# Measuring Curriculum Effectiveness for Developing Principled Leaders in an Undergraduate Engineering Program

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## Abstract

A standard objective of most undergraduate engineering curricula is to prepare students to solve challenging problems by applying technical knowledge to create original ideas and then turn those into practical applications. In addition to providing the technical knowledge, it is becoming progressively important that the engineering education provide students with the leadership tools needed to excel in their professions and to become ethical leaders in an increasingly complex world. The demand for principled engineering leaders will continue to play an increasingly vital role in the discovery of new knowledge and technologies that can address the complex global problems facing society. This demand amplifies the importance of integrating ethical leadership and decision making as a core element of the engineering curriculum and the need for it to remain at the forefront of curriculum design. This study seeks to provide insights into the research question of whether the use of an integrated leadership and ethics training program can improve an engineering student's ability to make ethical engineering decisions as measured by the National Society of Professional Engineers Code of ethics practice exam. A group of five scenarios and 25 True/False questions based on the NSPE Code of Ethics were used to measure the ability of students to identify and make decisions that adhere to a set standard of ethical and professional conduct relating to the practice of engineering. Scenarios were developed around situations that require the engineering student to make one or more decisions, selected from a menu of options presented. A two-group posttest-only randomized experiment was designed to investigate the research question. The test group of junior and senior engineering students have gone through 3 years of leadership training at The Citadel consisting of ROTC classes and professional ethics and conduct incorporated into the general and engineering curriculum. The control group consists of freshman engineering students at [the Institution] who have not received the ROTC and professional ethics and leadership classes. A simple random sample was taken of students in the school of engineering. All students in the study were administered the same ethics test. Analysis of the test results showed that there was no difference in mean scores on the tests. Within the limitations of the study, the findings suggest that the current leadership and ethics curriculum does not appear to improve the scores of upper class engineering students taking the NSPE ethics practice exam. This motivates the need for additional studies to investigate the value of The Citadel's curriculum based leadership and ethics training in providing a thorough understanding of engineering practice ethics. Our survey findings may support the idea that for the curriculum to be effective students must have more practical experience and exposure to the engineering practice gained firsthand through internships and contact with engineering practitioners and being exposed to formal and informal expectations.


## Introduction

The role and latitude of the engineering profession continues to change rapidly. Global issues, technological innovation, expansion of discipline boundaries, and increased professional expectations highlight the importance of Engineers acting ethically as they make choices during

their professional practice of engineering [1]. Engineering graduates are expected to have technical knowledge, skills, and abilities to think creatively and critically, effectively communicate, and work in teams to solve challenging problems that are built on a foundation in professional and ethical practices, therefore the development of ethical judgment skills is a key competency for engineering students [2]. Professional societies have also adopted increased emphasis on ethical responsibilities for future engineers. The American Society of Civil Engineers (ASCE) Vision 2025 describes a future in which civil engineers are "entrusted by society" and "serve"—not just work—to enhance the global quality of life "competently, collaboratively, and ethically," with sustainable techniques and results. "They must also be universally recognized as representing a respected and diverse body of dedicated professionals who maintain high ethical standards in the varied procurement processes that quilt the world." ASCE further proposes that, "Civil engineers are universally recognized for their high ethical standards of practice" [3]. Similarly, The American Society of Mechanical Engineers (ASME) Vision 2030 states that mechanical engineers need "to lead not only technically but also socially, politically, and ethically.... This implies a compassion and passion for our planet, ethics beyond the bottom line…" [4].

The Preamble to the National Society of Professional Engineers Code of Ethics for Engineers states *"Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct* [5]*."*

It is important for engineering students to study engineering ethics so that they will be prepared to make ethical decisions during their professional careers. The Accreditation Board of Engineering and Technology (ABET) has mandated that engineering educational programs include ethics in their undergraduate curriculum. From an institutional perspective that spans all degree programs The Citadel's mission as stated in the college catalog [6], "…The Citadel's mission is to educate and develop our students to become principled leaders in all walks of life by instilling the core values of The Citadel in a disciplined and intellectually challenging environment …The Citadel strives to produce graduates who have insight into issues, ideas, and values that are of importance to society. It is equally important that Citadel graduates are capable of both critical and creative thinking, have effective communication skills, can apply abstract concepts to concrete situations, and possess the methodological skills needed to gather and analyze information." The Citadel has initiated a campus wide program to integrate ethics and leadership development into the curriculum. By employing a multi-disciplinary approach both non-technical degree courses focusing on leadership and ethics and engineering curriculum courses with ethics components are taken by engineering students to fulfill requirements. This study seeks to provide insights into the research question of whether the use of an integrated leadership and ethics training program can improve ethical engineering decision making as measured by the National Society of Professional Engineers Code of Ethics practice exam.

## Background

Research advocates the importance of changing the way we educates engineering students on ethics by thinking about and implementing ethics in a way that is more consistent with the realities of engineering practice [7]. The importance of understanding that the way people 'do something right' is not just an ethical issue, it is also a practical issue that incorporates ethics into the dimension of philosophy [8]. Educating engineers and providing them with an understanding of the ethical and social issues that arise in engineering is one of the most important goals in engineering education [9].

The Citadel has embraced the mission to excel in the education of principled leaders and has initiated a campus wide program in leadership and ethics development. The campus wide program is driven by an academic department providing its own minor at the undergraduate level, and also an MS degree. Regardless of academic major all undergraduate cadets must complete a series of four courses and two seminars in ethical leadership development prior to graduation. These required courses are separate from and in addition to any ROTC course requirements.

The Citadel's Center for Leadership and Ethics offers three academic courses (LDRS 211, LDRS 311, LDRS 411) to support the learning of ethical leadership. These courses are designed to engage students in service learning, seminars, and interacting directly with professionals to develop the foundations they need to become principled leaders. Students contracting with a military service take an ROTC class in each semester which incorporates ethical leadership. Those not contracting take ROTC classes through their sophomore year; they then take an ROTC fulfillment class in each semester of their junior and senior years. For most students one of these fulfillment classes is LDRS 371, a three-credit-hour class on leadership in organizations or PMGT 401 a three-credit-hour class on project management that has an ethics and professional practice module.

## Ethics at the Institution

Enhancing skills related to ethical decision making has been recognized as one of the most pressing needs in society today and Ethics in Action is the focus of The Citadel's Quality Enhancement Plan (QEP). A QEP is a course of action for institutional improvement that addresses issues contributing to progress in student learning [6]. The learning outcomes based on Ethical Reasoning are aligned with The Citadel's strategic plan and mission to educate and develop our students to become principled leaders in all walks of life by instilling the core values of The Citadel in a disciplined and intellectually challenging environment. The process of selecting and developing the Ethics in Action program involved a collaboration of representatives from all of The Citadel's constituent groups – students of each class, evening undergraduate and graduate students, alumni and faculty, employers and staff, and institutional boards and committees [6].

The following guidelines were established in support of this program:

1. Academic departments or schools will designate (at least) one course that is required for students majoring in the degree in which to integrate ethics instruction; this may be a course in

which ethics is already part of the curriculum or it may be a course in which new ethics content will be infused.

2. Within the designated course(s), faculty will integrate at least one class session dealing with ethical reasoning that addresses two student learning domains:

a. The student will be able to articulate the impact of ethics on society and the professions.
b. The student will be able to apply an ethical decision-making process.

3. Faculty will identify and develop one written assignment in the selected course that students will upload into their E-Leadership portfolios to be evaluated by the QEP assessment team using the national Association of American Colleges and Universities VALUE rubric on Ethical Reasoning [6].

Freshman students take LDRS 101 and LDRS 111. LDRS 101 is a two lecture hour, one credit course which includes an ethical analysis of their summer reading assignment "A Few Good Men". LDRS 111 is a Freshman Ethical Fitness Seminar which is taken in the second semester of the freshman year. It is comprised of the Ethical Fitness Seminar (EFS) designed to promote ethical culture. Topics include recognizing why ethics matter, understanding trust, and tasking leadership with trust, defining ethical values, and analyzing and resolving dilemmas [6]. Learning outcomes for both freshman seminars are assessed via written essays, and small group discussion of ethical issues. Discussion and essay topics include: Abuse of power, Conflict between mission accomplishment and duty, Whistleblowing, Cover-ups, Institutional loyalty, and Conflicts between honor and justice [6].

In the second year students take the LDRS 201 sophomore seminar. In this one semester long class, students learn about leadership by reading and discussing real life examples of leadership. Learning outcomes for LDRS 201 are assessed via written essays, and small group discussion of ethical issues. Students are also required to participate in a 10 hours service learning project which is administrated through LDRS 211 [6].

In the third year the students take the LDRS 311 Junior Ethics Enrichment Experience. This " is a single day seminar on making ethical decisions based on Dr. Rushworth Kidders book "Moral Courage: Taking Action When Your Values are Put to the Test. Topics include gaining insight into the nature of moral courage,… [6]."

In the fourth year the [students] take the LDRS 411 Senior Leadership Integration Seminar. "This is another single day seminar - students are grouped by major and career interest, as they engage with business and community facilitators to discuss how they will apply their learning toward being effective principled leaders as they transition to the next phase of their lives [6]." Annually in the fall, senior students take part in a leadership day where they attend a workshop, often at local companies and interface with working professionals to work through a variety of work place issues and ethic case studies. These workshops include discussion of peer and supervisor interactions, ethical treatment of customers and clients, individual ethical behavior in the work place, and reporting of suspicious or fraudulent behavior.

Engineering students participate in a two semester senior year design capstone experience, ethics is again addressed in the context of responsible laboratory behavior, and intellectual property rights and in the professional obligation to hold the safety and welfare of the public paramount. Teams of students are assigned dedicated space in a large laboratory shared with other teams where considerate and ethical behavior in this environment is stressed. One 75 minute lecture session is typically devoted to a patent lawyer guest speaker, whose overview of intellectual property (IP) rights includes the ethical responsibility of honoring IP ownership. A key second semester engagement employs the National Institute of Engineering Ethics video, Incident at Morales, to dig deeply into the engineers' obligations to public welfare.

The engineering capstone design experience also provides numerous chances to engage students in the code of ethics for engineers. These include the fundamental canons of NSPE [5].

1. Hold paramount the safety, health, and welfare of the public.
2. Perform service only in areas of competence.
3. Issue public statements only in an objective and truthful manner.
4. Act as a faithful agent for clients or employer.
5. Avoid deceptive acts.
6. Act honorably, responsibly, ethically, and lawfully.

One such engagement is a dinner for all engineering seniors that is typically sponsored by the [State] Society of Professional Engineers at which a member of the [State] Board of Registration of Professional Engineers and Land Surveyors will address professional obligations, which of course includes professional ethics. This dinner is followed by induction of senior students into The Order of The Engineer, making this a memorable and impactful event.

**Study Methodology and Design**

This quantitative study sought to determine whether the use of an integrated leadership and ethics-training program could have a positive impact on the abilities of undergraduate engineering students to score higher on an ethics exam based on the NSPE ethics practice examination.

In our analysis, we investigated the following questions:

1. Will upper-class engineering students who have gone through a program of leadership and ethics classes have a higher average score on an engineering ethics survey than freshman students who have not gone through a program of leadership and ethics classes?
2. Will upper-class engineering students who have gone through a program of leadership and ethics classes have a higher average score on five engineering scenario based ethics questions than freshman students who have not gone through a program of leadership and ethics classes?
3. Will upper-class engineering students who have gone through a program of leadership and ethics classes have a higher average score on twenty-five True/False engineering ethics questions than freshman students who have not gone through a program of leadership and ethics classes?

To investigate our three research questions a group of five engineering scenarios and 25 True/False engineering ethics questions from the National Society of Professional Engineers (NSPE) Code of Ethics Examinations were used to measure the ability of students to identify and make decisions that adhere to a set standard of ethical and professional conduct relating to the practice of engineering. Five scenario based ethics questions were developed around situations that require the engineering student to make one or more decisions, selected from a menu of options presented.

To test the first research question we developed a hypothesis statement, which encompassed the average results for all 30 ethics survey questions [11]. To test our second research questions we developed a hypothesis statement to test the five scenario based ethics questions. To test our third research questions we developed a hypothesis statement to test the twenty-five True/False ethics questions. The Null hypothesis for all three research questions is formally stated as:

> The average scores from the two groups are equal: $H_0$: $\mu_1 = \mu_2$.
> Alternatively, the test hypotheses state that the average score for the upper-class engineering students will be higher than the average freshman score. $H_A$: $\mu_1 > \mu_2$.

A priori power analysis indicated that achieving a statistical power of 0.8 with a 0.4 effect size at the significance level of 0.05 required a minimum sample size of 78 students per group. There were 85 freshman and 98 upper-class respondents. Surveys for each group of participants were disseminated as part of a normal lecture classes over a period of two academic years.

**Survey Instrument**

Both groups of participants were given the same survey with the following components:

1. Basic non-identifying demographics questions – age, and academic class.
2. Scenario questions – five one paragraph scenarios which were adopted from the NSPE practice ethics scenarios developed around situations that require the engineering student to make one or more decisions, selected from a menu of options presented.
3. 25 True/False questions – from the NSPE Code of Ethics practice exam were used to measure the ability of students to identify and make decisions that adhere to a set standard of ethical and professional conduct relating to the practice of engineering.

Survey questions are listed in Appendix A.

**Results: Descriptive Statistics**

Table 1 summarizes the means, standard deviations, and differences between groups for the 30 question survey, the 5 scenario questions and the 25 T/F questions.

*Table 1. Summary of the Percentage of Correct Survey Answers.*

| SUMMARY<br>30 Questions | | | Alpha | 0.05 | |
|---|---|---|---|---|---|
| *Groups* | *Count* | *Mean* | *Std Dev* | *Std Err* | *df* |
| UpperClass | 30 | 0.5139 | 0.3418 | | |
| Freshman | 30 | 0.4851 | 0.3347 | | |
| Difference | 30 | 0.0288 | 0.0960 | 0.01752 | 29 |

| SUMMARY<br>5 Scenario Questions | | | Alpha | 0.05 | |
|---|---|---|---|---|---|
| *Groups* | *Count* | *Mean* | *Std Dev* | *Std Err* | *df* |
| UpperClass | 5 | 0.4388 | 0.2512 | | |
| Freshman | 5 | 0.3388 | 0.1080 | | |
| Difference | 5 | 0.1000 | 0.1771 | 0.0792 | 4 |

| SUMMARY<br>25 T/F Questions | | | Alpha | 0.05 | |
|---|---|---|---|---|---|
| *Groups* | *Count* | *Mean* | *Std Dev* | *Std Err* | *df* |
| UpperClass | 25 | 0.5290 | 0.3595 | | |
| Freshman | 25 | 0.5144 | 0.3578 | | |
| Difference | 25 | 0.0146 | 0.0681 | 0.0136 | 24 |

Results for the three paired t tests show that there is no statistically significant difference when comparing survey results for freshman and upperclassmen.

**Paired t test Results**

We conducted a series of one-tailed paired sample t-tests at the 0.05 significance level to test if the percentage of correct answers on the ethics survey for upper classmen were higher than the freshman scores [11]. The results of the one-tailed paired t-tests for the ethics survey are displayed in Table 2.

*Table 2. Summary of the Paired t test Results.*

| T TEST<br>30 Questions | Alpha | 0.05 | | | Hyp Mean Diff = 0 |
|---|---|---|---|---|---|
| | *p-value* | *t-crit* | *t-statistic* | *upper* | *sig* |
| One Tail | 0.0552 | 1.6991 | 1.64633 | | no |

| T TEST<br>5 Scenario Questions | Alpha | 0.05 | | | Hyp Mean Diff = 0 |
|---|---|---|---|---|---|
| | *p-value* | *t-crit* | *t-statistic* | *upper* | *sig* |
| One Tail | 0.1377 | 2.1318 | 1.2622 | | no |

| T TEST<br>25 T/F Questions | Alpha | 0.05 | | | Hyp Mean Diff = 0 |
|---|---|---|---|---|---|
| | *p-value* | *t-crit* | *t-statistic* | *upper* | *sig* |
| One Tail | 0.1468 | 1.7109 | 1.0736 | | no |

**Comparison of the % of Correct Responses**

Figure 1 shows the comparison of the percentage of correct answers to the 30 survey questions.

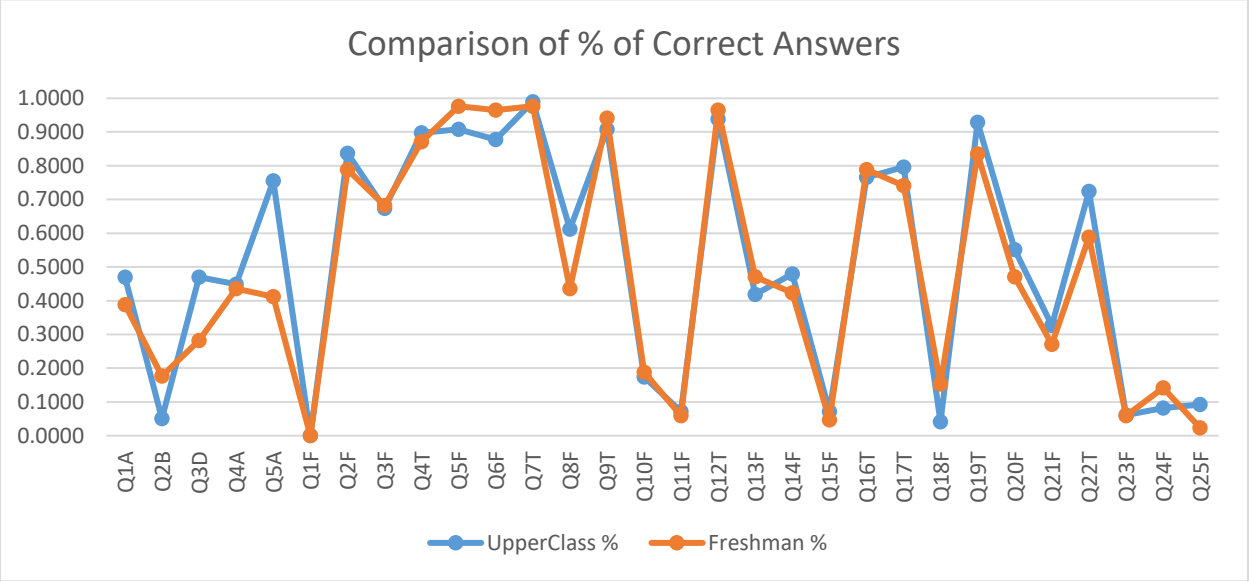


*Figure 1. Comparison of the % of Correct Answers for the two survey groups.*

Figure 2 compares the mean percentage of correct answers for the two survey groups.

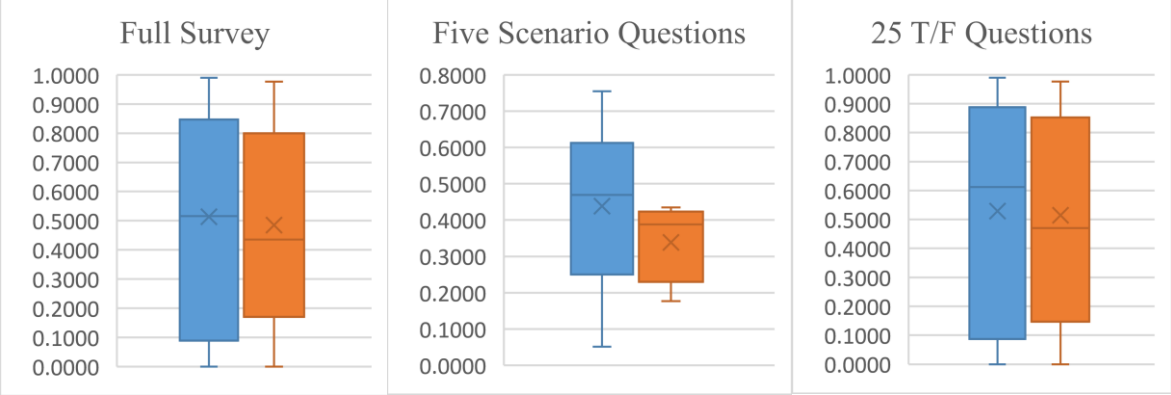


*Figure 2. Comparison of the mean % of Correct Answers for the two survey groups.*

The mean difference in percentage of correct responses for the 30 question survey was 0.0288, for the 5 scenario questions was 0.1000 and for the 25 T/F questions was 0.1046.

**Summary**

Analysis of our survey results for the three research questions revealed that there was no statistical difference in the percentage of correct responses when comparing the two ethics

survey populations. Therefore we were not able to prove our test hypothesis that the upper-class engineering students would score higher on the NSPE ethics practice exam than the freshman students.

In an attempt to gain greater insight into the results we compared specific questions with a high correct score percentage (≥ 80%) and those with a low correct score percentage (≤ 20%) for each of the survey groups. The results, shown in Table 3, are virtually the same and further support the overall findings that the [Institution's] curriculum of integrated ethical leadership courses were not effective in enhancing participants' performance on the NSPE ethics examination.

*Table 3. Questions With High or Low Correct Scores ( ≥ 80% or ≤ 20%).*

| Upper Classmen High Correct (≥ 80%) | Lower Classmen High Correct (≥ 80%) | Upper Classmen Low Correct (≤ 20%) | Lower Classmen Low Correct (≤ 20%) |
|---|---|---|---|
| | | Scenario Q2 | Scenario Q2 |
| T/F Q2 | | T/F Q1 | |
| T/F Q4 | T/F Q4 | T/F Q10 | T/F Q10 |
| T/F Q5 | T/F Q5 | T/F Q11 | T/F Q11 |
| T/F Q6 | T/F Q6 | T/F Q15 | T/F Q15 |
| T/F Q7 | T/F Q7 | T/F Q18 | T/F Q18 |
| T/F Q9 | T/F Q9 | T/F Q23 | T/F Q23 |
| T/F Q12 | T/F Q12 | T/F Q24 | T/F Q24 |
| T/F Q19 | T/F Q19 | T/F Q25 | T/F Q25 |

We also looked at the [Institution's] performance on the Ethics and Professional Practice portion of the Fundamentals of Engineering (FE) exam results for 1 July 2018 - 31 December 2019 shown in Table 4. The FE results indicate that the [Institution] scored slightly better than our comparator institutions.

*Table 4. Institution FE Exam Ethics and Professional Practice Results.*

| Fundamentals of Engineering (FE) Examination Exams: Ethics and Professional Practice | Institution Average Performance Index | ABET Comparator Average Performance Index | ABET Comparator Standard Deviation | Ratio Score | Scaled Score | # Taking |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 July 2018 – 30 June 2019 | 11.19 | 10.99 | 3.88 | 1.02 | 0.05 | 133 |
| 1 July 2019 - 31 December 2019 | 9.25 | 10.65 | 3.70 | 0.87 | -0.38 | 83 |

Developing the engineering students' understanding of the ethical and social issues that arise in engineering practice is an important and challenging goal. One reason why this may be so challenging to teach is because engineering ethics is particular to engineering activities [14]. Our research suggests that implicit student understanding of engineering ethics may not be developed solely through an integrated ethics and leadership curriculum. Ethical decision-making, of course, is not solely a matter of academic study and the current curriculum. One key variable commonly assumed to influence ethical behavior and ethical decision-making is the person's level of experience working in the field. Experience is thought to improve ethical decision-making and behavior.

## Conclusion and Future Work

There is a growing body of research that supports the belief that academic courses about applied ethics and the social implications of technology are not effective in increasing ethical knowledge but rather knowledge and awareness is discovered and acquired during the years of education and training [14], [2]. A key purpose of the NSPE code of ethics is to engage the members to work and behave according to the principles of the association and to protect the organization's interests [14].

With experience practitioners acquire both knowledge about ethical issues and better strategies for working through ethical problems [12]. The survey results might reflect a lack of training and experiential learning in the practice of engineering as well as a need for greater emphasis on including experiential learning opportunities for our students. Prior to the survey both populations of students had little or no learned ethical experience gained from working in the engineering profession. Although this study cannot say if lack of experiential training is a factor in the observed results, it does point to the need for future research to examine the role that experiential learning plays in ethical decision-making. It is interesting to compare the outcome of our survey with the results of previous research [13] that assessed how undergraduate engineering ethics courses affect the development of the student's professional identity. The previous research results indicate that students learn about engineering professionalism and ethics primarily from relatives and co-workers who are engineers, and rarely from technical engineering courses. Our survey findings may support the idea that for the curriculum to be effective students must have more practical experience, social interaction, and exposure to the engineering practice. This may be gained firsthand through internships and contact with engineering practitioners and being exposed to formal and informal expectations as well as everyday practice.

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## Appendix A

*Questions from the NSPE Sample Test*

1. A registered electrical engineer is working on a satellite guidance system for a strategic program late on a Friday afternoon. He is approached by a line foreman from the final assembly shop and is asked if he can review and approve a quality inspection on a minor weld repair for a support bracket. Sign-off on the inspection form is holding up shipment of a system that is to be installed on a launch vehicle this weekend. The inspection needs to be initialed by an engineer and due to the late hour none are available. What is the best decision the engineer can make in this scenario?

   (A) decline to inspect the weld and decline to initial the form
   (B) inspect the weld and initial the form, and document his observations
   (C) tell the line foreman to look for another engineer to initial the form, delaying the program
   (D) suggest the line foreman initial the form and document that no engineers were available

Engineers may perform services outside of their areas of competence as long as they inform their employers or clients. False - see NSPE Code of Ethics I.2. Therefore, (A) is correct

2. Your design team has just completed a prototype autonomous vehicle competition and is one of the three designs selected for final consideration by the client. The three winning teams have been asked to submit a bid which will be evaluated for price. Competition is expected to be fierce and winning this contract is key to the company's reputation and growth strategy. Your price-to-win analysis shows that you will need to replace several of the senior engineers on the team with new junior engineers to achieve your bid price-to-win target and win the competition. Which of the following options are acceptable?

   (A) The team should prepare their cost estimate and hope for the best.
   (B) The team should follow the price-to-win strategy and closely control all information and communications, replacing the senior engineers with new, lower cost employees.
   (C) Request a meeting with the client to inform them that they have set unrealistically low price expectations and need to consider increasing them.
   (D) Notify the client that you will not be submitting a bid.

Obligation to Employers and Clients: It is never ethical to accept a contract if you or the organization you are negotiating for cannot complete the work. Changing key members of a design team involved in the competition and replacing them with new members without informing the customer prior to selection is misleading. Answer (B) does not tell us if the team has some other way of completing the work without the special skills of the eliminated engineers, so we can't really say that answer (B) is acceptable.
Therefore, the answer is (B).

3. An engineer has applied for numerous jobs after graduating from college and has finally been asked back for a second interview at a prestigious engineering firm. During the job interview, she is informed that two of her classmates, who both graduated in the bottom of the class, are also applying for the positon and she is asked to compare and contrast her qualifications to the two classmates. What is her best decision?

   (A)withdraw her application for the position.
   (B)give a full and truthful accounting of all the ways her ability and experience are superior to those of her classmates.
   (C)demand to speak to the interviewer's supervisor.
   (D)decline to compare and contrast her qualifications.

It is not a violation of a registered engineer's obligation to other registrants to promote their own qualifications. However, one can't help but speak negatively about another registrant when comparing qualifications in a circumstance like this. The engineer in this situation can discuss her qualifications for the position but cannot ethically compare qualifications with other registrants applying for the position. The other registrants can then discuss their qualifications, and the employer can make the comparisons.
Therefore, (D) is correct.

4. A registered engineer is retained as an expert witness by one of the parties in a civil case where the public safety is not involved. In investigating the technical data in the case, the engineer discovers information which leads him to determine that the client may be at fault. Select the best course of action for the engineer.

   (A)inform the party who retained her of the findings.
   (B)inform the judge of the findings.
   (C)inform the opposing party of the findings.
   (D)say nothing about the findings until called to testify.

In this case, the engineer has only an obligation to her client until she is called to the stand, so she should report her findings to the party who retained her and that party will decide whether or not to call the engineer to testify.
Therefore, (A) is correct.

5. A professional engineer, originally licensed 30 years ago, is asked to act as a consultant on a newly developed computerized control system for a public transportation system. The engineer may accept this project if:

   (A) he or she is competent in the area of modern control systems.
   (B) his or her professional engineering license has not lapsed.
   (C) his or her original area of specialization was in transportation systems.
   (D) he or she has regularly attended annual meetings of a professional engineering society.

By definition, if he or she is a professional engineer, his or her license cannot have lapsed, so (B) is wrong. All that matters is that the professional engineer is competent. Therefore, (A) is correct

| T/F | Question |
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| False - see NSPE Code of Ethics I.1. | 1. Engineers, in the fulfillment of their professional duties, must carefully consider the safety, health, and welfare of the public. |
| False - see NSPE Code of Ethics I.2. | 2. Engineers may perform services outside of their areas of competence as long as they inform their employers or clients. |
| False - see NSPE Code of Ethics I.3. | 3. Engineers may issue subjective and partial statements if such statements are in writing and consistent with the best interests of their employers, clients, or the public. |
| True - see NSPE Code of Ethics 1.4. | 4. Engineers shall act for each employer or client as faithful agents or trustees. |
| False - see NSPE Code of Ethics I.5. | 5. Engineers shall not be required to engage in truthful acts when required to protect the public health, safety, and welfare. |
| False - see NSPE Code of Ethics I.6. | 6. Engineers may not be required to follow the provisions of state or federal law when such actions could endanger or compromise their employer or their clients' interests. |
| True - see NSPE Code of Ethics II.1.a. | 7. If engineers' judgment is overruled under circumstances that endanger life or property, they shall notify their employers or clients and such other authority as may be appropriate. |
| False - see NSPE Code of Ethics II.1.b | 8. Engineers may review but shall not approve those engineering documents that are in conformity with applicable standards. |
| True - see NSPE Code of Ethics II.1.c. | 9. Engineers shall not reveal facts, data...information without the prior consent of the client or employer except as authorized or required by law or this Code. |
| False - see NSPE Code of Ethics II.1.d. | 10. Engineers shall not permit the use of their names or associates in business ventures with any person or firm that they believe is engaged in fraudulent or dishonest enterprise, unless such enterprise or activity is deemed consistent with applicable state or federal law. |
| False - see NSPE Code of Ethics II.1.e. | 11. Engineers having knowledge of any alleged violation of this Code, following a period of 30 days during which the violation is not corrected, shall report thereon to appropriate professional bodies and, when relevant, also to public authorities, and cooperate with the proper authorities in furnishing such information or assistance as may be required. |

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| True - see NSPE Code of Ethics II.2.a. | 12. Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved. |
| False - see NSPE Code of Ethics II.2.b. | 13. Engineers shall not affix their signatures to plans or documents dealing with subject matter in which they lack competence, but may affix their signatures to plans or documents not prepared under their direction and control where they have a good faith belief that such plans or documents were competently prepared by another designated party. |
| False - see NSPE Code of Ethics II.2.c. | 14. Engineers may accept assignments and assume responsibility for coordination of an entire project and shall sign and seal the engineering documents for the entire project, including each technical segment of the plans and documents. |
| False - see NSPE Code of Ethics II.3.a. | 15. Engineers shall strive to be objective and truthful in professional reports, statements or testimony, with primary consideration for the best interests of the engineers' clients or employers. The engineers' reports shall include all relevant and pertinent information in such reports, statements, or testimony, which shall bear the date on which the engineers were retained by the clients to prepare the reports. |
| True - see NSPE Code of Ethics II.3.b. | 16. Engineers may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter. |
| True - see NSPE Code of Ethics II.3.c. | 17. Engineers shall not issue statements, criticisms, or arguments on technical matters that are inspired or paid for by interested parties, unless they have prefaced their comments by explicitly identifying the interested parties on whose behalf they are speaking and revealing the existence of any interest the engineers may have in the matters. |
| False - see NSPE Code of Ethics II.4.a. | 18. Engineers may not participate in any matter involving a conflict of interest if it could influence or appear to influence their judgment or the quality of their services. |
| True - see NSPE Code of Ethics II.4.b. | 19. Engineers shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to by all interested parties. |

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| False - see NSPE Code of Ethics II.4.c. | 20. Engineers shall not solicit but may accept financial or other valuable consideration, directly or indirectly, from outside agents in connection with the work for which they are responsible, if such compensation is fully disclosed. |
| False - see NSPE Code of Ethics II.4.d. | 21. Engineers in public service as members, advisors, or employees of a governmental or quasi-governmental body or department may participate in decisions with respect to services solicited or provided by them or their organizations in private or public engineering practice as long as such decisions do not involve technical engineering matters for which they do not possess professional competence. |
| True - see NSPE Code of Ethics II.4.e. | 22. Engineers shall not solicit nor accept a contract from a governmental body on which a principal or officer of their organization serves as a member. |
| False - see NSPE Code of Ethics II.5.a. | 23. Engineers shall not intentionally falsify their qualifications nor actively permit written misrepresentation of their or their associate's qualifications. Engineers may accept credit for previous work performed where the work was performed during the period the engineers were employed by the previous employer. Brochures or other presentations incident to the solicitation of employment shall specifically indicate the work performed and the dates the engineers were employed by the firms. |
| False - see NSPE Code of Ethics II.5.b. | 24. Engineers shall not offer, give, solicit, nor receive, either directly or indirectly, any contribution to influence the award of a contract by a public authority, or which may be reasonably construed by the public as having the effect or intent of influencing the award of a contract unless such contribution is made in accordance with applicable federal or state election campaign finance laws and regulations. |
| False -see NSPE Code of Ethics III.1.a. | 25. Engineers shall acknowledge their errors after consulting with their employers or clients. |