Chapter 3: Teaching Ethics (Section I - A Guide To Teaching the Ethical Dimensions of Science)

Author(s)

Michael Pritchard
Theodore Goldfarb

Description

The teaching of ethics is particularly suited to the use of illustrative case studies. Such narratives can be used to present examples of a range of significant ethical issues related to some human enterprise and many of the complexities associated with each of the issues. The cases can be either fictional or they can be based on actual events. Chapter 3 discusses how to determine which department is best qualified to teach ethics in the classroom.

Body

From: Ethics in the Science Classroom: An Instructional Guide for Secondary School Science Teachers

A Set of Objectives

A Set of Assumptions

A Set of Objectives

For the past several decades, colleges and universities have been wrestling with the question of the place of ethics in higher education. Traditionally, its proper place was thought to be in departments of philosophy or religion. However, beginning in the early 1970's courses in ethics began a rapid expansion into programs in medicine, law, business, education, engineering, journalism, communication, psychology, and so on. In the late 1970's a group of educators representing a broad range of disciplines gathered at the Hastings Center to explore the question of what the objectives in teaching ethics in higher education should be[36]. What is particularly striking is that, despite the differences among their respective academic disciplines, these educators developed a consensus statement of five basic objectives. Teaching ethics in higher education, they concluded, should:

- Stimulate the moral imagination of students.
- Help students recognize moral issues.
- Help students analyze key moral concepts and principles.

- Stimulate students' sense of responsibility.
- Help students deal effectively with moral ambiguity and disagreement.

Although intended for ethics in higher education, this set of objectives seems appropriate at the pre-college level as well, especially in junior and senior high school.

A Set of Assumptions

We will discuss each of these objectives and suggest how they might be adapted to the schools. However, at the outset, it is important to notice some assumptions about students that underlie this list. The first objective assumes that students already have moral imagination -- the aim is to stimulate it, not to implant it. The second objective assumes that students are capable of recognizing moral issues but that, like all of us, they can be assisted in this. The third objective assumes students are capable of analyzing key moral concepts and principles--the aim being to help them sharpen and refine their abilities. The fourth objective assumes that students already have, to some extent at least, a sense of responsibility. The fifth objective assumes that students are already familiar with moral ambiguity and disagreement, but that they need help in dealing effectively with this. In sum, students are viewed as active learners who already have some aptitude for the study of ethics they will be undertaking.

We believe these are reasonable assumptions to make about junior and senior high school science students, too. Although their familiarity with the various contexts in which moral issues related to science arise is limited, students in their early teens have already had considerable moral experience -- in their family life, in interacting with friends and peers, and in dealing with major institutions such as schools, churches, and, for many, places of employment. Furthermore, they have been exposed to moral issues in the news and, quite dramatically, in popular movies and television programs. So, students are not moral neophytes. However, they may be neophytes as participants in science classrooms that explicitly examine moral issues.

Back to Top

Can Ethics be Taught?

The notion that ethics might be *taught* at the junior or senior high level is sometimes met with skepticism. The thought may be that if students haven't learned the difference between right and wrong yet, it is too late. The lessons should have begun in the nursery, in the family, the churches. If these lessons took, what is left to be taught? If they didn't, how could it happen now? In one respect, there is something to this concern. Morality does need to have an early beginning in our lives. How, by whom, or even whether, morality should be *taught* in the early years are important questions. At this level, issues about indoctrination and the role of families, churches, and public schools require careful attention. However, the story of moral development is anything but over once we move beyond these early years. Engineer and author Samuel Florman comments on what can be gained even at the college level and beyond37. Skeptics -- both within academe and without--argue that moral character is formed in the home, the church, and the community, and cannot be modified in a college classroom or professional symposium. I cannot agree with the skeptics on this count. Most evil acts are committed not by villains but rather by decent human beings--in desperation, momentary weakness, or an inability to discern what is morally right amid the discordant claims of circumstances. The determination to be good may be molded at an early age, but we grapple all our lives with the definition of what is good, or at least acceptable.

If Florman is right (and we believe he is), early character formation and even the best of moral instruction is not enough.38 Moral learning is a life-long process. If we change the question from *Can ethics be*taught? to *Can ethics be profitably studied*? What the Hastings Center group has in mind becomes more evident. *Studying* ethics, rather than trying to indoctrinate a set of moral prescriptions, is what the five objectives emphasize. Students are respected as active learners who bring with them considerable resources to undertake the study of ethics in this or that area -- and should not be subjected to misguided efforts to implant certain moral values in them. We are suggesting that this respect should be extended to junior and senior high school students as well. With this in mind, we now turn to a more detailed discussion of the five Hastings Center objectives.

Back to Top

Stimulating the Moral Imagination

Consider a fictional case study, "The Falsified Data."[39] Jay is a young chemical engineer who specializes in catalysts to be used in chemical processes in his company. In preliminary research on catalysts, Jay has gathered some data suggesting that catalyst B might be best for a special chemical process. However, based on their experience, the senior chemical engineers in Jay's unit are still convinced catalyst A is best for that sort of process. Jay agrees that his data is inconclusive and that more research is needed. Meanwhile, the head of Jay's division tells the engineers that it is now time to recommend a catalyst for the company to use. Since there is no time for further research on catalyst B, the engineers recommend A. The division head tells Jay to write up the recommendation with supporting data. However, he tells him to "make the numbers look good" by doing the math backwards and leaving out Jay's data concerning catalyst B. What should Jay do?

Many are inclined to say that Jay simply should do what he is told. He is young, relatively inexperienced, and risks losing his job if he doesn't write up the report as requested; besides, his data are only preliminary and, for all he knows, the senior engineers may be right. In the fictional case, Jay does what he is told. However, the next case, "The Falsified Data Strike Back," introduces some complications. Jay's subsequent research shows rather decisively that catalyst B is preferable. Meanwhile, his company has invested a fair amount of money in catalyst A for the process. What should Jay do now? At this point we might want to reconsider the first case. What other options did Jay have? To ask this question is to begin exercising one's moral imagination.

Readers of the periodical *Chemical Engineering* were invited to respond to these two fictional cases. One of the more creative reader responses to "The Falsified Data" suggested that Jay try to convince his division head that the report should "tell it like it is" and include Jay's preliminary data about catalyst B. After all, if the senior engineers are convinced after analyzing all the data available to them that catalyst A is still preferable, why should it be necessary to "make the numbers look good" in order to persuade those at the next level that their recommendation is sound? Even if it later turns out that catalyst B is preferable, no one can complain that relevant data were deliberately withheld or that the math was done backwards. This may not

actually convince Jay's division head, but it seems worth the effort.

A business manager interviewed in Barbara Toffler's *Tough Choices* points out the importance of imaginative thinking when facing moral challenges like Jay's:[40]I first play out the scenario of what would happen if I did it one way and what would happen if I did it the other way. What would be the follow-up? What would be the next move? What would be the response back and what would be the consequences? That's the only way you can tell if you're going to make the right move or not because I think something that instinctively may feel right or wrong, if you analyze it, may not pan out that way.

The technique suggested by this business manager is one effective way of engaging one's moral imagination. The classroom itself provides another way. One of the advantages of discussing situations like Jay's in class is that, by thinking together, students are often able to come up with constructive alternatives that would not have occurred to them when thinking alone. Once again, we see students themselves as a powerful resource for generating new and useful ideas, rather than simply waiting for their teachers to provide them with answers.

Back to Top

Recognizing Moral Issues

It is rather obvious that *The Falsified Data* raises moral issues. This is implied by the title, which suggests that, among other things, honesty and truthfulness are at stake. However, situations calling for moral reflection do not normally come with labels alerting us to this. In fact, all too often we find ourselves in the middle of moral difficulties without advance warning -- or without having noticed warning signals. If we are on the lookout for potential moral complications, it may be possible to prevent these problems from arising in the first place, or at least to lessen their severity.

For example, suppose Jay also represents his company in dealing with vendors who supply needed materials. Over time Jay may develop friendships with certain vendors. What if one of these vendors offers him free use of his vacation home for a week? Will it occur to Jay that accepting favors like this might compromise his judgment in his future dealings with vendors? Or will it occur to Jay that *others* might

perceive this as compromising his judgment?

Routinely accepted practices can also have unnoticed objectionable features. Until fairly recently, the use of deception in designing experimental research was regarded as unproblematic. The infamous Tuskegee study of the long-term effects of untreated syphilis relied on deceiving subjects in the study about the true nature of their disease and the medical attention they were receiving.41 The well-known Milgram studies on obedience had deception of volunteer subjects as an essential part of the experiment.42 As we look back at these practices with questioning eyes, we need not see moral villains. Rather, we see a confirmation of Samuel Florman's view that even decent people can do things that, on more careful reflection, are morally inappropriate.

Back to Top

Analyzing Key Moral Concepts and Principles

In examining examples like those just presented, key moral concepts and principles come to our attention and require clarification. For example, in "The Falsified Data" has Jay been asked to *lie*? What is a lie? Falsifying data seems to be lying, but what about withholding data, which in this case seems to be at least *deceptive*. What is wrong with lying or engaging in deceptive practices as a scientist or engineer? Is the offer of a free condo for a week simply an act of *friendship*, or could it be viewed as a *bribe*? What is a bribe, and what moral issues does bribery raise? If Jay accepts the offer (whether we understand it as an act of friendship or as a bribe), has he created a *conflict of interest* for himself in future dealings with vendors? What is a conflict of interest, and what moral issues does such a conflict raise?

Although junior and senior high school students have not had to face situations quite like Jay's, it is not difficult to make connections. In their science classes they prepare lab reports. If the data do not appear as they think it ought to (or as they think their teachers expect it to), they may wonder about "making the numbers look good." Or their lab partners might urge them to "clean up" the report. They may recognize that part of what is at stake is their honesty and truthfulness, or this may not occur to them until after their teachers question them. Or they may recognize that their

honesty and truthfulness is at stake but not recognize what else is at stake -- viz., the importance *for others* that scientific experimentation and reporting be conducted competently and with honesty.

43

Back to Top

Stimulating a Sense of Responsibility

Discussions of situations like Jay's, as well as discussions of the societal impact of scientific practice, raise important questions about scientific responsibility. These questions may be about the individual responsibilities of scientists as practitioners, or they may be larger questions about the impact of science on society and a more collective responsibility for that impact (focusing, for example, on the responsibilities of educational institutions, professional societies, governmental agencies, and businesses). This, in turn, can stimulate students' sense of responsibility as future scientists or as participants in a democratic society that provides citizens with opportunities to participate in the shaping of its institutions, practices, and public policies, as well as to vote for or against individuals seeking public office. But it can also stimulate their sense of responsibility as students in the classroom.

Ethicist William F. May points out the need to pay particular attention to matters of moral character and virtue in our highly professionalized society. Most professionals, including scientists, work in large organizations and perform highly specialized functions that are understood by a relatively small number of people. As our growing knowledge in specialized areas increases, we are also becoming more and more dependent on those who have this knowledge to exercise it responsibly. May comments, "The knowledge explosion is also an ignorance explosion; if knowledge is power, then ignorance is powerlessness."[44]He then offers a test of professional character and virtue: "One test of character and virtue is what a person does when no one else is watching. A society that rests on expertise needs more people who can pass that test."[45] Scientists, for example, must depend on each other to do thorough, honest work in conducting and reporting their experiments. Scientists have neither the time or ability to check up on the reliability of all the work of other scientists -- not even of those with whom they work, who may have expertise in areas that only they understand well. So, they must trust each other; and the public

must trust scientists. In short, to a large extent, *no one else is watching* when scientists do their work.

It is important to realize that our attitudes toward responsibility can vary quite widely. We might think of a spectrum, with irresponsibility at one end and going *above and beyond the call of duty* at the other. Much of the current literature on ethics in science focuses on wrongdoing (e.g., falsifying data, plagiarism, willful or negligent causing of harm, violation of regulations). Particularly when this is associated with potential litigation, unlawful behavior, or the violation of specific professional standards (as found, e.g., in a code of ethics), it is tempting to focus primarily on what must be done in order to avoid getting in trouble.

There is a *Calvin and Hobbes* comic strip in which six-year-old Calvin congratulates himself for staying out of trouble and for not doing bad things.46 He suggest to his companion, Hobbes the stuffed tiger, that this shows he deserves lots of Christmas presents. Hobbes wryly replies, "Maybe good is more than the absence of bad." Calvin's view could be characterized as *minimalist* when it comes to responsibility. (Elsewhere, after Hobbes notes how impressed Calvin's mother is that Calvin has made his bed, Calvin replies that he likes people to be impressed when he fulfills the least of his obligations.) At the other end of the responsibility spectrum are instances of *exemplary* work. Presenting stories of exemplary scientific practice can also be an effective way of stimulating students' sense of responsibility by modeling responsibility at its best. A good illustration is the story of Fran Kelsey, a Food and Drug Administration official in the early 1960's.47Despite considerable industry pressure to approve a *morning sickness* pill for pregnant women, Kelsey insisted on further testing. She had seen reports of animal studies and human trials in England that raised questions for her about the drug's safety. Yet, if she had approved the drug, this would have been fully within standard regulatory practice. What was the drug in question? Thalidomide, whose use by pregnant women in England and Germany resulted in a large number of their babies being born with gross physical deformities. For her efforts Fran Kelsey received a Congressional Medal of Honor from President John F. Kennedy in 1962.

Back to Top

Dealing with Moral Ambiguity and Disagreement

Consideration of moral problems that arise in the sciences can be complicated in a variety of ways. First, there may be uncertainty or disagreement about what the relevant facts are. Second, there may be uncertainty or disagreement about the relative importance of facts that bear on the problems. Third, there may be uncertainty or disagreement at the level of basic moral principles or moral orientation. Fourth, there are some problems that seem to be genuine moral dilemmas. All of this becomes readily apparent in classroom discussions, and it raises important questions about what students and teachers should expect from discussions of moral issues.

One response to these complications is, *There are no right or wrong answers.* However, uncertainty and disagreement themselves do not warrant this conclusion. Insofar as the uncertainty or disagreement pivots around factual matters such a conclusion would be premature. This means that one of the first tasks of analysis is to get as clear as possible about the relevant facts. Scientific inquiry itself is characterized by factual uncertainty and disagreement, but it is based on the assumption that further inquiry can help resolve this.

However, many people apparently believe that there is a fundamental difference between factual and value issues. This is often reinforced in the schools -- factual issues can be resolved, it may be said, whereas value issues are simply a *matter of opinion*. But we need to realize that this way of putting the *fact/value* distinction is itself highly controversial and the subject of much philosophical discussion. Furthermore, it is not clear what the implications of making the distinction in this way are. Does something's being simply a*matter of opinion* imply that, when it comes to opinions, one opinion is as good (or bad) as another? If so, then we might wonder what the point is of trying to examine carefully moral issues in the sciences . Is it true that no matter what moral opinion one comes to, it is no better or worse than any other opinion (including one's previous or future opinions)? If so, we might ask, why bother?

At the same time, if teachers insist that there are right and wrong answers (and attempt to provide them to the students), they risk being accused of attempting to

indoctrinate their students. Equally worrisome, they risk discouraging students from thinking for themselves about moral issues. In any case, whether or not they agree with their teacher's pronouncements, students may soon become more interested in their teacher's answers than in the reflective process itself; after all, they may think, to get a good grade one must satisfy the teacher's expectations -- which, in this case, is to come up with what the teacher thinks are the right answers.

Fortunately, there are ways around these difficulties. The first thing that needs to be borne in mind is something we have already noted: by the time students are in junior or senior high school science classes, they are capable of thinking on their own about ethics. A careful examination of a situation often results in general agreement about what the salient ethical dimensions are; and this is not something that teachers will have to force on their students. For example, the importance of acquiring the informed consent of people before exposing them to health risks in an experimental study is rather evident.48Or, falsifying data on the effectiveness and safety of an experimental drug to treat heart disease can easily be seen to be unethical.

It is worth pointing out that not all ethical problems in science are *dilemmas* (a much overused word in discussions of ethics). A dilemma is a special sort of problem that seems to have no good solution -- whether this involves having to decide between undesirable options or good, but mutually exclusive, options.49 Most situations calling for ethical sensitivity and reflection are not dilemmas at all -- even though many might require good, hard thinking in order to come up with satisfactory answers. The danger of presenting students with an exclusive diet of dilemmas is that they may too easily generalize that all of ethics is a matter of unresolvable conflict.

Teachers can also indicate that students will not be graded on the "correctness" or "incorrectness" of their conclusions about the moral issues the class is considering. There might, indeed, be right or wrong answers; but that is not the point. The point, rather, is to encourage students to think about the issues carefully, to assemble and organize relevant facts as best they can, to support whatever conclusions they draw with the best reasons they can come up with, and to consider carefully alternative views suggested by others. If there are right or wrong answers, this seems like the most promising way of determining which is which. Even if, in the end, this is an unattainable goal, students will still have accepted the responsibility to think thoroughly and thoughtfully about moral issues related to science.

It is worth noting that there are many terms of evaluation other than 'right/wrong'. Our views can be carefully formulated/carelessly formulated, articulate/inarticulate, well informed/poorly informed, consistent/inconsistent, coherent/incoherent, and so on. Likewise, the vocabulary of ethics is much richer than right/wrong, moral/immoral, or ethical/unethical. Each of these pairs admits of degrees. But, in addition, there are many other terms that admit of degrees, such as, fairness/unfairness, honesty/dishonesty, beneficence/maleficence, considerateness/inconsiderateness, and respectfulness/disrespectfulness. All of these, and many others as well, can be usefully employed in developing thoughtful, well-developed responses to moral issues.

Although it will sometimes happen that a class consensus will emerge when discussing a difficult issue, the failure to reach consensus does not mean that the discussion is a failure. Consensus on complex issues should be no more expected in morality than in science itself. Reaching consensus does not necessarily mean the discussion is a success, either. If one person can have an ill-formed or inadequately supported view, so can an entire class. Closure is better marked by the bell than a final vote. This may seem awkward, but it need be no more awkward than any group of people deciding it is time to go on to something else despite the differences that remain. Furthermore, those who engage in lively debates outside the classroom do not necessarily conclude that no one has a better view than anyone else since agreement has not been reached (especially if they still think that their view is right!).

Finally, differences should not be exaggerated. People may argue endlessly about who, for example, should win the Academy Awards in a given year. However, the list of serious candidates is not endless, and the vast majority of films, actors, directors, and producers will not qualify as serious candidates. Or consider "best player" arguments in various sports. Who should be ranked the current best in men or women's tennis may be hotly disputed, but the list of plausible candidates is short, while the list of those who clearly do not belong on that list is very long. A similar point can be made about moral issues. What makes something a difficult choice is that we can see rather clearly positive or negative points on either side, but it is difficult to give them a decisive weighting that clearly determines what should be done. However, it is not difficult to think of any number of clearly *un*satisfactory ways of dealing with the situation.

Back to Top

Who's to say?

However, one might ask, "Who's to say?" In moral matters, as in science, this is not really a useful question to ask. In one important respect *no one* is to say, if by this we mean that there are voices that, by their sheer "authority," can dictate answers. In another respect we might say *everyone* is to say, if by this we mean that anyone might have an important contribution to make. Most important is *what* is said, and how it is supported, rather than *who* says it. Of course, as already noted, it is necessary for scientists to rely on the work of each other and for the public to rely on the expertise of scientists. However, even here it is assumed that, if pressed, scientists can give good reasons for their views. In short, it is the *support that can be given a view* that should carry the day, not those individuals who happen to provide that support. Although we must rely on scientists to provide us with well supported scientific information, we also need to be careful not to project a "halo effect" onto scientists that puts them on an "authority" pedestal that extends well beyond their expertise. This is particularly true when that "authority" extends into the moral domain, where the notion of *moral exper* needs to be viewed with some care and suspicion.

There is an important pedagogical point that follows from the above discussion of authority figures. Teachers obviously wield considerable power and influence over students. Furthermore, students easily grow accustomed to being told what the answers are -- both by authoritative teachers and texts. To resist this, teachers need to encourage students to think for themselves, to respect one another as mutual inquirers -- without this resulting in an atmosphere of "anyone's opinions are as valid as anyone else's." This is not easy to do. Teachers need to resist the temptation always to have the last word -- whether this be to conclude a class session by pronouncing authoritatively that this or that has been established, or to conclude by pronouncing that nothing has been established (because, after all, these are moral issues). Teachers are best viewed here as facilitators. This requires leadership and guidance, but sometimes this is accomplished better by silence than speaking. The mark of success is students engaging in thoughtful, informed discussion that shows respect for both the subject at hand and the students' own reflections.

Although we are suggesting that teachers who bring ethics in the science classroom see themselves more as facilitators than dispensers of answers to ethical questions, there are some important ground rules that need to be observed. First, as we have already indicated, students need to realize that they will be expected to support their views with good reasons, which requires them to be as well informed about relevant factual information, social policies, laws, and possible ethical stances as they can. Second, although some disagreements among students are to be expected, an atmosphere of *put downs,* impatient rejection of the ideas of others, and disrespectful behavior in general need to be discouraged. Third, as suggested in Chapter 2, teachers need to encourage an atmosphere of *reasonableness*, an atmosphere in which students are willing to listen to and reason *with* one another.

Footnotes

- 41This study received federal government support for more than 40 years, until it was exposed in the press in the early 1970's. We will discuss this case in some detail in Chapter 4.
- 42 For an excellent discussion of how routinely social science students used to accept deception of human subjects in experimental research, see Thomas Murray, "Learning to Deceive," *Hastings Center Report*, Vol. 10, April 1980, pp. 11-14.
- 43These others include not only other scientists who depend for their own work on the reliable work of their scientist colleagues, but also the public who take medications, undergo medical procedures recommended by physicians, drive over bridges, go up and down elevators, drive automobiles at high speeds, and so on -- all the while depending on the reliable work of scientists and engineers.
- 44 William F. May, "Professional Virtue and Self-Regulation," in Joan Callahan, ed., *Ethical Issues in Professional Life* (Oxford: Oxford University Press, 1988), p. 408.
- 45 Ibid.
- 46 Bill Watterson, *Calvin and Hobbes* in *The Kalamazoo Gazette*, December 23, 1990.
- 47 William Grigg, "The Thalidomide Tragedy -- 25 Years Ago, *FDA Consumer*, February 1987, pp.14-17.
- 48 This is true even though there are many instances in which researchers have failed to observe this basic form of respect for persons in their research.

- 49 Even here not everything is indeterminate. When we recognize something as a dilemma, this means that we see that some options really are undesirable. It is precisely because we believe that several things really do matter that the choice is so difficult.

Notes

Author(s): Michael S. Pritchard, Department of Philosophy, Western Michigan University & Theodore Goldfarb, Department of Chemistry, State University of New York at Stony Brook.

Rights

Resource Type

Instructor Materials

Parent Collection

Ethics in the Science Classroom

Topics

Goals of Ethics Education
Pedagogical Approaches

Discipline(s)

Teaching Ethics in STEM