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## **Ethics of Computer Use: A Survey of Student Attitudes**

**Working Paper Series—06-02 | March 2006**

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# **Ethics of Computer Use: A Survey of Student Attitudes**

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## *Introduction*

As the amount of corporate and personal information continues to grow and the access to that information by IT personnel increases, ethics and value judgments by IT professionals becomes more important. Research in information systems security and control, has reported large losses attributable to unethical activities (Straub, 1986). Pearson et al. define three factors which require further study of ethical behavior of IS professionals. These include a greater reliance on IT systems across the business enterprise, increasing use of system generated information for decision making, and the lack of single unified code of ethics for all IT personnel (Pearson, et. al., 1996).

Professional organizations like ACM and DPMA have implemented an ethical code of conduct. In addition, organizations are increasingly establishing codes of ethics for internal use with about 93% of U.S. firms having such codes in place in 1992 (Berenbeim, 1992). Unfortunately, many of these codes are either very general statements which are difficult for workers to translate into individual situations or, in some cases the ethical statements are viewed by workers with a certain denial of responsibility (Harrington, 1996). As a result, gaining understanding of ethical issues is best accomplished through the use of scenarios. These scenarios must be specific and engage the participant. Integration of ethics topics has been recommended for the computer science curriculum (Miller, 1992) and specific approaches for delivery of this content, through scenarios, have been explored within an Information Systems curriculum (Couger, 1989). Both the ACM and DPMA have included ethical issues as a part of their recommended standard curriculum for schools. Students studying under general business or Information Systems Curriculum should be given knowledge about ethics issues.

Computer Science and Information System students will compose our future IT workforce. A survey of ethical attitudes of these students can be used as a proxy for ethical attitudes of entry level IT workers. Previous surveys of business students (Slater, 1991) have shown that more than one-half of respondents claimed they had engaged in unethical computer activity, including hacking or illegal copying of software. This corresponds with surveys of industry abuse regarding the ownership of intellectual property. Losses for software developers attributable to piracy in 1996 were estimated to be 11.2 billion (SPA/BSA, 1997). This emphasizes the need for continued study of the ethical beliefs and value judgments made by students.

## *Student Perceptions*

Paradice first evaluated student perceptions based on 12 scenarios (Paradice, 1990). Although the study lacked rigorous statistic analysis, three motives for ethical behavior were defined. Motives were defined for obligation, opportunities, and intent. Each scenario presented an ethical situation to which MIS and non-MIS students responded. He concluded that MIS students had stronger notions of professional responsibility, and that non-MIS students were more tolerant of software piracy. However, a study by Im and Hartman (1990) was not able to confirm divergent ethic perceptions between MIS and non-MIS students.

Generally students rated situations concerning opportunity and intent as unethical. However, results were mixed for obligations to clients and companies (Paradice, 1990). This behavior of opportunity and intent was confirmed by Whitman, et. al. with greater statistical rigor. In addition, through a rigorous application of multivariate factor analysis revealed that ethical motives (factors) could be more correctly represented by misuse of corporate resources, illicit use of software or software license infringement (Whitman, et. al., 1999).

The mixed results experienced by Paradice were confirmed by Calluzzo and Cante in a survey of graduate and undergraduate students. Students often represented misconceptions about ethical and non-ethical behavior in response to questions. Students agreed that behavior was unethical if it was a matter of personal privacy or theft of software. However when the questions concerned property or privacy violations for the enterprise or business, many student responses were neutral when a clear ethical violation occurred (Calluzzo and Cante, 2004). Couger's earlier study (Couger, 1989) had also found that students were indifferent about enterprise piracy.

Ethical perceptions have been found to differ between industry professionals and students. Generally, greater IS experience produced stricter ethical interpretations. Older IS professionals rated situations as unethical where students or younger professionals allowed a more liberal interpretation (Prior, et. al. 2002). Behavior, including the production of software with bugs, or reducing testing efforts to bring a project within time and budget, was considered acceptable and not viewed as unethical by students. This result was confirmed when student

responses were compared to those of industry experts (Athey, 1993). Justification for the differential was attributed to lack of experience, student income level, or just that students see this behavior everyday in the business world, and so perceive it as acceptable behavior.

In explaining the student ethical evaluations, studies have used a variety of demographic factors like age, gender, computer experience, academic major or knowledge of programming languages (Whitman, et. al., 1999), income level (Athey, 1993) or just gender (Leventhal, et. al., 1992) Some evidence supports that male and female responses will differ (Leventhal, et. al., 1992). However, the results vary depending on the type of question.

### *Approach*

This study examines differences in perceived motivation or intent of an action and how these differences in intent affect student ethical evaluations. Student perceptions of how seriously ethical behavior is breached in a number of scenarios describing unauthorized access to computer systems, or use of computers in the illegal copying/distribution of copyrighted materials are examined. While a number of studies have looked at similar issues, few have rigorously examined how the motivation for the unauthorized access or illegal copying affects our ethical assessment of this behavior.

The focus on intent is created by presenting alternative scenarios in which the type of access or copying is identical, but where the motivation of the individual involved and the use made of the unauthorized access or illegal copies is varied. Scenarios are presented in which the incident of misuse, unauthorized access, or illegal copying is motivated by a variety of factors including – intellectual curiosity, malicious use of resources, obtaining resources for personal use or to support non-profit motivated activities, or obtaining resources for profit. We hypothesize that acts motivated by profit or malice will be viewed as more severe breaches of ethics than the same acts performed to satisfy intellectual curiosity or to obtain resources not used for profit.

### *The Survey Instrument*

The question set used is adapted from one developed by Paradice (1990). Paradice defined three motivations for his question set, consisting of obligation, opportunity, and intent. Since the purpose of the study was to identify levels of perceived intent, where intent was judged based on the level of malice, Paradice's questions on the motivation of obligation were deleted. Questions from the opportunity motivation were used essentially unchanged and questions from the intent motivation were both extended to provide better clarification of actor intent and supplemented with additional questions relating to software piracy.

A follow-on study applying a rigorous factor analysis to Paradice's question set isolated three specific factors (Whitman, et. al., 1999). These ethical factors were defined as software license infringement, illicit use (writing and disseminating viruses or causing a system crash), and misuse of corporate resources. To ensure comprehensive coverage of these factors affecting ethical decision making, this question set was mapped to these factors replacing the original motivations defined by Paradice. Questions 1 and 2 map to misuse of corporate resources, 3 and 4 map to illicit use, and 5, 6 and 7 map to license infringement.

The nature of the software referred to in each question (Word processing vs. Web Bots) was also changed to reflect the timeframe of this study, since the original work was created nearly 15 years ago. In addition, we have systematically increased the number of alternative scenarios in which the type of unauthorized access or license infringement was the same but the motive and type of use differed.

This survey was administered to students in a junior level management information systems (MIS) course at an AACSB accredited school of business which includes an outside ethics course in addition to ethics content included throughout the business core courses. The survey was administered across multiple sections serving different populations. One section, with 30 respondents, was an on-line section whose students were predominantly participants in a web-based undergraduate degree program for students with community college degrees relating to information technology. The remaining sections, with 37 respondents, were open to all business majors and were taught in face-to-face mode with supplemental materials, including the survey, provided on-line.

It seems reasonable to assume that the students in the on-line section were, in general, more sophisticated in their knowledge and experience with the use of computer systems, but would this affect their ethical perspectives. Greater knowledge of potential abuses in computer systems might make students more sensitive to the dangers of abusing computer privileges, and the fact that many of the students in the online course were headed for IT related careers might make them more sensitive to the codes of ethics and professional obligations relating to computer use. For these reasons we hypothesize that the students in the on-line section for students pursuing IT related careers will tend to view the ethical breaches in each of the scenarios as more severe than the general business students in the

face-to-face sections. Comparisons between the two types of students are presented in the last empirical results subsection below.

Survey Questions asked respondents to rate the behavior described in each scenario on a 7 point, centered, Likert scale. The response choices presented were 1) very ethical, 2) ethical, 3) somewhat ethical, 4) questionable, 5) somewhat unethical, 6) unethical, and 7) very unethical. Seven fundamental ethical scenarios were presented. However, variations with modification in the motivation for the action described were presented for most of the scenarios leading to a total of 19 questions. Two of the base scenarios and 4 total questions dealt with instances of misuse of corporate computer resources, Two base scenarios and 5 questions dealt with instances of illicit use of (unauthorized access to) computer resources. Finally, three base scenarios and 10 questions dealt with aspects of illegal copying and/or distribution of copyrighted software or digitized music. The questions used are listed in the heading area of each table of survey results presented below. In describing these empirical results, we will cover the scenarios, by category, in the order described above.

### Survey Results

In the tables of results presented below, the distribution of responses across the whole survey group (67 observations) is presented along with an indication of the percentage of respondents selecting each response. The median response is also indicated by that response being shown in bold faced type.

Likert scales provide data that are ordinal in nature. Although Likert scale data has often been analyzed using statistics designed for cardinal data, it is more appropriate to use nonparametric statistical tests that are valid for ordinal data (Classon and Dormody, 1994).

In the results presented below, the single sample Wilcoxin signed-ranks test for differences in paired responses is used to assess differences in response across scenarios posing the same action but with variations in the motivation for the action. Given that the data were coded so that a 1 means very ethical and a 7 means very unethical, a positive value for the signed rank statistic S means that respondents believed the first item in the pair to be less ethical than the second. Thus, for instance, the substantial negative value for the S statistic in the comparison of Question 1A with Question 1B in Table 1 indicates that respondents believe that the student's actions in finding the security loophole represented less of an ethical breach than the student's actions in using the loophole to access other students' records. The probability that the observed S value could have occurred when there is no difference in the population's rankings of the two items is shown in parentheses below each S value and results that are significant at the .05 level are indicated by an asterisk in the table results presented here.

#### *Misuse of Corporate Resources*

The first scenario of misuse of corporate resources presented is the one summarized in Table 1. A student finds a loophole in the security of a university computer system. The alternative scenarios assess the ethics of the student in finding the loophole, and in using it to access private information of other students. On average, respondents found the student's action in finding the loophole somewhat unethical, but found his or her action in exploiting the loophole, scenario B, significantly more unethical. Scenario C under this question deals with the actions of the administrator of the system that was breached, and the obligation to protect users for breaches of privacy. Respondents on average felt that the response of the system administrator was of questionable ethics, but felt that it was significantly less unethical than the actions of the student in accessing other students' records.

**Table 1**

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A student suspected and found a loophole in the university computer's security system that allowed him to access other students' records. He told the system administrator about the loophole, but continued to access others' records until the problem was corrected 2 weeks later.

- A. The student's action in searching for the loophole was
- B. The student's action in continuing to access others' records for 2 weeks was
- C. The system administrator's failure to correct the problem sooner was

	A		B		C	
	Count	Pct.	Count	Pct.	Count	Pct.
Very Ethical	2	2.99	0	0.00	0	0.00
Ethical	10	14.93	0	0.00	2	2.99
Somewhat Ethical	5	7.46	2	2.99	1	1.49
Questionable	12	17.91	0	0.00	29	43.28
Somewhat Unethical	<b>5</b>	7.46	2	2.99	<b>12</b>	17.91
Unethical	14	20.90	16	23.88	10	14.93
Very Unethical	19	28.36	<b>47</b>	70.15	13	19.40
			B		C	
Paired Signed Ranks Test for			S- Stat.	p - H0	S- Stat.	p - H0
Scenario A vs. ____			-351.50	(<.001) *	-16	-0.87
Scenario B vs. ____					571.5	(<.001) *

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Table 2 presents a single scenario of a programmer at a bank modifying an accounting information system to avoid a service charge on his personal account. Respondents on average found this behavior unethical with a near majority finding it very unethical.

**Table 2**

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A programmer at a bank realized that he had accidentally overdrawn his checking account. He made a small adjustment in the bank's accounting system so that his account would not have an additional service charge assigned. As soon as he made a deposit that made his balance positive again, he corrected the bank's accounting system.

	Count	Pct.
Very Ethical	1	1.49
Ethical	2	2.99
Somewhat Ethical	4	5.97
Questionable	2	2.99
Somewhat Unethical	5	7.46
Unethical	<b>26</b>	<b>38.81</b>
Very Unethical	27	40.30

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*Illicit Use of Computer Resources*

Table 3 presents results for a scenario in which a manager of a company subscribes to online services provided by a competing company. Two alternatives of this scenario have the manager using information she obtained to identify sales prospects in one case and to attempt to crash the competitor's on-line system in the alternative scenario. On average respondents felt that using the competitor's own system to identify prospects was unethical while using it to crash the competitor's system was overwhelmingly viewed as very unethical.

**Table 3**

---

A manager of a company that sells computer processing services bought similar services from a competitor. She used the service for over a year and always paid her bills promptly.

A. She used her access to the competitor's computer to try to break the security system and cause the system to "crash."

B. She used her access to the competitor's computer to identify other customers, and used this information to identify sales prospects.

	A		B	
	Count	Pct.	Count	Pct.
Very Ethical	0	0.00	1	1.49
Ethical	1	1.49	2	2.99
Somewhat Ethical	1	1.49	5	7.46
Questionable	2	2.99	10	14.93
Somewhat Unethical	5	7.46	13	19.40
Unethical	14	20.90	<b>19</b>	<b>28.36</b>
Very Unethical	<b>44</b>	<b>65.67</b>	17	25.37

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Paired Signed Ranks Test for Scenario A vs. Scenario B

S- Stat.	428.00	p - H0	(<.001) *
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Table 4 presents a set of scenarios about a programmer installing “bots” on vulnerable computers on the internet and using them in a variety of ways. In the first alternative he uses the bots to launch a denial of service attack against the web site of a company that he believes engages in exploitive behavior. In the second scenario, he simply uses the bots for his own amusement to calculate the value of Pi. Finally in the third scenario he ultimately uses the bots to extort money for personal gain. Not surprisingly, respondents overwhelmingly found the use of the bots for personal gain to be very unethical and found this behavior more unethical than the other 2 scenarios. Perhaps more surprising is the fact that, when the target of a denial of service attack was a company thought to engage in exploitive practices, respondents did not feel that use of the bots in a denial of service attack was less ethical than just using them for personal amusement.

**Table 4**

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Dilbert develops a set of programs that allow him to find vulnerable computers on the internet and install “bots” on them. These bots can be controlled by Dilbert to initiate e-mail from each computer infected with a “bot.”

- A. Dilbert uses these bots to flood the site of a corporation that is widely believed to have exploitive labor and environmental practices, causing the businesses web site to be unavailable for several hours. The bots cause no other damage to the affected systems and are not used for any other purposes. Dilbert's behavior is
- B. Dilbert uses these bots to take over the infected PCs when they are not in use and use these computing resources to help him calculate the value of PI 8 billion decimal places. His bots cause no damage to the infected systems and never operate when there are not idle resources. Dilbert's behavior is
- C. Dilbert uses these bots to flood the site of an online business for several hours. He then demands that this business pay \$50,000 to an “offshore” untraceable account and threatens to repeat the attack until the business makes this payment. Dilbert's behavior is

	A		B		C	
	Count	Pct.	Count	Pct.	Count	Pct.
Very Ethical	1	1.49	0	0.00	1	1.49
Ethical	1	1.49	1	1.49	1	1.49
Somewhat Ethical	2	2.99	3	4.48	3	4.48
Questionable	10	14.93	8	11.94	2	2.99
Somewhat Unethical	7	10.45	6	8.96	1	1.49
Unethical	<b>22</b>	<b>32.84</b>	<b>28</b>	<b>41.79</b>	8	11.94
Very Unethical	24	35.82	21	31.34	<b>51</b>	<b>76.12</b>

Paired Signed Ranks Test for	B		C	
	S- Stat.	p - H0	S- Stat.	p - H0
Scenario A vs. ____	-24.5	-0.56	-214.5	(<.001) *
Scenario B vs. ____			-247	(<.001) *

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*Illegal Copying and Distribution*

Three base scenarios of illegal copying and or distribution of copyrighted materials are presented here with variations involving differences in how widely the materials are distributed and whether profit is involved. The first scenario involves improper copying and use of computer software, while the remaining scenarios deal with downloading or copying copyrighted music.

Table 5 presents 3 variations of a scenario in which a student with a legal license to use a software package for educational purposes retained that software in violation of the license agreement after graduation. In one alternative she used the software to support work for a charitable organization, in another she used it for personal and job search activities, and in the third she used it in a for-profit company. The median response to the charitable and personal uses was that these uses were somewhat unethical. However, respondents felt that use of the software in a for-profit venture was more unethical than the other uses. The median response indicated this behavior was believed to be unethical and about a quarter of the respondents felt it to be highly unethical.

**Table 5**

A student legally obtained a copy of a popular word processing software package. The software license agreement allowed use “for educational purposes only” and required the student to remove the software from her computer once she was no longer a student. She kept the word processing software on her computer after graduation and used it						
A.	to support her volunteer work for a charitable organization. Her Behavior was					
B.	for personal correspondence and job search activities. Her Behavior was					
C.	in support of a for-profit business services company that she developed. Her behavior was					
	A		B		C	
	Count	Pct.	Count	Pct.	Count	Pct.
Very Ethical	4	5.97	5	7.46	2	2.99
Ethical	3	4.48	2	2.99	1	1.49
Somewhat Ethical	4	5.97	6	8.96	3	4.48
Questionable	21	31.34	19	28.36	10	14.93
Somewhat Unethical	<b>16</b>	23.88	<b>18</b>	26.87	15	22.39
Unethical	14	20.90	14	20.90	<b>20</b>	29.85
Very Unethical	5	7.46	3	4.48	16	23.88
			B		C	
Paired Signed Ranks Test for			S- Stat.	p - H <sub>0</sub>	S- Stat.	p - H <sub>0</sub>
Scenario A vs. ____			-2.00	-0.97	-290	(<.001) *
Scenario B vs. ____					-305.5	(<.001) *

Table 6 presents a set of scenarios relating to use and distribution of software illegally copied from a web site. Alternatives involving keeping the music for personal use, providing copies to friends, providing copies for no gain on the web, and selling copies of the downloaded music for personal gain were evaluated by respondents. Evaluation of the median responses and results of the signed-rank test indicate that our survey respondents felt that each of these activities involved progressively greater violations of ethics. Respondents overwhelmingly found the



sale of such downloaded music for profit to be very unethical. In fact the proportion of respondents finding this behavior very unethical was the highest of that for any of the scenarios and alternatives presented in this study.

**Table 6**

Andy downloads a copy of a CD by a famous artist recorded on a major record label from an illegal site.									
A.	He keeps this music on his own PC and MP3 player. Andy's behavior is								
B.	He sends copies of this music to 3 of his friends. Andy's behavior is								
C.	He makes copies of this music available (for free) to anyone requesting them on the web. Andy's behavior is								
D.	He makes copies of this music on a CD and sells them. Andy's behavior is								
	A		B		C		D		
	Count	Pct.	Count	Pct.	Count	Pct.	Count	Pct.	
Very Ethical	4	5.97	3	4.48	3	4.48	1	1.49	
Ethical	2	2.99	1	1.49	2	2.99	0	0.00	
Somewhat Ethical	4	5.97	1	1.49	2	2.99	1	1.49	
Questionable	14	20.90	8	11.94	4	5.97	1	1.49	
Somewhat Unethical	<b>12</b>	17.91	11	16.42	7	10.45	2	2.99	
Unethical	16	23.88	<b>17</b>	25.37	<b>21</b>	31.34	8	11.94	
Very Unethical	15	22.39	26	38.81	30	44.78	<b>54</b>	80.60	
			B		C		D		
Paired Signed Ranks Test for			S- Stat.	p - H0	S- Stat.	p - H0	S- Stat.	p - H0	
Scenario A vs. ____			-300.00	(<.001) *	-367	1) *	-580	(<.001) *	
Scenario B vs. ____					-85.5	0.00 *	-315	(<.001) *	
Scenario C vs. ____							-253	(<.001) *	

Table 7 presents scenarios similar to those of Table 6, except that here the music was originally purchased legally and was performed by a local band. Alternatives involving distribution to a few friends, making the music available to any one on the internet with no personal gain, and copying and selling the CD for personal gain were evaluated by respondents. Once again our respondents found each of these scenarios to represent successively greater breaches of ethics. While the majority of respondents found sale of the copied CDs to be very unethical, it is interesting that respondent tended to view each of the alternatives in Table 7 as slight less severe violations of ethics than the corresponding alternatives presented in Table 6. Evidently, the fact that the copy was initially obtained by illegal means made respondents more critical of further uses of the music.

**Table 7**

At a concert, Mandy buys a copy of a CD self produced by a local band.

- A. She makes electronic copies of this music and sends them to 3 of her friends. Mandy's behavior is
- B. She makes copies of this music available (for free) to anyone requesting them on the web. Mandy's behavior is
- C. She makes copies of this music on a CD and sells them. Mandy's behavior is

	A		B		C	
	Count	Pct.	Count	Pct.	Count	Pct.
Very Ethical	2	2.99	2	2.99	1	1.49
Ethical	5	7.46	3	4.48	0	0.00
Somewhat Ethical	3	4.48	5	7.46	0	0.00
Questionable	22	32.84	16	23.88	3	4.48
Somewhat Unethical	<b>11</b>	16.42	<b>8.00</b>	11.94	4	5.97
Unethical	18	26.87	18.00	26.87	18	26.87
Very Unethical	6	8.96	15.00	22.39	41	<b>61.19</b>

  

Paired Signed Ranks Test for	B		C	
	S- Stat.	p - H0	S- Stat.	p - H0
Scenario A vs. ____	-180.00	0.00 *	-733	(<.001) *
Scenario B vs. ____			-564	(<.001) *

### Comparisons Among Groups

As noted above the survey was completed both by a set of general business majors and by a separable set of students who were predominantly IS related majors in an on-line class. To see if these groups differed, we tested for differences in response between the predominantly IS student on-line section and the face-to-face sections consisting of general business majors. In this assessment, we treated the two types of sections as independent samples and performed a Chi-Square test for differences between the two samples. Results of the Chi-Square test are recorded as a Z-statistic where, for the given sample size, values greater than two generally indicate that the mean responses of the two groups are different using the standard .05 probability level for rejecting the null hypothesis of equality. The samples were ordered in a manner that causes the Z-statistic to be negative when the students in the on-line, IS oriented program rated the behavior in a scenario as less ethical than the class of general business majors. Chi-Square test results that are significant at the .05 level are also indicated by an asterisk.

The results shown in table 8 suggest that the differences between the two groups are of only modest magnitude. While the sign of the Z-statistic indicates that the online, IS oriented, students were usually more negative in their ratings of behavior in nearly every scenario, the differences were only statistically significant in 3 of 20 cases. It is interesting that the statistically significant values all came in the variant of a given scenario that was viewed as least unethical. It appears that perhaps IS oriented students are less tolerant of modest breaches of ethics, while both groups find more serious breaches equally egregious.

**Table 8**  
**Chi-Square Tests for Differences in Ethical Valuations**  
**Between IS Students and General Business Majors**

	Sub-Scenario			
	A	B	C	D
	Z-Value	Z-Value	Z-Value	Z-Value
Scenario 1	-2.00 *	-1.01	-1.43	
Scenario 2	0.49			
Scenario 3	0.16	-2.46 *		
Scenario 4	-0.49	-0.42	-1.17	
Scenario 5	-1.47	-0.99	-1.08	
Scenario 6	-1.50	-1.41	-1.47	-0.91
Scenario 7	-2.54 *	-1.54	-0.39	

### *Conclusions*

This paper presents the results of a survey of ethical attitudes among undergraduate business majors and IS majors. Students evaluated various scenarios related to the use of computer systems by individuals. These scenarios presented the student with a number of varying degrees of activity that could be judged in terms of their level of ethical or unethical activity. The judgment made by the student was on a scale of Very Ethical to Very Unethical with five levels in between. Sixty seven students participated in the survey.

The results of the survey are summarized in Table 9. The table shows the median ranking for each activity and also the score for the test for differences between the different activities for each scenario - statistically significant values are italicized. The median rank for all activities is in the range of somewhat unethical to very unethical. The results show that the **intent** of an individual engaging in the activity does alter the students' perception of the level of ethical behavior. Personal use of software, or downloads was judged more as being just somewhat unethical as was hacking into a computer system for reasons of intellectual curiosity. Malicious activity (scenarios 1, 2, 3 and 4) however, was judged primarily in the unethical to very unethical range. Accessing other peoples records, changing code for personal gain, and causing reduced response time on company PCs was judged to be in the unethical to very unethical range. However, causing reduced response time for a company that was believed to exploit its workers and was unfriendly to the environment was viewed no more negatively than the same activity performed without malicious intent. Sharing illegal copies with others was seen as less ethical than just personal use of such copies, and profiting from the illegal reproduction of music CD was overwhelmingly judged to be highly unethical.

Very little difference observed between the IS and general business groups of students. It appeared the IS students were a little less tolerant of modest breaches of ethics.

Further research should be done using other populations of students, industry users, and non industry home users to see if there are differences in attitudes among different types of users. Also, future research should examine the effects of ethics curriculum and the use of codes of ethics by conductive comparative studies of students before and after exposure to ethics instruction.

**Table 9**  
**Summary Results**

Scenario	M	B	C	D
<b>1. Loophole in Computer System</b>				
A. Student searches for loophole	su	-351	-16	
B. Student accesses other student's records	vu		571	
C. System Administrator fails to correct problem on a timely basis	su			
<b>2. Company manger using a competitors similar services</b>				
A. Tries to break security system to cause competitors system to crash	vu	428		
B. Used access to identify customers for sales prospects	u			
<b>3. Programmer at bank makes change in code to eliminate a fee</b>				
Code is changed back to original as soon as the balance is updated	u			
<b>4. Population of "bots" on computers using the Internet</b>				
A. Causes a website of a company with questionable labor and environmental practices to be unavailable for a few hours.	u	-24	-214	
B. Causes infected PCs in companies to calculate Pi to 8 billion decimals when those PCs have idle resources	u		-247	
C. Causes degraded service of an online site for hours, and demands a ransom to remove the "bots"	vu			
<b>5. Student's use of software for educational use only</b>				
A. Uses the software as a volunteer for charitable organizations	su	-2	-290	
B. Uses the software for correspondence and job search activities	su		-305	
C. Uses the software for a for-profit business services company she started	u			
<b>6. Download of a music CD by a famous artist on a major record label</b>				
A. Uses the music on personal PC and MP3 player	su	-300	-367	-580
B. Sends copies of music to 3 friends	u		-85	-315
C. Makes copies of music available to anyone accessing his website	u			-253
D. Makes copies on CDs and sells them	vu			
<b>7. Purchase of CD sold by a local band</b>				
A. Makes copies on CD to give to friends	su	-180	-733	
B. Sends copies on CD to anyone requesting the CD on her website	u		-564	
C. Makes copies on CD and sells them	vu			

**Column M** - Median response (Very Ethical, Ethical, Somewhat Ethical, Questionable, Somewhat Unethical, Unethical, Very Unethical)

**Columns B, C, D** – Wilcoxin signed-rank value for differences in paired responses. Example: 1A (minus value) is much less of an ethical breach compared to 1B. 1A and 1C are about the same. 1B (plus value) is much more of an ethical breach as compared to 1C.

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