
## Responsibility and Moral in Science: Online Ethics

What does responsible conduct of research mean and how can students be introduced to it? "Online Ethics" is a web site of well-researched resource material, useful functionality and services, and compelling educational value. It excels in its choice of content, in web site design and, most especially, in online educational methodology. It is the child of the Online Ethics Center for Science and Engineering (OEC) directed by Caroline Whitbeck of Case Western Reserve University, Cleveland, OH.

The content editors have taken considerable effort to gather varied but tightly focused materials and to annotate them for efficient use. Here are a few examples of annotated items categorized according to the four major categories that we deduced:

1. Principles: a) "Towards a Theory of Moral Change" by Charles E. Harris. To what extent can we understand moral change conceptually? Are there any factors that are (at least commonly) associated with moral change? Is it possible to have a theory of moral change?[1] b) The Proposed Federal Policy and Definition of Research Misconduct annotated to show the wording that was the object of significant comment at the recent National Town Meeting on Research Misconduct.
2. Research: a) American Chemical Society Code of Conduct: ACS provides its members with many more specific statements, such as on the environment and on conditions of employment, rather than one general code. b) Codes of Ethics Online: A project of the Center for the Study of Ethics in the Professions at the Illinois Institute of Technology (IIT) aimed at university teachers, scientists, and engineers.
3. Instruction: "Role Playing in an Engineering Ethics Class" (Michael C. Loui, University of Illinois at Urbana-Champaign) discusses how to use almost any case as the basis for a role playing exercise in class that actively engages students in confronting ethical issues. Problems: Scenarios submitted by visitors to the Center or explored in student investigative projects—problem situations followed by interviews with knowledgeable people on how best to address those problems are presented.
4. Service: The Ethics Help-Line provides advice for engineers, scientists, and trainees encountering ethical problems in their work.


Figure 1. OnlineEthics home page.

Suggest a web site or submit a review:
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Above all, this site is designed to educate. The targets are professional scientists, academic scientists, and students. There is a special genius in the way that the material is augmented and integrated to educate all three of these target clients simultaneously. The selection of appropriate material is the start. But, significantly, this is a living site—new material is being constantly added. In preparation is an essay based on a dialogue between the Center Director and an accreditation readiness committee. In that dialogue, the committee questions are precisely those that any faculty member, confronted with the task of incorporating an ethics component into her/his course, would ask. And they are answered with links to the relevant site reference materials. This is an impressively effective way to introduce the site contents in a meaningful context, and to tutor inquiring faculty in the ways of ethics applied to science, engineering, and education.

Students can be an enormous asset in computer engineering design, and the OEC has used them well. This site not only looks professional, it also "works" professionally. As such, its congeniality immediately lowers a barrier confronting the learner who approaches the extensive amount of material managed here. This is especially fortunate since it is not just its scope, but primarily its quality, that makes it a potent resource to both science practitioner and educator alike.

The physical layout (Figure 1) has some details that are significant for both

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Figure 2. Typical content page.

convenience and for educational effect. In fact, educational utility is a predominant *leitmotiv* of this site. The site consistently uses short, annotated tables of contents at the start of its pages, organized into and with links to logical subsections. The choices for logical divisions of content pages into subsections are well conceived (Figure 2). For example, in pages giving lists of resources, the designers chose to segregate those unique to the Online Ethics Center (OEC), those maintained by the OEC, and those listed but maintained by others. This provides advice to users about the relative availability and stability of the resources, very handy for an instructor or a workplace ethics specialist designing training materials for future use. But it also gives courteous warning to the browsing user of when navigation will lead to exit from the site. Finally, this site is easy to navigate because careful attention has been paid to make speed of downloading an important design criterion. The result is navigational ease and a resulting increase in educational usefulness that comes when learners are able to move efficiently around the complex landscape of these extensive, interrelated materials.

The close coupling between all the material and its educational use extends to sections of primary use to science and engineering practitioners, as well as those obviously intended for primarily instructional use. A good example is the Ethics Help-Line. This section provides a linkage between practitioners seeking ethical advice and a (volunteer) cadre of those who can provide such advice. To set the context, there is a clear explanation and warning of how ethical opinion may vary among "right-minded" people, as well as a legal disclaimer. Such items are not only instructional for the client, but especially so for those students who might come here for a sample of contemporary, if less than heroic, ethical disputes. The subsection "Examples of Advice" from the Help-Line provides this sample.

Another example of tight integration between practice and instruction is the "randomized" link to a moral biography appearing in the sidebar. Effective cognitive instructional methodology emphasizes the importance of context in learning about principles. The omnipresence of these biographical "data" (for example Roger Boisjoly on the Challenger disaster) within the sphere of attention provides a context against which the "abstracted" ethical principles can be cast. And their ready accessibility facilitates the rapid context switching (principles to cases and back again) that is needed for effective construction of understanding.

If expectations raised from first viewing justify any "criticism", or perhaps better "hope", it would be that there were some treatment of the ethical issues now arising due to the pervasiveness of information technology in science and engineering. Some of these issues might be: researchers' habit of sequestering their data obtained by publicly funded research or equitable attribution of the relative contributions of effort in collaborative research projects. A start on this is in an essay by OEC Director Caroline Whitbeck on trustworthiness among researchers.[2]

The OEC is clearly an active and ongoing project. So we can hope for more, and certainly should check back here often to see what is new.

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[1] *Professional Ethics* **1997**, 1 and 2.
[2] In the "Ethics" subsection, entitled "Essays on Research Ethics".

For further information visit
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