011@gmail.com

Teaching Computer Ethics

Introduction

Teaching a computers, ethics, and society course for the first time can be intimidating! Unlike the typical computer science class, which focuses on technical content, a computers and society class focuses on people and the decisions they make. Determining the right thing to do is not like finding the maximum element on a list. The moral problems discussed in this book are complicated, and there are no algorithms that enable you to “solve” a moral problem as neatly as you can construct a binary search tree. If you have little or no formal training in ethics, you probably feel uncomfortable being responsible for teaching an ethics class.

Fortunately, your job is *not* to preach to the students or tell them how they ought to behave (outside of class, anyway!). Rather, your role as the teacher is to raise questions, give students the opportunity to formulate answers, and then gently but firmly insist that the students justify their answers by explaining their reasoning. If you are successful, the students will complete the course with a greater understanding of contemporary ethical issues related to information technology, an improved ability to think critically and defend their decisions logically, and a greater appreciation for alternate points of view.

As C. Dianne Martin and Hilary J. Holz put it:

Our belief is that ethics cannot be taught; rather what can be taught is a framework for evaluating ethical dilemmas and making decisions. In accepting the premise that technology is value-laden, we stress the need to teach a methodology of explicit ethical analysis in all decision-making related to technology... The role of ethics education should be to provide students with at least a minimal theoretical background essential for their understanding of the role that values and ethics play in all decision-making, whether it be technical, economic, political, social, or personal.¹

What is the best way to achieve this goal? The consensus among experienced instructors is that the best computer ethics classes are discussion-oriented. Discussions force students to organize their thoughts. In addition, students are more receptive to hearing ideas from peers than from you. They will come to realize that every complicated issue can be looked at from multiple points of view. They will also learn that some arguments are better than others, and

¹ “Non-Apologetic Computer Ethics Education: A Strategy for Integrating Social Impact and Ethics into the Computer Science Curriculum,” C. Dianne Martin and Hillary J. Holz, The Research Center on Computing & Society (web site), www.southernct.edu/organizations/rccs.

that the best arguments are those that use logic to reach conclusions from facts and commonly held values.

From time to time, I've gotten feedback from readers noting that some of the arguments I present in the book seem flimsy compared to others. They wonder why I've included them. The point is that I want students to develop the critical thinking skills that will enable them to weigh arguments and determine which are better than others. When they demonstrate they have acquired these skills by identifying the weaker arguments in the text, that's a good sign!

Discussions

Finding topics to discuss should not be a problem for you. The book raises far more issues than you will have time to discuss, and late-breaking news stories provide even more discussion material. It's hard *not* to find a question related to ethics and information technology in the day's news! You will have to pick and choose the topics you deem most important. Take advantage of the discussion questions and in-class exercises found at the end of each chapter. They can lead to interesting class debates and require no preparation beyond reading the chapter.

The end-of-chapter interviews provide another source of discussion topics. Your students may be highly critical of some of the opinions expressed by the interviewees—so much the better!

One of your important responsibilities as the teacher is to get every student engaged in discussions of ethical issues. I recommend you oversee many small-group discussions instead of one large discussion. When it is time for a discussion, break the class up into small groups of four or five students and ask each group to discuss the question at hand. This approach dramatically increases the number of students who are speaking, from one person in the entire class to one person in each group, and it makes it much more likely that every student will speak. After the small groups have had a reasonable amount of time to discuss the issue, you can then ask one person from each small group to report out to the entire class, giving the entire class the opportunity to benefit from the insights generated in each group.

Another one of your responsibilities is to ensure that the students justify their point of view. If a student should say, "I think such-and-such is wrong" without further elaboration, you should ask the student to explain *why* the action is wrong. Sometimes you need to drill down several levels before you get to the moral value or principle upon which the conclusion rests. I encourage my students to couch their arguments in one or more of these words: benefit, harm, right, obligation, duty, or character. A utilitarian analysis relies upon an evaluation of benefits and harms. A social contract theory analysis focuses on rights. A Kantian analysis considers duties or obligations. An analysis from the perspective of virtue theory determines whether the action is consistent with someone having good moral character. Asking for these words can have two benefits. It makes the analysis more rigorous, and it helps the class understand the ethical theory being invoked.

Take advantage of the introduction to logical argumentation appearing in Appendix B. If you and your students are familiar with the structure of valid arguments, the most common fallacies, and unfair debating gambits, it will be easier for all of you to identify when someone's

argument is flawed and name the problem with it.

Many of the issues discussed in this class are highly controversial. Students often have difficulty coming up with a logical argument defending a point of view to which they are emotionally attached. One way to solve this problem is to poll the class and find out which students support an issue and which are opposed to it. If the class is reasonably well divided between the two points of view, ask the students to argue the point of view opposite to their own personal beliefs. Without an emotional attachment to a particular point of view, students can be more analytical.

You can add value to a discussion and keep it moving along through the use of meta-comments. For example: “Maria has just given a utilitarian argument why the proposed action is wrong. Can someone analyze this issue from a Kantian point of view?”

It is important that students understand there are multiple ways to look at nearly every issue. Through the use of leading questions, you can help ensure that both sides of an issue are expressed. If you cannot find anyone to express a contrarian view, you may need to bring that view out yourself. Be prepared to promote either side of every issue!

Role-Playing Exercises

You should occasionally set aside time for role-playing exercises. Role-playing activities guarantee that many students will participate, and students particularly enjoy them. The textbook contains many of these exercises.

For a typical activity, the class is divided into small groups that give presentations representing a particular point of view. You will need to give the groups time to discuss the issue and devise the arguments they will make to the rest of the class. The amount of time depends on the exercise, but it is often 10–20 minutes. Next, each group makes its case. Again, the amount of time depends on the exercise, but it is often 20–30 minutes. Finally, it is good to have a concluding discussion in which the students have the opportunity to discuss the relative strengths of each group’s case.

Writing Assignments

I believe in the adage that “You don’t know what you know until you write it down.” To that end, writing assignments provide an important opportunity for students to practice constructing ethical evaluations. The media are filled with stories raising moral problems related to information technology. It is easy for students to find current news stories related to the topic of a chapter. In a typical 600-word essay I ask students to describe a moral problem, take a clear stand on whether a particular action or decision is right or wrong, and then defend their position through the use of one or more of the practical ethical theories described in the book (Kantianism, act utilitarianism, rule utilitarianism, social contract theory, or virtue ethics). You can find rubrics for grading written essays on the Web (see the next section).

Web Resources

A variety of Web sites contain information valuable to instructors of computer ethics courses.

This section describes a few good sites.

Robert Greene, a faculty member at the University of Wisconsin-Eu Claire, has created a Web site organized according to the chapters of *Ethics for the Information Age*. The site has links to hundreds of articles from Wikipedia, *The New York Times*, and other news sources. The home page for his site is people.uwec.edu/GREENER/phil308/index.htm.

The **ComputingCases.org** Web site provides detailed case studies that you can use in class. Some of them overlap with cases described in *Ethics for the Information Age*, while others are different. The site introduces a methodology called “Social Impact Analysis” for exploring the social and ethical issues related to a computing system. It gives practical advice on how to lead an ethics case discussion, and it provides a worksheet that students can use when weighing the pros and cons of alternative actions. The home page for the site is ComputingCases.org.

DOLCE is an acronym for Developing On/Off-Line Computer Ethics. The DOLCE Web site contains several classroom activities, including quizzes and role-playing exercises, that you can use early in the term to help motivate the study of ethics. The site also contains several rubrics (evaluation sheets) that can help you grade written essays. The URL of the DOLCE home page is edocs.uis.edu/kmill2/www/dolce.

Edward F. Gehringer at North Carolina State University has created an attractive visual map that provides links to Web sites, news articles, and case studies related to computer ethics. The URL for the **Ethics in Computing** site map is ethics.csc.ncsu.edu.

RCCS (Research Center on Computing & Society) is a particularly valuable site if you are integrating computer ethics in an existing computer science course. It provides case studies relevant to a wide variety of courses in the typical undergraduate computer science curriculum. You could also take advantage of these case studies if you are teaching a stand-alone computer ethics course. The home page for this site is www.southernct.edu/academics/schools/arts/departments/philosophy/computingandsociety.html.

CERIAS is an acronym for the Center for Education and Research in Information Assurance and Security. The CERIAS Web site is a good place to check if you are integrating computer ethics into another computer science course. Its materials suggest how discussions of ethical issues can be introduced into various undergraduate courses in computer science. The URL for this site is www.cerias.purdue.edu.

Summary

One of your roles as a teacher of computer ethics is to raise questions and ensure that a wide variety of points of view are expressed. You are also serving as a role model, demonstrating to students the importance of thinking about the right thing to do—and then doing it. Thinking about ethics is not just for people with a Ph.D. in philosophy. Ethics is for all of us, and all of us have more to learn. It’s perfectly acceptable to respond to a question with, “I don’t know. I’ll read up on that and get back to you.” I’ve certainly done that! By letting the students know that you are a student of ethics, too, you can give them confidence that they can start—right now—to think about the moral qualities of their professional decisions.

Chapter 1

Catalysts for Change

1. Even though information technology has existed for millennia, the invention of computers and high-speed communication networks have made information far easier to collect, store, manipulate, and distribute, legitimizing the use of the term Information Age to describe the present era.
2. Mathematical tables constructed manually invariably contained errors, stimulating the invention of automated devices to do the computations and typeset the results.
3. A similarity between the growth of the mechanical calculator market in the second half of the nineteenth century and the growth of the personal computer market in the second half of the twentieth century is that in both cases inventors and entrepreneurs were able to capitalize on relatively recent developments in technology. Advances in machine tools and mass-production methods made mechanical calculators possible. The invention of microprocessors made personal computers possible.

A difference between the growth of the mechanical calculator market and the growth of the personal computer market is that the demand for mechanical calculators came from large corporations with middle managers who needed access to information in order to make decisions, whereas the demand for personal computers came in large part from antiwar and anti-establishment activists who were interested in providing individuals with a powerful tool out of the control of large corporations and the government.

4. Both the Burroughs Adding Machine Company in the 1890s and IBM in the 1960s had strong sales and marketing operations that helped them achieve dominant positions in their respective markets.
5. Three advances in computing stimulated by the development of radar are electrostatic memory (exemplified by the Williams Tube), semiconductor memory (exemplified by the transistor), and graphical user interfaces (exemplified by Doug Engelbart's oNLine System).
6. The Minuteman II ballistic missile program was the largest customer of integrated circuits in the United States between 1962 and 1965. During this time companies learned

how to make much more powerful integrated circuits, paving the way for the invention of the microprocessor, which is at the heart of every personal computer. In this way the Cold War helped bring about the personal computer.

7. The semaphore telegraph was adopted more rapidly on the continent of Europe than in the British Isles because the system only works when atmospheric conditions allow good visibility between stations. Since fog and rain are more common in the British Isles, the semaphore telegraph was not as practical.
8. Cellular networks are an important category of wireless network. Cellular networks have provided telephone service to billions of people who never had access to traditional wired telephone networks. The telephone created the first online communities. Today, online communities thrive with many having access through WiFi or other wireless Internet technologies. Morse's telegraph put the Pony Express out of business. Text messaging available through wireless networks made telegrams obsolete. The telephone blurred the traditional boundaries between private life and public life. Today's smart phones continue to test our boundaries regarding when it is appropriate to consult a digital device.
9. Tim Berners-Lee chose to construct his hypertext system, the World Wide Web, on top of the TCP/IP protocol, rather than one vendor's proprietary network protocol. This decision helped ensure the success of the Web, because it enabled the Web to span computers made by different manufacturers running different operating systems.
10. Examples of how a social condition influenced the development of a new information technology:
 - The need for large amounts of timely information by corporate managers in the late nineteenth century fueled the growth of the manual calculator market.
 - The need to store and manipulate large amounts of data prompted the invention of punched-card tabulation and data-processing systems.
 - A demand for less expensive access to computers stimulated the development of time sharing.
 - BASIC became popular because there was a demand for an easy-to-learn programming language.
 - An interest in accessing and sharing information led to the rapid adoption of the World Wide Web created by Tim Berners-Lee.
 - (Other examples are possible.)
11. Examples of a social change brought about by the adoption of a new information technology:
 - The transcontinental telegraph system put the Pony Express out of business.
 - The adoption of the telephone erased traditional boundaries between work and home.

- The telephone also make possible the first on-line communities, through party lines.
- Manual calculators led to the “de-skilling” and “feminization” of bookkeeping.
- Time-sharing systems gave many more people access to computers, which they used for both educational and entertainment purposes.
- Television broadcasts may have influenced the outcome of the U.S. Presidential election of 2000.
- (Other examples are possible.)

