

How Do Information Technology Students Stand on IT Ethical Issues and What Influences Their Decisions

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Abstract

This manuscript presents a review and analysis of how information technology ethical issues are viewed by current information technology students and examines influences on their decisions. The moral intensity influence is based on the work of Jones (1991) and Rest (1986) and attempts to determine which, if any, of the moral intensity factors influenced their decisions. Influences surveyed include five common moral intensity variables of Magnitude of Consequences, Social Consensus, Proximity of Effect, Concentration of Effect, and Temporal Immediacy. The findings first reveal that not all commonly regarded unethical IT situations are opposed by students. Some are supported, some are opposed and others are neutral. Also although questionable moral situations were judged with varying levels of opposition or support, both gender and age affected ethical decisions. It was also found that the students are affected by different moral intensity variables in their moral decisions depending on the issue. Educators and practitioners can use these findings to tailor moral education and training activities to improve information technology ethical decision making.

Keywords: ethics, ethical decision making, information technology, moral intensity, students.

1. INTRODUCTION

There has been much technology ethics study by various researchers for many years. One of the primary reasons for this study as well as its continuing need is Ogburn's cultural lag theory (Marshall 1999). This theory suggests that ethical understanding needed to be associated with advances in technology lag behind the technological development itself. In other words, our technology outpaces our ability to keep up with ethical issues associated with that technology. Studies have been performed in the past on overall ethics in information technology, but there have been many new technologies that have been developed that

have not been addressed. Advances have occurred and technologies have also changed fundamental rights issues such as privacy, property, and secrecy. The views of information technology students related to these ethical issues are explored in this study. This study reviews current information technologies and issues associated with these technologies and reviews how current information technology students decide on these issues.

The study will explore student views on IT issues. But it will also explore the effect of student gender and age on information technology and ethical decision-making of students. In addition it will attempt to explore the variables that affect student infor-

mation technology ethical decision-making. Past studies have shown that moral decisions may be influenced by gender. Wood and Glass (1995) determined that females were less likely to support software piracy. Vitell (2003) found that as age increased so did support of ethical positions. Singhapdi (1999) found that females were more likely to be ethical than males. There are also some researchers who suggest that gender does not have an influence in certain technical situations. Both Vitell (2003) and Athey (1993) have found no gender differences in their ethical studies.

In ethical decision-making theory a general concept that has been developed is moral intensity. Jones (1991) suggested that moral intensity serves as a basis for support of moral decision-making. He suggested six components of moral intensity which overall made up a single construct of moral intensity that impact moral decisions. Researchers have varied in their opinions of whether moral intensity is a single construct or rather a disparate group of influences. In a marketing study, Paolillo and Vitell (2002) have found moral intensity to be a single construct. But there are other researchers who have found specific variables within moral intensity to be more significant than others (Marshall and Dewe, 1997 and Frey, 2000). Magnitude of Consequences has been found to be a significant factor in many moral judgments and intentions (Barnett and Valentine, 2004). In another study Social Consensus, along with Magnitude of Consequences were found to be the most important (Chia and Mee, 2000). As noted, in several cases the individual moral intensity variables were found to have differing impacts on moral decisions and intentions. This study will use Jones's moral intensity aspects as separate variables for analysis.

2. MOTIVATION

The primary motivation for this study was to explore current ethical attitudes and determine issues that may be addressed to improve moral decision making in future IT workers. Laudon (1995) suggests an "ethical vacuum" in information technology. The cost of unethical information technology behavior is staggering. Dean (2005) suggests the impact and importance of IT ethics noting that software piracy and intellectual property vio-

lations alone created \$64 billion negative impact on taxes and reduction of 1.5 million jobs. The importance of ethical behavior in the workplace is paramount.

Current information technology students will soon be in the workforce. Their opinions and attitudes towards common information technology ethical issues will be brought with them to the workforce. It is therefore important to understand their attitudes and provide educational efforts to address areas of concern.

As a result, this study will attempt to determine current IT student attitudes towards information technology ethical issues. By understanding the extent of attitudes, as well as possible influences, we can better prepare a strategy to address the key problems.

3. HYPOTHESES

The first hypothesis then tries to determine the moral compass of students today with regard to information technology. It is assumed that even though unethical behavior is significant in society, most individuals will oppose unethical situations.

1. Current unethical information technology statements will be opposed by information technology students.

It is suggested that not all issues will be opposed equally by students. Some moral questions will resonate more with students.

2. Current unethical moral information technology statements will have varying degrees of opposition by information technology students.

Gender as noted has shown in some cases to significantly affect moral decision making.

3. Gender will significantly affect degree of student opposition to unethical IT statements.

Generally older, more mature individuals often behave with greater morality than younger counterparts.

4. Increasing age will significantly affect degree of student opposition to unethical IT statements.

Finally, though it is important to understand the extent of the ethics problem and the

demographic influences, it is also important to understand what internal and self-reasoning takes place within individuals. This is accomplished through the study of moral intensity influences on ethical responses.

5. Students will be affected by explicit moral intensity factors with regard to specific unethical moral information technology statements as the basis for their ethical judgments.
 - a) I may copy someone else's software for my own personal use.
 - b) I may distribute copies of someone else's software
 - c) I may download unauthorized music from the Internet for my own personal use.
 - d) I may distribute copies of unauthorized downloaded music
 - e) I may download unauthorized video from the Internet for my own personal use.
 - f) I may distribute copies of unauthorized downloaded video
 - g) I may access private and confidential information without consent
 - h) I may distribute private and confidential information without consent
 - i) I may access other's computer or telecommunications resources without consent
 - j) I may take programs or other work I have done for one employer and keep for personal use
 - k) I may take programs or other work I have done for one employer and use at another employer
 - l) At work, I do not have to correct inaccurate information I may hold about customers

4. METHODOLOGY

The moral intensity variables used were based on Paolillo and Vitell (2002) and consisted of the following statements, which

were offered as support for the moral intent decision. For each variable a positive and negative statement was offered as support for or disagreement with the moral issue.

Magnitude of consequences – I believe that the potential harm done to others would be minimal

I believe that the potential harm done to others would be high

Social consensus - I believe that most view this activity as acceptable

I believe that most view this activity as wrong

Proximity - I believe that any harm that would take place would be to people I do not know

I believe that any harm that would take place would be to people I know.

Concentration of effect – I believe the number of people harmed would be minimal

I believe the number of people harmed would be high

Temporal Immediacy – I believe that negative effects of this action would occur a very long time from now

I believe that negative effects of this action would occur very soon

In order to test the hypotheses, a convenience sample of large public eastern US university students was selected to participate in an online web-based questionnaire. All participants were information technology students. In general, 75 usable responses were obtained. Harris and Weaver (1994-1995) used a similar approach to obtain student respondents' attitudes towards IT ethics. Response rate were 100% (students in authors' classes).

The questionnaire consisted of 12 statements and 10 variables. The statements (Table 1) present a commonly regarded unethical situation and students are asked their level of agreement or disagreement with the statement. The Likert scale of ranges from strongly agree (internally scored as 0) to strongly disagree (4). The respondents could then check any or all moral intensity variable statements (as checkboxes) that influenced their moral decision. Scoring was 0 or 1 for each moral intensity variable. These variable statements are presented in table 2. There are positive and negative statements based on the five studied moral intensity variables.

Positive statements suggest low adverse impact and negative statements suggest high adverse impact.

I may copy someone else's software for my own personal use.
I may distribute copies of someone else's software
I may download unauthorized music from the Internet for my own personal use.
I may distribute copies of unauthorized downloaded music
I may download unauthorized video from the Internet for my own personal use.
I may distribute copies of unauthorized downloaded video
I may access private and confidential information without consent
I may distribute private and confidential information without consent
I may access other's computer or telecommunications resources without consent
I may take programs or other work I have done for one employer and keep for personal use
I may take programs or other work I have done for one employer and use at another employer
At work, I do not have to correct inaccurate information I may hold about customers

Statement/Variable	Abbreviation
Positive Variables	
Magnitude of consequences: I believe that the potential harm done to others would be minimal	CONSQ+
Social consensus: I believe that most view this activity as acceptable	SOCIAL+
Proximity: I believe that any harm that would take place would be to people I do not know	PROX+
Concentration of effect: I believe the number of people harmed would be minimal	CONC+
Temporal Immediacy: I believe that negative effects of this action would occur a very long time from now	TEMP+
Negative variables	
Magnitude of consequences: I believe that the potential harm done to others would be high	CONSQ-
Social consensus: I believe that most view this activity as wrong	SOCIAL-
Proximity: I believe that any harm that would take place would be to people I know	PROX-
Concentration of effect: I believe the number of people harmed would be high	CONC-
Temporal Immediacy: I believe that negative effects of this action would occur very soon	TEMP-

6. RESULTS

1. Current unethical moral information technology statements will be opposed by students.

Surprisingly (see table 3) from the twelve unethical statements only five were opposed and significantly different from a neutral position (2.0). Two were actually supported (download music; take personal programs created at work). The remaining five were neither significantly supported nor opposed. Hypothesis one was not supported. Current unethical moral information technology statements were not consistently opposed by students. Issues associated with intellectual property are the least supported. A one-sample two-tailed t-test test was performed for significant difference from neutral or 2.0.

2. Current unethical moral information technology statements will have varying degrees of opposition by students.

Clearly there are varying levels of opposition. In fact as shown in table 3. As noted, five were neither supported nor opposed and two were actually supported. The strongest opposition was found in the privacy area. Distribution of personal information and Access to personal information both were above 3.0 or between Disagree and Strongly Disagree. Issues associated with intellectual property are the least ethical.

3. Gender will significantly affect degree of student opposition to unethical IT statements.

Many researchers have found that women have a higher level of ethics in many different situations. It was proposed that gender would have a significant impact on views of these unethical information technology statements. In our study, all except one case, female students were more strongly opposed the unethical IT statement than men (table 4). The exception was copying software. In addition, the difference between genders of accessing computers was not statistically significant at $p < .05$. Female students showed a higher level of opposition to

Table 3 All Statement Results Mean and Significance from Neutral

	Mean	Significance of difference from mean, p
Copy software	2.0000	1.000
Distribute software	2.3600	.025
Download music	1.4133	.000
Distribute music	2.2000	.199
Download video	2.0267	.858
Distribute video	2.3194	.063
Access info	3.2133	.000
Distribute info	3.3200	.000
Access computers	2.9459	.000
Take program - pers	1.6133	.009
Take program - work	2.2703	.130
Correct info	2.8933	.000

unethical information technology situations. Hypothesis 3 was supported.

Table 4 Gender Results

Gender	Female	Male	
	Mean	Mean	sig.
Copy software	2	2	1
Distribute software	3.25	2.0364	.000
Download music	2.25	1.1091	0.001
Distribute music	3.25	1.8182	.000
Download video	2.5	1.8545	0.054
Distribute video	3.4737	1.9057	.000
Access info	3.75	3.0182	0.046
Distribute info	3.9	3.1091	0.027
Access computers	3.2105	2.8545	0.37
Copy software0	2.3	1.3636	0.003
Copy software1	3.1	1.963	0.004
Correct info	3.4	2.7091	0.024

- Increasing age will significantly affect degree of student opposition to unethical IT statements.

Older individuals have been found by researchers to decide and act in a more ethical manner. For nine of the twelve unethical statements proposed older individuals generally did decide in a more ethical manner than their younger student counterparts (table 5). In three of the situations there was no statistical difference at $p < .05$. Hypothesis 4 was partially supported.

- Students will be affected by explicit moral intensity factors with regard to specific unethical moral information

technology statements as the basis for their ethical judgments.

- I may copy someone else's software for my own personal use.
- I may distribute copies of someone else's software
- I may download unauthorized music from the Internet for my own personal use.
- I may distribute copies of unauthorized downloaded music
- I may download unauthorized video from the Internet for my own personal use.
- I may distribute copies of unauthorized downloaded video

Table 5 Age Distribution Results

age	sig.
Copy software	0.546
Distribute software	0.012
Download music	0
Distribute music	0.044
Download video	0.098
Distribute video	0.006
Access info	0.01
Distribute info	0.008
Access computers	0.023
Take program - pers	0.01
Take program - work	0.002
Correct info	0.112

- I may access private and confidential information without consent
- I may distribute private and confidential information without consent

- i) I may access other's computer or telecommunications resources without consent
- j) I may take programs or other work I have done for one employer and keep for personal use
- k) I may take programs or other work I have done for one employer and use at another employer
- l) At work, I do not have to correct inaccurate information I may hold about customers

This study has thus far examined current ethical positions on a variety of information technology topics. The next step was to explore what moral intensity variables significantly affected ethical decision making by these students. By understanding influences on their decisions, programs can be better targeted to reach these students.

- a) I may copy someone else's software for my own personal use.

Based on adjusted R squared, over 50% of a student's decision on copying someone else's software for their personal use is reflected by significant moral intensity variables (table 6).

	Unst. Coeff.	Sig.
(Constant)	2.153	.000
CONSQ+	-.898	.000
SOCIAL+	-.269	.260
PROX+	.725	.002
CONC+	-.294	.160
TEMP+	.866	.000
CONSQ-	.237	.614
SOCIAL-	.279	.258
PROX-	.919	.012
CONC-	-.575	.104
TEMP-	.285	.445

A view of low amount of harm resulted in support of software copying. Opposition was enhanced if it was believed that harm would come to people either known or unknown to the individual. These were the strongest influencers on software copying. Long term effect understanding also strongly affected moral decision making. Those who saw the long term effect were more opposed to software copying.

- b) I may distribute copies of someone else's software

	Unst. Coeff.	Sig.
(Constant)	2.370	.000
CONSQ+	-.524	.173
SOCIAL+	.472	.176
PROX+	.071	.828

For this question 40% of the variance in response to this question can be attributed to the moral intensity

variables. There was a different variable affecting distribution of copied software. The only significant variable decreasing opposition was Concentration of effect. People who saw that the number of people harmed would be high were more in opposition to this situation. If the number of people affected was viewed as high then the students were more opposed to distribution of someone else's software (table 7).

- c) I may download unauthorized music from the Internet for my own personal use.

Unauthorized downloading of music as shown before is not largely opposed. A moral variable supporting downloading was the temporal effect (negative effects would occur a very long time from now) (table 8). Those who oppose downloading of music were most influenced by a view that potential harm would be high. Only 20% of the variation was caused by these variables however, suggesting other reasoning processes at work.

Table 8 Download Music

	Unst. Coeff.	Sig.
(Con-stant)	1.492	.000
CONSQ+	-.176	.570
SOCIAL+	-.341	.340
PROX+	.612	.107
CONC+	-.209	.516
TEMP+	-.857	.039
CONSQ-	1.797	.014
SOCIAL-	.445	.349
PROX-	.003	.996
CONC-	.503	.531
TEMP-	.376	.420

d) I may distribute copies of unauthorized downloaded music

Support for distribution of downloaded music was most affected by a low number of people harmed (table 9). Those who supported distribution did not believe that many people are harmed by it. Opposition correlated with immediate harm and a social view that most people view this as wrong.

For this question 42% of the variance in response to this question can be attributed to the moral intensity variables.

e) I may download unauthorized video from the Internet for my own personal use.

The largest significant concern with downloading video (table 10) was the concern for a high number of people harmed. Many did not oppose as they felt that potential harm done to others would be minimal. Over 50% of the variance was explained by moral intensity variables.

Table 9 Distribute Music

	Unst. Coeff.	Sig.
(Con-stant)	1.754	.000
CONSQ+	.565	.096
SOCIAL+	-.031	.939
PROX+	.258	.384
CONC+	-.938	.038
TEMP+	-.446	.144
CONSQ-	1.748	.001
SOCIAL-	.849	.016
PROX-	-.927	.085
CONC-	-.698	.203
TEMP-	1.297	.001

f) I may distribute copies of unauthorized

Table 10 Download Video

	Unst. Coeff.	Sig.
(Con-stant)	2.036	0.000
CONSQ+	-0.757	0.009
SOCIAL+	-0.212	0.465
PROX+	0.446	0.166
CONC+	-0.369	0.249
TEMP+	-0.133	0.712
CONSQ-	0.776	0.082
SOCIAL-	0.680	0.050
PROX-	-0.794	0.109
CONC-	1.071	0.025
TEMP-	0.280	0.412

downloaded video

Distribution of video was supported because many saw negative effects occurring a long time from now (table 11). Opposition centered on the magnitude of consequences (high potential harm) of this action. More than 55% of the variance was explained by moral intensity variables.

Table 11 Distribute video

	Unst. Coeff.	Sig.
(Con-stant)	2.482	.000
CONSQ+	-.461	.184
SOCIAL+	-.081	.833
PROX+	.774	.023
CONC+	-.651	.081
TEMP+	-1.419	.000
CONSQ-	1.313	.003
SOCIAL-	.485	.122
PROX-	-.934	.063
CONC-	.094	.849
TEMP-	.273	.406

g) I may access private and confidential information without consent

There were many variables statistically influencing access to private and confidential information (table 12). General opposition was influenced by high harm, societal taboos, and immediacy of harm. Nearly two-thirds of the variance was explained by moral intensity variables.

h) I may distribute private and confidential information without consent

Influencing opposition of distribution of private and confidential information were high

Table 13 Distribute Info

	Unst. Coeff.	Sig.
(Con-stant)	2.080	.000
CONSQ+	-.356	.725
SOCIAL+	-.467	.661
PROX+	.255	.557
TEMP+	.212	.697
CONSQ-	.706	.010
SOCIAL-	1.459	.000
PROX-	-.488	.000
CONC-	-1.136	.000
TEMP-	.697	.004

Table 12 Access Info

	Unst. Coeff.	Sig.
(Con-stant)	2.201	.000
CONSQ+	1.621	.085
SOCIAL+	-.419	.554
PROX+	.098	.770
CONC+	-2.185	.001
TEMP+	.232	.667
CONSQ-	.815	.001
SOCIAL-	1.146	.000
PROX-	.241	.396
CONC-	-1.226	.000
TEMP-	.909	.000

harm, social norms, and large number of people harmed (table 13). Moral intensity variables accounted for nearly 60% of the variance.

Table 14 Access Computers

	Unst. Coeff.	Sig.
(Con-stant)	3.210	.000
CONSQ+	-.361	.395
SOCIAL+	-.921	.063
PROX+	.269	.549
CONC+	-1.806	.000
TEMP+	-.166	.803
CONSQ-	.427	.180
SOCIAL-	.291	.359
PROX-	.188	.601
CONC-	.463	.211
TEMP-	-.703	.026

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- i) I may access other's computer or telecommunications resources without consent

Support for this unethical action was based primarily on the belief that few people would be harmed (table 14). MI (moral intensity) variables accounted for over 50% of variance.

- j) I may take programs or other work I have done for one employer and keep for personal use

Taking programs from work that you created was seen as socially acceptable and having little consequence to those who supported this action (table 15). Over 50% of variance accounted for by MI.

- k) I may take programs or other work I have done for one employer and use at another employer

Interestingly anonymity played the key role in both and support and opposition to this unethical act. Those who supported taking others' programs believed it would affect people they didn't know. Those opposing felt it would affect people they do know (table 16). Again, more than 50% of variance was caused by MI.

- l) At work, I do not have to correct inaccurate information I may hold about customers

Finally not correcting inaccurate information was supported by those who saw a long time

Table 16 Take Program - Work

	Unst. Coeff.	Sig.
(Con-stant)	2.267	.000
CONSQ+	.053	.890
SOCIAL+	-.455	.305
PROX+	-1.719	.000
CONC+	-.684	.089
TEMP+	.160	.710
CONSQ-	.495	.223
SOCIAL-	.188	.540
PROX-	1.151	.012
CONC-	-.274	.569

Table 15 Take

	Unst. Coeff.	Sig.
(Con-stant)	2.476	.000
CONSQ+	.509	.289
SOCIAL+	-.567	.301
PROX+	.346	.342
CONC+	-.533	.344
TEMP+	-.933	.001
CONSQ-	.849	.001
SOCIAL-	.684	.015
PROX-	-.638	.048
CONC-	-.065	.830
TEMP-	.179	.524

Table 17 Correct Info

	Unst. Coeff.	Sig.
(Con-stant)	2.476	.000
CONSQ+	.509	.289
SOCIAL+	-.567	.301
PROX+	.346	.342
CONC+	-.533	.344
TEMP+	-.933	.001
CONSQ-	.849	.001
SOCIAL-	.684	.015
PROX-	-.638	.048
CONC-	-.065	.830
TEMP-	.179	.524

frame for harm but opposed by those who

saw high harm by not acting. MI variables only represented less than 45% of variance.

6. CONCLUSION

Rest (1986) suggests that "moral education programs designed to stimulate moral judgment development do produce modest but significant gains". With identification of problem areas, programs can be instituted to improve ethical enforcement, education, and awareness. By understanding the current status of information technology issues among students and future information technology professionals, we can better focus on key issues and demographical initiatives to improve the gap between technology and ethics.

In general, it was found that older IT students have higher ethical standards than younger students. Also, females were found to exhibit higher moral positions than males. Education should be general but provide increased emphasis in these demographic areas. Many of the areas where education and training should take place were indicated by the moral intensity variables affecting IT ethical decision making. To reduce software copying, emphasis should be placed on the degree of harm caused. Distribution of copied software may be preventable by providing information on the number of people harmed. The immediacy of effects from downloading music and the amount of people harmed by distribution of downloaded

music could reduce music theft. The amount of harm from downloading video and the immediacy of distribution effects are important influencers that bear training. Privacy can be improved by further emphasis on harm, societal taboos, the number of people harmed and the immediacy of harm. Theft of resources may be curtailed by increased training on the number of people harmed. To improve accuracy of information more emphasis may be placed on how quickly negative effects can occur. Finally, taking programs from work may be curtailed by increasing social pressure, emphasizing consequences and showing how it directly affects people they know.

There are significant implications for students, educators, and IT practitioners. Further research into university student ethics on information technology to confirm the findings of this report are recommended. But assuming these results are confirmed, major efforts should be undertaken to explore information technology ethics issues in conjunction with technology education. Past efforts and societal attitudes have not proven successful in providing consistent ethical development. Particular focus needs to be placed on young, male students to identify and recognize ethical problems and solutions. Many specific areas need to be addressed including property rights, intellectual property distribution, privacy, and accuracy of information. The current state of information technology ethics among students has significant room for improvement. Focused attention on intellectual property, personal privacy, and unauthorized resource use should be specifically incorporated into our information technology curriculum. This can help reduce the staggering losses from current unethical information technology practices.

As educators we are obligated to not just train and equip our students with the latest tools. With those skills come responsibilities. We must accept the challenge to emphasize the ethical issues associated with information technologies and improve the future of our global information society.

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