Teaching Research Ethics Better: Focus on Excellent Science, Not Bad Scientists

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Abstract

A recent report of the United States' Presidential Commission for the Study of Bioethical Issues highlights how important it is for the research community to enjoy the "earned confidence" of the public and how creating a "culture of responsibility" can contribute to that confidence. It identifies a major role for "creative, flexible, and innovative" ethics education in creating such a culture. Other recent governmental reports from various nations similarly call for a renewed emphasis on ethics education in the sciences. We discuss why some common approaches to ethics education in the graduate sciences fail to meet the goals envisioned in the reports and we describe an approach, animated by primary attention on excellent science as opposed to bad scientists, that we have employed in our ethics teaching that we think is better suited for inspiring and sustaining responsible, trustworthy science. Clin Trans Sci 2013; Volume #: 1–3

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We both share decades long commitments to the promise that biomedical research holds for improving the health and lives of so many people. It is also clear to us that, given that its goal is to improve our collective well-being, research, at its most fundamental level, is a deeply moral endeavor. Thus we also share a strong commitment both to the role of ethics in educating researchers and understanding how to meaningfully engage and interest researchers-in-training in ethics. We have watched in disappointment at times, though, to see how little interest some in the science academy can have in the role of ethics in science learning, especially at the graduate and postgraduate levels. Too often we see a complacency and a sense that ethics teaching, if there is going to be any, is best turfed to others. Thus we were heartened to read the most recent report of the United States' Presidential Commission for the Study of Bioethical Issues, for it has many thoughtful comments consistent with our sentiments about the need to drastically improve how research ethics is taught to biomedical researchers.

Their report, "Moral Science: Protecting Participants in Human Subjects Research," speaks eloquently about the need for the research community to enjoy the "earned confidence" of the public if there is to be a successful research enterprise.[1] They set forth several recommendations that can contribute to this confidence, including a recommendation to "create a culture of responsibility" in the research community. The Commission viewed a commitment to "creative, flexible, and innovative educational approaches" [1,p.72] to the ethics of research as central to efforts to create such a culture, arguing that "ethics education [should] play an increasingly central role in advancing research ethics." [1, p.73]

The Commission's recommendations about ethics education occur against a backdrop of some considerable global emphasis already in place on instruction in research ethics, including the responsible conduct of research (RCR). For example, the US National Institutes of Health (NIH)[2] and National Science Foundation (NSF),[3] the European Science Foundation,[4] the Council of Canadian Academies,[5] the British Department for Business Innovation and Skills,[6] and, most recently, the II Brazilian Meeting on Research Integrity, Science and Publication Ethics[7] all call for science training programs to include research ethics instruction in their curricula. NIH and NSF go so far as to mandate RCR instruction as a stipulation of funding for training grants.

One of the things that struck us most about the Commission's Report was its treatment of these efforts, including the US mandated ones. There is no doubt, as the report makes clear, that the Commission is aware of at least these US RCR mandates. Rather than celebrate them or mention anything the least bit positive about them, they instead called for a profound change by the scientific community, for a new approach in how it educates its new entrants about the role of ethics in its work.

What might explain the Commission's treatment of current RCR instruction and its implicit suggestion that the Commissioners have little confidence that compliance with current US mandates meets their criteria for innovative ethics education that will contribute to the "earned confidence" of the public? Readers familiar with science education know that the role of ethics in it is often just to satisfy RCR or other mandates. Mandated instructional activities typically focus heavily on avoiding plagiarism, falsifying data, wrongly assigning authorship, and the like. While there may be a need at times to address such professional lapses in ethics learning, to make them the principal focus of what is too often, at least at the graduate and postgraduate level, the entirety of ethics learning in a science curriculum can have very negative consequences for many learners. Learners may find such courses peripheral to their interests, or even a distraction from what they consider their "real work" to be, meaning that the opportunity for effective education in ethics is largely lost when the thrust of a RCR course is avoiding misbehavior and other deviations from professional norms.[8]

Of particular concern about RCR instruction in the United States is its apparent quite limited effectiveness.[9] Indeed, the findings from one recent study that recruited students from more than 20 US RCR courses suggest that many such courses not only fail to demonstrate value to students but may actually do more harm than good for some students.[10] Unfortunately, such courses are the preferred way of many in the US to comply with RCR mandates. A comprehensive survey of NIH funded Principal Investigators showed that a majority of respondents favored designating a stand-alone course to satisfy the mandates of NIH. [11]

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Types of ethics questions to be explored in a curriculum	Significance of the question	Examples
What are the **Bright Lines** that ought not be crossed in science?	Certain activities necessarily undermine the integrity of research. Consequently, they need to be avoided by all scientists in every circumstance.	Data fabrication; data falsification; selective, misleading use of data; plagiarism; misattribution of authorship; mistreatment of animals; exploitation of human subjects; failure to obtain informed consent; failure to minimize risks to research participants
What is the **Big Picture** that frames scientific research?	Science never exists in isolation. The pursuit of discovery is a social one, always situated in a broad cultural, political and economic context that shapes both the pace and direction of science. This broader context underscores the public citizen role of the scientist.	Who pays for science? Who sets the research agenda? What does the public expect and deserve in return for its support of science? How do we determine if limits need to be set on scientific inquiry?
What are the **Deep Questions** posed by scientific investigations?	Scientific inquiry can have profound consequences. Researchers need to consider the expansive social implications of their work and consider the importance of engagement with the public about science and its role in our collective human future.	What impact will increased knowledge about genetics have on notions of human destiny? How may brain imaging affect traditional understandings of human freedom and responsibility? What will be the implications if innovations in social computation undermine traditional ideas about privacy?

Table 1. Organizing a research ethics curriculum.

Science educators in other countries looking to comply with newly issued calls for research ethics instruction in their settings would do well to avoid the prevalent US approach and follow instead the Commission's call for a more innovative integration of ethics into science curricula. United States science educators should also reconsider their approach to ethics education and take to heart the Commission's recommendation that "[p]rofessional societies, universities, and accrediting organizations need to promote [education about research ethics] standards not as legal burdens relegated to compliance departments but as expectations enforced by the *community of scientists* as well as oversight officials." [1, emphasis added, p. 73] The Commissioners have made clear that ethics learning belongs in the hands of the faculty; it ought not be the domain of compliance officials, which, sadly, it too often is. Merely teaching what responsibilities scientists are subject to, which can happen when a course's main purpose is to demonstrate compliance with a training mandate, rather than having courses that also explore from whence responsibilities are derived and why they are important, falls well short of the efforts needed to create a culture of responsibility that can earn and preserve the public's confidence. It also completely ignores the best of what ethics can offer to learners, which is defining excellence and inspiring its pursuit.

How, then, might one teach ethics better? How can one inspire excellence rather than just warn against misbehavior? Progress toward this goal will depend in large part upon teachers of biomedical research recognizing that the Commission is correct in its view that science faculties do not have the luxury to delegate ethics instruction to compliance programs, while they themselves remain bystanders. It is science faculty members who must transition from a "compliance mindset" to think instead about how ethics learning can enhance and advance science. Science faculty need to help design curricula that produce students whose aspirations and sense of professional responsibility will inspire public confidence in science and trust in the research institutions where it is conducted.

We now briefly describe our efforts to develop ethics curricula that we think meet the Commission's call for ethics education that is "creative, flexible, and innovative." One effort targets a computational biology graduate program[12] and the other targets translational science training programs. While our efforts, and thus the examples we include below, focus on biomedical researchers in graduate and postgraduate training, we think our approach can be easily adapted across the full range of natural and behavioral sciences as well.

We started with the realization that ethics instruction could not just be about avoiding misbehavior or telling people what they must and must not do. It had to play a much broader and enriching role in a science curriculum. We have captured the breadth of ethics content relevant to science learning by organizing activities around three specific sets of questions that students and teachers can investigate together (See *Table 1*):

1. What are the **bright lines** that cannot be crossed in research?
2. What is the **big picture** in which science is situated today?
3. What are the **deep questions** posed by scientific investigations?

Having the appropriate content in a curriculum only partly accomplishes the tasks before us, though. Captivating and motivating students can be challenging in ethics education since, even though ethics is at the foundation of science, it is by nature one step removed from the actual research that excites our students. Thus, it is important to contextualize lessons in tasks and challenges learners will likely face in future professional roles. Hands-on activities, such as learning to conduct a fair and impartial peer review of a colleague's work, give learners the chance to practice activities they will perform after completion of their studies. Role-playing where students can explore different sides of a conflict, for example over what counseling services, if any, a direct-to-consumer genetic test developed in a colleague's lab should offer, is often effective. Journaling promotes reflection, introspection and deliberation about complex challenges, and can be connected to lessons about the importance of good laboratory record-keeping. Students also benefit from hearing from experts who have successfully navigated their way through contentious waters. For example, they can benefit from hearing how a clinical investigator designed a clinical protocol and informed consent process that involved a particularly vulnerable population or from a technology transfer officer who worked collaboratively with private industry in a way that managed to still honor academic freedom. Surely there are many other learning approaches that a motivated faculty will be able to employ.

The volume of relevant material and diversity of potentially effective learning activities calls into question the assumption

that a single ethics course should be used to prepare students for successful careers producing trustworthy science. It seems implausible to us that sufficient training of students in these issues can be accomplished in a single course, no matter how well-designed; nor should it be. Much of science learning is sequenced because some knowledge and skills is a prerequisite to acquiring other knowledge and skills. Ethics is no different, so it too is best approached longitudinally. Having an innovative ethics course is essential, but it needs to be supplemented with additional ethics learning integrated throughout a curriculum that provides ongoing opportunities to examine ethical issues, identify core values and principles, and apply them on an ongoing basis—outcomes that a stand-alone ethics course on its own cannot deliver.

Lest readers worry about adding additional requirements to already full curricula, integrating a longitudinal curriculum does not require the addition of multiple ethics courses to the formal curriculum. The informal curriculum is also available to the faculty, and we have also explored how it can be used to great effect in ethics learning. For example, guest lectures, "brown bag" discussions, professional conferences, and orientation exercises all create important opportunities for integrating ethics. Another dimension of the informal curriculum is the ongoing "debriefs" among graduate students and other learners where they explicitly discuss and process their learning among themselves, thereby creating a synthesis from the entire spectrum of learning activities they are exposed to.[13] It is during such discussions that they prioritize, validate and assign value to what they learn. To the extent that a faculty creates a longitudinal ethics curriculum to supplement an ethics course, students will have a more keen "ethics lens" through which to conduct their peer-to-peer interactions.

The hidden curriculum,[14,15] perhaps best understood as the socialization process whereby learners acquire attitudes, beliefs, and behaviors that will mold their careers, is also available for use. For example, when students overhear faculty candidly discussing the peer review process for research grants, or when they witness a professor respond to an allegation of improper attribution of a graduate student's contributions to a research paper, powerful life-long lessons, either good or bad, are learned. Even though the hidden curriculum is not easily amenable to design and control by individual faculty members, they ought not ignore its influence on student learning. Nor should institutional leaders; good leadership intentionally nurtures a supportive and socially responsible learning and research culture.

Ethics is the bedrock of important, trustworthy science. As such, it ought not be an afterthought of science faculty nor should it be in a curriculum merely to accede to wishes or dictates from funding agencies. Instead, it deserves to be embraced by science faculties and given a role of prominence in their curricula. That is why we hope this brief essay can help spark interest in the science academy to reflect collectively about the vibrant role that ethics should have in science education and how it is best realized. We believe a consensus would quickly emerge from that reflection that nothing short of an innovative and integrated approach to ethics, with broad objectives, taught through diverse and creative methods, per the Commission's recommendations, is likely to be sufficient to produce a culture of responsibility for generations of scientists, worthy of the trust that so many in society will bestow upon them.

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