Engineering Ethics Survey for Faculty: An Assessment Tool

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Abstract

The College of Engineering at Villanova University is committed to an Ethics Across the Curriculum component in all of its undergraduate programs. During the fall of 2011 the College administered a Faculty Survey on Professional Ethics to all the full-time members of the College faculty. The survey was designed to assess the faculty’s backgrounds in engineering ethics as well as their willingness to participate in the ethics initiative. This paper discusses the logistics of developing and administering the survey and summarizes the results of the survey. Other institutions may want to use this survey or a similar instrument to establish a base line regarding their faculty’s familiarity with ethics principles and the degree to which the faculty address ethical issues in their classes.

Introduction

The need for a Faculty Survey on Professional Ethics became apparent after the College began to implement an Ethics Across the Curriculum approach in May 2009 with a two-day Engineering Ethics Workshop. The details of the workshop were presented in a previous ASEE paper\(^1\). The original plan envisioned similar workshops every two years as additional faculty committed to Ethics Across the Curriculum. However, the initial workshop raised some fundamental questions regarding the faculty’s perceptions of engineering ethics and why/how ethics should be included in technical courses. These issues had to be addressed in the planning process for the second workshop.

The purpose of the survey was three-fold:

- to gauge the current level of faculty understanding of ethics principles;
- to discover what faculty might already be doing in classes regarding ethics;
- to identify methods for improving the engineering ethics program.

The survey also had a more subtle purpose: To convince the faculty that many critical cases in engineering ethics do not have obvious answers. The survey included six case histories and asked: “Is there an ethical dimension to this case?”

An ad hoc Ethics Committee that included representatives from the College of Engineering (CoE) as well as members of the Ethics Program and the Department of Theology and Religious Studies developed the survey. The Committee worked with professionals from Villanova’s Office of Planning and Institutional Research (OPIR) who ensured the efficacy of the survey and preserved the confidentiality of the respondents. The committee prepared the survey over the 2011 summer for distribution to the CoE faculty at the beginning of the fall 2011 semester.

As will be discussed in the next section, the Dean of Engineering sent the survey electronically to all full-time faculty members of the College in September 2011. The responses were
submitted directly to OPIR which tracked the participants and sent reminder notices as necessary. The survey website was open for approximately three weeks.

Survey Design

In this section, the authors will go into some detail about the survey instrument itself, in order to provide the rationale for what is included. The goal is to provide guidance to others who might want to develop their own instrument. The entire survey can be found in an appendix to this paper. The results of the survey will be presented in the next section.

Survey Questions

The authors relied on the expertise of OPIR to hone the questions and to create the instrument itself. However, the authors were responsible for the content and, unless otherwise noted, developed the content of the survey.

As noted earlier in this paper, the goal of the survey was to obtain a baseline regarding the CoE faculty’s understanding of professional engineering ethics and their capacity/comfort with engaging these topics in their regular undergraduate engineering classes.

The first question aims to ascertain the level to which a faculty member might have receiving some formal training. The question is: Have you engaged in any formal training in professional ethics during the past 5 years? It was important to know how recently and in what context the faculty members received formal training in this area. The options given for this question are “Took an academic course on ethics,” “Participated in a professional seminar/workshop on ethics,” “Attended a conference specifically related to ethics,” “Attended a session on ethics as part of a professional conference,” “Attended a continuing education program on ethics” and “Other.” After the option “other” there was a space for the respondent to elaborate on “other.” This is true for all other “other” options noted in the survey.

The second question continues this line of examination, but moves to more informal sources of ongoing education. The question is, How often have you used/accessed the following resources for Engineering Ethics in the past academic year? There are significant resources available to engineering faculty on the topic of professional engineering ethics. These resources include colleagues whose expertise is ethics as well as the library on campus and a variety of internet-based sources. These internet-based sources included the Engineering Ethics journal, the professional engineering associations’ websites and the ASEE website. The question focused on the past academic year (2010-2011) because we wanted to ascertain whether or not faculty members are actively engaged in these kinds of issues, independently of this particular survey.

The third question, In the past academic year, how often have you engaged your students in class in discussions of ethical issues? is more specific than the preceding question in terms of ascertaining whether or not engineering professors discussed ethics in their engineering courses. Since the survey is part of a college-wide attempt to build ethics across the curriculum, it seemed important to know whether, and to what degree, engineering professors were already discussing ethics in their courses. This question is followed up by a request for examples from those who respond that they did discuss ethics in their courses during the last academic year.
The next major question of the survey gets to the heart of the matter for the authors and the CoE. What does “Ethics Across the Curriculum” mean to you? While it is clear that engineering professors think that ethics is important for engineers, they do differ as to what it means to ensure that students are prepared to be ethically responsible engineers. In informal conversations among the engineering faculty, some think that ethics is just common sense, and that we need not worry about it in the classroom. They identify Student Life leaders on campus as the sources of moral education. Others think that they are incompetent to address these kinds of topics in their classroom because they are not trained in ethics. Others think that ethics should be fully integrated into every engineering course offered at Villanova. This question is aimed at generating the perceptions of engineers at Villanova about this idea of ethics across the curriculum. As the CoE moves forward in implementing some kind of ethics across the curriculum program, knowing where faculty stand on this concept is a valuable piece of information.

A follow up to the question on ethics across the curriculum aims at the faculty member’s own willingness to assist in this project. How can you as a faculty member in the College of Engineering help the college in its objective of educating ethically responsible engineers? Just as it is important to know where faculty stand in their understanding of the concept “ethics across the curriculum,” so it is also important to know what responsibilities they are willing to assume in order implement Ethics Across the Curriculum. This question seeks open-ended comments, in order to generate the most varied of responses from the participants.

Survey Case Studies
The next section of the survey centers around six case studies. The prior questions aim to ascertain faculty familiarity with professional ethics, their practice in terms of discussing ethics in their classroom and their understanding of ethics across the curriculum. The cases are meant to measure, to some degree, several things: their capacity to identify the moral dimensions of a case, their sense of competency to discuss the moral dimensions of a case in their classes, and their willingness to do so. After each case, we ask if there is an ethical dimension to the case, whether they feel competent to discuss these issues with their students and whether or not they would use the case in class.

The decision to use case studies in this survey demands some explanation. Since the broader goal of the CoE is to achieve Ethics Across the Curriculum, the cooperation and skill level of engineering professors will be paramount in attaining this objective, and thus the cases are meant to provide the professional ethicists with critical information that will be used to structure our ongoing educational efforts with engineering professors. In addition, after reflecting on the successes and failures of a two-day ethics workshop for engineering professors held two years earlier, the ethicists became convinced that the case method approach represented the most promising avenue for equipping engineering professors to teach ethics across the curriculum, and that subsequent workshops would rely heavily on this approach. So the inclusion of cases in the survey was also intended as an introduction, albeit a brief one, to the types of situations that will be staple components of the CoE’s educational thrust in ethics for the foreseeable future.

We chose the case method as the principal pedagogical tool for teaching engineering faculty ethics in the classroom for three reasons: its relevance, practical value, and function as a bridge
to ethical theory. Let us explain each briefly. Having taught ethics at the university level for quite some time, we are convinced that the best way to stimulate genuine, abiding interest in the discipline of ethics is to connect it directly to the everyday lives of the students. In doing so, students not only become aware that whether they realize it or not, they are, in fact, making a number of ethical choices every single day, and these choices are rife with ethical meaning. When the ethical dimension of their choices is analyzed, sometimes students are pleasantly satisfied; at other times, they are bewildered or disconcerted with what they have done or with who they have become. Either way, students begin to see the value of ethical deliberation because it becomes not just another academic exercise done for the sake of accumulating knowledge, but a way to gain a great deal of clarity about meaningful facets of their lives, whether personally or professionally. In a similar way, we believe that engineering professors will be much more excited about and amenable to addressing ethical issues in their classrooms, as well as will feel more competent in doing so, if ethical deliberation focuses on situations that are likely to occur either in the classroom or in their daily activities as engineers.

The practical value of the case method approach is that through the examination of cases, engineering professors become more adept practitioners of mental habits which allow them to do a number of things: to generate paradigms that function as stable, secure ethical base points; to draw analogies between these paradigms and other cases, and to recognize and identify morally relevant differences between them; to deal with both ethical clarity and ambiguity; and to analyze particular circumstances. In other words, professors begin to practice the time-honored tradition of casuistry, which if done correctly will inculcate a set of mental virtues that not only have a great deal of practical ethical applicability, but also provide professors with an ethical platform from which to dive into new and perhaps unfamiliar ethical terrain. For a comprehensive study of casuistry, see Jonsen and Toulmin^2.

Finally, the case method approach provides a natural segue to more theoretical matters, which even if implicit and largely unacknowledged, always have a bearing on the practical resolution of cases. When engineering professors examine cases and begin articulating the goods at stake in particular situations, they almost automatically begin to reveal their presuppositions, assumptions, and the ethical goods that they consider worthy of pursuit. This can be quite an informative exercise for them, since this movement of uncovering background commitments and beliefs is often not a mental habit practiced widely, and it also shows that moral sensibilities and specific judgments do not occur in a vacuum. On the contrary, they emerge out of a particular ethical stance, and this ethical stance, in turn, can be subject to a critical evaluation for its cogency and intellectual credibility. This typically leads to a different, and highly valuable, type of ethical deliberation, which is concerned with things such as moral principles, the nature and content of the good life, and the habits or virtues necessary to pursue ethical goods either individually or communally.

In terms of the cases included in the survey, the first focuses on a conflict of interest. An alumnus of an engineering program comes back to his department and asks them to do some testing on a medical machine he has developed for this company. The question is whether or not the engineering department should engage in something which might have the appearance of a conflict of interest, even if the testing is above board.
The second case has to do with the practice of manufacturing companies holding educational luncheons or hosting educational conferences to which potential clients are invited. Again, conflict of interest concerns hold center place in this case.

The third case seems like more of a management issue. An offer has been made by a firm but then is rescinded 10 days later, after the prospective employee had turned down other offers. We chose to include this case because many engineers become managers and much of professional engineering practice involves the management of people. Also, it is a borderline case in that an argument could be made that the case is not strictly engineering ethics. We wanted to see what the response was among the faculty, perhaps suggesting some content for the upcoming workshop.

The fourth case involves engineering firms or individuals who make contributions to political campaigns, especially when that contribution is to individuals who may send contracts in the direction of the firm or individual. Since a reputation for integrity is an important aspect of engineering ethics, this case illustrates the difficulty in navigating what is innocent behavior and what may appear less than innocent behavior.

The fifth case is designed to address proper engineering ethics issues where, sometimes, the line between them and other issues is not clear for people. This case allowed us to ascertain the clarity with which engineers discern this line. Similar to the third management-related case, this case may convince some respondents to seek assistance in identifying and framing issues that might involve ethical dilemmas.

The sixth case is also a management-style case which involves a work setting where one of the employees may be alcohol-impaired. The case focuses on the extent to which engineers are responsible for the health, welfare, and safety of those who might be impacted by her decisions, either as a designer of a system or the manager of a system.

All but the first and fifth cases were borrowed from another source. Those sources were identified in the survey in order to give credit to the authors of those cases. The two non-resourced cases were developed by Mark Doorley and Mark Graham specifically for this survey.

To summarize, the cases were included in order to provide the authors with feedback about the following questions: to what degree are engineering professors at Villanova capable of identifying the moral dimensions of a case, to what degree do they feel confident that they can discuss those issues in class, and to what degree are they willing to do so in their courses.

This last concern is underlined by the next question in the survey, after the cases: Engineering courses are an appropriate place in which to address the kinds of ethical issues raised in the cases you have just reviewed. This question would provide us with the clearest indication of where the CoE stands in terms of its faculty’s willingness to engage clearly ethical issues in their engineering courses.

We then ask the participants in the survey to provide feedback on the cases they have reviewed. Please feel free to provide any observations or comments about any of the cases you’ve just
reviewed. The goal of this question is to allow the participants to engage in free association with regard to the cases.

It occurred to the authors that there are few times when faculty members in the engineering college are asked what areas or issues they would like more information on. We took this opportunity to solicit that kind of feedback. We asked: Please identify the types of ethical issues, situations, problems, values, or religious or philosophical traditions about which you would like more information. We have quite a varied faculty, in terms of ethnicity, research interests, and religious backgrounds, so this question provides a way to elicit feedback influenced by that variety.

The last question of the survey returns to the Ethics Across the Curriculum concern driving the workshop and this survey. We asked the participants of the survey to rate the degree to which they thought a number of optional activities/programs might be of value to the undergraduate students. All address professional engineering ethics education. The options were as follows:

- An annual lecture by an engineering professional on some topic related to professional ethics.
- An engineering ethics case competition for undergraduates.
- A special event that highlights the relationship between the service break engineering trips and the social responsibility of professional engineers.
- An annual symposium in which student work, focused on ethics is celebrated, with awards presented.
- Pizza and Principles: a twice a month gathering for pizza at which a professional engineering ethics case is discussed, facilitated by engineering faculty.
- A professional engineering ethics student organization.
- A bi-annual conference on professional ethics, hosted by the College of Engineering, open to students from engineering colleges in the area.

All of these options are independent of the classroom, so the inclusion of this question on the survey was to capture feedback from those participants who may be concerned about adding new material to already overloaded courses, or who do not consider the engineering classroom to be the optimal place for professional engineering education. As is the practice of this survey, there is space left at the bottom of this list for participants to generate ideas of their own, different from what is listed above.

Survey Administration

The survey was administered electronically on September 15, 2011. The email sent to the engineering faculty was written by the Dean of Engineering. It contained the rationale for the survey, the importance of everyone participating, the assurance of confidentiality, the link to the survey and a request that it be accomplished in the five days following receipt of the email. The first three points included in the email are addressed in this excerpt:

As one of our strategic initiatives to improve the undergraduate program and to better prepare our students for their professional careers, we are investigating means for improving our engineering ethics program. As you are likely aware, most if not all of our
students currently are required to take an ethics course from the ethics department. A study that we funded 3 years ago to look at that approach indicated that while the students were getting a good fundamental introduction to ethics principles, they were not getting an opportunity to understand these principles and apply them in an engineering context. One approach we are looking at is to integrate engineering ethics within engineering courses. This has several advantages for students to connect ethics with engineering but does require that engineering faculty be more familiar and comfortable with ethics principles. Toward this end, we are conducting a survey of the engineering faculty to try to understand the current level of understanding of ethics principles, what faculty might currently already be doing in classes with ethics, and to best determine what our next steps will be.

Please be assured of the confidentiality of your responses to this survey. The data will be collected and analyzed by the Office of Planning and Institutional Research (OPIR). OPIR provides summary results to me. Any comments written in response to the open-ended questions are extracted from the individual surveys and edited to eliminate any possible identifying language. They are then presented to me as verbatim quotations, but with no identifying information.

With the assistance of OPIR, this survey was developed and implemented. It is an important first step for an institution that wants either to start anew or build on what is already established in the area of undergraduate professional engineering ethics education.

OPIR summarized the results of the survey and forwarded its report to the Dean of Engineering in mid-October of 2011.

Survey Results

As noted earlier, the purpose of this survey was:

- to understand the current level of faculty understanding of ethics principles;
- to discover what faculty might currently already be doing in classes with ethics; and
- to determine what the next steps will be for improving the engineering ethics program.

A total of 40 members of the full time faculty responded to the survey and 37 completed the survey in its entirety, which represents an overall response rate of 55%. Regarding training and familiarity with engineering ethics resources, 2/3 of respondents reported that they had engaged in formal training in professional ethics during the past 5 years. The predominant activities were professional seminars and workshops on ethics. It is interesting to note that respondents reported no participation in academic courses on ethics and no attendance at conferences specifically related to ethics.

A list of resources associated with engineering ethics was provided in the survey and faculty were asked to address how often they used or accessed these resources. Three or fewer respondents reported accessing any of these resources with great frequency (very often).
However, more than 50% of the respondents reported that they utilized faculty colleagues or an ethics page from their own professional society’s documents with great frequency (very often). Other sources that were used “occasionally” included faculty scholars in the ethics field, library sources, the National Society of Professional Engineers (NSPE) Code of Ethics, the Online Ethics Center for Engineering and Research and the National Institute for Engineering Ethics.

Regarding the application of ethics issues in class, 84% of respondents reported that they engaged their students in ethics related discussions. Of these respondents, only 8% reported that they engaged students once a week or almost during every class. In-class topics of discussion included academic integrity, responsibilities of engineers, intellectual property, professional conduct, taking and giving credit for work performed, ethics-based federal laws, the codes of ethics from professional engineering societies and reporting factual information. This is a wide range of topics and indicates an understanding of ethical behavior in the engineering profession and the importance of addressing such issues in a well-balanced undergraduate engineering curriculum. The 84% response rate regarding engagement of students in class also seems to indicate a basic understanding of the need for the implementation of a ‘mindset’ that supports the concept of Ethics Across the Curriculum.

The question “What does Ethics Across the Curriculum mean to you?” evoked a wide range of responses. Five (5) respondents provided definitions or identified ethical issues that would be addressed in such a curriculum. Fifteen (15) respondents indicated that ethics would be taught or incorporated in every engineering course. Seven (7) respondents said that ethics would be integrated into courses as appropriate or under certain circumstances, and three (3) respondents expressed concern about the concept. When asked, “How can you, as a faculty member in the College of Engineering, help the College in its objective of educating ethically responsible engineers,” 15 responded by indicating that they could incorporate ethics into their courses, expand class discussions and create more opportunities for discussions in class. This response was the most common response by far.

Six case studies were presented in the survey along with the following three Yes/No questions:

- Is there an ethical dimension to this case?
- If yes, based on your current knowledge of ethics, do you feel qualified to discuss this issue with your students in class?
- If yes, would you use this case study in class?

These case studies were specifically selected such that the answer to the first question is not obvious and, therefore, the specific case study is subject to discussion. The thought process here was to select case studies that support a subtle purpose of the survey which was to convince the faculty that many critical cases in engineering ethics do not have obvious answers. Perhaps the ambiguity of the case studies selected led to the results obtained.

The results of the survey are summarized in Table 1.
The responses to the first question indicate that most respondents observed an ethical dimension to these case studies even though that was not the proper conclusion to draw in every case. We can further conclude that more than half of the respondents feel qualified to discuss these case studies in class without further ethics-based education or training and we can further conclude that less than half of the respondents might select these particular case studies to use in their courses. When asked to provide any observations or comments about any of the case studies, eight (8) commented that the case studies did not fit well with their course materials. Four (4) thought that the case studies were reasonable and appropriate and three (3) had suggestions for other case studies.

The overall results from the responses to these case studies seem to indicate a true interest in the need for ethics across the curriculum and a belief that such an effort has been implemented, to some degree at least, and that it is already underway. In addition, in response to the statement, “Engineering courses are an appropriate place in which to address the kinds of ethical issues raised in the case studies reviewed,” 78% of respondents agreed that it is appropriate to address ethical issues in engineering courses.

The survey also introduced the concept of offering extra-curricular opportunities for students in the area of professional ethics. Faculty members were given a list of possible extra-curricular opportunities and were asked to rate (high value, some value, no value) how valuable they thought each opportunity would be for undergraduate students. This list of these prospective extra-curricular ‘ethics’ opportunities was described earlier. The results are presented in Table 2.

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<thead>
<tr>
<th>Activity</th>
<th>Number of Respondents</th>
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<tr>
<td></td>
<td>High Value</td>
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<tr>
<td>Annual Lecture</td>
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<tr>
<td>Case Competition</td>
<td>7</td>
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<tr>
<td>Special Event</td>
<td>10</td>
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<tr>
<td>Annual Symposium</td>
<td>2</td>
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<tr>
<td>‘Pizza &amp; Principles’</td>
<td>9</td>
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<tr>
<td>Ethics Organization</td>
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<td>Bi-annual Conf.</td>
<td>3</td>
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Table 2. Summary of Responses to Extra Curricular Activities
Based on a comprehensive review of the data presented in Table #2 above, It can be concluded that the respondents felt that an Annual Lecture and ‘Pizza and Principles’ Gatherings would be the most valuable extra-curricular activities for students in professional ethics.

**Conclusions**

The conclusions of the Faculty Survey on Professional Ethics are measured against the initial purposes as stated above in the **Results**. These 3 purposes and their associated conclusions are as follows:

- *To understand the current level of faculty understanding of ethics principles.*

The results of the survey indicate a basic understanding of ethical behavior and principles, and a basic knowledge of the difference between right and wrong as it applies to the engineering profession. They also seem to indicate a ‘black and white’ approach to understanding ethics. There also seems to be a basic belief that ethical issues and an approach to Ethics Across the Curriculum already exist in the College, albeit at a rudimentary or elementary level. We can also conclude from the results that most faculty agree that more should be done to implement further a deeper and more thorough culture within the College which supports and embraces Ethics Across the Curriculum as primary and essential throughout the undergraduate educational experience.

- *To discover what faculty might currently already be doing in classes with ethics.*

The results indicate that some faculty members are currently addressing ethics in some of their classes. However, the current general approach to ethics in engineering courses is viewed as secondary or peripheral. It is often an ‘addendum’ or perhaps addressed on a superficial level. In most instances, ethics is not presented as an integral part of engineering courses. Although most respondents indicated a need for achieving a comprehensive approach to Ethics Across the Curriculum, they are not yet moving forward toward that goal.

- *To best determine what the next steps will be for improving the engineering ethics program.*

The results very clearly indicate that the faculty recognizes the need for establishing an ethics across the curriculum culture within the CoE. The results also indicate that, although some faculty members are currently addressing ethics to some degree in their courses, this approach is short sighted and not nearly as comprehensive as it should be. Respondents seem to agree. Therefore, more must be done to further instill the concept that Ethics Across the Curriculum is a College wide goal which will become a reality in the long term. To achieve that goal, more training and a further continual emphasis must be given to this subject. Only through a continuous and unwavering faculty training program, visibly and vocally endorsed by the Dean of the CoE, will the concept of Ethics Across the Curriculum be achieved.
As a real, tangible, and measurable step forward, it is suggested that all incoming faculty members to the CoE be encouraged, as part of their orientation process and during their first year of employment, to participate in an Ethics Workshop similar to the Workshops already conducted by the College. As a result of their participation in these Workshops, these new faculty members will be further encouraged to include ethics issues throughout their course syllabi and to share their teaching and learning experiences with other faculty members in subsequent Ethics Workshops.

In order to further enhance the continual nature of this effort, it is suggested that these Workshops be offered at least biannually and that attendance not be restricted only to incoming faculty members. Attendance should be open to any and all faculty members, part-time and full-time. Incoming faculty members should be strongly encouraged to participate.

Regarding extra-curricular opportunities for students in the area of professional ethics, based on the results of this survey, it is strongly recommended that an Annual Lecture and ‘Principles and Pizza’ gatherings, described above in **Results** be implemented during the next academic year. It is recommended that such implementation can occur through collaboration between the administration of the CoE and the University’s Ethics Program.

**References:**

Appendix

Engineering Ethics Survey Administered To College of Engineering Faculty

Villanova University

Fall, 2011
## APPENDIX I

2011 Faculty Survey on Professional Ethics

Have you engaged in any formal training in professional ethics during the past 5 years? Please mark all that apply.

- ☐ Took an academic course on ethics
- ☐ Participated in a professional seminar/workshop on ethics
- ☐ Attended a conference specifically related to ethics
- ☐ Attended a session on ethics as part of a professional conference
- ☐ Attended a continuing education program on ethics
- ☐ Other (Please specify):

How often have you used/accessed the following resources for Engineering Ethics in the past academic year?

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<thead>
<tr>
<th>Resource</th>
<th>Not at all</th>
<th>Occasionally</th>
<th>Often</th>
<th>Very Often</th>
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<td>Faculty colleagues in Engineering</td>
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<td>Faculty scholars in the field of ethics in the Ethics Program or in the Philosophy, Humanities and/or Theology and Religious Studies Departments</td>
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<td>Falvey Library -- online and book resources</td>
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<td>National Society for Professional Engineers (<a href="http://www.nspe.org/ethics">www.nspe.org/ethics</a>)</td>
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<td>Online Ethics Center for Engineering and Research (<a href="http://www.onlineethics.org">www.onlineethics.org</a>)</td>
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<td>An Engineering Ethics Blog (<a href="http://engineeringethicsblog.blogspot.com">http://engineeringethicsblog.blogspot.com</a>)</td>
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<td>National Institute for Engineering Ethics (<a href="http://www.niee.org">www.niee.org</a>)</td>
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<td>An ethics page of your own professional society or association (ASME, IEEE, AIChE, ASCE)</td>
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<td>Please list any other resources:</td>
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In the past academic year, how often have you engaged your students in class in discussions of ethical issues?

- ☐ Never
- ☐ At least once in a course
A few times during a course
Once a week
Almost every class

Please provide some examples of the types of ethical issues that are discussed in your classes.

What does Ethics Across the Curriculum mean to you?

How can you as a faculty member in the College of Engineering help the college in its objective of educating ethically responsible engineers?

The following section of the survey presents six case studies. Please answer the question or questions that accompany each case study.

**Case I:**
The college of engineering at a Midwestern US university has an alumnus who now heads a major manufacturing firm, specializing in medical machinery. The alumnus has been very generous to the college in the past, and has approached the chair of the mechanical engineering department with a proposal. His firm has developed a new respirator for hospitals. He would like the mechanical engineering department to engage in the testing of this device, which will assist him in getting FDA approval to market it.
<table>
<thead>
<tr>
<th>Is there an ethical dimension to this case?</th>
<th>Yes</th>
<th>No</th>
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<td>![Circle]</td>
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Based on your current knowledge of ethics, do you feel qualified to discuss this issue with your students in class?

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<th>Yes</th>
<th>No</th>
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Would you use this case study in your course?

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<th>Yes</th>
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**Case II:**
The ABC Pipe Company is interested in becoming known within the engineering community and, in particular, to those engineers involved in the specification of pipe in construction. ABC would like to educate engineers about the various products available in the marketplace: the advantages and disadvantages of using one type of pipe over another. ABC sends an invitation to Engineer A, as well as other engineers in a particular geographic area, announcing a one-day complimentary educational seminar to educate engineers on current technological advances in the selection and use of pipe in construction. ABC will provide all refreshments, buffet luncheon during the seminar, and a cocktail reception immediately following. Engineer A agrees to attend.


<table>
<thead>
<tr>
<th>Is there an ethical dimension to this case?</th>
<th>Yes</th>
<th>No</th>
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Based on your current knowledge of ethics, do you feel qualified to discuss this issue with your students in class?

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Would you use this case study in your course?

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Case III:
Smith, an unemployed graduate engineer who recently received certification as an Engineer-Intern, is seeking employment with a consulting firm. Smith is contacted by Engineer A, a principal with a large consulting firm. After a long discussion including such matters as working conditions, salary, benefits, etc. Engineer A offers and Smith accepts a position with the firm. Smith cancels several additional job interviews with other individuals. Two days later, in a meeting with other principals of the firm, it was agreed by the firm's management, including Engineer A, that the vacancy should be filled by an engineering technician. Not until a week and a half later did Engineer A contact Smith and rescind the firm's offer.

Source: website_http://www.onlineethics.org/Resources/Cases/ec91-1/WithdrawalBER.aspx

Is there an ethical dimension to this case?

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Case IV:
Engineer A is the principal in a small-sized consulting engineering firm. Approximately 50% of the work performed by Engineer A's firm is performed for the county in which the firm is located. The value of the work for the firm is estimated to be approximately $150,000 per year. Engineer A is requested to make a $5,000 political contribution, the maximum amount allowed by law, to help pay the cost of the media campaign of the county chairman.

After subsequent thought, Engineer A makes a $2,000 contribution to the campaign of the chairman, a person Engineer A has known for many years through mutual public service activities as well as their activities on behalf of the same political party. The county board chairman serves in a part-time capacity and receives $9,000 per year for his services. Other members of the board receive $8,000 per year for their services. As required under the laws of his state, Engineer A reports the campaign contributions to the state board of elections, and correctly certifies that the contributions do not exceed the limits set by the law of the state.

These contributions and the contributions of other firms in the county are reported by members of the local media who appear to suggest that Engineer A and other firms have contributed to the campaign in anticipation of receiving work from the county. Engineer A continues to perform work for the county after making political contributions.

Source: This case is taken from the National Society of Professional Engineers publication "Opinions of the Board of Ethical Review."
Is there an ethical dimension to this case?

Yes  No

Based on your current knowledge of ethics, do you feel qualified to discuss this issue with your students in class?

Yes  No

Would you use this case study in your course?

Yes  No

Case V:
Ralph Byrnes, a 10 year veteran at his engineering firm, Tre Design, approaches his boss about starting a faith sharing group at the company, meeting during lunch time. Everyone would be invited to join. Ralph thinks this would be a good way for the employees of the firm to get to know each other better, and so impact operations. It would be very low key, focused on people sharing their experience of faith, whatever it might be.

Is there an ethical dimension to this case?

Yes  No

Based on your current knowledge of ethics, do you feel qualified to discuss this issue with your students in class?

Yes  No

Would you use this case study in your course?

Yes  No

Case VI:
You are a quality assurance engineer. One of your workers, who is also a close friend, almost had an accident on the factory floor that would have slowed down production and possibly injured some of the operators. Over the
years you have noticed that your friend has been consuming more and more alcohol after work and on the weekends. You suspect that alcohol may have been involved in the near accident. When confronted, your friend denies any alcohol problem. The company has a strict policy against drinking or being under the influence of alcohol during working hours. The penalty for violating the policy is dismissal. Jobs are hard to find. Your concern for your friend's family makes the management even more difficult.

Source:

Is there an ethical dimension to this case?

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Engineering courses are an appropriate place in which to address the kinds of ethical issues raised in the cases you have just reviewed.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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Please feel free to provide any observations or comments about any of the cases you've just reviewed.

Please identify the types of ethical issues, situations, problems, values or religious or philosophical traditions about which you would like more information.
Below is a list of possible extra-curricular opportunities for students in the area of professional ethics. Using a scale of 1 to 5, please rate how valuable you think each would be for undergraduate students.

<table>
<thead>
<tr>
<th>Activity</th>
<th>1 - No Value</th>
<th>2 - Some Value</th>
<th>3 - High Value</th>
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<tbody>
<tr>
<td>An annual lecture by an engineering professional on some topic related to professional ethics</td>
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<td>An engineering ethics case competition for undergraduates</td>
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<td>A special event that highlights the relationship between the service break engineering trips and the social responsibility of professional engineers</td>
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<td>An annual symposium in which student work, focused on ethics is celebrated, with awards presented</td>
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<td>Pizza and Principles: a twice a month gathering for pizza at which a professional engineering ethics case is discussed, facilitated by engineering faculty</td>
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<td>A Professional Engineering Ethics student organization</td>
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<td>A bi-annual conference on professional ethics, hosted by the College of Engineering, open to students from engineering colleges in the area</td>
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Please list other suggestions for extra-curricular opportunities for students in the area of professional ethics.