Teaching the Art of Act-Utilitarianism: Ethical Decision Making in the Design Stage

Hamid Khan
Our Lady of the Lake University
Graduate School of Business Administration

Abstract-- Students in an engineering design and ethics class started with the testing of a student's "cynicism quotient" of engineering business practice. Then they were tested with an Myers-Briggs Type Indicator (MBTI) instrument for their perceptual validation.

After examining some design failures and ethical dilemma cases in the semester, the students felt that they have learned something of importance— economics, morality, virtue ethics, Kantian theory, Deontological theory and Teleological theory. They, then, evaluated their own professional competence using theories of "ethics and the individual," "ethics and the technical manager," "ethics and the organization," and ethics of the global business. Then they tested different theories of "ethical displacements" as it worked in different levels: individual, department, organization, and industry levels.

In this paper we are going to show significant improvement in student attitudes and ethical understanding through philosophical examination of a business case study. We will take formal measures of student attitudes before and after modular interventions.

Assessing Student Attitudes toward Business

An integrated concept in ethics was discussed for student's individual and professional development of business ethics. Students exposed to such ethics courses with stimulating ethics cases faced hard questions to answer, when placed in an ethical dilemma. They learned one thing important: "Deciding what's right: a prescriptive approach." The outline of the class discussion will be presented in thirteen ethics development modules and they will be integrated by a comprehensive case study to address the ethical dilemma of engineers and managers faced at the very design implementation stage. Under condition of simulated input via a case study, their behavioral reactions will be monitored.

With the introduction of a Business Cynicism questionnaire at the outset it was expected that students would be ready to experience business ethics and practices and they would learn ethical constructs in the following domains: financial gain and profit motive, ethical standards in business, financially successful business, relevance of moral values, rules of business, and the

game of business, the act-utilitarianism, and the rule-utilitarianism. The students were given the following business cynicism pretest and posttest in the duration of the semester.

Business Cynicism Quotient Questionnaire-- Pretest

Answer the following questions as honestly as you can. Circle the number between 1 and 5 that best represents your own beliefs about business. The class averages are in red.

	Strongly disagree				Strongly agree
1. Financial gain is all that counts in business.	1	**2**	3	4	5
2. Ethical standards must be compromised in business practices.	1	2	3	**4**	5
3. The more financially successful the business person, the more unethical the behavior.	1	2	**3**	4	5
4. Moral values are irrelevant in business.	1	**2**	3	4	5
5. The business world has its own rules.	1	2	3	4	**5**
6. Business persons care only about making profit.	1	**2**	3	4	5
7. Business is like a game one plays is to win.	1	2	3	4	**5**
8. In business, people will do anything to further their own interest.	1	2	3	4	**5**
9. Competition forces business managers to resort to shady practices.	1	2	3	**4**	5
10. The profit motive pressures managers to compromise their ethical concerns.	1	2	3	4	**5**

Table 1 Student pretest responses of ethical cynicism quotient

Then the students were given the Ford Pinto Case ***before*** any theories of ethics were discussed.

In the beginning of a senior business ethics class, students were given an ethical cynicism test. The class was pretty cynical, to say the least. The average cynical measure was 37 out of a maximum of 50. Six out of ten elements of ethics were on the most cynical side. Students at this stage did not know how business ethics works. At least majority of them had a very strong sense of personal moral ethics- the unspoiled ethics. The students were advised that learning to make ethical decision making in the business setting will require them to learn many dimensions of ethics from a theoretical standpoint and then apply them selectively in the world of business using design and product safety, marketing advertising, utilitarianism, Kantian ethics, rights and value, justice and the market system, concept of whistle blowing, trade secrets and the conflict of interest, construct of privacy, health and safety, and ethics in finance.

Before the case was discussed, the class took an MBTI typology test to determine their approximate orientation toward judging category. 22% were judging type.

HUMANMETRICS OF THE ETHICS CLASS

Jung-Typology **Pre-Test** Averages of the class

INTJ

Introverted	Intuitive	Thinking	Judging
Strength of the preferences %			
56	11	11	22

Table 2 Student pretest responses of MBTI personalities aggregate

Qualitative analysis of class type formula:

- **Moderately expressed introvert personalities**
- **Slightly expressed intuitive personalities**
- **Slightly expressed thinking personalities**
- **Slightly expressed judging personalities**

Cost benefit analyses: Ford Pinto Design

Adapted from Boatright [1] "In the late 1960s, American automakers were faced with serious competition from German and Japanese firms in the subcompact market. Some Detroit executives felt that they should concentrate on medium-size and larger models and let foreign competitors with their lower costs have the small car market. Others argued that the sub compact market was potentially lucrative and should be pursued. Ford, whose market position had eroded, opted for the later strategy, and in 1968 it decided to produce the Pinto.

Although production planning for the new model normally takes about 3 1/2 years, Ford decided to try to move from conception to production in two years; it wanted the Pinto ready for 1971 model year. In normal time frame, design changes and quality assurance standards are in place largely before production line tooling. But tooling requires about a year and a half, and hence, in the case of Pinto, tooling and product development overlapped considerably.

Prior to production of the Pinto, Ford crash-tested 11 Pintos as part of its quality assurance program. The tests were conducted in part with an eye to Federal Motor Vehicle Safety Standards 301, which was proposed for adoption by National Highway Traffic Safety Administration (NHTSA) in 1968. Standard 301 proposed that all autos be required to withstand a fixed-barrier impact of 20 mph without loss of fuel. Of Ford's 11 tests, conducted at an average impact speed of 31 mph, only three autos passed with unbroken fuel tanks. None of eight standard-designed Pintos passed. In one successful test a plastic baffle was placed between the front of the gas tank and the differential housing. In a second successful test, a piece of steel was placed between the tank and rear bumper. The third successful test was of a Pinto with a rubber-lined gas tank.

Ford decided to go ahead with this gas tank design, and not alter the tank in light of its crash tests. It did so for several reasons. First, cost-benefit analysis, as detailed in a Ford memorandum titled "fatalities associated with crash induced fuel leakage and fires," suggested that there was no advantages in upgrading the Pinto's fuel tank. In the early 1970s, NHTSA decided that cost-benefit analysis was an appropriate basis for safety design standards. To make such an analysis some specific value had to me placed on human life, and NHTSA decided on a figure of $200,725 as the estimated cost to society every time a person is killed in an auto accident:

Future productivity losses

Direct	$132,000
Indirect	41,300
Medical costs	
hospital	700
other	425
property damage	1,500
Insurance Administration	4,700
Legal and Court	3,000
Employ losses	1000
Victims pain and suffering	10,000
funeral	900
assets (lost consumption)	5,000
miscellaneous accident costs	200
total per fatality	200,725

Using NHTSA's data, Ford calculated costs and benefits by considering the variables of lives saved by product redesign and the cost of the product. For example a Ford internal

memorandum gives the following calculation of an $11 gas tank improvement, which was estimated to save 180 lives.

Benefits
Savings: 180 burn deaths, 180 serious burn injuries, 2100 burn vehicles
Unit cost: $200,000 per death, $67,000 per injury, $700 per vehicle
Total Benefit: 180 * 200,000 + 180 * 67,000 + 2100 * 700 = 49.5 million.

Costs
Sales: 11 million cars, 1.5 million light trucks
Unit cost: $11 per car, $11 per track
Total cost: 12,500,000 * 11 =137 million.

Since the costs of the $11 safety improvement outweighed its benefits, Ford maintained they were not justified in making the improvement.

A second factor in Ford's decision was that the Pinto did meet all Federal Auto Safety Standards set at the time. NH.TSA standard 301 was only a proposed rule. It was strenuously opposed by the auto industry, and was only adopted in 1977. Furthermore Ford's Pinto tests were at an average speed of 31 mph-considerably over the 20 mph speed proposed in Standard 301.

A third factor was that Ford had to cut costs to be competitive. Ford wanted the Pinto to weigh less than 2000 pounds and cost less than $2000. ("The limits of 2000.") It felt that control of both variables was necessary to compete against Volkswagen and the Japanese imports. Within the scope of the law it had to control both weight and cost.

A fourth factor in Ford's decision was the belief that Americans were not primarily interested in safety. As Lee Iacocca was fond of saying, "Safety doesn't sell."

A fifth factor was that Ford had experimented with other gas tank designs but had ruled them out for various reasons. For example the tank could be placed over the rear axle and differential housing, as in Ford Capri. This design had been successful over 50 crash tests at speeds up to 60 mph. The problem with the Pinto, however, was that this sort of placement drastically reduced its already scanty trunk space. Variables such as trunk space, as well as safety, had to be taking into consideration

A sixth factor was undoubtedly Ford's tight production schedule. When crash tests revealed the gas tank problem, production tooling was already underway. A redesign and retooling would have been expensive.

From 1968 until its adoption by NHTSA in 1977, Ford opposed Standard 301. Studies showed that 400,000 autos burned every year, that 3,000 people were burned to death in autos every year, and that 40 percent of auto-burn deaths could be prevented by adoption of Standard 301. The Pinto now has a rupture-proof fuel tank that meets the standard.

Reactions to the Pinto case have been very divergent. An industry spokesman said, "We have to make cost benefit analyses all the time. That's part of the business. Everyone knows that some people will die in auto accidents, but people do accept the risks and they do want us to hold down costs. We could build an absolutely safe car but nobody could afford it." A Pinto critic said, "One wonders how long the Ford Motor Company would continue to market lethal cars, were Henry Ford II and Lee Iacocca serving twenty-year terms in Leavenworth for consumer homicide."

Outline of the course module for the following analysis can be seen at Appendix A.

Class Analysis and Discussion

- In your opinion, is cost benefit analysis the appropriate basis for safety design standards?
- Why or why not?
- If not, what other factors should be considered?
- Discuss NHTSA's figures regarding the estimated costs of an auto fatality. Is it justified?
- Analyze each factor in Ford's decision not to implement the $11 gas tank improvement.
- Do the reasons (individually or together) provide an adequate justification for Ford's decision?
- Discuss the moral basis of Ford's opposition to NHTSA standard 301. .

Guidelines to Comprehensive Discussion and Presentation

1. Introduction: What are the facts in this case? Summarize neatly.
2. Issues: What are the ethical issues that need to be addressed on:
   a. An individual level? b. An Organizational level? c. A societal level?
3. Evaluate each alternative according to Teleological Theory (Act and Rule Utilitarianism)
4. Evaluate each alternative according to Deontological Theory (Act and Rule Non- consequentialism)
5. Evaluate how each significant group (company, society, special interest group) perceives each alternative for itself.
6. Choose an alternative to apply and forcefully justify your decision, which will (evidently) affect the above groups.
7. Envision and develop a strategy to overcome any possible negative thrust/feedback by these groups.
8. Summarize what you have learned as a change agent. And what do you profess to the society at large regarding this scourge or dilemma.

In order to support a healthy discussion in the class, the students were given lectures on thirteen modules as seen in the appendix A. The effectiveness of these modules was tested with student opinions as shown in Appendix B, with a rating of 1-10, ten being the highest impact on student. The student opinion of module contents, and effectiveness of the case discussion, it is presumed, had a positive impact on the ethical perceptions. That is the indication why the MBTI scores on judgmental orientation changed from INTJ to INFJ—from thinking to feeling perspective. The class also took positions on ethical conduct and they are shown by way of a statement which

agrees with the prominent beliefs and assertions of ethics practitioners and scholars, as the case had been tested in the courts. It is conducive to see that these class opinions are in tune with the major court rulings. With more training in the class, these outcomes are going to be congruent.

Business Cynicism Quotient Questionnaire-- Posttest

Answer the following questions as honestly as you can. Circle the number between 1 and 5 that best represents your own beliefs about business. The class averages are in pink.

	Strongly disagree				**Strongly agree**
1. Financial gain is all that counts in business.	**1**	2	3	4	5
2. Ethical standards must be compromised in business practices.	1	**2**	3	4	5
3. The more financially successful the business person, the more unethical the behavior.	1	2	**3**	4	5
4. Moral values are irrelevant in business.	1	**2**	3	4	5
5. The business world has its own rules.	1	**2**	3	4	5
6. Business persons care only about making profit.	1	2	**3**	4	5
7. Business is like a game one plays is to win.	1	**2**	3	4	5
8. In business, people will do anything to further their own interest.	1	**2**	3	4	5
9. Competition forces business managers to resort to shady practices.	1	**2**	3	4	5
10. The profit motive pressures managers to compromise their ethical concerns.	1	**2**	3	4	5

Table 2 Student posttest responses of ethical cynicism quotient

Students were given an ethical cynicism test at the end of reflection in action. The class was pretty non-cynical. The average posttest cynical measure was 21 out of a maximum of 50.

Although statistical analysis could not be conducted due to paucity of time, the score is fairly significant, intuitively speaking. Ten out of ten elements of ethics were on the non-cynical side. The students learned to make ethical decision making in the business setting by learning many dimensions of ethics from a theoretical standpoint and then applied them selectively in the world of business using design and product safety, marketing advertising, utilitarianism, Kantian ethics, rights and value, justice and the market system, concept of whistle blowing, trade secrets and the conflict of interest, construct of privacy, health and safety, ethics in finance.

HUMANMETRICS OF THE ETHICS CLASS

Jung-Typology **Post-Test** Averages of the class

INFJ

Introverted	Intuitive	Feeling	Judging
Strength of the preferences %			
33	56	10	1

Table 2 Student posttest responses of MBTI personalities aggregate

Qualitative analysis of class type formula:

- **Moderately expressed introvert personalities**
- **Moderately expressed intuitive personalities**
- **Slightly expressed feeling personalities**
- **Slightly expressed judging personalities**

It can be seen from posttest to pretest comparison of the class that students tended to be more reserved in being impulsively judgmental at the first opportunity and offered to make reasonably sound moral, ethical, and legal considerations before making a decision. There has been marked change in the average MBTI scores from Pretest to Posttest as seen below.

From "Moderately expressed introvert personalities 56%" → to "Moderately expressed introvert personalities 33%"
From "Slightly expressed intuitive personalities 11%" → to "Moderately expressed intuitive personalities 56%"
From Slightly expressed thinking personalities 11%" → to "Slightly expressed feeling personalities 10%"
From Slightly expressed judging personalities 22%" → to "Slightly expressed judging personalities 1%"

Emergence of Four Essential Ethical Positions

1. Class Position--critique of Utilitarianism (and cost-benefit analysis)

"In order for the cost benefit calculations to be performed the way they are supposed to be, all costs and benefits must be expressed in a common measure, typically dollars, including things not commonly bought and sold in the markets, and to which dollar prices are therefore not attached. The most dramatic example of such things is human life itself." [2] (Kelman: The American Enterprise Institute of Public Policy Research, Washington DC.)

2. Class Position -- in favor of Utilitarianism (and cost benefit analysis)

"We disagree (and in doing so, we speak for ourselves, not for the federal trade commission, or its staff). Cost benefit analysis is not a means for judging private decisions. It is a guide for decision making involving others, especially when the welfare of many individuals must be balanced. It is designed to dictate individual values, but to take them into account when decisions must be made collectively. Its use is grounded in the principle that, in a democracy, government must act as an agent of the citizens." [3] (Butters G., Johan Calfee, and Pauline Ippolito. *Defending the Cost Benefit Analysis: Replies to Steven Kelman* The American Enterprise Institute of Public Policy Research, Washington DC.)

3. Class Position – conditionally and moderately in favor of Whistle Blowing

"In addition to doing their jobs, engineers can plausibly be said to have an obligation of loyalty to their employers, and firms have a right to a certain amount of confidentiality concerning their internal operations. At the same time engineers are required by their professional ethical codes to hold the safety of the public paramount. Where these obligations conflict, the need for and justification of whistle blowing arises." [4] (De George, R. *Ethical Responsibilities of Engineers in Large Corporation: The Pinto Case* The American Enterprise Institute of Public Policy Research, Washington DC.)

4. Class Position – strongly in favor of Whistle Blowing

"The Ford Pinto case is a good example to use to try out this approach to whistle blowing. The principle which informs this position is: if it is in our power to prevent something bad from happening without thereby sacrificing anything of comparable moral significance, then we aught to do it. Did the Ford engineers know that something "bad" was likely to happen? … They were involved in producing a harmful product; i.e., they were involved in allowing others to be harmed." [5] (Birsch, D: *A study in ethics, technology and society, SUNY press, 1992)*

Acknowledgment

The author wants to acknowledge the effect of positive reviews made by the reviewers. Almost all the comments were critically evaluated and implemented. Since the evaluation of business ethics teaching is so rare, a qualitative analysis of the results have been undertaken to see the impact of modular and case methods. A statistical treatment has been envisioned for the future to

comprehensively study the long term impact of interventions when more time and resources are made available.

References

1. BOATRIGHT, J. (2003) Ethics and the conduct of Business. Prentice Hall, Upper Saddle River.

2. KELMAN, S. (1994) *Cost Benefit Analysis: An Ethical Critique* in The Ford Pinto Case --A Study in Applied Ethics, Business and technology, Donald Birsch and John Fielder editors.

3. BUTTERS G., Johan Calfee, and Pauline Ippolito. (1994) *Defending the Cost Benefit Analysis: Replies to Steven Kelman* in The Ford Pinto Case --A Study in Applied Ethics, Business and technology, Donald Birsch and John Fielder editors.

4. DE GEORGE, R. (1994) *Ethical Responsibilities of Engineers in Large Corporation: The Pinto Case* in The Ford Pinto Case --A Study in Applied Ethics, Business and technology, Donald Birsch and John Fielder editors.

5. BIRSCH, D. (1994) *Whistle Blowing, Ethical Obligations and the Ford Pinto Case* in The Ford Pinto Case --A Study in Applied Ethics, Business and technology, Donald Birsch and John Fielder editors.

HAMID KHAN

HAMID KHAN is an Associate Professor of Management at the Graduate School of Business Administration of Our Lady of the Lake University. He teaches Organizational Behavior, Human Resources Management, Business Ethics Models, and Management Development in the MBA curriculum and in the Executive MBA programs. His research interest has been in the field of Management Development of Engineers and Technology Managers. Hamid has a BS in Mechanical Engineering, MS in Industrial and Management Systems Engineering, MBA in Management, and a Doctorate in Education. He has contributed about thirty five refereed papers to American Society for Engineering Education and Frontiers in Education conferences and chaired technical sessions. He has published and has been reviewer of the Journals of Engineering and Engineering Technology. Dr. Khan is a Registered Professional Engineer in the State of Texas since 1985, and has offered every year, his professional services to TAC of ABET program evaluation for strengthening engineering technology curricula and personnel.

Appendix A

Outline of Modules and Class Lectures

1. Business activity as a distinctive economic character. Business strives to apply economic relationships to buyer and seller. Ethics in business is only the economic relationships. One lecture.

2. Business activity takes place in (very large) impersonal organizations and, under a system of hierarchy people tend to make imbalanced and impersonal decisions. One lecture.

3. Ethical levels of decision-making: decision-making occurs in individual, organizational and business system level. Yet people are accountable. One lecture provided on ethical displacement theory (i.e., decision being made at a higher level than where the problem exists).

4. Moral, Economic and Integrated concepts of justification. One lecture.

- Business has a purely moral point of view
- Business has integrated ethics with economics
- Business has integrated ethics with law
- Business has integrated ethics with management

5. Teleological Theories emphasize, "The rightness of an action is determined solely by its consequences." One lecture.

6. Deontological Theories "Ignore the consequences of actions and focus on the nature of the actions." One lecture.

7. Classical Utilitarianism says that the "action is right if it produces greatest balance of pleasure over pain for everyone." **Problems arise while calculating utility of pain and pleasure.** One lecture.

8. Act- Utilitarianism, which evaluates the rightness of any given act by the consequences of that act. One Lecture.

9. Rule-utilitarianism determines the rightness of the act using relevant rules of morality. (piety, honesty, reciprocity, obligation, sincerity) One lecture.

10. Cost-benefit analysis: It expects precise quantitative application of cost and benefits. Problem of assigning monetary value emerges as the greatest bottleneck. The question is, "Should all things be assigned a monetary value?" One lecture on cost benefit analysis.

11. Kantian Ethics, Rights and Virtue. One lecture.

- **Categorical imperative is the fundamental principle of morality.** Act only in the spirit of the maxim by which you will that it should become a universal law.
- **The Concept of rights—**in safety and public policy, such as the right of all persons to receive food, clothing and medical care
- **Application of Virtue ethics;** (benevolence, compassion, courage, courtesy, dependability, friendliness, fidelity, honesty, loyalty, moderation, self-control, and tolerance)
- **Virtue ethics in business—** "Happiness is the end of life," as propagated by Aristotle and business products or services must promote this precept.

12. Justice and the market system. One lecture.

- Aristotle's principle of proportionate equality. Is proportional equality good?
- John Mill's theory of justice based on utility. Discussed South Africa's AIDS case. "All persons possess a presumptive right to equal treatment unless the inequalities are justified by social need."
- John Rawls egalitarian theory of justice: Using the veil of ignorance students are to choose the principle of justice e.g., The principle of equal liberty, The difference principle, and The principle of equal opportunity.
- Utility and the Market System: Adam Smith's invisible hand argument to promote an end (welfare society) ***without causing externalities. (This was emphasized for the Pinto Case)***
- Robert Nozick's libertarian entitlement theory. Emphasizes individual liberty free from the interference from powerful others in the free market system.

12. Whistle blowing, and responsibility of a whistle blower

- Justification of whistle-blowing in the case of a dangerously defective design?
- Is there a right of an employee (an engineer, designer, production specialist or manager) to blow the whistle when he or she feels the civic responsibility, as in this case of Pinto's internal memorandum on crash tests?

13. Marketing advertising and Product Safety

- Ethical issues in marketing – "The limits of 2000?"
- Consumerism and the marketing concept
- Persuasion and behavior control/deceptive design and marketing
- Theories of product liability/ due care theory/contractual theory/ strict liability

Appendix B

Assessment of Module's impact on student's thought process for making ethical judgment.

	Impact on Ethical Judgment Minimum 1 2 3 4 5 6 7 8 9 10 Maximum
1. Business activity as a distinctive economic character.	3
2. Business activity in impersonal organizations	2
3. Ethical levels of decision-making	5
4. Moral, Economic and Integrated concepts of justification.	5
5. Teleological Theories	5
6. Deontological Theories	8
7. Classical Utilitarianism	5
8. Act- Utilitarianism	8
9. Rule-utilitarianism	5
10. Cost-benefit analysis	2
11. Kantian Ethics, Rights and Virtue	8
12. Justice and the market system	5
13. Whistle blowing, and responsibility of a whistle blower	7
14. Marketing advertising and Product Safety	8