Work in Progress - Enhancing Ethical Awareness within Undergraduate Multidisciplinary Teams by Preparing Codes of Ethics

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Abstract - IIT, Lehigh, Michigan Tech, and Rice universities are piloting a strategy based on the book by Jones & Ferrill, The Seven Layers of Integrity (2006), to teach ethical awareness to engineers and scientists. Students at the four universities are expected to prepare a Code of Ethics for their own project or course problem context. These codes are evaluated and each Code of Ethics must have an over-arching principle as well as seven canons describing the standards of conduct to which the individual or professional working in the problem context shall be held. Each canon must be supported by descriptions of ethical pressures and risks. Each of these requirements is scored and the scores from these ‘code’ evaluations constitute evidence of the extent to which teams understand the principles of ethics and can translate that understanding into a code of ethics.

Index Terms – code of ethics, ethical canon, over-arching principle, ethics.

INTRODUCTION

Impetus for our research comes from the ABET criteria that have evolved over the past decade focusing on professional skills, such as ethical awareness, and from the reports by the National Academy on the attributes of the engineer of 2020.3 While most engineering students have presumably been exposed to an engineering Code of Ethics, it has not been established that this exposure has any impact on their future decision making. The ideal learning outcome, presumably, is that all students will be able to recognize a situation, in professional or personal life, that presents an ethical dilemma, will be able to analyze the challenge from a variety of perspectives and make an informed decision, recognizing the ways in which they were adhering to some ethical canons or codes of ethics but perhaps not to others.

Ethical issues are usually very complex and have multiple possible courses of action, some of which are better than others, but none of which can typically be qualified as either “right” or “wrong”. Muskavitch[7] specifically notes the need for ethics education to fulfill two distinct cognitive needs. One, it must allow the student to disagree with others and engage in a process of give-or-take – there should not be “answers” that are characterized as either correct or incorrect. Two, it must allow learners to make connections between what they already know and what they are currently learning.

Several important issues are evident in the discussions of how best to develop ethical competence among undergraduate students. One issue concerns how to conceptualize, define, and measure the desired – or feasible – outcome. While there seems to be consensus that all programs hope to shape students who will behave ethically as adults, we have found no studies that link undergraduate educational experiences to measurable ethical behavior after graduation. The one study that most nearly tried to assess the impact of ethics education on undergraduate students’ perceptions about ethics found that very few (8%) students felt they were well prepared to deal with the ethical issues confronting them in the workplace.5

RESEARCH PLAN

Employing a theoretical framework supported by prior research, we have begun pilot-testing a strategy for developing an awareness of ethical issues by having students create a Code of Ethics for a project in which they are engaged for a semester (or more). Our strategy involves integrating ethics materials into an existing course structure, relying on the “regular” faculty with help from outside expert consultants. We have implemented versions of our intervention in three universities, with a fourth now planning to do so in spring 2008.

A Code of Ethics is a statement about the guiding principles for how a person should behave ethically with regard to the domain of concern. In our project, the Code of Ethics concerns the problem context for the students’ multidisciplinary team (not the functioning of the team itself). Students are asked to identify the ways that person working on their project as a professional might be tempted to act unethically (the risks) and the reasons why a person might choose to act that way (the pressures). This process asks the students to specifically make connections between a project with which they have become familiar over several weeks’ work and information in a textbook that describes seven different perspectives for examining ethical issues. The process of making these connections should speak to Muskavitch’s second point, while the book’s explanation of the seven different “layers” for defining an ethical issue...
should provide the room for give-and-take described in Muskavitch’s first point.

**THE INTERVENTION FOR DEVELOPING ETHICAL AWARENESS**

To promote an understanding of ethics, a core text is required, *The Seven Layers of Integrity*, by George Jones and June Ferrill. The authors propose that ethical dilemmas can be analyzed from the perspectives of 1) legal requirements, 2) contracts and agreements, 3) professional codes of ethics, 4) industry standards, 5) community standards, 6) personal relationships, and 7) moral and spiritual values. In this context, any ethical challenge must be evaluated from all seven perspectives, to assess ways in which the proposed (or actual) practices may violate ethical principles at one or more of the levels. A particular behavior may be considered acceptable or ethical at one level but not at other levels. The Code assignment is being implemented at each of our Universities but for the sake of brevity only IIT’s experiments will be discussed in any detail.

**THE IIT ETHICS INTERVENTION**

Students in 35-45 multidisciplinary teams of 12 students are asked to read the ethics text. A four-hour workshop on ethics and creating a code of ethics is held and videotaped. All IIT teams are then required to prepare a Code of Ethics for their project – directed at the industry or problem context in which they are working, not their own team interactions. Each team is asked to provide a major canon or Overarching Standard, or a principle that should always apply to their problem. In addition they develop an ethical canon related to each of the seven layers. Each canon describes the standards of conduct to which the individual or professional working in the problem context shall be held. Each canon must be supported by examples of pressures which describe in what ways a person may be tempted or pressured to act against the standards of behavior described in the canon, and risks, the unethical behavior that might result from the pressure. Each canon must also have identified measures that will indicate when a risk has occurred.

These codes are evaluated using a rubric where the required components are rated as 0 (nothing written or does not make sense), 1 (too general, missing information) or 2 (makes sense, sufficient information provided, possible measure identified). IIT students are also asked questions about their Code of Ethics – how it was developed, how it had shaped their project work – as part of the final project judging at the end of the semester.

**RESULTS FOR FALL 07 AND SPRING 08 SEMESTER AT IIT**

Results from the fall 2007 semester at IIT indicate that most teams did well on this project. Of the 33 teams who submitted a Code, the average score was 81%; 16 teams scored 90% or above on the Code evaluation. Anecdotally, faculty leaders reported that doing the Codes of Ethics had enabled their team to understand better their project problems, and that the activity inspired more active project management.

Results from the Spring 2008 semester at IIT indicate that most teams again did fairly well on this project; as shown in table 1, 19 of 40 participating teams scored 80% or better in the grading process. However, the grading rubrics are substantially harder to satisfy in spring 08 vs the fall 07 semester. One complication is that half of the spring 08 teams had to revise a code from the fall 07 semester as a first draft code already exists for these continuing teams. Second, measurements of the risks were added as a canon requirement and finally new pressures and risks not submitted in fall 07 had to be provided if this was a second pass at a code of ethics for a specific problem context.

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<thead>
<tr>
<th>Percent Correct on Ethics Grading Criteria</th>
<th>Number of teams</th>
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<tr>
<td>91-100</td>
<td>10</td>
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<tr>
<td>81-90</td>
<td>9</td>
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**RESULTS**

At IIT we have established that student teams, properly motivated, can produce Codes of Ethics. Results of similar experiments at Rice and LeHigh support this finding. Whether this means ethical awareness has been increased by this learning process awaits the development of a pre/post measurement instrument or some other benchmark data.

**CONCLUSIONS/FUTURE WORK**

We conclude that the Code of Ethics process shows good promise of creating a learning outcome with significant benefits regarding ethical awareness increases in undergraduate students. Our next steps are to gather comparable data across our four Schools and implement a learning measurement tool so that we can at least benchmark against ourselves the levels of ethical awareness that we have attained in our students.

**REFERENCES**


