

GIFT: The Influence of Stakeholders in Ethical Decision Making

Mrs. Natalie C.T. Van Tyne P.E., Virginia Polytechnic Institute and State University

Natalie Van Tyne is an Associate Professor of Practice at Virginia Polytechnic Institute and State University, where she teaches first year engineering design as a foundation courses for Virginia Tech's undergraduate engineering degree programs. She holds bachelors and masters degrees from Rutgers University, Lehigh University and Colorado School of Mines, and studies best practices in pedagogy, learning strategies, reflective learning and critical thinking as aids to enhanced student learning.

GIFT: The Influence of Stakeholders in Ethical Decision Making

This is a Great Idea for Teachers (GIFT). Students in first-year engineering design courses recognize that the purpose of their design is to solve a problem or meet a need for a new product or process. Therefore, their end user is a major stakeholder for their design. In design courses, the end user is not the only stakeholder, and that the views of everyone who could be impacted by the new product or process should be addressed by the design and its implementation or manufacture.

Stakeholder interests often extend beyond the technical domain and involve broader societal impacts. Conflicts in interests and motives among stakeholders make ill-structured and incompletely defined societal problems perplexing at best. Where are the solutions that used to be conveniently found in the back of a textbook? Instead, students need to develop a problem solving process, based on the design model consisting of defining the problem, investigating its causes, conditions and constraints, brainstorming alternative solutions, and testing these solutions in view of problem specifications arising from causes, conditions and constraints in order to determine the optimal solution.

Stakeholder interests often become part of product or process specifications; therefore, a similar problem solving process can be applied to the resolution of an ethical dilemma in engineering. An ethics-based exercise helps students to identify stakeholder interests and apply them to the resolution of an ill-structured problem taken from the engineering workplace. The example ethics case study used as an example, involving a hypothetical software design firm called Occidental Engineering. Stakeholders from both inside and outside the company were used to define the problem in greater detail by providing additional specifications for its resolution. Students worked in teams, in class, to represent certain stakeholders and recommend a solution based on that stakeholder's position, as they perceived it.

This GIFT includes a table, on the next page, in which students can describe solutions to an ethical dilemma, as expressed by various stakeholders. An example stakeholder group for the Occidental Engineering case study is also attached. A variation of this exercise can also be used by applying one or more ethical frameworks, such as Deontology, Virtue Ethics, Consequentialism or Utilitarianism. Other frameworks can be used instead. Would a stakeholder's response change under a particular framework?

This exercise can be given either in class or as a homework assignment. If used as a homework assignment, students can also share their results with the rest of the class after submitting their responses. Class discussion might reveal how a particular stakeholder's recommendation might change according to the framework applied, or how their recommendation might be so strongly driven by their own interests that their recommendation would not change, no matter which framework is applied.

Stakeholders' Recommendations Template for Ethical Decision Making in Engineering Ethics Case Studies

Note: this page is expandable. Include as many different stakeholders as possible.

<i>Stakeholder</i>	<i>Stakeholder's Position, Interests and Motives</i>	<i>Recommendations to Solve the Ethical Problem</i>
Who is affected by the decision?	<i>What could affect or bias the stakeholder's recommendation?</i>	<i>What does this stakeholder think that the decision maker should do?</i>
Your Own Position	<i>What are your own interests and motives with respect to the subject matter of this case?</i>	<i>Given all of the stakeholders' recommendations, what would you recommend to the decision maker?</i>

Example Stakeholder Table for Use with Occidental Engineering Case Study

<i>Stakeholder</i>	<i>Stakeholder's Position, Interests and Motives</i>	<i>Recommendations to Solve the Ethical Problem</i>
Frequent Air Traveler	You are a frequent traveler for both work and pleasure. You usually fly with major airlines from main airports; however, you occasionally travel short distances which require flights to and from small, local airports—including the one where the FAA would perform live tests of Occidental's software.	
Air Traffic Controller	You are an air traffic controller with over 20 years in this profession working in several high-pressure, high-profile airports. Last year you decided to relocate to an area with a small airport, where you can utilize your extensive experience without the stressful environment of major airports. This is the airport where the FAA would perform live tests of Occidental's software.	
Senior Engineer at Occidental	You have worked at Occidental Engineering for 18 years. You are well established at this firm and have progressed to a comfortable and respected position in the Aerospace Division. While there is only five years until you are eligible for a generous retirement package, your job is vulnerable due to recent financial cutbacks, and the fact that you are one of the highest paid employees in your division, in view of your knowledge and experience.	
Wayne Davidson's Supervisor (Deborah)	You are a project manager in the Aerospace Division of Occidental Engineering. You have worked at this firm for 9 years and devoted much of your time and energy to its success. Only a few people in the firm know that the idea to low-ball the bid for this project was yours. You assured those people that this was a golden opportunity for the company and that you would make sure that the project was successful. You have developed many close relationships with other employees. Some of them are your friends with whom you spend time outside of work and whose families you have come to care for as well. Their jobs, along with your job and reputation, are intimately connected to the success of this project.	
Owner/Founder of Occidental Engineering	You started the company with your partners approximately 20 years ago and grew the business from its small and local beginnings to the massive firm that it is today. You could easily retire but choose to maintain a role in the firm. You are proud of this respectable and successful business.	
Junior Engineer at Occidental Engineering	You are a junior engineer at Occidental Engineering. You were hired 6 months ago after a grueling job search. Having recently graduated from a highly prestigious engineering university, you approach the engineering field with enthusiasm and moral vigor. You want the world to be a better place for all people, especially for your family.	
Spouse of the Junior Engineer	You are the spouse of a junior engineer at Occidental Engineering. Both of you are young and ambitious, but you have decided to put your career on hold in order to take care of your new baby. Your spouse works in the Aerospace Division of the firm, but is not working directly on the Operation Safe Skies project. You are happy that your spouse was recently hired for this job, but the salary is just barely enough to support your family.	
Local Resident and Amateur Pilot	You live in house located near the small airport where you keep your own Cessna airplane and where the FAA would be testing Occidental's software. Due to your busy work and family schedule, you have not had much opportunity lately to fly your plane. However, your house is located on the flight path of many of the planes exiting/entering the airport and the sound of them reminds you of how much you love flying and fuels your desire to get back into the air. You are planning a number of day trips in the near future.	
Your Own Position	Given all of the stakeholders' recommendations, what would you recommend to Wayne Davidson?	

Note: my thanks to Melanie Brandt, Colorado School of Mines, for these example stakeholder descriptions