Work in Progress - Evaluating the Decision Making Process that Individuals and Teams of Engineering Students Employ When Solving Ethical Dilemmas

Ewa Rudnicka, Mary Besterfield-Sacre, Larry Shuman and Harvey Wolfe
University of Pittsburgh, Industrial Engineering Department
Pittsburgh, PA 15261 rudnicka@pitt.edu, mbsacre@engr.pitt.edu, shuman@engr.pitt.edu, hwolfe@engr.pitt.edu

Abstract - Little empirical research has been focused on team based ethical decision making specific to engineering. With ABET’s criterion 3-f, engineering educators must now have a sound understanding of students’ knowledge about and approaches to solving ethical dilemmas. The research objectives of this funded research are: to investigate how groups of engineering students differ than individual engineering students when resolving problems involving ethical issues, to evaluate and describe approaches to solve problems ethical in nature, and to assess those variables that potentially affect the quality of the resolution and the quality of the decision process. Adopting two primary models from the literature: Jones’ Synthesis of Ethical Decision Making Model and the Harris, Pritchard, and Rabins (HPR) Model, the Conceptual Individual/Team Ethical Decision Making Model will be used in an experimental study involving both individuals and teams of engineering students solving ethical dilemmas. This Work-In-Progress paper describes the model and experiment that is currently underway.

Index Terms – engineering ethics, team ethical decision – making model.

INTRODUCTION

Engineers may have to deal with an ethical dilemma at some point during their careers. Although basic character and personality traits are formed by the time students enter college, educators have the responsibility of contributing to model).

I. Jones’ Synthesis of Ethical Decision Making Model

Integrating the various models developed by Ferrell and Gresham, Trevino, Hunt and Vitell, and Dubinsky and Loken, Jones [7]-[11] proposed an integrative model of ethical decision making, the Synthesis of Ethical Decision Making Model. The foundation of this “fused” model is based on his Issue Contingent Model (also 1991) that utilizes Rest’s four-stage process [12] and introduces the concept that ethical decisions are contingent upon factors that define the characteristics of an ethical dilemma. Jones collectively refers to these characteristics of moral issue as ‘moral intensity’.

the moral development of their students [1]. In Gilligan’s words, “moral development in the college years thus centers on the shift from moral ideology to ethical responsibility” [2].

The NSPE and the ABET have strongly endorsed the teaching of ethics in engineering. Criterion 3-f asserts that “engineering programs must demonstrate that their graduates have…an understanding of professional and ethical responsibility” [3]. Pfatteicher [4] suggests that engineering educators should be documenting and assessing students’ knowledge approaches or processes to solve ethical dilemmas not their actual behavior. Understanding why and how individuals and groups make ethical decisions in an engineering context will help to improve the ethical decisions made in an organizational and professional context.

CONCEPTUAL INDIVIDUAL/TEAM ETHICAL DECISION-MAKING MODEL FOR ENGINEERING

There are two types of models involving ethical judgments. Descriptive models are based on the cognitive processes individuals use in making decisions, describe ethical behavior that actually occurs in the organization and identify variables that actually influence ethical decision making. In contrast, normative models often assume absolute truths about appropriate decision making and address behavior that should follow. Two primary models have been adopted for this research: Jones’ Synthesis of Ethical Decision Making model [5] (a positive model) and the Harris, Pritchard and Rabins model [6] widely used in engineering education (a normative

II. Harris, Pritchard and Rabins (HPR) Model

The HPR model [13] is the most widely used and comprehensive model for ethical engineering decision making. The procedure in the HPR model is general; therefore, it is not limited to a particular situation, a potential downfall of other normative models. Searing [14] further designates the original model to HARPS Ethical Analysis Methodology. Four phases comprise the method: information, issues, analysis, and conclusion.
III. Conceptual Individual/Team Ethical Decision Making Model for Engineering

For the purpose of this research we combined the positive Jones model and the normative HPR model to create a Conceptual Model of Individual/Team Ethical Decision Making in Engineering for studying both individuals and teams of engineering students. The conceptual model was enhanced with five categories of factors influencing the decision making process and include those from the business literature review as provided initially, as well as factors the author proposes. The various “factors” that contribute to ethical decision making, as cited by literature are grouped into five categories: problem characteristics, individual attributes, personal environment, team characteristics, and professional/legal environment. With the exception of “Team Characteristics,” these categories have been previously defined by the literature.

In addition, the Individual Attributes in the conceptual model have been further categorized by the author along seven sub-groups: (1) level of moral development, (2) view of self, (3) view of self versus the peer environment/organization, (4) one’s religious moral values, (5) one’s knowledge, (6) one’s ethical behavior/ responsibility for consequences, and (7) one’s demographics.

THE EXPERIMENT

To evaluate the research questions, an experiment is being conducted to evaluate the proposed conceptual model. The experiment involves both teams of engineering students and individuals solving engineering based ethical dilemmas. Further, half of the participants have had a course in engineering ethics; and the other half will have had no formal training in engineering ethical decision making. Both the teams and individuals are being videotaped while they complete their assigned tasks. This allows the researcher to observe and assess the processes that teams and individuals make while solving the ethical dilemmas.

In addition to resolving the ethical dilemmas, participants will be asked to take a number of instruments that have been developed and used in previous studies. These instruments include Defining Issues Test (DIT), Ethical Self-Efficacy Test, Demographic Survey, and the Professional Developer™. To study the “processes” that engineering students use, the rubric proposed by Shuman et. al. [15] will be used.

REFERENCES

[14] www.taknosys.com (09.29.00)
Figure 1. Conceptual Individual/Team Ethical Decision Making Model