# STUDENT ATTITUDES ON SOFTWARE PIRACY AND RELATED ISSUES OF COMPUTER ETHICS

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## Abstract

Software piracy is older than the PC and has been the subject of several studies, which have found it to be a widespread phenomenon in general, and among university students in particular. An earlier study by Cohen and Cornwell from a decade ago is replicated, adding questions about downloading music from the Internet. The survey includes responses from 224 students in entry-level courses at two schools, a nondenominational suburban university and a Catholic urban college with similar student profiles. The study found that there has been little if any changes in student opinions regarding the unauthorized duplication of copyrighted materials. Students generally felt that copying commercial software and downloading music from the Internet was acceptable and found that there was no significant correlation between student attitudes and their school's religious affiliation or lack thereof. Additionally, the study found that a small but significant percentage of respondents considered the other questionable behaviors as ethically acceptable. Finally, the reasons for these attitudes are discussed as well as what colleges can do to correct the situation.
Key words - Software piracy, music downloading, computer ethics, student attitudes, plagiarism

## Introduction

The ethical use of computers and information technology has become a subject of great interest in the past decade. In 1992, the ACM adopted a revised Code of Ethics and Professional Conduct for computer professionals (Anderson 1993); part of the reason was to address issues that developed after the adoption of its Code of Professional Conduct in 1972. The 2001 curricular guidelines include a recommendation of 10 hours of instruction on professional and ethical conduct (CC2001). Several textbooks have appeared on the market for use in courses on Computer Ethics, including works by Johnson (2001), Spinnello (1997), Ermann et. al. (1997) and Forester and Morrison (1993).

Of all the issues within computer ethics, the unauthorized duplication of software (usually called software piracy) has captured more than its share of attention. Software piracy is almost as old as the desktop computer. Bill Gates' famous "An Open Letter to Hobbyists", in which he likened software piracy to outright theft, was published in February 1976, five years before the introduction of the IBM Personal Computer (Wallace 1992). The Business Software Alliance estimates that New York State alone lost over $540 million in retail sales due to software piracy (BSA 2001).

The attitudes that students have regarding software piracy have been the subject of several studies. Christoph, Forcht and Bilbrey (1987) found that prior computer experience made no significant difference in their attitudes toward piracy. Cohen and Cornwell (1989a) replicated the study by Christoph et. al. and added additional questions asking respondents whether they themselves had engaged in software piracy and whether they consider it legal. Husted (2000) determined that several factors that comprise national culture influence the probability that someone will engage in software piracy; these factors includes level of economic development, income equity and cultural sense

of individualism.  Kini, Rominger and Viayaraman (2000) found that attitudes toward software piracy were not affected by experience with computers but were significantly affected by general demographic variables such as age.  Wood and Glass (1995) found that female students were less likely to allow another student to make an illegal copy of commercial software than male students were.  Harris and Weaver (1994) found that this attitude extended to ethical issues in computer use .

The previous studies that were done by Schuster (1987), Christoph et al. and Cohen and Cornwell are all over ten years old and there have been many changes that have occurred since then. There is a different generation of students attending college. Many software publishers allow users to download basic versions of programs such as Netscape Navigator, RealPlayer, Flash and WinZip.  Napster, the digital music sharing program, became one of the more popular Internet applications, with the company estimating 10,000 users per second at peak times (Ciolli 2001) before the courts forced the company to end its music sharing service.  It has since been succeeded by a variety of music and file sharing programs, the most popular one currently being KaZaa (Terrell 2003).

The study differs in a few ways.  The survey was conducted in entry-level undergraduate courses.  These included two introductory math classes, three introductory programming classes, and seven computer literacy classes. While the previous surveys were conducted at western (Schuster 1987) and midwestern (Cohen 1989a) colleges, the students in this study attended college in the New York metropolitan area. The survey also encompassed students at two schools: Adelphi University, a non-denominational school in Garden City, New York, and Saint Peter's College, a Catholic college located in Jersey City, New Jersey.  Despite the geographical differences, (Adelphi is in a suburb of New York City; Saint Peter's is in an urban setting), there are many similarities in the student pool.  After the survey was started, two additional questions about downloading music were added to the questionnaire.  Half of the classes surveyed did not have the additional questions; they served as a control group to see if the presence of these questions affected their answers to the other questions.

## Methodology

The questionnaire used was essentially the same one as used by Cohen and Cornwell. Two additional questions were added about downloading music.  These additional questions were not on the questionnaires distributed to the first classes surveyed; they were left out of approximately half the later questionnaires to determine if the presence of the extra questions affected the responses on the original questions. The respondents were also asked about their attitudes toward privacy, and the use of hardware, work and data that belongs to others. Students were not asked to categorize themselves by year, sex, race or other identifying information.  Sims (1996) showed that younger students and male students are more likely to commit software piracy.  Omitting questions of this type made it more difficult to identify the student completing the questionnaire and it made their answers more anonymous; therefore the student was likely to be more candid.

As noted above, the classes surveyed were all introductory courses with roughly half the students attending Adelphi University and the other half at Saint Peter's College. These courses were chosen to ensure that there was no overlap, i.e. that students in one class were not in another. The survey was conducted during the 2000 Summer Session, Fall 2000 and Spring 2001 Semesters; one section was surveyed during the 2001 Summer Session.

Questionnaires were numbered after collection to ensure auditability and the answers were tabulated class by class in a Microsoft Excel workbook using a 1 to indicate "True" and a 0 to indicate "False." Entries for unanswered questions were left blank. A total of 224 student questionnaires were used in the survey. Questionnaires in which questions were left unanswered were excluded from the totals, resulting in a response rate of 96%. Adelphi students completed 110 questionnaires while Saint Peter's students completed 114 questionnaires. 108 completed questionnaires contained the two questions regarding the downloading of music; 116 omitted these questions.

**Results**

Students were asked their experience with computers and their usage. This data appears in Table 1. It shows clearly that most of the students were fairly familiar with computer usage and that even those with limited exposure used it for over a year. Most used it for their schoolwork, almost half used it on the job and most used it for recreation as well.

Table 1
Computer Experience and Usage of Respondents

|  | Total |
|---|---|
| My experience with computers includes… | |
| Daily use over more than a year | 78% |
| Limited exposure, but for more than a year | 17% |
| Extensive exposure, but less than a year | 1% |
| Only passing experiences | 3% |
| no prior experience | 2% |
| | |
| I use software… | |
| on my job | 47% |
| for classes I take | 90% |
| for recreation | 79% |

Table 2 shows their response to the first five questions, which ask whether they thought most people copied software, as well as most students, most professors and most college administrators. Responses at the two schools were very close. In every case, the percentage of students agreeing with the statement never differed by more than 10%, most cases the difference was within 5%. Similarly, the presence of the two questions about downloading music made no discernible difference in responses to the other questions.

4

Table 2
Student Perceptions of Software Piracy

|  | Total |
|---|---|
| I think that most people copy commercial software instead of buying it. | 68% |
| I think that most students copy commercial software instead of buying it. | 78% |
| I think that most professors copy commercial software instead of buying it. | 39% |
| I think that most administrators copy commercial software instead of buying it. | 36% |
| I have copied commercial software instead of buying it. | 54% |

The questions shown in Table 3 ask about their attitudes on copying software under different circumstances. In all but one case, the percentage of students agreeing with the statement differed by 2% or less.  In the case of copying software for educational difference, the difference was 15%.

Table 3
Attitudes On Software Piracy

| I think it is okay: | Total |
|---|---|
| for people such as myself to copy commercial software instead of buying it. | 66% |
| for people such as myself to copy commercial software  instead of buying it when we use it for educational purposes. | 74% |
| for employees to copy commercial software to evaluate it for possible purchase. | 54% |

Table 4 shows the response to questions about the propriety of using University-owned software at home and the circumstances under which copying software is legal. There was no significant deviation in the data when the responses were categorized by school or by the presence or absence of the Napster-related questions.  Most students believed that it was appropriate to use University-owned software at home for University assignments and a majority felt that it was permissible even for personal use.  While less than half of the respondents thought that it was always legal to copy commercial software, only a quarter of those asked thought that this was never legal.

Table 4
Attitudes About the Propriety and Legality of Copying Software

|  | Total |
|---|---|
| It is okay to use University-owned software at home… | |
| to complete University assignments | 90% |
| for my personal use. | 58% |
| | |
| I think that it is legal for people such as myself to copy commercial software instead of buying it… | |
| Always | 37% |
| When used for school work | 40% |
| Never | 25% |

Table 5 shows the responses to questions about downloading music. The permission of the recording artist was not a significant factor in attitudes about downloading music.

Table 5
Attitudes About Downloading Music

| I think it is okay: | Total |
|---|---|
| to download music from the Internet | 82% |
| to download music from the Internet if the musicians say  it's OK | 84% |

Table 6 shows the responses to questions about three areas of privacy: the use of computer accounts belonging to others, access to confidential student records and access to names and addresses in university directories. Half of the respondents thought that it was all right to use another student's account with their permission and approximately a quarter of the respondents felt this way about viewing student records if they were not changing them. It is interesting to note that 12% did not think that it was wrong to use someone else's account without their permission and 10% thought that it was okay to look at and change confidential student records. This compares with 8% who thought that it was all right to sell names and addresses from the university directory.

Table 6
Attitudes Toward Privacy

| I think it is okay: | Total |
|---|---|
| to use another student's computer account if the student agrees. | 50% |
| to use another student's computer account without the student's knowledge. | 12% |
| for a student to look at, but not change confidential student records | 27% |
| for a student to look at and change confidential student records | 10% |
| for me to sell names and addresses from the University's phone directory | 8% |

Table 7 shows the responses to questions about the ethics of the use of computers by university employees for non-university activities. 45% of respondents thought that this was ethical for employees taking copies of programs that they had written for the University to their new jobs. It is interesting to note that while 58% of respondents saw no ethical problem in using University computer's for non-University activities, only 44% that that it was okay to use these same computers to run programs for their social organizations.

Table 7
Attitudes Toward Faculty and Staff Ethics

| I think it is okay: | Total |
|---|---|
| for faculty to use the University's computer for non-University activities. | 58% |
| for employees to take with them to their new job copies of programs they have written for the University | 45% |
| for University employees to run programs for their social organization on the University's computer | 44% |

Table 8 showed the responses to questions regarding student plagiarism and related activities. Most of the students felt that it was all right for students to work together on assignments and roughly a quarter felt the same way about giving a classmate a copy of their own work to submit to the instructor. A majority thought that it was all right for two students to work collaboratively on an assignment and for both of them to submit it.

Table 8
Attitudes Toward Student Plagiarism and Related Activities

| I think it is okay: | Total |
|---|---|
| for students to work together on computer assignments. | 86% |
| for students to give a copy of their work to another student to hand in | 26% |
| for two students to share their work for a computer assignment and each hand in a copy | 57% |

Table 9 shows the response to questions about the propriety of using university computers for personal benefit. Most respondents saw no problem with this if it had no adverse affect on others and significant percentage saw no problem doing this even if it had an either a minor adverse effect on others or regardless of its effect on others.

Table 9
Attitudes Toward The Propriety of Using University Computers For Personal Benefit

| It is okay to use the University's computer for my personal benefit: | Total |
|---|---|
| if it has no adverse effect on others | 90% |
| if it has only minor adverse effect on others | 26% |
| regardless of its effect on others | 18% |

Table 10 shows the response to questions about the propriety and legality of copying commercial software under various circumstances. Almost half felt that it was only permissible for backup and archival purposes, an attitude that conforms to the terms of most software licenses. A quarter felt that it was always wrong to copy commercial software, while slightly more than half of the respondents thought that it was proper to copy software that they would never buy or to copy it for trial purposes.

Table 10
Attitudes About The Propriety and Legality Of Copying Software Under Various
Circumstances

| Here is what I believe about people copying commercial software that belongs to others: | Total |
|---|---|
| It is always wrong. | 27% |
| I shouldn't copy it, but the purchaser may make copies for backup and archive purposes. | 47% |
| It is okay for me to use this copied software if I would not buy it anyway. | 54% |
| It is okay for me to "try out" software so long as I buy it if I keep on using it | 63% |

## Discussion

Table 11 compares the results of this study with the earlier studies done by Cohen and Cornwell and by Schuster (1987). The asterisk (*) indicates questions not asked by Schuster. All three studies produced comparable responses on three out of five questions. This study showed that less than half of the students surveyed thought that professors copied software; earlier studies showed that more than half of the respondents thought that professors did it as well. One student suggested to the author that students might assume that professors and administrator are provided with their software by the university. Additionally, in this survey more than half of the students surveyed said that they had copied software themselves, 10% more than in Cohen and Cornwell's study. This can be most easily attributed to greater computer literacy, given than only 24% indicated computer experience in the earlier study.

Table 11
A Comparison of Questions From Three Studies

| | This Study | Cohen & Cornwell | Schuster |
|---|---|---|---|
| I think that most people copy commercial software instead of buying it. | 68% | 69% | * |
| I think that most students copy commercial software instead of buying it. | 78% | 86% | 96% |
| I think that most professors copy commercial software instead of buying it. | 39% | 56% | 79% |
| I think that most administrators copy commercial software instead of buying it. | 36% | 25% | 89% |
| I have copied commercial software instead of buying it. | 54% | 44% | * |
| I think it is okay for people such as myself to copy commercial software instead of buying it when we use it for educational purposes | 74% | 79% | 84% |
| * Not included in Schuster's study | | | |

College students today are far more computer-literate than students were when Schuster, Christoph et al. and Cohen and Cornwell did their respective studies. But

current attitudes toward software piracy are similar to what they were at that time. While various studies have shown that one can create a profile of the software pirate or of the culture that is more likely to foster software piracy, there is no sense among college students that the unauthorized copying of commercial software is wrong. And there is no clear indication that this belief is becoming more or less prevalent.

It is very clear that students do not see any problem with downloading music over the Internet. The permission of the artists whose music they are downloading is insignificant in their forming opinions on the issue of downloading music. In fact, there were respondents at Adelphi who thought that downloading was acceptable **unless** the musicians said that it was OK! The popularity that Napster enjoyed and that KaZaa currently has seems to imply that the sentiments expressed by respondents are fairly typical of college students in general.

Software piracy and the unauthorized sharing of copyrighted music both show a fundamental disrespect for intellectual property rights; one would expect some indication that a more permissive attitude toward software piracy makes one more likely to have a permissive attitude toward downloading music. The correlation coefficient for the questions on copying software and downloading music was 0.40, which indicates a moderate positive correlation. A full third of the respondents who saw nothing wrong with downloading music did not consider the copying of commercial software as "OK."

It is hard to say if the respondents see any real difference between downloading music from the Internet and copying software. Anecdotal evidence suggests that there are fewer qualms about downloading music because there is an assumption that they have a right to download whatever they find on the Internet. Copying software is a different matter; the attitude can be summarized by a comment that one student wrote in the margin of a questionnaire: "I don't have hundreds of [dollars] to spend [on software packages] and I need them."

The obvious question is why students believe that there is no potential ethical problem with making copies of software or downloading music. Although the survey did not ask students to explain the reasons for their opinions, informal discussions with students suggest that there are a few misconceptions that help promulgate the belief that the duplication of copyrighted materials is permissible. Some of these misconceptions are quite popular and have been debunked (Templeton 2004):

*The owner is not losing anything.* It is hard to conceive of an action being theft if the owner still has physical possession of his or her property. Yet the very fact that copies of the work exist that the copyright holder did not authorize and for which he or she receives no royalties constitutes a theft in most cases. The IFPI, the international recording industry association of which the Recording Industry Association of America is a member, bases its estimates of losses due to music piracy on the assumption that everyone making an unauthorized copy would otherwise buy an authorized copy. (IFPI 2002). There is anecdotal evidence that this is not the case; some students will buy

recordings that they have already downloaded while others will download recordings that they would never have bought (Siegfried 2003).

*Materials available over the Internet are all in the public domain.* There is a general impression that anything that one can access free of charge is legitimately available for downloading. Most students do not distinguish between materials clearly placed in the public domain by its creators and materials on which there is copyright protection.

*The copying is covered by the "fair use" exception to copyright law.* Although the concept of "fair use" may exist in the legal systems of many countries, exactly what is included varies. In the United States, there are four nonexclusive factors that must be considered if the fair use exception applies:

1. the purpose and character of the use;
2. the nature of the copyrighted work;
3. the amount and substantiality of the portion used in relation to the whole work;
4. the effect that the use may have on the potential market or value of the work (US Copyright Law 1993).

In many cases, the unauthorized copying of software and downloading of music fails to pass the final test; the very reason for copying the work in most instances is to avoid buying it. However, in cases where the user is copying a recording from one medium to another for his/her own, e.g., from CD to cassette tape to play in his/her tape player, it would pass this final test. It is difficult to gauge the extent to the fair use exception would actually apply. Other countries such as the Netherlands (1990) and Belgium (1994) allow the creation of copies for personal use, charging a levy on recording media that is used to compensate the copyright holders. In these countries, the downloading of music is illegal, even if the uploading of these very recordings may not be.

Before the end of 2000, Adelphi University requested that the University's Internet Service Provider (ISP) block Napster from the campus network because of the huge amount of bandwidth that its traffic consumed. Immediately after the block went into effect, there was a sizeable drop in traffic (Gallagher 2001). This suggests that Napster was a popular application for the University community and that the swapping of music files was fairly common. In an era of video cassette recorders, "boom-boxes" which can easily recording radio programming and compact disks and CD-RWs, students have a hard time perceiving ethical distinctions between time-shifting of programs, saving a favorite episode of a program and swapping these recordings with friends and strangers.

Plagiarism is another example of an ethical issue exacerbated by the Internet. The popular press has written about the available of online term papers for sale (Hickman 1998; Zack 1998) and there are web pages helping college faculty identify it and deal

with it (Ehrlich 2002). Ehrlich lists 8 methods of detecting plagiarism including checking sites such as **www.schoolsucks.com** that provides term papers for sale.

Plagiarized programming assignments have also become an issue in recent years. There are a variety of methods used to detect plagiarized programs ranging from comparing character string in programs using simple tools like the UNIX utility *diff* to more sophisticated analyses of program structure such as *JPLag* (Malpohl 2002), *Moss* (Aiken 2002), and *SHERLOCK* (Joy 1999). One of the problems of dealing with software plagiarism is the question of where innocent collaboration ends and plagiarism begins. Joy and Luck (1999) acknowledge this "potentially gray area of acceptability." The fact that 57% of respondents considered it acceptable to collaborate on a program for each to hand it in as their own work may reflect some confusion on the part of students as to where that that "poorly defined" boundary is that separates "plagiarism and legitimate cooperation."

Although the plagiarism problem is not new, it has increased in recent years (McCabe 2001a). Easy access to the Internet and its information resources is at least partially responsible for this growth (McCabe 2001b). Additionally, many students do not know what is considered an appropriate use of materials found on the World Wide Web (CAI 2004). Some universities have placed pages on their web sites to explain the plagiarism issue to students (Tulane 2004; Michigan 2004) and to faculty (Iowa 2004; Rutgers 2004). Martin (1994) argues that plagiarism ought to be seen as less of a sin that it is currently considered because this approach overlooks certain forms of plagiarism that are frequently overlooked, such as ghostwriting.

What is most worrisome is the fact that 10% of the respondents considered it acceptable to change student records and 12% considered it "OK" to use someone else's computer without their knowledge. This suggests that the "hacker mentality" may be more prevalent than commonly assumed although Woodcock and Armstrong (2001), in surveying high school and university students in Northeast Australia, found that such behavior was less likely to be considered ethical. It is interesting to note that this compares to only 8% thinking it acceptable to sell names and addresses from university phone directories despite the fact that this information can be compiled from other sources.

At first glance, it is surprising to see that affiliation with the Catholic Church made no difference in students' ethical attitudes. This has been observed before; Kennedy and Lawton (1989) studied religious affiliation and its correlation with ethical orientation and found that no discernible difference between students at Catholic and unaffiliated institutions.

What can be done to make students more aware that of the ethics of computer usage? Cohen and Cornwell (1989) spoke about integrating ethics into the computer science curriculum and not simply teaching it as a separate. They found evidence that suggests it improves students' attitudes toward most ethical issues in computing. But this lesson must start with a good example: Athey found in her study of AACSB-accredited

universities (1990) that faculty was sometimes viewed as the main offenders of software piracy policies and frequencies as being ineffective enforcers.  Taylor (1993) noted that professors are more likely to copy software than business executives, attributing it to the looser supervision of college faculty and fewer sanctions that they face if caught. Additionally, students can be made more aware of educational discounts. Most major software companies are offering most of their packages at significant discounts to college students.  Most schools could remove one of the motivating factors in software piracy by following the examples of schools such as New York University and Columbia University, which sell software at educational discount in stores on campus.

Robert Harris claims that plagiarism can be detected by following a few strategies that include understanding the motivation and the methods of plagiarism (Harris 1994). Lou Bloomfield of the University of Virginia found that efforts to detect plagiarism followed up by enforcement can reduce plagiarism (Argetsinger 2001).  However, such enforcement efforts are rare; partly because of student intimidation of faculty and partly because faculty fear that university administrators will not back them up.  Preventive efforts, such as requiring intermediate work products such as outlines and first drafts can reduce plagiarism (Innerst 1998).

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