

Integrating Computer Ethics across the Curriculum: A Case Study

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ABSTRACT

There is an increased use of computers in the educational environment of today that compels educators and learners to be informed about computer ethics and the related social and legal issues. This paper addresses different approaches for integrating computer ethics across the curriculum. Included are ideas for online and on-site workshops, the design of a faculty seminar day and an academic course. The paper contains a template for designing modules that are relevant for individual disciplines as well as those that are discipline-independent. One module is presented in detail. Survey results are presented for a two year project on integrating computer ethics across the curriculum. The study of computer ethics is critical as technology is being integrated into every aspect of our lives.

Keywords

Ethics, Computers, Technology, Education

Introduction

The rapid growth of technology has left a clear impact on the educational environment. Online distance education is growing in popularity, instructional technology is being incorporated into courses in the traditional classroom and the concept of hybrid courses that have both an on-site and online component are being implemented on a wide-scale basis. The increased use of computers across the curriculum compels our students to be knowledgeable about computer ethics and the related social and legal issues so the rewards of technology can be accessible to all (Bynum and Rogerson 1996; Huff and Martin 1995; Kallman and Grillo 1993; Maner 1996). It is our pedagogical obligation to help learners develop the necessary habits of scholarship that are required for use of the computer, the Internet and electronic resources in an intellectually responsible way (Martin et al. 1996; Martin 1999; NSF 1998). Computers are a part of the educational environment independent of the different learning styles of students.

Students of all majors are utilizing computers within the classroom, are using computers as research tools, and are using computers to communicate with friends and colleagues. For some, computers actually serve as the sole vehicle of participation in classroom discussions. Computers are an integral part of the professional, social and educational life of more and more people. In order to facilitate the appropriate use of the power of technology in student learning we need to integrate the study of computer ethics into the different disciplines (Ben-Jacob 2003).

There are many links between computer technology and different disciplines. A correlation between disciplines and topics includes the following:

- Legal Studies: Is the use of legal self-help software and websites an unauthorized practice of law? Who is liable for the publication of false information on the Internet?
- Social Science and Humanities: How can we discern misrepresentation of identity on the Internet? How can the use of computers compromise the ethics of social work?
- Mathematics and the Natural and Physical Sciences: How does parasitic computing compromise research? How does the Web contribute to the misrepresentation of statistics?
- Computer Science: Should software engineers be licensed? What are acceptable computer user policies? What are the roles of Internet cookies? What can we do about spam?
- Business and Cultural Studies: What are appropriate guidelines for computer usage? How much knowledge should be shared? How do people abuse radio music in cyberspace?
- Interdisciplinary Concerns: What are appropriate citations of different types of Internet resources? What constitutes plagiarism? What are the issues with regard to downloading materials from the Net? What constitutes the responsible use of computer systems that are not individually owned? (Ben-Jacob 2004)

The Project

With the support of the National Science Foundation we conducted a two year project on integrating computer ethics across the curriculum. The first phase of the project was a hands-on workshop for a core group of Mercy College faculty representing different academic disciplines, the second phase involved a faculty seminar day for the entire College faculty, the third phase focused on an online workshop for faculty at other institutions across the United States and the fourth phase encompassed the design and teaching of an online computer ethics course for Mercy College students that had a module which was team-taught with a faculty member from DePaul University.

The On-site Workshop

The format of the three days hands-on workshop allowed for presentation by a scholar of national reputation and group discussion in the morning. In the afternoon the participants worked on individual modules in the computer lab. Faculty from disciplines as diverse as English, economics, history, mathematics, computer science, library science, psychology and music participated. The following semester we brought our work on ethics into our classrooms and are fine-tuned our modules to our students' experiences.

The Seminar Day

For phase two of our project, we conducted a seminar day for the entire Mercy faculty to promote the integration of computer ethics across the curriculum. Our agenda included a plenary session led by an expert in the field of computer ethics and discipline-related breakout sessions. The day concluded with a session of summation and reflection. The discipline-related sessions resulted in modules that reflect the issues and concerns geared to the curricula in the specific areas.

The Online Workshop

The online workshop during the third phase of the project was open to faculty at institutions of higher learning across the country. It ran for one week and promoted discussions led by Mercy faculty of various disciplines. The advantages associated with an online workshop for faculty of different institutions include different perspectives on the topic. It commenced with a general discussion of computer ethics and then more leads more specifically into issues that are subject-related. The online workshop was delivered by a team of Mercy faculty who had developed modules and were aware of the need for the integration of computer ethics across the curriculum and more specifically into their respective disciplines. They encouraged and guided their colleagues across the United States with the development of modules and exercises that have proven to be pedagogically sound.

The online workshop, whose format encouraged collaboration, was offered through Mercy's distance learning program, using WebCT as a platform. The goals of the workshop included providing faculty with information, support and guidance in integrating computer ethics into their curricula. The use of a technologically mediated environment facilitated the participation of faculty from a large geographic locale at less financial expense than its on-site equivalent, and the asynchronous delivery allowed flexibility for participation. On the workshop homepage there were icons serving as links to a welcome message, workshop notes, announcements, discussions, e-mail and pre-workshop readings. The welcome message provided the participants with an overview of the workshop format and prompted each participant to introduce him/herself. The notes icon was linked to the information posted by each discussion leader. The information content was self-contained and encouraged discussion. For each set of notes there was a correspondingly labeled topic area in the discussion section where the exchange of ideas was posted. The e-mail link allowed private correspondence as well. The announcements contained the module template, copies of all surveys and evaluations, and logistics messages. Discussion leaders and participants were encouraged to take part in all the discussions in order to support an invigorating exchange of ideas and opinions. Although the workshop was officially one week in length it was available for navigation one week before and remained available for referral several weeks afterward. Within a week of its conclusion, the participants were asked to submit a module that they developed based on the collaborative work done in the workshop. Discussion leaders were available to support participants throughout the workshop and afterwards as well. There was a discussion thread led by each of the experts.

The Online Course

The online course in computer ethics and related social and legal issues covered ethics and computer ethics, privacy and the ubiquity of information, freedom of electronic speech, social and legal implications of the world today, crime abuse, the responsibility and liability of computer professionals and ethical and social issues of distance learning, to name just some of the topics. The subject matter was introduced by the instructor and the topics were addressed through readings and case studies that were discussed online in a thread /conversation format. The class discussion focused on (1) understanding the ethical issues addressed in the readings; (2) examining the positions taken and arguments given by the authors; (3) exploring how these positions arise out of the context within which computers are being used and the philosophical position of the author; and (4) analyzing scenarios and case studies to uncover and examine ethical and social issues. The students were made aware of the issues, guided in the evaluation and decision-making process and taught what the responsible action is in each situation. There were proctored exams as well as an individual research project. The course addressed the ethics of distance learning, a learning environment which is ever growing in popularity.

The Pedagogical Tool

The main pedagogical tool developed throughout the project was a module whose format lends itself to different topics. We provided the design as well as guidelines for educators to generate their own assignments and examples. Our contention is assignments, in general, should represent ethical issues from areas such as fraud, freedom of speech, hacking/security, intellectual property rights, privacy and spamming, safety for critical systems, whistle-blowing, concerns of the workplace, critical thinking and discipline specific issues. (Bowyer 2001). We recommend that each class exercise or activity generated involve an independent search of the Net by students. This could, however, be done as a group, as a class, or if necessary, by the instructor with a handout provided to the students.

Our design of classroom exercises, i.e. the module template, addresses the following:

Topic area

Target audience, the relevance to the course in which it is being used

Materials

Background information

References

Activity e.g. reading assignment, worksheet classroom exercise, debate (Ben-Jacob 2004; Bowyer, 2000).

The following is a specific example of a module on the issue of plagiarism, a concern that crosses all disciplines. It appears in *Integrating Computer Ethics Across the Curriculum*.

Academic Integrity: Ethical Behavior for Students

Abstract

Cheating is present in too many institutions of learning. If students are aware (that the professor is aware) of the different methods of cheating, it may lower the incidences of non-ethical academic behavior. In addition, evaluation of information from the web will reinforce critical thinking and the exercises will strengthen the art of collaboration among students.

Goals for the activity

To raise student awareness of what is considered to be ethical academic behavior for students and what the possible consequences are for what might otherwise be construed a seemingly, harmless action.

Knowledge / skills / attitudes to be developed (behavioral objectives)

- To have students understand what plagiarism is and why it is wrong.
- To have students critically analyze case studies and other information on ethics that are available on the Internet.

- To have students explore their opinions on ethics and compare and contrast them with the views of others.
- To have students work collaboratively.
- To make students aware of the consequences of lack of academic integrity and generically, lower the incidence of cheating.

Procedure

Start with definitions of ethical academic behavior, cheating, plagiarism, and whistle blowing. Have the students complete the reading assignment of cases and worksheet. Divide the class into groups that must collaborate and form a consensus.

Assessing outcomes

Qualitative outcome- Part I of the Worksheet: Ask the students if their initial attitudes are different from their attitudes after the assignment and if their opinions differ from the groups and why. Quantitative outcome - Part II of the Worksheet: The number of correct answers.

Additional remarks

Assignment

Read the case studies and the article on the legal aspects of academic dishonesty. Take a look at some of the websites mentioned in the reference section. Complete the worksheet.

Worksheet

Part I

1. List the different ways a student can cheat in a college course.
2. Prioritize this list in the order of “most to least heinous.”
3. Which of these ways is suitable only to on-site learning? Online learning?
4. If one of your peers were cheating, would you report him/her?
5. Does your answer to question 4 change if the other student was/was not in your class?
6. What type of punishment do you think is suitable for someone who is caught cheating?
7. Would you support the enforcement of the aforementioned punishment if the student claimed ignorance, e.g. “I did not know that was considered plagiarism.”
8. Name areas, other than the academic environment where cheating and plagiarism can take place.
9. Comment on the case studies that you read, e.g. Was there proof of cheating? Was the punishment in line with the crime? Was the outcome of the case in agreement with your sense of ethics?

Part II

Consider the following original paragraph taken from Dr. Kevin Bowyer's book *Ethics and Computing, Living Responsibly in a Computerized World* (IEEE Press), and the three paragraphs that follow it. Determine why each of the three is plagiarized.

Original

Reading can help you learn about things like codes of ethics and resolutions of particular ethical conflicts, but ethical behavior is a way of life. As such, it is best learned through experience; that is, by continually living ethically yourself.

Paragraph1- According to Bowyer reading can help a person behave in an ethical manner but ethical behavior is a way of life. The best way.....

Paragraph 2- Reading can help you learn about things like codes of ethics and resolutions of particular ethical conflicts, but ethical behavior is a way of life. As such, it is best learned through experience; that is, by continually living ethically yourself.

Paragraph 3- One can read about ethical behavior in different situations but the best way to understand ethics and what is considered to be ethical behavior is to integrate it into one's own life. This can be accomplished..... (Ben-Jacob 2004).

Dissemination

Our dissemination plan for the project included a website where the major portions of the project are chronicled, <http://www.mercy.edu/IT/ethics>, and a book entitled *Integrating Computer Ethics Across the Curriculum* (Ben-Jacob 2004) which contains the modules that were developed by interested students as well as the participants of the on-site and online workshops. We have presented at conferences and written papers on computer ethics as well.

Surveys and Statistics

Surveys were conducted throughout the project. The results of the pre-post comparison of Mercy faculty responses for the on-site workshop held at the college, N = 18, follow. The faculty were surveyed on attitudes both before and after the workshop. The survey instrument contained nine statements regarding knowledge and attitudes toward computer ethics and they were:

1. Comprehending the ethical and related social and legal issues of computing is necessary for all computer and computer information system majors.
2. Comprehending the ethical and related social and legal issues of computing is necessary for all college/university students.
3. The study of computer ethics should be integrated across the computer science curriculum.
4. The study of computer ethics should be integrated across the general education curriculum.
5. The study of computer ethics should be integrated across pre-college curriculum.
6. One should be familiar with ethics before enrolling in online courses.
7. I plan on integrating the module I develop into my fall courses.
8. My course outline will address the issue of computer ethics.
9. I plan on adapting the module to reflect the life experiences of my students.

Of these questions two showed significant differences between pre and post assessment at the $p < .05$ level, using the paired t-test. These were questions 1 ($t(17) = -2.557$; $p = 0.02$) and 4 ($t(17) = -3.29$; $p = 0.004$). The faculty members' attitudes were in the direction of more strongly agreeing with the importance of comprehending computer ethics for CIS majors and the importance of computer ethics integrated across the general education requirement, demonstrating the positive effect of workshop participation.

Comprehending Computer Ethics for CIS Majors - pre

	Frequency	Percent
Agree	6	33.3
Strongly Agree	12	66.7
Total	18	100.0

Comprehending Computer Ethics for CIS Majors - post

	Frequency	Percent
Agree	1	5.6
Strongly Agree	17	94.4
Total	18	100.0

Study of Computer Ethics Integrated across Gen. Ed. Curriculum - pre

	Frequency	Percent
No Opinion	2	11.1
Agree	9	50.0
Strongly Agree	7	38.9
Total	18	100.0

Study of Computer Ethics Integrated across Gen. Ed. Curriculum – post

	Frequency	Percent
Agree	6	33.3
Strongly Agree	12	66.7
Total	18	100.0

Paired Samples Test

		t	df	Sig. (2-tailed)
Pair 1	Comprehending computer ethics for CIS majors - Comprehending computer ethics for CIS majors	-2.557	17	.020 *
Pair 2	Comprehending computer ethics for all college students - Comprehending computer ethics for all college students	-2.051	17	.056
Pair 3	Study of computer ethics integrated across CIS curriculum - Study of computer ethics integrated across CIS curriculum	-1.000	17	.331
Pair 4	Study of computer ethics integrated across gen. ed. curriculum - Study of computer ethics integrated across gen. ed. curriculum	-3.289	17	.004 *
Pair 5	Study of computer ethics integrated across pre-college curriculum - Study of computer ethics integrated across pre- college curriculum	-1.458	17	.163
Pair 6	Familiar with ethics before enrolling in on-line course - Familiar with ethics before enrolling in on-line course	.369	17	.717
Pair 7	I plan on integrating the module I develop into my fall courses. - I plan on integrating the module I develop into my fall courses.	-2.062	17	.055
Pair 8	My course outline will address the issue of computer ethics - My course outline will address the issue of computer ethics	-.825	17	.421
Pair 9	I plan on adapting the module to reflect the life experiences of my students - I plan on adapting the module to reflect the life experiences of my students	-.251	17	.805

Although the calculations of the responses to statements #2 and #7 were “not quite statistically significant,” one can speculate that participation in the workshop encouraged the appreciation of the attendees for the importance of computer ethics being understood by all college students. In addition, after attending the workshop and developing a module, the participants realized the benefits of including a module in their respective courses. The calculations of the responses to statement #6 lead us to conjecture that the attendees were initially familiar with the academic importance of the subject matter and that is why they enrolled in workshop. The calculations of the responses to statement #9 support the assumption that the participants designed modules that sufficiently accounted for the life experiences of their students and did not feel that further adaptation would be necessary to make the issues relevant.

Analogous research with regard to attitudes both before and after the online workshop where the participants were faculty members of institutions of higher education located across the nation was conducted. As a result of technological issues, a paired sample test was not possible. The first six questions in this sample matched the aforementioned first six, and we were able to compute group means both before and after the workshop. The results of the pre-post comparison for the online workshop, N= 23, are:

	Pre-workshop Group Mean	Post-workshop Group Mean
Question 1	5	5
Question 2	4.73	5
Question 3	4.82	4.88
Question 4	4.27	5
Question 5	4.36	4.75
Question 6	4.45	4.63

Since all the comparative means were non-decreasing, once again we contend that the online workshop had a positive impact on the attitudes of the participants. The aforementioned project focused on curriculum

development and was not a research study. As such, the surveys that were conducted were done so as an internal evaluative measurement and not designed with the detail that is necessitated for substantive research.

Conclusion

To summarize, there is a need for computer ethics to be brought to the forefront of education given the impact technology has on all of our lives. Courses addressing this issue are prevalent on the graduate level but we contend that it should be integrated at the undergraduate level. We have presented a successful model that can be easily replicated in part or in whole to achieve this purpose.

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