Integrating Ethics into a Project Management Course

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ABSTRACT

In today's increasingly technical society, constant pressure exists to provide the engineering student with a comprehensive four-year curriculum that devotes sufficient attention to the traditional disciplines of the profession while at the same time anticipates areas of developing interest. As if this continued monitoring and refinement of the technical curriculum were not enough, because of the frequently competing demands placed on the new engineer in the world of commerce and government, attention must also be paid in the course curriculum to the development of non-technical skills. These non-technical skills must include not only those required to make the engineer more comfortable in the areas of sophisticated written and oral communication but should also strive to have the engineer openly and confidently evaluate ideas and products with an eye to the overall ethics of any given situation. In the era of brutal international competition, many product-producing companies have compromised ethical considerations so that, at any critical juncture in decision-making, the paramount question to be answered by the engineer has become "Is it legal?" as opposed to "Is it ethical?" This paper describes an approach to provide students in a Project Management course with the knowledge of a worldwide ethic and how to apply that ethic in engineering projects.

INTRODUCTION

There is constant pressure to provide a four-year engineering curriculum with the breadth of knowledge students require as a basis for a successful career. In order to develop the non-technical skills required for success (and required by ABET) along with an increasing technical requirement, it has been necessary to integrate the non-technical knowledge and skills development into our technical curriculum.

The vast majority of the early and present day contributions in the ethics area emanate from civil engineering, chemical engineering and bioengineering. Not surprisingly, these fields can and do have significant impact on the quality and sacredness of human life. Unfortunately, the vast majority of the contribution to engineering ethics addresses the engineer only as a designer affecting the sacredness of human life. In the era of brutal international competition, however, many "lean" product-producing companies have expanded the role of project manager to include functions that were previously considered outside of the typical engineering functions. In addition, many companies have compromised ethical considerations so that, at any critical juncture in decision-making, the paramount question to be answered by the engineer has become "Is it legal?" as opposed to "Is it ethical?" Instead of confronting the ethical dilemmas directly,

today's engineer, with an expanded role in the corporate organization, now looks implicitly to other disciplines (management, finance, law) for guidance and, at times, to convince oneself that there are "acceptable" reasons for giving less than full consideration to potential ethical concerns when planning projects, managing human resources, and specifying products.

This paper describes an approach to integrating ethics into a Project Management course. First, the paper outlines the expanded responsibilities of today's Project Manager as it is taught in a Project Management course. Then, an engaging approach to introducing ethics at the beginning of the course and developing the ethical concepts into a "capstone" discussion of a global ethic is described. As the course progresses through the Project Management outline, adding depth to each responsibility of the Project Manager, this paper identifies some selected case studies that not only lend themselves to the application of a Project Management function but also contain ethical considerations whenever possible. Also, whenever appropriate, case studies are selected from current events in order to reinforce the value of the application project management and ethics knowledge to the real world.

PROJECT MANAGEMENT COURSE CONTENT

Project Management is a critical function, particularly in the product-producing sector. This is one of the few functions that, if done well, can make a good project a great one and, if not done well, can cause what could be a great project to fail miserably. To add even more responsibility to the project manager, many companies in our lean global economy either include the role of personnel manager into the Project Manager function or combine the project management, personnel management and technology management roles into an Engineering Management function. With minor differences among various texts [1,2], the role of project manager has been further expanded to include the following nine responsibilities:

1. Problem Identification - is the genesis for a project where either a problem or an opportunity is identified and assigned to the project manager to evaluate.
2. Project Definition – further defines the problem by creating a Concept Specification with sufficient detail to create a Project Plan
3. Project Planning – is the most critical responsibility of the project manager. The project plan incorporates a complete functional specification; a detailed schedule documenting the time required for each task, the resources required to perform the task, and when the task is to be performed in relation to other tasks; a cost estimate of the personnel and materials required to complete the project; and finally a financial analysis. Each component of the Project Plan is individually addressed and developed further in the course:
   a. Functional Specification
   b. Task identification (Work Breakdown Structure)
   c. Risk analysis
   d. Personnel allocation into a Cross Functional Team
   e. Detailed time estimation for each task
   f. Schedule creation reflecting the principles of concurrent engineering
   g. Cost estimation incorporating both the cost of the personnel and the cost of the materials to deliver the final product

      h. Financial and other benefits of the completed product
           i. Product pricing
           ii. Product / production forecast over multiple years
           iii. Calculation of the net present value, payback or other financial metrics.

4. Project Selection and Approval – Typically, the completed project plan, utilizing all the available information and resulting in a "best estimate", is presented to the management team (along with others) for their approval and subsequent budget and official resource allocation.

5. Personnel Management - Many project management functions now include personnel management responsibilities because of the Cross - Functional nature of many of today's development teams. These responsibilities include staffing (hiring and firing), performance evaluations, and often compensation determination.

6. Intellectual Property Search - Once the project is approved and relevant detailed design has been completed, patent, trademark and copyright searches should be conducted in order to avoid intellectual property infringement.

7. Project Tracking, Reporting and Evaluation –As work commences, it is the project manager's responsibility to track the actual progress and expenditure against the plan, report on the progress, and evaluate how to improve the performance of the project team.

8. Project Control – The project manager must continuously resolve any personnel or resource issues and remove any other impediments to the plan. If it becomes clear that the original plan cannot be achieved, then it is the project managers responsibility to communicate the functional deficiency, cost overrun, or schedule overrun to upper management and then develop and document a new plan which remedies the problem and establishes a revised set of goals, if necessary.

9. Project Termination – Finally, it is the project manager's responsibility to de-allocate the resources as tasks are completed as the project nears release. The de-allocation of personnel should include the project manager's assistance in finding each team member their next assignment. Before release, the project manager must be sure that all documentation is archived properly and all remaining issues are resolved to the satisfaction of the stakeholders. A release meeting is scheduled to officially release the product and document follow-up activities followed by a celebration.

At the beginning of the Project Management course, one to two class periods are set aside to discuss ethics both from an engineering / project management perspective and a personal perspective. Then the course introduces the nine Project Management functions and, for the remainder of the semester, expands upon each function and their sub-functions. As the course progresses, cases are selected for analysis not just for their project management content, but for their ethical content as well.

ETHICS IN THE ENGINEERING CURRICULUM
As illustrated in the outline of the Project Management course, day-to-day ethical decision-making does not typically involve issues associated only with design engineering. There are important ethical considerations in project selection, project scheduling, project budgeting, risk assessment, unit volume and revenue forecasting, personnel management, procurement[3] and intellectual property rights. For this reason, it is important that our students first understand the differences between ethics, morals, and laws. Students must then understand the concept of moral codes and how moral philosophies develop culminating in the concept of a universal moral code. Finally, it is important that students understand how such a code might apply not just to our professions and careers but also to everyday life. This understanding typically comes at the later stages in our moral development.

Definitions
In researching the subject matter of ethics, the terms ethic, moral, and law are used frequently, and often interchangeably, by students and by many professionals. If they are to be used properly and we are to understand their meaning when conducting research or otherwise addressing the subject, however, then we need to understand their meanings and how they differ. From Webster's Dictionary:

Ethic
1. "The discipline dealing with what is good or bad and with moral duty and obligation.
2. A set of moral principles or values."

Moral
1. "Of or relating to principles of right and wrong in behavior.
MORAL implies conformity to established sanctioned codes or accepted notions of right and wrong.
ETHICAL may suggest the involvement of more difficult or subtle questions of rightness, fairness or equity."

Law
1. "A binding custom or practice of a community: a rule of conduct or action prescribed or formally recognized as binding or enforced by a controlling authority."

Undoubtedly, all these terms are related. As can be seen from the above definitions, however, "ethic" and "moral" are very closely related focusing on principles of good and bad or right and wrong. These principles are less apparent in the definition of law. Unfortunately, in today's industrial age, law or "what is legal" has taken on a greater concern so much so that one can argue that it often supplants the role of ethics in corporate decision making (see case studies). The problem with law overtaking ethical considerations is apparent in the very definition: what is "formally recognized" "binding" or even "enforced" may vary greatly by place and time so that the question of "is it legal" quickly dissolves into "will we get caught?" Clare Booth Luce has an excellent example of the difference between the law and morality: "There is no law that requires a person to speak the truth, unless he is under oath to do so in a court proceeding. A person can, with legal impunity, be a habitual liar. The traditional morality of our society, however, takes a dim view of the habitual lair. Accordingly, society punishes him in the only way it can--by social ostracism."[4] Stated simply, our moral and ethical responsibilities must go beyond the limitations of the law. [5]

Stages of Moral Development

Lawrence Kohlberg hypothesized six different stages or moral philosophies through which people can pass as they develop.

Stage 1: A morality focusing on obedience - yielding to the wishes of those who are more powerful and thus avoiding punishment.

Stage 2: An instrumental morality that seeks personal benefit with little concern for the needs of others.

Stage 3: Amorality that seeks to maximize the quality of relationships. A person does what will gain other's approval.

Stage 4: A morality of law and order: One has a duty to obey the law and maintain social order.

Stage 5: A morality that focuses on social contract: What is moral is what people have previously agreed to.

Stage 6: A morality that uses abstract, universal ethical principles to decide what is a moral act. Reasoning at this stage respects all people without regard to their ethnicity, age, class, or other personal characteristics." [6]

Stages 1 and 2 are known as Pre-conventional. Most people, including college undergraduates, primarily use the moral reasoning of Conventional Stages 3 and 4. Post conventional Stages 5 and 6 involve using principles to think about relationships among people rather than rigid laws.[6]

An Ethic – Engineering Technology Students

An excellent way to illustrate the stages of moral development in class is to first engage the students to create their own Code of Ethics, then introduce Kohlberg's stages of moral development, and finally ask them to evaluate where they fall in the six stages. An example of a set of ethics that was produced in the fall of 2001 is seen below [9]. About thirty students were asked to break out into teams of approximately five students each and develop a set of engineering ethics. The students later reassembled and each team presented their set of ethics. From these teams, the students created a set of ten ethics that best reflect those of the class.

Engineering Technology Students' Code of Ethics

1. An engineering technology student shall do all he/she can to avoid putting the safety and well being of others in danger.
2. An engineering technology student shall be open to criticism, acknowledge and correct their faults, and learn from their mistakes.
3. An engineering technology student shall strive to maintain every aspect of the academic integrity and dishonesty policy.
4. An engineering technology student shall deliver precise and timely information that is of the highest quality possible with his/her available knowledge and resources.
5. An engineering technology student shall present him/herself in a professional manner, display good qualities in leadership and team unity, build their reputation on the skills they have, and not compete unfairly with others.
6. An engineering technology student shall get to know their peers, assist them in their

professional development, and to support them in following this code of ethics.

7. An engineering technology student shall respect others' ideas and fairly treat all people regardless of race, religion, gender, disability, age, or national origin.
8. An engineering technology student shall engage in activities that foster their personal growth and enjoy themselves.
9. An engineering technology student shall develop good study habits.
10. An engineering technology student shall set goals and use his/her time wisely.

True to Kohlberg's model, the list of ethics generated by college students displays characteristics of primarily the "Conventional" stage as indicated by ethics 2,3,4,5,6. Ethics 8,9,10 reflect the "Pre - conventional" stage. Ethics 1 and 7 may indicate a transition to the "Post-Conventional" stage. When this exercise is completed, the instructor then moves the discussion to the concept of a universal ethical code. [10,11,3]

Absolute Values
So what are our basic ethical principles? One might direct students toward the engineer's codes. These codes have been the ethical baseline of our profession and still serve that purpose under many circumstances. The codes, however, were written by engineers in the context of their own industrialized culture but in today's global economy, some of the morals and ethics shared by one culture are not shared by others. In fact, assuming that other cultures, and in many cases individuals within our own culture, accept the engineers' codes or some other code is not only naïve but can lead to difficulties ranging from simple misunderstandings to absolute failure of a technical or commercial relationship. Some codes are a lengthy, detailed, almost dogmatic, set of rules directed solely at a specific field that do not lend themselves to everyday use. On the other hand, other ethical codes confuse ethics with other desired behaviors. For example, The Fundamental Principles of The "Code of Ethics of Engineers" on the ABET Web Site [12] are as follows:

- using their knowledge and skill for the enhancement of human welfare
- being honest and impartial, and serving with fidelity the public, their employers and clients
- striving to increase the competence and prestige of the engineering profession; and
- supporting the professional technical societies of their disciplines

The first two bullets describe ethical behaviors, the latter two, although admirable qualities, do not.

Because of the breadth and global nature of the functions performed by today's engineers, particularly in the management role, there is a growing need to go beyond the engineers codes and utilize an ethical code that prepares the student for these broader functions. Fortunately, there is a substantial amount of research being conducted on identifying a common code of ethics, one basic moral code, that is intended to not only guide all professions but all human activity.

A Baseline Global Ethic
Rushworth M. Kidder,[10] in his article entitled "Universal Shared Values" stated "There is a pressing need for shared values in our age of global interdependence without consensus." Is there a set of moral and ethical principles shared by mankind or at least most cultures that are likely to conduct business with each other? Many philosophers say yes with the caveat that some

cultures stress some morals more than others. [4,10] Has the set of principles been sufficiently refined and put into print? From the research conducted for this paper, one could easily conclude, "No", at least not to the point where any *broad based* consensus is shared within the philosophical community. If one combines, however, the efforts of some philosophers and others searching for a global ethic,[11] there is a startling commonality among their conclusions. Hans Kung [11] has conducted the most exhaustive research including Buddhism, Christianity, Native religions, Hinduism, Judaism, Islam, Sikhs, and Inter-religious organizations from nearly all parts of the globe. Each of the "Baseline Global Ethics" outlined below are identified in the works of Hans Kung [11], Rushworth Kidder [10], Clare Booth Luce [4], and Keshavan Nair. [13] All talk about the following ethics as the baseline among multiple cultures and religions. These universal principles compiled from their works may not be all inclusive but they are undoubtedly the baseline.

Do unto others as you would have them do unto you.
The Golden Rule can be found as a prominent ethic in almost every culture. This macro ethic is identified as the basis for almost all other morals in almost every reference. It is sometimes described as **fairness and justice**. At its roots is the concept of equality among different individuals, sexes, cultures, religions, and races.

Respect for Life
Inflict no pain or harm on another person. Compassion, non-violence and love for others. Responsibility for others well being.

Truthfulness and Honesty
This principle includes truthfulness and honesty to both oneself and others.

Accepting **Responsibility** for ones actions
This virtue is closely aligned with truthfulness and honesty and is sometimes identified with those. It concerns being truthful about one's actions and accepting the consequences (good or bad) of them.

Unity of Mankind
Strive to move mankind toward solidarity and partnership and to pursue the common good. Respect and love one another. Loyalty to all mankind.

Unselfishness and Service to Humanity
Also described as hospitality.

Tolerance and Respect
A sense of moderation; particularly toward those who think differently.

Courage
The "willingness to take risks and a readiness to sacrifice" [7] to make a fundamental change.

PEDAGOGICAL SUGGESTIONS

It is not logical to conduct our professional life on a moral basis different from our personal life. As Caroline Whitbeck observes, "we are doing our students a disservice by assigning casework or other scenarios with 'cookbook', 'doing the right thing' solutions. More often than not, ethical decision making is about pursuing multiple 'good' solutions simultaneously and then selecting the solution most just for all persons (or issues) involved." [7]

Richard Conway [8] also provided some applicable advice:

1. Provide relevant cases--if the cases don't seem plausible you won't engage the students.
2. Ask questions to facilitate reflection, especially on the nuances of the case.
3. Allow students to disagree and struggle with the issues. If you have selected good cases there will undoubtedly be multiple "right" answers and some answers not everyone will embrace.

As does Lion Gardiner: [6]

4. Have students play the roles of and explain the reasoning used by others to resolve moral dilemmas.
5. Ensure all students have ample out of class contact with faculty members.
6. Directly teach Kohlberg's model of six stages of reasoning as one would teach other disciplinary concepts.

As does the author:

7. Promote rigorous discussion and participation from many students so they all hear and understand each person's viewpoint (ethic) concerning a specific issue.

If the instructor is successful in promoting rigorous discussion, it normally requires about two class periods to complete the introduction to ethics. At its conclusion, two important concepts that sometimes need to be reinforced are 1) there is often a difference between behaving in a legal fashion as opposed to behaving in an ethical fashion and 2) morals and ethics are not a moving target; it simply takes humans awhile to reach the emotional maturity necessary to recognize that a universal moral code might exist.

For the remainder of the Project Management course, the challenge for the instructor becomes researching and selecting contemporary case studies that not only offer project management problems but ethical problems as well.

RELEVANT CASES [8] – A SURVEY

"The Fatal Flaw in Flight 51-L"[14]

The Challenger spacecraft disaster is a well-known but still relevant case study on engineering ethics. More often than not, faulty O - rings are blamed for the accident. In fact, the project managers were informed by multiple design engineers, well ahead of time, that the O-rings became increasingly unreliable when temperatures dropped. The project managers elected to continue with the launch raising several ethical issues. When the design engineers "blew the whistle" they were removed from their positions.

> **Project Management issues** – numerous: teams, Project Manager selection, risk assessment, personnel management, procurement and second sourcing, verification testing and more
> **Ethical questions** – respect for life, fairness and justice, truthfulness and honesty, tolerance and respect, unity of mankind, unselfishness, courage

"Confessions From A Crash"[15]

This short article describes how MicroStrategy, a software company and dot.com casualty, had been "cooking its books" in order to lure investors to buy their stock. Concerning the lawsuits filed by the defrauded investors, Michael Saylor, the CEO, stated ""but for a technicality we would have won" and blames bad luck "a fluke."" Mr. Saylor never acknowledges dishonesty, nor any other ethical or moral fault, nor does he display any courage to accept responsibility for his actions. He simply blames bad luck for getting caught by the SEC and will simply "manage the risk better" when he pursues future opportunities.

> **Project Management issues** – accounting, funding, leadership
> **Ethical questions** – honesty, accepting responsibility for ones actions, unselfishness and service to humanity
> **Legal issue -** fraud

"The United States Patent System: An essential role in Engineering Design Education" [16]

does an excellent job explaining the patent system from its historical purposes to its present day functions. The paper discusses ethical issues associated with intellectual property such as "designing around" another patent. Also, it contains good examples of how the *most* ethical solution is not "cookbook"[7] and there are "multiple right answers"[8] where innovation must be balanced against infringement. Mr. Garris touches upon the legal "minefield" associated with innovation if it is alleged to infringe. The economic value of patents is covered in general terms. Finally, the paper outlines how the patent system can be utilized in design education.

> **Project Management issues** – patent search, innovation
> **Ethical questions** – designing around patents, ethics in secondary education
> **Legal issue** – infringement litigation

"Applying a Global Ethic in Engineering Organizations" – Megamation case [3]

This case condenses several real scenarios from various sources and industries under a credible scenario with a fictitious company and fictitious names. Several moral, ethical, and legal issues are raised that are otherwise difficult to find in a single engineering management or project management setting.

> **Project Management issues** – product forecasting, compensation, teams, Project Manager selection, personnel management, project termination
> **Ethical questions** – fairness and justice, truthfulness and honesty, tolerance and respect, unity of mankind, unselfishness, courage
> **Legal issues** – sexual harassment, fraud, contractual default, fairness in pricing

"Innovation, ethics and core values: Keys to global success" [17]

This is the transcript of a speech given by Merck's (a pharmaceutical company) CEO, Raymond V Gilmartin. Mr. Gilmartin cites "three principles that are important to global success: 1) A commitment to innovation to drive growth 2) A consensus on core values that guides actions and decisions 3) An adherence to the highest standards of ethical behavior and integrity to inspire confidence and trust" He directly connects Merck's innovation to helping millions of people and to the sustained growth of the company. A company slogan is "We try never to forget that medicine is for the people, not for the profits."

> **Project Management issues** – organizational charter, leader selection
> **Ethical questions** – integrity (truthfulness and honesty), fairness, tolerance and respect, unselfishness and service to humanity

"The Sears Lectureship in Business Ethics at Bentley College - Ethics as a Competitive Edge"[18]

Chairperson and CEO of Bell Atlantic, Ivan Seidenberg, delivered this lecture at Bentley College in April 1998. He begins his lecture describing Bell Atlantic (a large telecommunications company) along with recent trends in its markets. In leading up to his discussion of ethics, Seidenberg shares the following observation "Technology today has given people added choice and power, whether they're individuals or individual corporations. This additional choice means everyone has more responsibility to exercise that choice in a fashion that's consistent with "doing the right thing"" Along with other subjects, he address compliance to governmental and corporate regulations and his views on the Microsoft antitrust case. More importantly, Mr. Seidenberg speaks about business ethics in the areas of entertainment and other corporate "perks," fair pricing, and others. When a potential violation of their corporate ethics arises, Mr. Seidenberg describes the process Bell Atlantic follows to resolve it. He gives excellent advice to students in their job search – honesty in their resume and what it says about a company when you are offered "perks." He cites minimizing the corporate hierarchy and the utilization of self-managed teams in order to give employees more autonomy to innovate.

> **Project Management issues** – compliance to government and corporate regulations, leader selection, project organization and teams, personnel management, innovation
> **Ethical questions** – truthfulness and honesty, fairness, tolerance and respect, accepting responsibility for one's (a corporations) actions, courage
> **Legal issues** – antitrust (Microsoft), kickbacks

DISCUSSION

At school, on the job, in the news, and around the world ethical issues are increasingly on the rise. Educators and engineers and are not addressing them effectively and our young people are beginning to accept them as normative behaviors. [6] Clare Boothe Luce writes, "Campus surveys show that one-third of our college students say they would cheat if they were sure they would not be caught. Forty-five percent say that they do not think that it is necessary to lead a moral life in order to be happy or successful. Sociologists note the extraordinary increase in blue and white-collar dishonesty, such as sharp business practices, dishonest advertising, juggled books and accounts, concealment of profits, and the taking and giving of bribes. These are all practices which rip-off the buying public." [4] Selfish decision making, the careless collection or misrepresentation of facts, and the disregard for and disrespect of the individual under the guise of what is good for the organization are compromising the common good on a global scale.

It is important that our graduates understand that when engineers' actions compromise the ability of their employers' to make sound decisions, they also compromise their employer's ability to provide long-term employment. In every case example, an ethic as basic and simple as *the golden rule* was violated along with the other ethics mentioned. In many cases, the *Golden Rule* has now become "Do unto others what you can get away with." Interestingly, *few of these ethical violations are illegal* unless taken to the extreme resulting in significant financial damage or personal physical or emotional harm.

Our educational institutions and our students as our future corporate leaders must recognize that practicing and reinforcing basic ethics is a lifelong process; not something learned only in our formative or pre-conventional years. The ideal venue for educators to reverse this trend is in the relevant and recurrent moral and ethical education of engineering students.

Postscript

Because of the obvious impact of the *respect for life* ethic, most of the ethical issues found in print are those dealing with various facets of this ethic in the health care industry. It is very difficult to find contemporary cases dealing with the other ethics, particularly in the engineering area. Is it because we have clouded and compromised our ethics, for reasons we have already discussed, to the degree that some behaviors are become acceptable; or is it because engineering is not in the forefront of public interest; or could it be that our profession has been more successful in resisting the ethical deterioration of our society?

BIBLIOGRAPHY

1. Badiru, Adedeji B. and Pulat, Simin P. <u>Comprehensive Project Management</u>, Englewood Cliffs, New Jersey, Prentice Hall, 1995
2. Meredith, Jack R. and Mantel, Samuel J. Jr. <u>Project Management, A Managerial Approach</u>, John Wiley & Sons, 2000
3. Globig, James E. "Applying a Global Ethic in Engineering Organizations" <u>Proceedings of the 2001 ASEE Annual Conference and Exposition</u>, June 2001
4. Luce, Clare Booth. "Is The New Morality Destroying America?" <u>Human Life Review</u>, New York, Winter 1999, pp. 15 – 26
5. Mucha, D. Michael. "Is it Necessary to Compromise Engineering Ethics to Remain Competitive in Today's Marketplace?" <u>Civil Engineering</u>, May 1994, pp. 62 – 63
6. Gardiner, Lion F. "Fostering Student's Moral Development" <u>Teaching Excellence</u> Vol. 11, No. 5, 1999 - 2000. Davis, Michael. <u>Thinking Like an Engineer</u>, New York, Oxford University Press, 1998
7. Whitbeck, Coroline. "Ethics as Design: Doing Justice to Moral Problems" <u>Hastings Center. The Hastings Center Report</u>, Hastings on Hudson, May / June 1996, p. 9
8. Conway, Richard. "Teaching Ethical Decision Making" <u>The Teaching Professor</u>, May 1999, p.
9. Segalewitz, Scott. "Introduction to Engineering Technology" University of Dayton, Fall 2001
10. Kidder, Rushworth M. "Universal Human Values" <u>The Futurist</u>, Washington, July / August 1994, p. 8
11. Kung, Hans and Kuschel, Karl-Joseph. <u>A Global Ethic</u>, London, SCM Press Ltd, 1993
12. http://www.abet.org/Code_of_Ethics_of_Engineers.htm
13. Nair, Keshavan. <u>A Higher Standard of Leadership: Lessons from the Life of Gandhi / Keshavan Nair</u>, San Francisco: Berrett – Koehler; Emeryville, CA: Publishers Group West [distributor], c.1994
14. Bell, Trudy E. and Esch, Karl. "The fatal Flaw in Flight 51-L" <u>IEEE Spectrum</u>, 24 Feb, 1987, pp. 36 – 51
15. Thomas, Evan. "Confessions From A Crash," <u>Newsweek</u>, June 18, 2001, p. 36
16. Garris, Charles A. "The United States Patent System: An Essential Role in Engineering Design Education" <u>Journal of Engineering Education</u>, April 2001, pp. 239-246
17. Gilmartin, Raymond V."Innovation, ethics and core values: Keys to global success" <u>Vital Speeches of the Day</u> v65n7 Jan 15, 1999, pp. 209 – 213.
18. Seidenberg, Ivan. "The Sears Lectureship in Business Ethics at Bentley College - Ethics as a Competitive Edge" <u>Business and Society Review</u> v104n3, Fall, 1999 pp. 291-303

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