Work in Progress – Engineering Courage: From “Not My Business” to Positive Responsibility

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Abstract – How does a course on engineering ethics affect an undergraduate student’s feelings of responsibility and decisions about moral problems? Can an ethics course promote moral courage? In this study, we interviewed six students who had taken a course on engineering ethics and six who had not. We asked what they would do as participants in two short cases that posed moral problems. For each case, we successively increased the level of seriousness and asked how each change altered the students’ decisions. For both cases, even when they were not directly involved, students who had taken the ethics course were more likely to feel responsible and take corrective action. Students who were less successful in the ethics course gave answers similar to students who had not taken the course. This latter group of students seemed to have weaker feelings of responsibility: they would say that a problem was “not my business.”

Index Terms – assessment, engineering ethics, professional responsibility

INTRODUCTION

What educational outcomes can we expect from instruction in ethics? Students can definitely achieve cognitive goals in knowledge and reasoning. They can understand, interpret, and apply provisions in the code of ethics of the National Society of Professional Engineers. They can distinguish between copyrights and patents, and between bribes, gifts, and extortion. They can analyze cases to identify moral issues. They can evaluate actions according to moral criteria. Using different instruments, Self and Ellison [9] and Sindelar et al. [10] demonstrated that in a full three-credit course on engineering ethics, the moral reasoning skills of students improve significantly.

While we may expect instruction in ethics to improve cognitive skills, should ethics instruction also aim to improve affective skills? Developing affective skills through “emotional engagement” [6] can foster the commitment to choose the right action. In plain terms, an individual can know what is right, but might not act accordingly, for lack of courage. Do ethics courses promote moral courage? Should courses do so?

On the one hand, Pritchard [8] hypothesized that in ethics courses, stories of “good works” might inspire students to develop moral commitment. Harris et al. [3] asserted that ethics courses can strengthen the student’s “ethical will-power” when students understand the consensus of the engineering profession about standards: expressing this consensus, a code of ethics allows an engineer to object to an immoral request not merely as a matter of individual conscience, but with the support of the entire profession [1]. On the other hand, Pfatteicher [7] argued that ethics instruction in secular institutions should not attempt to control a student’s behavior or to indoctrinate students in a specific set of beliefs. Davis [2] questioned whether ethics instruction can change a student’s character anyway, since there are so many other influences.

METHOD

A total of twelve students were interviewed in the fall of 2004. Six of these students had taken ECE 216, Engineering Ethics, an elective course for juniors and seniors, in the Fall 2003 or Spring 2004 semester. The other six students had had no formal ethics training. Four of the six ECE 216 students were considered “successes” because they had participated in classroom discussions and had excelled on assignments. Two ECE 216 students were considered “failures” because their performance on assignments was mediocre; one “failure” had rarely attended classes.

The interview protocol had two sections: questions about the student’s experiences and expectations of a career in engineering, and questions about their reactions to two cases. In the second section, two cases were used: one concerned a miscalculation of salaries, and the other posed a potential product safety hazard. Each case had a sequence of variations that increased in seriousness. Students were asked to explain what they would do in each variation and to elaborate on their feelings about the situation and their plan of action. All interviews were transcribed and analyzed.

The first case, called “Payroll Problem,” is a variation of the “Oil Spill” case in the textbook by Harris et al. [4]. The interviewed student is placed in the position of an engineer whose friend Jesse describes a payroll system that his company created years ago. Jesse discovered a small intermittent software glitch in which payroll calculations could be off by a few pennies every pay period. The case includes some dialogue in which the engineer tries to convince Jesse that something should be done about this problem, while Jesse denies that there is a problem. In the first variation of the case, the engineer is not just Jesse’s friend, but a consultant to the company responsible for the error. In the second variation, the engineer works for Jesse in the company that has committed...
In the “Payroll Problem,” we also found differences between students’ ability to determine the right course of action in a given situation. For instance, four of the six non-ECE 216 students recognized moral problems that engineers might face on the job. From the interviews, it appears that ECE 216 students began the course with very different perspectives on professional responsibility. Perhaps students who did not become fully engaged in the course did not receive its benefits. It is also possible that these students began the course with very different perspectives on ethics from other students.

In contrast, all six ECE 216 students maintained consistency in their responses. The four “successes” said that they would take some sort of corrective action, regardless of whether they were just Jesse’s friend or worked directly for the company. “I kind of think my answers would be the same for everything. It doesn’t matter for me. I’m trying to think what the right course of action would be.”

The consistency in responses of ECE 216 students could mean that a student who successfully completes the course can perceive moral problems; the student can recognize the core moral issues of a case without distraction by peripheral considerations. Students in ECE 216 learn that an engineer has a social responsibility to the public [5]. This responsibility should determine an engineer’s actions, even when she is not on the job. From the interviews, it appears that ECE 216 “successes” internalized this understanding of social responsibility, because they would take positive action even when they have no assigned role responsibility.

ECE 216 “successes” said they would take action, but “failures” did not

In the “Payroll Problem,” we also found differences between the responses of ECE 216 “successes” and “failures.” ECE 216 “successes” felt that Jesse’s inaction was wrong. They would take corrective action in every variation of the situation. ECE 216 “failures,” however, were the least responsive to the situation. Both “failures” said they would not do anything to solve the payroll problem in any variation. While they recognized that Jesse was wrong, they did not feel responsible to fix the problem. Like most non-ECE 216 students, each ECE 216 “failure” felt that the problem was “not my business.”