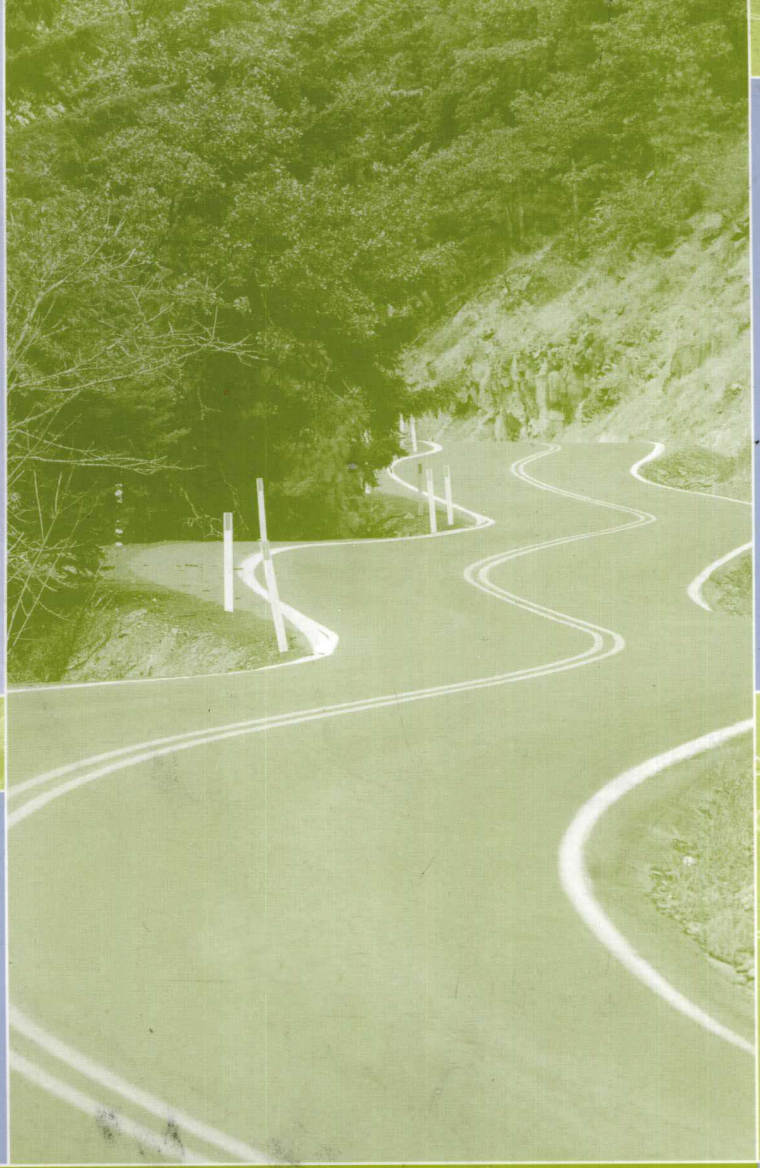

READINGS FROM THE DISCIPLINES

RESEARCH MODELS FOR WRITERS

Christine A. Hult

CUSTOM EDITION

READINGS FROM THE DISCIPLINES
RESEARCH MODELS FOR WRITERS

Christine A. Hult

CUSTOM EDITION

PEARSON
Custom
Publishing

PEARSON

Grateful acknowledgment is made to the following sources for permission to reprint material copyrighted or controlled by them:

"Questions for Discussion," by Christine A. Hult in *Readings from the Disciplines: Research Models for Writers*, (1997), Allyn and Bacon, A Pearson Education Company.

Printed in the United States of America

10 9 8 7 6 5 4 3 2

ISBN 0-536-75019-X

BA 998344

BK/KG

Please visit our web site at *www.pearsoncustom.com*

PEARSON CUSTOM PUBLISHING
75 Arlington Street, Suite 300, Boston, MA 02116
A Pearson Education Company

READINGS FROM THE DISCIPLINES
RESEARCH MODELS FOR WRITERS

Christine A. Hult

CUSTOM EDITION

PEARSON
Custom
Publishing

Grateful acknowledgment is made to the following sources for permission to reprint material copyrighted or controlled by them:

"Questions for Discussion," by Christine A. Hult in *Readings from the Disciplines: Research Models for Writers*, (1997), Allyn and Bacon, A Pearson Education Company.

Printed in the United States of America

10 9 8 7 6 5 4 3 2

ISBN 0-536-75019-X

BA 998344

BK/KG

Please visit our web site at *www.pearsoncustom.com*

PEARSON CUSTOM PUBLISHING
75 Arlington Street, Suite 300, Boston, MA 02116
A Pearson Education Company

CONTENTS

PART TWO: *47*

READINGS FROM THE SOCIAL SCIENCES *47*

PREFACE

In this reader, you will find articles written by scholars in their fields that were first published in professional journals. These articles will serve you well as models for your own research papers and reports in your college classes. The articles are engaging and accessible, with topics ranging from coyotes and foxes in Yellowstone to the social system of a high school dance class. Because these articles were chosen exclusively from professional journals, they will help you to become familiar with the types of academic writing you will encounter throughout your college experience and into your chosen career.

This reader is designed to be used independently or with a research guide or handbook. The purpose of this reader is to provide you with professional journal articles as models for your own research. *Readings from the Disciplines* introduces you to the types of writing typically found in the professional journals from various fields. It will be an important learning tool for you, because it provides you with real writing from your discipline in an accessible form. In this way, you will become familiar with the types of articles and the formats those articles are presented in from various academic fields.

Readings from the Disciplines is divided into three parts: I. Readings from the Sciences and Technology, II. Readings from the Social Sciences, and III. Readings from the Humanities and Arts. Each article is presented in its entirety as it was originally printed in the professional journal. Following the article are discussion questions to encourage you to look for features of the article such as the effectiveness of its argument, the author's thesis or tone, the article's organization or structure, and so on. You are also encouraged to make connections between the articles and your own experience as a beginning scholar.

1

Readings from the Sciences and Technology

The sciences hold an authoritative position in modern society and have been enormously successful at formulating and testing theories related to the natural and physical world. Scientific insights and methods have also been carried over to fields of applied science and technology, such as computer science and engineering. Writing in the sciences tends to be of two general types: 1) reports of original research or 2) reviews or speculative articles on more general bodies of information. The readings selected for Part I exemplify both kinds of scientific writing.

The article by Gese, Storrs & Grothe from the *Journal of Mammalogy* illustrates type one: a straightforward report of original research. These wildlife biologists studied animal behaviors in the field and they report their findings in the form of a journal article. The sections of the report also typify this kind of scientific writing: Abstract, Materials & Methods, Results, Discussion, Acknowledgments, and Literature Cited.

The remaining articles broadly illustrate type two, although they vary from a scholarly argument favoring ethics in engineering education to a more informal discussion of Mayan astronomy. The range of readings is intended to illustrate for you the range of writing found in the sciences and technology. Both Vesilind and Nichols argue for curricular reform in their disciplines: Vesilind for inclusion of ethics in engineering education and Nichols for inclusion of values in biology education. Aveni describes in a colorful and lively way the astronomers of ancient Maya. His article is geared toward a less specialized audience with the purpose of entertaining as well as informing on his topic. The final piece is an editorial from a physics journal which attempts to place the field of physics into the larger university discussion of multiculturalism.

All of the articles included in Part One are reproduced in their entirety from the journals in which they were originally published, by permission of the publisher and/or author(s).

Using Academic Integrity To Teach Engineering Ethics

P. Aarne Vesilind, Duke University

ABSTRACT

Ethics can be taught by using case studies to which students can relate. Since all students appreciate and understand problems of academic dishonesty, the nature of ethical problems in academics can be used to illustrate ethical problems encountered in professional engineering. If students can be sensitized to the value of ethical behavior while in school, they will carry this understanding over to their profession. The purpose of this paper is to suggest that academic integrity can be used to introduce the basic concepts of professional engineering ethics. A videotape and instructor's manual using this pedagogical technique is described.

I. ACADEMIC INTEGRITY

Although most engineering educators and practitioners agree that engineering ethics should be included in the engineering curriculum, this is often difficult to achieve. First, most engineering schools do not have faculty who are qualified to teach professional ethics, and second, teaching engineering ethics in its abstract is ineffective since students have difficulty recognizing the significance of ethical problems in engineering. Students cannot identify with the problems facing the practicing engineer since they have never been in that role. They have never had a client, for example, so how can they appreciate the problems of client confidentiality? Pedagogically, students respond best to material with which they are somewhat familiar. It only makes sense, therefore, to begin teaching ethics using problems that students understand and can relate to. The most ubiquitous and familiar ethical problem facing students is cheating on school work.

The objective of this paper is to show how academic integrity can be used to illustrate the concept of professional ethics. It should be possible to sensitize students to future ethical problems they might encounter during their professional careers by relating academic dishonesty to professional engineering ethics.

The moral development and maturation of college students is rapid during their college years, and the quality of the education they receive can influence their professional conduct following graduation.[1] Derek Bok has eloquently discussed this moral development of students and called for the revival of moral education in the American universities.[2] As evidenced by the work of Heath, universities and colleges have a major influence on the moral development of students. [3] It therefore seems imperative that universities provide the courses, teachers and atmosphere for students' moral development.

The American university, in addition to its role as the purveyor of knowledge, is supposed to be a place where the students develop and mature intellectually in multiple dimensions. Chickering suggests that the college experience should include "developing intellectual competence; learning to manage emotions; developing and establishing autonomy, establishing identity, developing interpersonal relationships; developing a sense of purpose; and developing integrity."[4]

Heath studied the maturation of students and postulated that the college was influential in what he considered the important facets of human development: "To become a more mature person is to grow intellectually, to form guiding values, to become knowledgeable about oneself, and to develop social, interpersonal skills."[5] At the conclusion of his study of college graduates he was apparently surprised that "the college's distinctive, most salient, enduring effect was to permanently alter the character, the values, and the motives of many men."[3]

And yet, there is no doubt that academic dishonesty is a serious problem in American higher education. Numerous surveys have confirmed that a vast majority of college students cheat at least once during their time in college, and one fourth are regular cheaters. Some studies show that academic dishonesty has increased markedly in the past decades (see for example the 1979 Carnegie Council study, reference 6). There is little doubt that the level of cheating is very high, as measured by numerous surveys.[7-21]

Engineering students are just as likely to cheat as other students, and in some studies engineering students have been found to have a higher than average incidence of cheating. In a recent study, McCabe et al[22] show a breakdown by intended profession (Table 1), and engineering is high in the ranking of students cheating.

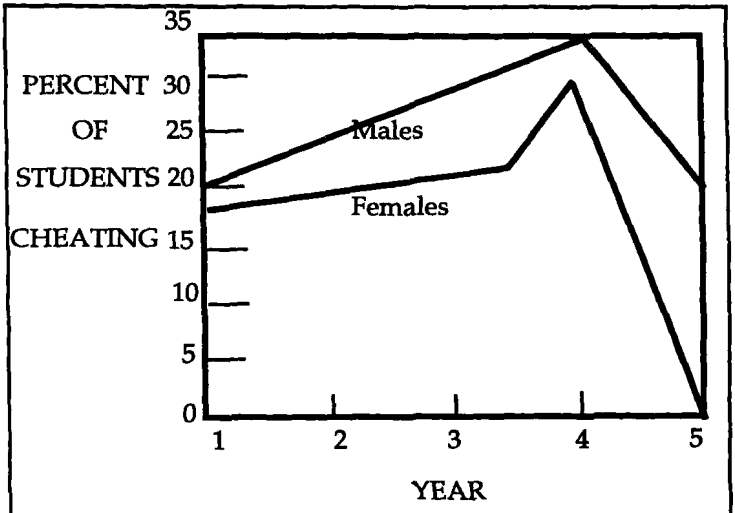

Figure 1. Incidence of cheating among engineering students at Drexel University Data by Nguyen et. al, courtesy of Professor William Zuspan (Emeritus), Department of Civil Engineering, Drexel University, Philadelphia, PA (18)

Intended Career	Percent of students who cheated at least once
Business	76%
Engineering	71%
Medicine	68%
Public Service	66%
Arts	64%
Law	63%
Education	57%

Table 1. Frequency of cheating, by intended major.(22)

Year	Percent of engineering students copying on term papers or assignments at least once
Freshman	26.1
Sophomore	58.6
Junior	70.9
Senior	59.7

Table 2. Academic dishonesty by engineering students.(23)

Interestingly, Nguyen and colleagues,[18] in a student project at Drexel University, found that cheating incidence for engineering students rose steadily from the first year to the fourth year, and then dropped off dramatically. They found that not a single female engineer interviewed had cheated during the senior year. Their study did not have statistical significance, but the results are nevertheless interesting. A summary of their results is illustrated in Figure 1.

The variability in cheating with year in college was also studied by Harp and Taietz who also found a parabolic relationship in cheating (Table 2).[23] The authors did not speculate on why the dropoff in cheating might occur for engineers during the senior year, but one explanation for the reduction in academic dishonesty during the senior year might be the students' moral development. Herch, Paolitto and Reimer cite an unreferenced study of college students that found that the level of moral development (as defined by the Kohlberg scale)* has an effect on academic integrity. They found that of those students who scored at level 3 and 4 on the moral development scale, 40% had cheated, whereas only 11% of the students who scored 5 or 6 cheated.[24]**

It seems reasonable to conclude that students do experience moral development during their schooling, that this process can be enhanced and strengthened, and that the results of such development will have a lasting effect on the students' professional lives. The key is to relate this development to professional engineering. In fact, this is not difficult, since many of the values involved in academic integrity apply equally well to professional engineering ethics. Since we know that engineering students tend to cheat as often as other students and that such cheating seems to be pervasive, it might be useful to take advantage of this and to use academic integrity as a bridge to the understanding of professional ethics.

II. THE BRIDGE FROM ACADEMIC INTEGRITY TO ENGINEERING ETHICS

There appears to be a direct link between academic integrity and professional engineering ethics. Consider the following scenarios to illustrate that similar values are involved in ethical problems commonly encountered by students and by professional engineers.

---

*The Kohlberg scale of moral develoment ranges from 1 where the individual has no sense of moral reasoning, to 6, the highest level of moral reasoning. See Kohlberg, L. *The Philosphy of Moral Development* vol. 1, Harper and Row, New York, 1971.

**There is some question about the validity of this study. None of Kohlberg's students in the original study ever reached level 6 in reasoning.

Loyalty to Friends and Deception

A.) Student A develops a foolproof way of cheating on a mechanics examination, and shows one of his friends (student B) what he intends to do. Student B does not want to participate in the scheme, and wants to stop student A from cheating. Should student B tell the professor what he knows in order to prevent the cheating from ever occurring?

B.) This scenario can be related to the problem many engineers face when they know that a colleague is planning to engage in unethical conduct. If engineer A decides to give himself a raise by padding his travel account, and tells engineer B about his plans, the alternative courses of action can range from doing nothing to alerting the accounting department and possibly preventing his friend from getting into trouble.

Confidentiality and Loyalty

A.) A homework problem in structural analysis is to be solved using a computer program. Student A writes a program that cuts down the computation time, but still requires further programming. She is asked by her friends to share the program with them. They try to convince her that this is simply a computational tool and has no bearing on their understanding of the problem. They appeal to her as a friend to help them. Should she share her work, and if one of her colleagues uses it, should it be cited?

B.) Engineer A has just started work for a company when her boss asks the engineer for information on the jobs conducted by the previous employer, suggesting that there is nothing sacred about such information and that sharing it would make engineer A more valuable to her new firm.

Plagiarism

A.) A student in an engineering project class uses a writing tutor to help him with the final report. What are the student's obligations to cite the assistance? At what point does assistance become unethical?

B.) An engineer, in writing a final report for a client, plagiarizes his own work that he did for another client. He does not acknowledge the original source, even though he receives compensation for the initial writing.

III. APPLICATION OF THEORY TO PRACTICE

Supported in part by funds from the National Science Foundation, the concept of using academic integrity to teach professional engineering ethics has been incorporated into a videotape and instructor's manual designed for classroom use. This videotape contains four scenarios illustrating problems in academic integrity—problems with which all students

are familiar. The actors are Duke University students and the video is professionally directed and produced. In all four scenarios, the decision is left unresolved so as to provide maximum opportunity for classroom discussion.

The principles highlighted in all four scenarios are also basic principles in professional engineering. The instructor's manual which accompanies this videotape contains material that bridges these ethical issues to professional engineering. Also included are engineering case studies that parallel the videotape presentation. The cases presented on the videotape are:

The Take-Home Exam:

An engineering student discovers that a take-home examination has been copied from an old textbook. He decides to use the information, telling of his discovery to only one friend. The friend, out of loyalty, tells her roommate of the book in the library. After the examination has been graded, some of the students find out and complain to the professor.

The main themes in this scenario are loyalty, trust and the confidentiality of information. A secondary theme with which students identify is the credibility of the professoriate, or in a wider sense, the credibility of any organization that purports to hold regulatory or licensure power. The four themes—loyalty, trust, confidentiality, and credibility—are key elements of engineering professional practice. In the American Society of Civil Engineers (ASCE) Code of Ethics, the operative section that relates to the themes of loyalty, trust and confidentiality is Fundamental Canon No. 4: "Engineers shall act in professional matters for each employer or clients as faithful agents or trustees, and shall avoid conflicts of interest."

When in Rome:

An engineering student discovers that two students from overseas are copying a term paper out of a book. He confronts them, and discovers that they do not believe that what they are doing is wrong. They argue that if copying material out of a book (without attribution) is acceptable in their countries, why isn't it just as acceptable here? The first student is placed in a dilemma of whether or not to tell the professor.

The central theme here is the question of the relativity of ethics. Can something be right in one society, and wrong somewhere else? Is copying material out of a book and handing it in as a paper to be graded acceptable in one country, and not another? Should United States engineers be allowed to pay bribes while doing work in countries where bribery is the normal way of doing business? In the United States, bribery for securing

work is prohibited in the ASCE Code of Ethics. Under Fundamental Canon 5, the first guideline reads: "Engineers shall not give, solicit or receive either directly or indirectly, any commission, political contribution, or a gift or other consideration in order to secure work . . ."

Laboratory Efficiency:

Two engineering students decide to increase their mechanics laboratory grades by using old data. The teaching assistant catches them and reports the incident to the professor, who does not want to pursue the issue. The teaching assistant must decide if she will report the incident to the judiciary board.

The central theme is deceitfulness. Once a group of people agree to a proper way of conducting themselves, to secretly not follow the rules is deceitful and morally wrong. The reaction of the professor is also unprofessional. The professor should understand that she has a duty to act as an ethical role model.

The core value in engineering is truthfulness. Only by adhering to the most stringent principles of truthfulness can large and even small engineering projects be successfully completed. Sometimes being truthful is difficult, especially if it results in damage to one's career. Yet if one is not truthful this will be discovered in due time and one's effectiveness as an engineer in a cooperative environment is jeopardized.

The applicable statement in the ASCE Code of Ethics is: "Engineers shall issue public statements only in an objective and truthful manner."

Love Thy Neighbor:

Two engineering students in a chemistry laboratory notice that one of their colleagues is sabotaging another student's experiment. They confront the student and discover that she sees nothing wrong with cheating if this will help her get accepted to medical school. The students wonder if it is their responsibility to be concerned with the qualify of people entering the professions.

This scenario, based unfortunately on too many real experiences, shows the lengths to which some students will go to get good grades so that they can enter the professions. Engineers recognize that all professionals are responsible for the integrity of their professions. Society yields certain powers to the professions, and expects ethical behavior in service of the public in return, and professionals have a moral responsibility to police their own profession and to dismiss those who do not adhere to the code of ethical conduct. In the ASCE Code of Ethics, the third Fundamental Principle states that engineers should "strive to increase the competence and prestige of the engineering profession."