

AC 2008-2812: ENHANCING ETHICAL AWARENESS WITHIN UNDERGRADUATE MULTIDISCIPLINARY TEAMS BY PREPARING CODES OF ETHICS

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ENHANCING ETHICAL AWARENESS WITHIN UNDERGRADUATE MULTIDISCIPLINARY TEAMS BY PREPARING CODES OF ETHICS

The Problem Addressed

This research paper addresses a new strategy for helping undergraduate students working on real problems within multidisciplinary teams to develop an awareness of ethical issues. High profile business scandals the last few years strongly support efforts to provide our students with a greater awareness of ethical issues and guidelines to address them. Another impetus for our focus, of course, comes from the ABET¹ 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^{2,3}. While most engineering students have presumably been exposed to an engineering Code of Ethics, it has not been established that this exposure has a great impact on their future decision making. The ideal outcome, presumably, is that all students would be able to recognize a situation, in professional or personal life, that presented an ethical dilemma, would be able to analyze the challenge from a variety of perspectives and discuss it with relevant peers, and make an informed decision, recognizing the ways in which they were adhering to some codes of ethics but perhaps not to others.

Many higher education programs cite “ethics,” “ethical behavior,” or “ethical awareness” as an important component of their students’ educational experience. However, it is difficult to identify research about which strategies are the most effective for developing ethical awareness, although there are some guidelines for evaluating such programs.⁴ According to one study that interviewed 686 employed adults, the majority felt there was little or no emphasis on ethics in their undergraduate program, and they felt poorly prepared to deal with ethical dilemmas.⁵

A variety of approaches to teach ethics have been described in the literature. The Electrical and Computer Engineering Department at California State University, Northridge, for example, uses a board game called The Ethics Challenge, in which students try to come up with the “best” answers to a series of ethical dilemmas.⁶ Some schools incorporate cases into their ethics education programs.

Although strategies such as these certainly appear to capture students’ attention and actively engage them in the learning processes, they may be insufficient for developing a sophisticated sense of ethical awareness. As noted in Karen M.T. Muskavitch’s commentary⁷ on the use of cases in ethics education, a paradigm such as this one can limit students’ creativity and perhaps erroneously foster a sense of “right-and-wrong-ism” for students when analyzing issues of ethical behavior. 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 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.

The research literature on acquiring understanding and applying complex paradigms also emphasized the “self-reference effect” that is so often demonstrated in learning and psychological research.^{8,9,10} That is, people remember information better when they are asked to

apply it to themselves or when they make the information self-relevant. In addition, several decades of research on learning processes suggest five key elements in helping students develop more depth in their understanding of complex problems: active learning, frequent feedback from others also involved in the problem solving effort, collaboration, cognitive apprenticeship involving mentors, and practical application in tasks that have real consequences.¹¹

Several models of ethics education apply these principles. For example, at the University of Arkansas, civil engineering students have a two-part ethics/professionalism project at the senior level.¹² During the first part of a semester, students scrutinize ethical canons and standards of professional conduct published by the American Society of Civil Engineers and the National Society of Professional Engineers, and prepare an essay concerning the applicability of these standards. In the second part of the project, students are asked to develop a set of canons or standards targeted specifically to the undergraduate student, and suggest processes for implementing these standards within the department. While this exercise involves the students in applying general principles (from the canons) to their own student role, it may not adequately prepare them for the kinds of ethical dilemmas they face in the work place. Faculty at Farleigh Dickinson University have developed a strategy for teaching ethics to their undergraduate business students that includes a course in the second semester of the freshman year, including lectures, readings and a paper during the first half, and visits to corporate sites to learn about actual ethics issues and programs during the second half.¹³ Students critique the ethics programs for the corporation they visit, and keep a journal of what they have learned. At the University of Cincinnati, a co-operative education program known as the Professional Practice Program, students pursue common learning outcomes, which includes professional ethics. In this program, students complete a module on ethics in which they familiarize themselves with the code of ethics for their profession, create a hypothetical scenario portraying an ethical dilemma that involves issues covered by the code, resolve the dilemma, and explain why their resolution is the best course of action based upon the code of ethics.¹⁴

Several important issues are evident in the discussions of how best to develop ethical competence among undergraduate students. One 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 study that most nearly tried to assess the impact of undergraduate teaching on ethics found that very few (8%) felt they were well prepared to deal with the ethical issues confronting them in the workplace.⁵ Some programs have utilized measures of ethical reasoning¹⁵ or a final course project.¹⁶ A second issue revolves around who should teach ethics: philosophers, or practitioners in business, engineering, etc. Jones and Ottaway¹³ explained why they brought the ethics component “in house” within the business school: they felt that the philosophy professors knew too little about business and at times presented an overly negative view of business. They opted to help management professors obtain sabbatical leave to prepare them to teach business ethics. A third issue is whether ethics should be taught as a stand-alone course,^{12,13} or integrated within existing courses or programs, with special modules.⁴ There is no compelling evidence about which of these strategies is more effective.

PROJECT PLAN

On the basis of such 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 outside expert consultants. We have implemented versions of an intervention in three universities, with a fourth now participating.

Our **research question** is: Will undergraduate students be able to identify potential ethical issues found in the problem contexts of professional projects and/or business cases and demonstrate their knowledge of ethical standards by writing a Code of Ethics specific to their project and/or cases?

This report is **descriptive research**, since we have not identified or developed a credible measure of ethical awareness (or of ethical behavior) to assess the impact of our educational strategy. Ideally, we would have measures of ethical awareness before and after our intervention. We offer varied measures of awareness of ethical issues, but recognize that our measures have not yet demonstrated desired levels of reliability and validity.

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 a textbook that describes seven different perspectives for examining ethical issues. The process of making these connections should speak to Muskavitch’s⁶ 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’s⁶ first point.

Our process also capitalizes on the research on developing more depth in their understanding, including the self-reference effect. Creating a Code of Ethics for a problem on which the student is currently working is expected to be a task that induces high self-relevance. In addition to generating self-relevance of the principles described in the required ethics text, the Code of Ethics assignment is also expected to lead to deeper processing of the information in the text. It has often been demonstrated that deeper levels of processing, i.e. thinking about the meanings of a word or using the word in a sentence, leads to better memory of the learned material than shallower levels of processing, such as memorization by repeating a list of words for several minutes.¹¹ Following this chain of logic, we expect that the Code of Ethics assignment, which involves generating examples of the seven layers described in the text as they apply to the students’ projects, will lead to deeper processing of the material than an assignment such as a multiple-choice test over the content of the text, which requires students to do little more than memorize the material.

Participating University Programs

The four university partners all have undergraduate engineering programs with multidisciplinary teams.; All of the programs have some form of competitive presentation of project results at the end of the semester. Each of the partners has distinctive features, as summarized in Figure 1.

The lead university, *Illinois Institute of Technology*, has the *IPRO – Interprofessional Projects Program* -- with the broadest scope of projects of the four collaborating institutions, covering service learning, entrepreneurship, process improvement, and product/ venture development. All undergraduates are required to participate in two IPRO projects as part of their General Education requirement. Students select projects, though some projects now require an application and approval process. Project teams are composed primarily of junior & senior undergraduate students across a range of majors (engineering, computer science, architecture, sciences, business, psychology, social sciences and humanities). During the fall semester of 2007, over 375 students participated in 37 multidisciplinary teams (each with a minimum of three majors represented). IIT is a private university, with roughly 2,300 undergraduate and 4,500 graduate students, with 18% minority and a substantial [34%+] international student body. IPRO was initiated in 1995 with NSF funding.

Lehigh University has the *Integrated Product Development (IPD)* program within the College of Engineering and Applied Science. Lehigh is a private university with 4,600 undergraduate students and 2,000 graduate students. The IPD program was founded in 1994; it provides juniors, seniors and graduate students the opportunity to work in interdisciplinary teams with industrial sponsors to design, fabricate and produce new products for a global economy. At the undergraduate level, IPD draws students enrolled in Bio Engineering, Mechanical Engineering and Mechanics, Material Science Engineering, Design Arts and various business majors. In 2007 there were 150 students in 25 teams with projects from industry sponsors, local entrepreneurial startups and student startups. The Lehigh teams have been active with the ASEE and USASBE as well as several entrepreneurship oriented foundations such as the NCIIA, Kern Family Foundation and Kauffman Foundation.

Rice University is a private, independent university dedicated to the “advancement of letters, science, and art.” It attracts 3000 undergraduates and 2000 graduate students, with a range of academic studies that includes humanities, social sciences, natural sciences, engineering, architecture, music and business management. Undergraduates wanting to study the business environment may take a second major in *Managerial Studies*, established in the 1970s. Approximately 50 students graduate with this second major each year. Students in Managerial Studies have other majors in engineering, natural sciences, social sciences (especially economics and psychology), and humanities (especially English and history). The interdisciplinary program in Managerial Studies is designed to provide undergraduates with an understanding of the environment in which businesses and other organizations exist today, and of some of the tools employed by management in the commitment of its financial and human resources. These students study economics, finance, statistics, psychology, public policy, and accounting. The capstone course for this second major is Managerial Communications, open only to students in this major. In this course students work on business cases to apply their knowledge to real world situations. The ethics intervention discussed in this paper was used in this course.

Michigan Tech University has the *Enterprise Program*, initiated in 1998 with funding from NSF to create an undergraduate curriculum that incorporates active and discovery-based learning. Michigan Tech is a public university, with 6,500 students of whom 3,600 are in the college of engineering. The Enterprise Program recruits students from second year through seniors to participate in teams that operate like a company to solve real-world problems by performing testing and analysis, making recommendations, developing projects, providing services, meeting

budgets and managing multiple projects. The Enterprise Program has grown to include 25 different teams, with 700 students participating, and representation from 25 different disciplines.

Figure 1: Characteristics of School Using Interventions Writing Codes of Ethics

School	Course Audience	Program/ Major	Activities	Assessment Methods
IIT: Private university	Multidisciplinary Teams, upper level; 375+ students in 37 teams	InterProfessional Projects (IPRO)	Read 7 <i>Layers</i> Attend ethics workshop Write Code of Ethics Explain Code, and ethical Issues at IPRO Day	Score Code Knowledge Test Self assessment Judge ratings
Lehigh: Private university	Multidisciplinary teams, upper level; 7 teams in intervention	Integrated Product Development (IPD); Entrepreneurship Practicum	View video of ethics workshop Write Codes of Ethics	Score Codes
Lehigh	Sophomores in 1 credit hour course;	Mechanical Engineering	Read 7 <i>Layers</i> Write Codes of Ethics for companies	Evaluate Codes
Michigan Tech: Public university	Multidisciplinary teams; sophomore-senior; 100 students in 3 course sections	Enterprise Program	View video of ethics workshop Lecture on 7 <i>Layers</i> Write Code of Ethics	Discuss Codes
Rice University: Private university	Multidisciplinary teams; senior level; 18 students in 3 teams	Managerial Studies	Read 7 <i>Layers</i> Write Code of Ethics	ScoreCode of Ethics Score on knowledge test

The Intervention for Developing Ethical Awareness

To promote an understanding of ethics, a core text was required, *The Seven Layers of Integrity*, by George Jones and June Ferrill.¹⁸ 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. It is understood (and included in the teaching) that a particular practice may be considered acceptable or ethical at one level but not at other levels; the very difficult challenge is to debate how to proceed when a practice is considered ethical at one or more levels but not at others. These analyses provide the most challenging situations.

The IIT IPRO Ethics Intervention Students were asked to read the core text. One of the book's authors (June Ferrill) led a four-hour workshop on ethics and creating a code of ethics at IIT (during the pilot summer session, in the fall semester, and in the spring semester) and led a four-hour workshop on ethics and creating a code of ethics; this workshop was videotaped and made available on line at IIT and the other universities. Evaluations of the initial sessions at IIT suggested that they were valuable, but would be more valuable if the examples were drawn from problems more similar to those in which the students are involved; this modification was made for the spring semester. Students were required to complete a Knowledge Test covering the concepts in the required text and the workshop.

All IPRO teams were required to prepare a Code of Ethics for their project – directed at the industry in which they were working, not their own team interactions. Instructions were distributed and posted on-line. Each team was asked to provide a major canon or Overarching Standard – “a standard you would want to always be applicable.” (Examples were provided from the National Society of Professional Engineers (NSPE) and the American Medical Association (AMA). After developing the over-arching standard, they were to write a principle related to each of the seven layers. Each canon should describe the standards of conduct to which the individual or professional working in the problem context shall be held. The canon includes examples of how ethical behavior would be measured. 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.. Faculty leaders were required to sign off on the code of ethics to ensure that the submitted code of ethics is suited to the problem context of the IPRO problem assignment.

These codes were evaluated using a rubric developed by IPRO research staff in consultation with Dr. Ferrill. Each of the required components were 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). A total of 16 points was possible. Teams received feedback on their Codes prior to the end of the semester.

IIT students were also informed that questions about their Code of Ethics – how it was developed, how it had shaped their project work – would be part of the final judging at the end of the semester. This provided an additional opportunity to understand the code by explaining it to professionals who had not been involved in creating the Code.

The Lehigh University Ethics Programs At Lehigh University, two ethical awareness initiatives were piloted. In the first, students from the Entrepreneurship Practicum, a diverse group consisting of juniors and seniors from the Colleges of Arts & Science, Engineering and Business, made up 7 teams that followed the protocol described above. They reported that the workshop was considered of value to them. The second pilot involved sophomores in Mechanical Engineering who were required to take a one credit ethics course. The professor used the *The Seven Layers of Integrity*¹⁸ as required text but had the student teams formulate Codes of Ethics using existing standard employment contracts as a base of knowledge. This group focused on what the companies providing the contracts might develop and endorse as internal codes of conduct based on the Seven Layers.

The Rice University Ethics Intervention At Rice University, students wrote a Code of Ethics for businesses described in business strategy cases. (The point needs to be stressed that these cases were not ethics cases. For the major class project, each student team role played consultants charged with making recommendations to solve a business strategy problem for a company described in a case). The six multidisciplinary teams consisted of three students each, all of whom were taking a second major in Managerial Studies; their other majors were either in social sciences, engineering or natural sciences. Two students were juniors and 16 were seniors. To prepare for writing Codes, they attended the four-hour workshop by Dr. Ferrill, read the *Seven Layers of Integrity*, and took a pre-test and a post-test on the book and lecture. The instructor started the process of writing the codes by asking students to consider what pressures would seem to exist in the company's environment, culture, or situation. For example, students said that the company was under time pressure to launch its new product. Next, the instructor asked if this pressure led to risks that the management might behave illegally or unethically and violate standards in any of the Seven Layers. A student suggested that the company may cut corners on manufacturing processes or not adequately test the product, leading to safety issues which would not meet legal or regulatory standards. Another student suggested that this lack of testing may lead to ethical issues in the layer involving community, as the community of consumers' standards are not met. This process continues with students identifying pressures and risks within the layers and then writing a canon to address such issues. Students wrote the Overarching Standard last.

The Michigan Tech Ethics Intervention Michigan Tech used a modified form of the intervention during the fall 07 semester. They incorporated it into a sophomore level 2-credit Enterprise Teaming course required for all enterprise students. They had three course sections, with approximately 100 students. Students were divided into teams of 4-8 students, according to the enterprise team they belong to, and were required to work on a project of importance to their enterprise over the course of the semester. While they did not require students to read the 7 Layers book, they provided an overview of the concepts and encouraged students to view the videotaped lecture. They reviewed and discussed ethical situations and problem solving methods used to resolve ethical dilemmas. Each project team was required to create a Code of Ethics, using the 7 Layer format, related to either their project or their Enterprise team. While full results are not yet available, many of the teams did an exceptional job giving the limited time they were able to spend on the subject. They will be following the main protocol during the spring 2008 semester.

Preliminary Results

The scores from these code evaluations constitute important evidence of the extent to which teams understood the principles of ethics and could translate that understanding into a code.

Results from the fall 2007 semester at **IIT** indicate that most of the teams did very well on this project. Of the 33 teams who submitted a Code, the average score was 81.4%; 16 teams scored 90% or above on the Code. Anecdotally, we have additional evidence of the success of this approach. Several of the IIT IPRO teams submitted outstanding Codes, and their faculty leaders reported that doing the Codes had enabled them to understand their projects much better than previously, and that it inspired active project management to ensure good outcomes

Results from **Lehigh University** are based on the team intervention (and not the classroom pilot). In this program, students from the Entrepreneurship Practicum, a diverse group consisting of juniors and seniors from the Colleges of Arts & Science, Engineering and Business, made up seven teams that followed the protocol described above. The leader of this group followed a somewhat different procedure than that used by IIT or Rice. This leader had the students start with a blank sheet of paper. At the top they wrote their company “mantra” and from there the overarching ethical standard to which they intend to adhere. After that, they outlined “buckets” (areas) in which they thought there might be ethical concerns. Once they identified three or four buckets, they added the next layer of detail, which was usually a great deal of specific issues having to do with that bucket. (For example, if the bucket was “finances” the issue might be clear record keeping and billing, charging the market value rather than a predetermined mark-up, and paying back their investors). Next they considered possible scenarios – often in the form of “pressures”, but once the bucket and the pressures were clear, then the risks were identified; from there the canon became very clear that they were able to state it based on the underpinnings they had discovered in their bucket outline. Finally, they went through the layers: Is the behavior or practice unlawful? Is it in violation of a contract? Is it in conflict with their profession’s code? Then they assigned each pressure and risk to the appropriate layer (writing it in the worksheet everywhere it applied). Once they had condensed the information by plugging it into the worksheet, they were able to see a much more comprehensive approach to writing an actual “code” and one to which they could then assign measures.

The grading score used by Lehigh was somewhat different than that used by IIT. The Codes were evaluated relative to their own worksheet options (rather than requiring “1 from column A and 2 from column B”). For example, if a team ended up with four canons that made sense, they got 40 out of 40 points for that section. The Overarching Standard was worth 10 points, each canon was worth 10 points (minimum of 4) and the overall thoroughness and correct assignment to the 7 Layers of risks/ behaviors identified was worth 10 points. Thus, a team that wrote four canons, scored a 9 for their Overarching standard and an 8 for their overall risks/behaviors would have gotten 57/60 or 95%. A team that wrote three canons and had the same for the other two metrics would have received 47/60 or 78% and a team that wrote five canons and had the same for the other two metrics would have received a score of 67/70 or 96%. The average score of the seven teams at Lehigh was 90.6%. Anecdotally, the faculty leader felt that going through the process this way helped them focus on the real issues they might face. The leader found their work to be substantive and thought provoking, for the most part.

At **Rice**, which used business cases, the results showed strong evidence of students understanding the ethical issues which could be encountered in the problem contexts of the cases. The mean score for the six teams’ Codes of ethics was 88%. (For an example of a Team’s

Code which scored 15 out of 16, as well as a lower-scoring team, see Appendix B.) On the Pre-test on business ethics, students' mean score was 68%; on the post-test, which followed the workshop, reading of the book, and writing the Code of Ethics, students' mean score was 92%.

The Overarching Standard and Professional Codes of Ethics layer provided the most challenges for the Rice teams. For the Overarching Standard, three of the six teams wrote a business goal or mission statement rather than an ethical standard. As an example, one team wrote that the overarching standard was "To ensure that the strategic alliance between Atencio Plasticos and Denning Inc. is successful in introducing each others' products in the United States and Mexico." The following overarching standard correctly concerns itself with ethical behavior rather than business goals: "Design and craft quality silk screens by operating our textile plant with integrity and the highest professional standards, acting as responsible stewards of our communities in both America and China, and adhering to all laws and regulations." Discussion of the difference between business mission statements or business goals and ethical overarching standards should be provided to eliminate these types of errors.

Three teams at Rice also had some difficulty with writing a canon for the Professional Codes of Ethics layer. Students on these teams seemed to confuse industry standards and/or safety codes with professional codes. Being aware that students may make these mistakes in writing their Codes, the workshop presentation can stress that Professional Codes commonly deal with due diligence, conflicts of interest, independence and objectivity, and privacy issues.

Anecdotally, a number of teams used their study of ethical issues in writing final reports and giving presentations. In writing the Codes of Ethics, giving presentations and reports, the teams assumed the role of management consultants making recommendations on strategy to the top executives of the companies in the cases. Students foresaw potential ethical risks and addressed some of these in their recommendations. Continuing to apply their ethical awareness, without prompting, indicated that students had been actively engaged in learning beyond merely writing Codes.

Discussion

This approach seems promising for promoting a deeper understanding of the complexities of ethical decision making. Students are engaged in a discussion about a project in which they are involved, and where the project outcomes often have consequences beyond a class assignment. They are working with individuals who may bring quite different assumptions and understandings about ethical behavior, and they have an opportunity to share these in a relatively protected setting. Students also used this learning later in the semester. At Rice faculty incorporated the teams' discovery of potential ethical risks into strategy recommendations for executives involved in the cases students used. Having an opportunity to discuss how the Codes of Ethics were created and used, as part of the final judging day at IIT should also be useful; we will explore the links between various measures of ethical awareness in future research.

This approach was successfully used in different teaching environments with different size teams using different instructional materials and having different goals. At IIT, the 40 teams are engaged in a variety of design, social service, and entrepreneurial projects, each with an average size of 12 students. At Lehigh, students were working on entrepreneurial projects rather than business or community problems or with typical engineering re-design or design. At Rice small student teams were concerned with business problems and used business cases. This study seems

to indicate that this adaptable approach can be used with good results in different settings, with large or small teams working on entrepreneurial endeavors, engineering problems, business or community service issues, and using real companies or cases.

Much learning seems to occur in the discussions students have while writing codes on the teams. One suggestion would be that as many students as possible be involved with discussing and writing the actual Codes. At Rice, with only three students per team, students worked together on the Codes during a class meeting with the instructor acting as coach, going from one team to another. They finished the Codes in team meetings outside of class. However, all the students were engaged in the process.

Anecdotally, faculty members from IIT and Lehigh have spoken favorably about the use of the book *Seven Layers of Integrity* and its template. One IIT faculty member said that the approach taken in this book was much more intuitive and easier to use than any approach he had ever seen in ethics education in the past. A Lehigh faculty member said of the book that “the text is so clear, concise, and practical - it makes teaching the subject and facilitating a workshop so easy.” Writing Codes of Ethics without the Seven Layers approach may not have the same result as we have described in this paper.

This approach is relatively efficient, although one must have appropriately-prepared personnel to provide the guidance to teams, and grade the Codes. Undoubtedly, this will involve some faculty development. One approach is to provide sabbatical leave to gain specialized expertise in ethics and teaching ethics.⁸ Some universities have a faculty development coordinator to assist other faculty in including ethical discussions in very course where appropriate.⁸ IIT faculty have been invited to participate in the ethics workshops (though few have done so). On the other hand, graduate students from varied disciplines have been hired to facilitate team processes at the ethics workshops, and they have all received some focused training in teaching ethics. NSF has funded summer workshops on integrating ethics materials into existing courses but developing faculty to be effective ethical guides is a challenge yet to be fully addressed..

Our current work addresses an important challenge in a promising way. However, we need to either identify or develop a reasonable measure of ethical sensitivity, awareness of ethical issues, and/or ethical behavior so that we can benchmark our students. We are not confident of our ability to develop a robust measure of ethical behavior, but we believe we can at least assess whether our students recognize ethical dilemmas and have ways of thinking about them.

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APPENDIX A: IPRO Code of Ethics Guidelines

Overview of the Assignment for NEW Projects

- The assignment is to write a Code of Ethics **for the problem context of the multi-disciplinary project to which your team has been assigned**. The Code should describe the guiding principles for how a person should behave ethically with regard to this problem (the canons), the ways that a person might choose to act *unethically* (the risks), and the *reasons* why a person might choose to act that way (the pressures).
- This Code should **not** be about your **school project**; you should write it as though you are a group of professionals working on this problem in the “real world.” The Code **should not mention IIT or the IPRO Program at all**.
- The Code should be based on your required text, *The Seven Layers of Integrity* by Dr. June Ferrill. Each of the “seven layers of integrity” should be described in the Code you submit, according to the following **five (5) requirements**:

1. Overarching Standard

- The Code must have **one (1) overarching** standard that describes the **guiding principle** of the project and the **ethical behavior** of individuals working in the problem context. This principle should be specific to the problem context and should fit logically with the rest of the code.

2. Seven Canons

- The Code must have **seven (7) canons** describing the **standards of conduct** to which the individual or professional working in the problem context shall be held. Each canon should **clearly relate to one of the seven layers of integrity from the text**. If you write a canon for one of the seven layers, and you are not absolutely sure the relationship of your canon to that layer is clear, it is a good idea to provide a sentence or two explanation and a **reference to the text** to explain why you think your canon applies to that layer.

3. Pressures and Risks

For **each of your 7 canons**, you should support them with a minimum of either:

- **Two (2) pressures and one (1) risk or**
- **One (1) pressure and two (2) risks**
- **Pressures** must be directly related to the canon and accurately describe why someone might be tempted or pressured to act against the standards of behavior described in the canon.
- Each **risk** must be related to at least one of the pressures and should describe the unethical behavior that might result from that pressure.
- **Examples of pressures and risks** are included on the last page of this document. Please refer to these examples to ensure that you have understood these concepts before writing your Code.

4. Measures

- **Each canon** must further be supported by at least **one (1) measure of ethical behavior**. The “measure” should describe at least one way that individuals could tell if they and their team have behaved in accordance with the canon they have written.

5. Faculty Approval

- **The IPRO faculty advisor must sign off on the code of ethics** before submission of the Code to the IPRO office for grading. It is the IPRO faculty leader’s responsibility to ensure that the submitted code of ethics is suited to the problem context of the IPRO problem assignment.

I. IPRO Code of Ethics Grading Criteria for NEW Projects

Overarching Standard

Point Values:

0 – Nothing is written, or the **Overarching Standard** does not make sense.

1 – **Overarching Standard** is very general, does not line up with the rest of the code, or does not say anything about ethical behavior.

2 – **Overarching Standard** is specific to the project, fits with the rest of the code, and includes a relevant statement about ethical behavior.

(Possible Points: 2)

Seven Ethical Layers

Students should refer to the **Code of Ethics Grading Guidelines** for specific requirements for writing their canons, pressures, risks, and measures. Each of the seven canons will be graded according to the following point values:

- 0 – Nothing is written, or the canon does not make sense.
- 1 – A canon is written but is too general; canon does not line up with pressures and risks; pressures and risks are missing, insufficient, or unrelated to each other; no possible measure of ethical behavior is identified.
- 2 – A canon and a sufficient number of pressures and risks are written. Canon makes sense, is specific to the project, and is related to pressures and risks identified. Pressures and risks that are listed are related to each other. A possible measure of ethical behavior is identified.

(Possible Points: 14)

The following standard point deductions also apply:

- Writing the Code from the perspective of the team (i.e. “our IPRO team will...”):
 - **0.5 point deducted from total score (once)**
- Writing the statements in the code about IIT, the IPRO Program, or students working on a project, rather than writing them about the problem context:
 - **0.5 point deducted from total score for each statement written this way**
- Faculty advisor not signing off on the Code within one week of submission to the IPRO Office for grading:
 - **2 points deducted from total score (once)**

Total Possible Points: 16

II. Examples of Pressures and Risks

A **pressure** is a force or influence that makes us want to act.

A **risk** is an action we might take in response to a specific *pressure* that is unethical, unlawful, or both.

Examples

Pressure: I’m running late for class.

Risk: I break the speed limit.

(Being late to class is a pressure; I want to arrive at class on time. In response to the pressure of being late to class, I choose to break the speed limit to try and get to class on time, which is an unethical/unlawful behavior.)

Pressure: We are running out of time to complete a product prototype.

Risk: We do not adequately test the product.

(An approaching deadline is a pressure; we want to meet our deadline. In response to the pressure of running out of time, we choose to cut corners on our testing and get the prototype done sooner, which is an unethical/unlawful behavior.)

Pressure: I need to find investors to contribute money to my startup business.

Risk: I lie to potential investors about my business.

(Needing money for my business is a pressure; I can't start my business without any money. In response to the pressure of needing money, I choose to lie to potential investors about how profitable my business is likely to be so that they will be more willing to contribute their money. This is an unethical/unlawful behavior.)

For questions or help with your team's Code of Ethics, please contact Elizabeth Howard (IPRO Graduate TA), ehoward3@iit.edu. I will be happy to provide early feedback for you if you send me your team's Code at least one week prior to the due date for submitting Codes of Ethics.

III. IPRO Code of Ethics Guidelines for CONTINUING Projects

Overview of the Assignment

- The assignment is to write a Code of Ethics **for the problem context of the multi-disciplinary project to which your team has been assigned**. The Code should describe the guiding principles for how a person should behave ethically with regard to this problem (the canons), the ways that a person might choose to act *unethically* (the risks), and the *reasons* why a person might choose to act that way (the pressures).
- **Continuing IPROs** (IPROs that were running during the Fall 2007 and/or Summer 2007 semesters) have the option of either **improving on the previous IPRO team's Code OR "starting from scratch" with a new code**. Either way, **the new Code must be distinct from all previously submitted Codes**. Requirements for making the Code distinct are detailed below.
- This Code should **not** be about your **school project**; you should write it as though you are a group of professionals working on this problem in the "real world." The Code **should not mention IIT or the IPRO Program at all**.
- The Code should be based on your required text, *The Seven Layers of Integrity* by Dr. June Ferrill. Each of the "seven layers of integrity" should be described in the Code you submit, according to the following **six (6) requirements**:

6. Overarching Standard

- The Code must have **one (1) overarching** standard that describes the **guiding principle** of the project and the **ethical behavior** of individuals working in the problem context. This principle should be specific to the problem context and should fit logically with the rest of the code.

7. Seven Canons

- The Code must have **seven (7) canons** describing the **standards of conduct** to which the individual or professional working in the problem context shall be held. Each canon should **clearly relate to one of the seven layers of integrity from the text**.
- If you write a canon for one of the seven layers, and you are not absolutely sure the relationship of your canon to that layer is clear, it is a good idea to provide a sentence or two explanation and a **reference to the text** to explain why you think your canon applies to that layer.

8. Pressures and Risks

For **each of your 7 canons**, you should support them with a minimum of either:

- **Two (2) pressures and one (1) risk or**
- **One (1) pressure and two (2) risks**
- **Pressures** must be directly related to the canon and accurately describe why someone might be tempted or pressured to act against the standards of behavior described in the canon.

- Each **risk** must be related to at least one of the pressures and should describe the unethical behavior that might result from that pressure.
- **At least two pressures, at least two risks, or at least one pressure and one risk should be COMPLETELY DIFFERENT from the pressures and risks included in the Fall 2007/Summer 2007 IPRO team's Code of Ethics.**
- **Examples of pressures and risks** are included on the last page of this document. Please refer to these examples to ensure that you have understood these concepts before writing your Code.

9. Measures

- **Each canon** must be supported by at least **one (1) measure of ethical behavior**. The "measure" should describe at least one way that individuals could tell if they and their team have behaved in accordance with the canon they have written.

10. Faculty Approval

- **The IPRO faculty advisor must sign off on the code of ethics** before submission of the Code to the IPRO office for grading. It is the IPRO faculty leader's responsibility to ensure that the submitted code of ethics is suited to the problem context of the IPRO problem assignment.

11. Improvement on the previous IPRO team's Code

- A continuing IPRO team may choose to improve on the previous IPRO team's Code, rather than "starting from scratch." Any team choosing to improve on the previous team's Code should **contact Elizabeth Howard (ehoward3@iit.edu) to obtain a copy of the previous team's graded feedback**. Any mistakes the previous team made should be corrected. **The requirement that the pressures and risks be new (see #3) still applies.**

IV. IPRO Code of Ethics Grading Criteria for CONTINUING Projects

Overarching Standard

Point Values:

- 0 – Nothing is written, or the **Overarching Standard** does not make sense.
- 1 – **Overarching Standard** is very general, does not line up with the rest of the code, or does not say anything about ethical behavior.
- 2 – **Overarching Standard** is specific to the project, fits with the rest of the code, and includes a relevant statement about ethical behavior.

(Possible Points: 2)

Seven Ethical Layers

Students should refer to the **Code of Ethics Grading Guidelines** for specific requirements for writing their canons, pressures, risks, and measures. Each of the seven canons will be graded according to the following point values:

- 0 – Nothing is written, or the canon does not make sense.
- 1 – A canon is written but is too general; canon does not line up with pressures and risks; pressures and risks are missing, insufficient, or unrelated to each other (or are not distinct from the previous IPRO team's Code); no possible measure of ethical behavior is identified.
- 2 – A canon and a sufficient number of pressures and risks are written. Canon makes sense, is specific to the project, and is related to pressures and risks identified. Pressures and risks that are listed are related to each other and are distinct from the previous IPRO team's Code. A possible measure of ethical behavior is identified.

(Possible Points: 14)

The following standard point deductions also apply:

- Writing the Code from the perspective of the team (i.e. “our IPRO team will...”):
 - **0.5 point deducted from total score (once)**
- Writing the statements in the code about IIT, the IPRO Program, or students working on a project, rather than writing them about the problem context:
 - **0.5 point deducted from total score for each statement written this way**
- Faculty advisor not signing off on the Code within one week of submission to the IPRO Office for grading:
 - **2 points deducted from total score (once)**

Total Possible Points: 16

V. Examples of Pressures and Risks

A **pressure** is a force or influence that makes us want to act.

A **risk** is an action we might take in response to a specific *pressure* that is unethical, unlawful, or both.

Examples

Pressure: I’m running late for class.

Risk: I break the speed limit.

(Being late to class is a pressure; I want to arrive at class on time. In response to the pressure of being late to class, I choose to break the speed limit to try and get to class on time, which is an unethical/unlawful behavior.)

Pressure: We are running out of time to complete a product prototype.

Risk: We do not adequately test the product.

(An approaching deadline is a pressure; we want to meet our deadline. In response to the pressure of running out of time, we choose to cut corners on our testing and get the prototype done sooner, which is an unethical/unlawful behavior.)

Pressure: I need to find investors to contribute money to my startup business.

Risk: I lie to potential investors about my business.

(Needing money for my business is a pressure; I can’t start my business without any money. In response to the pressure of needing money, I choose to lie to potential investors about how profitable my business is likely to be so that they will be more willing to contribute their money. This is an unethical/unlawful behavior.)

For questions or help with your team’s Code of Ethics, please contact Elizabeth Howard (IPRO Graduate TA), ehoward3@iit.edu. I will be happy to provide early feedback for you if you send me your team’s Code at least one week prior to the due date for submitting Codes of Ethics.

Appendix B. Examples from Rice of Good and Less Adequate Codes, with Comments from Evaluator

TEAM 2

Score: 15 out of 16 points

CODE OF ETHICS

***Overarching Principle:** Design and craft quality silk screens by operating our textile plant with integrity and the highest professional standards, acting as responsible stewards of our communities in both America and China, and adhering to all laws and regulations.*

1. Law

Canon: We will abide by the federal regulations of both the United States and China. We will not conduct business with any persons or organizations that we believe are engaging in illegal activities.

Measure: Number of violations filed against L.A Silks.

Pressure: Self-design the interior and features of our plant.

Risk: Omit features from the floor plan that violate U.S. safety regulations (i.e. failure to provide enough bathrooms, emergency exits, etc.).

Pressure: Being unfamiliar with Chinese management styles.

Risk: Fail to follow non-discriminatory employment policies, in particular, favoring Americans over Chinese for management positions at the plant.

2. Contracts

Canon: We will honor our contracts and be open with our partners and clients. We will write fair contracts that are clear, unambiguous, and free of omissions or deception and establish policies for gift acceptance and self-dealing.

Measure: Number of times L.A. Silks has been sued. Retention rate of current business partners and number of repeat clients.

Pressure: Make an informed decision although we do not have complete information from Gui Fen.

Risk: Write a contract without full information that may have clauses that both parties do not fully understand.

Pressure: Accept gifts from our Chinese business partners, since gift-giving is a common Chinese business practice.

Risk: Being unduly influenced by gifts.

Pressure: Meet the deadlines of a client on a particular project.

Risk: Falsify the documentation of the firm's production.

Pressure: Develop creative, innovative silk designs.

Risk: Violate our business partners' intellectual property rights.

3. Professional Codes

Canon: We fairly represent of the aims of our company by distinguishing between our personal convictions and professional duties.

Measure: Peer ratings by fellow professionals in the textile industry.

Pressure: To be asked by potential customers to provide information about our past and current clients.

Risk: Violate confidentiality agreements by disclosing information about our clients.

Pressure: Quickly turnaround an order for a client.

Risk: Disregard the health and safety of our workers to satisfy our client's demands.

Risk: Undermine the integrity of our product with poor quality control.

4. Industry Standards

Canon: We will conform to the guidelines set by the International Silk Association (ISA) to provide the highest quality products to the global marketplace.

Measure: Annual scorecard as determined by the International Silk Association.

Pressure: Minimize costs.

Risk: Use uncertified equipment and manufacturing processes.

Risk: Use raw materials unapproved by the ISA (i.e. synthetic silk).

5. Community

Canon: We protect the welfare of our community before advancing our own private interests. We are open and transparent with the general public.

Measure: Community approval rating.

Pressure: Have positive public image.

Risk: Misrepresent the environmental and community impact of our manufacturing to the community and its political leaders.

Pressure: Provide a safe environment for our workers who live in our factory.

Risk: Are overly restrictive in our living policies.

6. Personal Relations

Canon: All employees will be equitable, honest, and courteous to fellow co-workers and colleagues.

Measure: Rate of human resources incidents.

Pressure: Maintain status as a productive and efficient worker.

Risk: Criticize others to make yourself look better.

Pressure: Preserve friendships with fellow co-workers.

Risk: Treat employees unfairly by favoring friends in the company.

7. Moral Values

Canon: We advocate and value personal oaths, integrity, and diversity. We do not compromise our individual moral compasses.

Measure: Employee retention rate. High ranking as a “Top Firm to Work For.”

Pressure: Enter a business venture in a communist market.

Risk: Conflict with employees’ political beliefs.

Risk: Loss of employees because they choose to leave the firm.

Pressure: Maximize productivity.

Risk: Keep factory open seven days a week, which may conflict with religious beliefs.