Morality and Technology, or Is it Wrong to Create and Let Loose a Computer Virus¹

Urs E. Gattiker²
Helen Kelley
Centre for Technology Studies,
The University of Lethbridge, CANADA

Abstract

Stories about computer-related actions (e.g., placing a document about how a computer virus works on an electronic network/bulletin board) were presented to users. Data indicate that women end-users compared to men have a less libertarian sense of what is right and wrong; as well, younger respondents are more libertarian than their older compatriots. Data also indicate that participants are less likely to endorse civil liberties and more concerned about the harm and violations of social norms when the scenario describes a context-specific situation. Researchers and policy makers may be concerned about how to maintain and protect the privacy of individuals, and at the same time ensure moral conduct by end-users who enjoy using the electronic highway. Suggestions are made for developing theoretical models of moral judgment in the cyberspace domain.

Our understanding of people's morals regarding computer technology and information systems are limited. Are disrespectful actions judged to be moral violations, even when they are harmless, and how may end-users' moral judgements be affected when computer technology is involved? Laws need to be developed to reduce physical harm, and social and economic reforms may be necessary to address the tide of legal violations by computer users.

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A better understanding of users' motivations, morals and ethics is required in order to make the electronic highway a safe, equitable place. This is a prerequisite if regulatory attempts for safeguarding civil liberties against abuse and misuse are to be successful, protecting our need for privacy and freedom to use computer-mediated communication technology. Turiel, Killen and Helwig (1987) concluded from previous research investigating morality that it is useful and necessary to (1) study and explain individuals' understanding of moral issues as they relate to general social concepts (e.g. civil liberties and justice) and (2) apply moral issues in contextual situations.

This paper responds to these concerns. Stories about various actions (e.g., placing a document about how a computer virus works on an electronic network/bulletin board, using a self-made encryption device) were presented to computer users and their feelings regarding regulation and privacy issues of computer networks and bulletin boards were investigated. The conclusion summarizes the results of the survey, explores policy implications and outlines future research avenues.

Literature Review

The Moral Code of End-users (MCEU): A Beginning

The literature about delinquency and moral codes suggests that we need to better understand how computer users feel about certain behaviours, specifically, computer hackers and computer viruses. Researching individuals' attitudes about what are just, appropriate and immoral behaviours with regard to information technology may facilitate our understanding of the delinquency in the cyberspace domain. At this time, our understanding of the

² Comments and requests for reprints should be addressed to Urs E. Gattiker, Lethbridge Centre for Technology Studies, Faculty of Management, The University of Lethbridge, Lethbridge, AB, T1K 3M4, CANADA. E-mail: Gattiker@Cetus.Mngt.uLeth.CA Phone: (403) 320-6966; Fax: (403) 329-2038

MCEU is limited and our knowledge regarding whether and how users adhere to moral codes when working with computer-mediated technology is non-existent for all practical purposes.

Demographic variables

Socio-demographic variables, such as age and gender, have been considered important variables in management, psychology and sociology research (e.g., Bikson & Gutek, 1983; Zedeck & Cascio, 1984). This stream of research has documented results which indicate that demographic variables are often significantly associated with work and computer-related attitudes as well as behavioral outcomes.

Research with adults indicates that older employees tend to report higher levels of work and job satisfaction than their younger colleagues (see Rhodes, 1983 for an extensive literature review). Kelley, Gattiker, Paulson and Bathnagar (1994) reported that increased age had a positive effect upon respondents' assessment of an information system's ease of interaction (e.g., interactive commands), and ease of analysis of information and data. Haidt, Koller and Dias (1993) reported that age had a significant effect upon people's moral development. For instance, children were more likely to universalize their judgment (i.e. regardless of where this is done it is wrong to do it) than adults. In turn, this would suggest that older respondents might differentiate between various behaviours, and depending upon their attitudes regarding whether the behaviour is attributed to the personal, moral or conventional domain, their judgments may not be universalized.

The above indicates that research into the emergence of morality in children and young adults revealed correlations between age and how moral judgements are applied. Other research assessed computer-related attitudes in the workplace and reported differences related to the age of respondents. Hence, the following hypothesis warrants testing:

Hypothesis 1: Younger individuals are more likely to universalise and generalize their moral and non-moral social judgements between harmless stories and less-harmless stories about computer-supported and computer-related behaviours.

Gender: Compared to men, women are reported to be more concerned about the effects of computerbased technology on the quality of work life (e.g., Gattiker & Nelligan, 1988; Gutek & Larwood, 1987). Other researchers have argued that new technologies may reinforce existing gender inequities (Ebben & Mastronardi, 1993; Frissen, 1992). Women constitute a smaller percentage of end-users utilizing major online systems (from 10% on Delphi, Genie and CompuServe to 35-40% on America Online and Prodigy) (Brail, 1994).

How gender may affect moral reasoning in certain situations, such as using a self-developed encryption device or uploading a software virus on a Bulletin Board (BB), remains to be tested (cf., Turiel, Killen & Helwig, 1987). Accordingly, this study also intends to investigate the following hypothesis:

Hypothesis 2: Women appear more cautious/concerned than men about protecting and safeguarding people's rights and freedoms against harmless and/or less-harmless acts materializing from computer-supported and computer-related behaviours of computer users.

McClosky and Brill (1983) reported that respondents tend to endorse civil liberties more if the moral questions are general or abstract, whereas, respondents' endorsement drops significantly within contextual or specific situations. Hence, findings in this study may differ between the context-specific scenario and abstract scenario (see Appendix 1) according to the different levels of experience in using computer technology, although previous research on this issue in the computer domain is lacking.

To summarize, the purpose of this study was twofold: (1) to determine if gender and age effect people's moralizing stance regarding harmless and less harmless stories about computers and computer related activities; and (2)to determine if end-users' assessments differ between context situations and abstract situations.

Method

Sample

To obtain the sample, we distributed the survey using electronic means, either listservers or electronic newsletters. We received 137 responses. Two points need to be addressed. First, the use of electronic technology is quick, fast and cheap, but we do not know what percentage of people who received the information were willing to respond, were able to respond and actually decided to respond.

Nevertheless, we do know that approximately 40 respondents received the survey through an electronic newsletter, 80 participants through two listservers. and the rest of the respondents through friends and BBs. Second, the disadvantages outlined in point one can also be interpreted as advantages: respondents were interested in the subject; and (b) respondents had experience with listservers. electronic newsletters and BBs. Using the method described above for gathering data assured that the vignettes and issues addressed in the survey were context-related and not simply abstract for participants (McClosky & Brill, 1983). Mailing out the survey would have provided us with responses from individuals with little or no practical experience in these matters, threatening the validity of the data (cf. Turiel, Killen & Helwig, 1987). Naturally, this sample is not representative of the overall population but, instead, represents the views of experienced users of BBs and EDLs on the "Infobahn."

Materials and procedures

The novel stimuli created for this study were three stories describing illegal or legal action of a bystander. The action being performed may or may not be questionable from a moral point-of-view (cf. Appendix 1). The respondent, who was depicted as observing the bystander, was asked to respond to the questions depending upon her/his interpretation and attitudes towards the situation. After each story, five probe questions were posed in the self-administered survey: (a) Evaluation: "What do you think about this situation (description of the act)? Is it very wrong, a little wrong, or perfectly okay?"; (b) Harm: "Is anyone hurt by what your friend did? Who? How?"; (c) Bother: "Imagine that you actually saw someone [performing the act]. Would you feel bothered, not care, think this is good?"; Interference: "Should the person be stopped. Should the person be punished?"; and (e) Universal: "Suppose you learn about two different foreign countries. In country A, people doing [the act] are quite common, and in country B, one never does [the act]. Which one of these customs [if either] is bad or wrong? Both customs are wrong; Country A's custom is wrong; Country B's custom is wrong; neither one both customs are okay". The vignettes are described in Appendix 1.

Results

Results were obtained using SPSS' ANOVA. A

Bonferroni procedure was used to adjust the per comparison alpha levels because the research design included multiple planned comparisons. The per comparison alpha level was considered statistically significant when the p value was less than or equal to .0166.

Age: The first hypothesis stated that younger individuals would be more likely to universalise and generalize their moral and non-moral social judgments between harmless stories and less harmless stories about computer-supported and computer-related behaviours.

The *Permissiveness probe* asked whether the act was wrong. This question does not reveal whether the wrongness of the act was perceived as a moral (universal) or conventional (local) domain; it served merely as an initial measure of permissiveness. Subjects were asked to code the action as either *very wrong*, a little wrong or perfectly okay. The results in Table 1 indicated that the evaluations of the encryption vignette were significantly different (F = 3.771, p < .0166). In particular, older respondents were more likely to feel that using an encryption device was potentially very wrong or a little wrong. In contrast, younger participants felt using the encryption device was perfectly okay.

The Harm probe asked whether anyone was harmed by the actions described in each of the three vignettes. All references to a person being potentially harmed were recorded. Responses which cited a victim were divided into two groups: 1) endusers who mentioned that a person or an entity other than the actor of the story was being harmed and 2) end-users who cited that the actor experienced harmful consequences (e.g., the friend/colleague who performed the act experienced feelings of guilt). The data in Table 2 revealed that the results of the responses to the game scenario were significantly different across the age groups ($\underline{F} = 4.546$, \underline{p} <.0166). In short, younger people were less likely to believe that a person was being harmed by what her/his friend did; older respondents felt the opposite.

The **Bother probe** served as a manipulation check on the affective content of the vignettes. Subjects were asked to code the action as either *feel bothered*, did not care or thought it was good. The results in Table 3 indicated that the evaluations for the encryption vignette were significantly different (F = 4.025, p < .0166). In particular, older respondents were more likely to feel that the utilization of encryption devices were bothersome.

For the Interference probe, subjects were asked

whether the actor/friend should be "stopped or punished." The data in Table 4 revealed that older respondents felt the person should not be allowed to use an encryption device ($\mathbf{F}=4.254$, p<.0166). For the punishment probe, all three scenarios produced statistically significant results (see Table 5). The results of the statistical analysis indicated that for the encryption vignette older groups of computer users (50-69 and 60-69 years of age) believed that punishment was appropriate ($\mathbf{F}=9.517$, p<.0166). For the virus scenario, the biggest difference was between the 20-29 year-old group and 30-39 year-old

group. About two-thirds of the 20-29 year-old respondents believed that the individual should not be punished; whereas, two-thirds of the 30-39 year-old respondents believe the person must be punished. Older respondents felt that the person should be punished for putting a virus on a BB (F = 3.987, p < .01). In the game vignette, respondents in the 10-19 year-old group did not feel the person should be punished. The percentage of respondents with the opposite opinion increased with age (F = 3.221, p < .0166) (cf. Table 4).

Table 1: Percentage of Participants Who Morally Evaluated the Scenario

			Age Categ	ories						
Story	Response	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	Total	F	
Encryption	Very Wrong		0.00	0.00	0.00	0.90	0.00	0.90	1.80	
• • •	A Little Wrong		0.00	0.00	0.00	0.00	0.90	0.00	0.90	
	Perfectly Okay		10.40	29.20	28.30	19.80	7.50	1.90	97.10	
	Total	10.40	29.20	28.30	20.70	8.40	2.80	100.00	3.771***	
Virus	Very Wrong		3.80	15.20	22.90	15.20	7.60	2.90	67.60	
	A Little Wrong		5.70	7.60	2.90	3.80	0.00	0.00	20.00	
	Perfectly Okay		1.00	5.70	2.90	1.90	1.00	0.00	12.50	
	Total	10.50	28.50	28.70	20.90	8.60	2.90	100.00	1.726	
Game	Very Wrong		0.00	1.90	7.70	3.80	2.90	1.90	18.20	
	A Little Wrong		1.90	4.80	8.60	5.80	1.90	0.00	23.00	
	Perfectly Okay		8.60	22.10	12.50	10.60	3.80	1.00	58.60	
	Total	10.50	28.80	28.80	20.20	8.60	2.90	100.00	2.381*	

Note. The research design of this study included planned multiple comparisons. To correct the inflation of alpha levels a Bonferroni procedure was used to adjust the per comparison alpha level to keep the experiment-wise alpha value at a reasonable level. The experiment-wise alpha level was set to .10 and the per comparison alpha level was calculated to be .0166 (experiment-wise alpha = .10/[3 stories X 2 groups of categories] = .0166 per comparison alpha level) (Tabachnick & Fidell, 1989). Due to rounding, the total for each column and row may not be exact.

Unadjusted significant p values: * p < .10, *** p < .05, *** p < .01, **** p < .001 Adjusted significant p values: p < .0166

Table 2: Percentage of Participants Who Perceived the Scenario as Harmful

			Age	Categories					
Story	Response	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	Total	F
Encryption	No		10.30	29.00	28.00	20.60	6.50	1.90	96.30
••	Yes		0.00	0.00	0.90	0.90	0.90	0.90	3.60
	Total	10.30	29.00	28.90	21.50	7.40	2.80	100.00	2.241
Virus	No		3.80	9.40	6.60	0.90	0.90	0.00	21.60
	Yes		6.60	18.90	22.60	19.80	7.50	2.80	78.20
	Total	10.40	28.30	29.20	20.70	8.40	2.80	100.00	1.863
Game	No		10.90	24.80	16.80	9.90	5.00	0.00	67.30
	Yes		0.00	4.00	12.90	10.90	3.00	2.00	32.80
	Total	10.90	28.80	29.70	20.80	8.00	2.00	100.00	4.546***

Note. A Bonferroni procedure was used to adjust the alpha levels because the research design included planned multiple comparisons (See Table 1 for an explanation).

Due to rounding the total for each column and row may not be exact.

Unadjusted significant p values: *p < .10, **p < .05, *** p < .01, **** p < .01 Adjusted significant p values: p < .0166

Table 3: Percentage of Participants Who Were Bothered by the Scenario

					ge Categori	es.			
Story	Response	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	Total	F
Encryption	Bothered	0.00	0.00	0.90	0.90	1.90	0.90	4.60	
	Not Care	2.80	13.00	20.40	12.00	4.60	1.90	54.70	
	Is Good	7.40	15.70	7.40	8.30	1.90	0.00	40.70	
	Total	10.20	28.70	28.70	21.20	8.40	2.80	100.00	4.025**
Virus	Bothered	6.70	21.90	24.80	18.10	7.60	1.90	81.00	
	Not Care	3.80	4.80	4.80	1.90	1.00	0.00	16.30	
	Is Good	0.00	1.90	0.00	1.00	0.00	0.00	2.90	
	Total	10.50	28.60	29.60	21.00	8.60	1.90	100.00	0.650
Game	Bothered	0.00	4.80	11.40	11.40	2.90	1.90	32.40	
	Not Care	10.50	19.00	16.20	7.60	4.80	1.00	59.10	
	Is Good	0.00	4.80	1.90	1.00	1.00	0.00	8.70	
	Total	10.50	28.60	29.50	20.00	8.70	2.90	100.00	2.956**

Note. A Bonferroni procedure was used to adjust the alpha levels because the research design included planned multiple comparisons (See Table 1 for an explanation).

Due to rounding the total for each column and row may not be exact.

Unadjusted significant p values: * p < .10, *** p < .05, *** p < .01, **** p < .001 Adjusted significant p values: p < .0166

Table 4a: Percentage of Participants Who Believed the Person Should be Stopped - Interference

				A	ge Categori	CS			
Story	Response	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	Total	F
Encryption	No		10.30	29.00	29.00	19.60	8.40	1.90	98.20
	Yes		0.00	0.00	0.00	0.90	0.00	0.90	1.80
	Total	10.30	29.00	29.00	20.50	8.40	2.80	100.00	4.254***
Virus	No		4.00	13.90	7.90	4.00	1.00	0.00	30.80
	Yes		6.90	15.80	21.80	15.80	6.90	2.00	69.20
	Total	10.90	29.70	29.70	19.80	7.90	2.00	100.00	1.458
Game	No		10.00	27.00	22.00	12.00	6.00	1.00	78.00
	Yes		1.00	3.00	8.00	6.00	2.00	2.00	22.00
	Total	11.00	30.00	30.00	18.00	8.00	3,00	100.00	1.824

Note. A Bonferroni procedure was used to adjust the alpha levels because the research design included planned multiple comparisons (See Table 1 for an explanation).

Due to rounding the total for each column and row may not be exact.

Unadjusted significant p values: * p < .10, ** p < .05, *** p < .01, **** p < .001 Adjusted significant p values: p < .0166

Table 4b: Percentage of Participants Who Believed the Person Should be Punished - Interference

					Ago	Categories				
Story	Response	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	Total	F	
Encryption	No		10.60	29.80	29.80	19.20	7.70	1.90	99.00	
	Yes		0.00	0.00	0.00	0.00	0.00	1.00	1.00	
	Total	10.60	29.80	29.80	19.20	7.70	2.90	100.00	9.517****	
Virus	No		6.30	19.80	9.40	6.30	2.10	0.00	43.90	
	Yes		5.20	8.30	20.80	12.50	6.30	3.10	56.20	
	Total	11.50	28.10	30.20	18.80	8.40	3.10	100.00	3.195***	
Game	No		11.20	27.60	25.50	14.30	7.10	0.00	85.70	
	Yes		0.00	3.10	5.10	3.10	1.00	2.00	14.30	
	Total	11.20	30.70	30.60	17.40	8.10	2.00	100.00	3.221***	

Note. A Bonferroni procedure was used to adjust the alpha levels because the research design included planned multiple comparisons (See Table 1 for an explanation).

Due to rounding the total for each column and row may not be exact.

Unadjusted significant p values: * p < .10, ** p < .05, *** p < .01, **** p < .001 Adjusted significant p values: p < .0166

The universal probe asked the respondent whether it was "okay" for countries to differ on the custom in question. Subjects who replied no to either country A or B or both were, by definition, universalizing their judgment. The data in Table 5 indicated that older respondents moralized their opinions regarding encryption devices more than younger respondents (F = 3.972, p < .01).

Based on the above data, Hypothesis 1 can be accepted because significant age differences were present for the encryption and virus data sets. As predicted by the hypothesis, in most cases, younger computer users were more permissive than older endusers. The more contextual or specific the situation outlined in our vignettes, the more age effects occurred in the direction predicted.

Table 5: Percentage of Participants Who Perceived the Scenario in Universal Fashion

				Ago	Categories				
Story	Response	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	Total	F
Encryption	Both Customs - Wro	ong	0.00	0.00	0.00	1.00	1.90	1.00	3.90
	A's Custom - Wrong	0.00	0.00	0.00	1.90	0.00	0.00	1.90	
	B's Custom - Wrong	1.90	3.80	2.90	1.90	1.00	0.00	11.50	
	Both Customs - Okay	7.70	26.00	26.90	15.40	5.80	1.00	82.80	
	Total	9.60	29.80	29.80	20.20	8.70	2.00	100.00	3.572**
Virus	Both Customs - Wrong		1.00	5.10	7.10	6.10	4.10	1.00	24.40
	A's Custom - Wrong	3.10	3.10	10.20	4.10	2.00	0.00	22.50	
	B's Custom - Wrong	4.10	10.20	2.00	2.00	0.00	1.00	19.30	
	Both Customs - Okay	3.10	11.20	10.20	6.10	2.00	1.00	33.60	
	Total	11.30	29.60	29.50	18.30	8.10	3.00	100.00	1.017
Game	Both Customs - Wro	ong	1.00	0.00	1.00	0.00	1.00	0.00	3.00
	A's Custom - Wrong	1.00	4.10	10.20	7.10	2.00	1.00	25.40	
	B's Custom - Wrong	1.00	5.10	1.00	1.00	0.00	0.00	8.10	
	Both Customs - Okay	8.20	20.40	17.30	12.20	3.10	2.00	63.20	
	Total	11.20	29.60	29.50	20.30	6.10	3.00	100.00	0.843

Note. A Bonferroni procedure was used to adjust the alpha levels because the research design included planned multiple comparisons (See Table 1 for an explanation).

Due to rounding the total for each column and row may not be exact.

Unadjusted significant p values: * p < .10, *** p < .05, *** p < .01, **** p < .001 Adjusted significant p values: p < .0166

Table 6: Percentage of Participants Who Morally Evaluated the Scenario

		Gender				
Story	Response	Women	Men	Total	F	
Encryption	Very Wrong		0.00	2.40		2.40
••	A Little Wrong		0.80	0.00	0.80	
	Perfectly Okay		17. 90	78. 9 0	96.70	
	Total	18.70	81.30	100.00	0.049	
Virus	Very Wrong		15.60	50.80	66.40	
	A Little Wrong		2.50	20.50	23.00	
	Perfectly Okay		0.80	9.80	10.70	
	Total	18.90	81.10	100.00	3.157*	
Game	Very Wrong	6.60	9.00	15.60		
	A Little Wrong	4.10	19.70	23.80		
	Perfectly Okay	8.20	51.60	59.80		
	Total	18.90	81.10	100.00	5.547**	

Note. A Bonferroni procedure was used to adjust the alpha levels because the research design included planned multiple comparisons (See Table 1 for an explanation).

Due to rounding the total for each column and row may not be exact.

Unadjusted significant p values: * p < .10, *** p < .05, *** p < .01, **** p < .01, **** p < .01 Adjusted significant p values: p < .0166

Gender: The second hypothesis proposed that women compared to men appeared more cautious about or concerned with protecting and safeguarding people's rights and freedoms against harmless or less-harmless acts materializing from computer-supported and computer-related behaviours of certain end-users. The first question again used the *Permissiveness probe*. The results in Table 6 indicated that evaluations for the game vignette were significantly different between men and women ($\underline{F} = 5.547$, $\underline{p} < .0166$). In particular, a high percentage of male respondents felt that it was okay to distribute the game to other computer users even when the game was outlawed in one's own country.

The *Harm probe* asked whether anyone was harmed by the bystander's actions as described in each of the three vignettes. The data in Table 7 revealed that for the game scenario data a larger percentage of men compared to women thought the game was not harmful (F = 11.935, p < .0166).

The **Bother probe** served as a manipulation check on the affective content of the vignettes. The results in Table 8 indicated that the evaluations given for the game vignette were significantly different between genders (F = 8.747, p < .0166). Women compared to men were more likely to be bothered by the person's behaviour described in the game and the virus vignettes.

The results for the *Interference probe* are presented in Table 9. Data revealed that for the

game vignette about 60% of responding women felt the person should not be stopped, whereas 88% of men felt the person should not be stopped (F = 9.999, p < .0166). For the punishment probe, the game scenario again resulted in significantly different responses for men and women (F = 12.714, p < .001). Men's responses were more permissive than women's responses.

The universal probe asked the respondent whether it would be "okay" for countries to differ on the custom in question. Subjects who replied no to either country A or B or both were, by definition, universalizing their judgment. The data indicated that statistically significant differences were not present for the three vignettes. The data revealed that both genders believed that both countries' customs regarding encryption devices were okay, whereas men were somewhat less moralizing about the game scenario than women. For the virus vignette, about half the respondents in both gender groups took a moralizing stand.

Based on the above data, Hypothesis 2 can be accepted because statistically significant gender differences were present in the data set for the game scenario. The more contextual or specific the situation described in our vignettes, the more gender effects occurred in the direction predicted (i.e., women perceived the action to be harmful, bothersome or felt that some intervention was necessary).

Table 7: Percentage of Participants Who Perceived the Scenario as Harmful

			Gender		
Story	Response	Women	Men	Total	F
Encryption	No	· · · · · · · · ·	17.70	78.20	96.00
••	Yes		1.60	2.40	4.00
	Total	19.40	80.60	100.00	1.416
Virus	No		2.40	17.90	20.30
	Yes		16.30	63.40	79 .70
	Total	18.70	81.30	100.00	0.918
Game	No		7.70	62.40	70.10
	Yes		11.10	18.80	29.90
	Total	18.80	81.20	100.00	11.935****

Note. A Bonferroni procedure was used to adjust the alpha levels because the research design included planned multiple comparisons (See Table 1 for an explanation).

Due to rounding the total for each column and row may not be exact.

Unadjusted significant p values: * p < .10, ** p < .05, *** p < .01, **** p < .001 Adjusted significant p values: p < .0166

Table 8: Percentage of Participants Who Were Bothered by the Scenario

			Gender		
Story	Response	Women	Men	Total	F
Encryption	Bothered	1.60	2.40	4.00	
	Not Care	12.00	43.20	55.20	
	Is Good	5.60	35.20	40.80	
	Total	19.20	80.80	100.00	2.431
Virus	Bothered	18.00	64.80	82.80	
	Not Care	0.80	13.90	14.80	
	Is Good	0.00	2.50	2.50	
	Total	18.90	81.80	100.00	3.245*
Game	Bothered	11.50	18.00	29.50	
	Not Care	5.70	55.70	61.50	
	Is Good	1.60	7.40	9.00	
	Total	18.90	81.10	100.00	8.747***

Note. A Bonferroni procedure was used to adjust the alpha levels because the research design included planned multiple comparisons (See Table 1 for an explanation).

Due to rounding the total for each column and row may not be exact.

Unadjusted significant p values: * p < .10, ** p < .05, *** p < .01, **** p < .01 Adjusted significant p values: p < .0166

Table 9a: Percentage of Participants Who Believed the Person Should be Stopped - Interference

Table 9b: Percentage of Participants Who Believed the Person Should be Punished - Interference

			Gender				Gend	ler	
Story	Response	Women	Men	Total	F	Women	Men	Total	F
Encryption	No		18.50	79.80	98.40	•	17.40	81.80	99.20
	Yes		0.80	0.80	1.60		0.00	0.80	0.80
	Total	19.40	80.60	100.00	1.215	17.40	82.60	100.00	0.209
Virus	No		3.40	25.40	28.80		8.00	37.20	45.10
	Yes		15.30	55.90	71.20		8.80	46.00	54.90
	Total	18.60	81.40	100.00	1.484	16.80	83.20	100.00	0.045
Game	No		10.40	70.40	80.90		11.40	76.30	87.70
	Yes		7.80	11.30	19.10		6.10	6.10	12.30
	Total	18.30	81.70	100.00	9,999**	17.50	82.50	100.00	12.714****

Note. A Bonferroni procedure was used to adjust the alpha levels because the research design included planned multiple comparisons (See Table 1 for an explanation).

Due to rounding the total for each column and row may not be exact.

Unadjusted significant p values: * p < .10, ** p < .05, *** p < .01, **** p < .001 Adjusted significant p values: p < .0166

Discussion and conclusion

This study had two major purposes: (1) to determine if gender and age affect people's moralizing stance regarding harmless stories and less harmless stories about computers and computer-related activities; and (2) to determine if respondents' assessments differ between context or specific scenarios and abstract scenarios. Darley (1993) pointed out that most individuals are susceptible to immorality socialization. Unfortunately, this "insight has received relatively little attention in the moral issue literature" (p. 356). In this study, our intent was to respond to this call by applying technology issues to morality questions. In particular, what

might first be regarded as a morally repugnant action or as a morally neutral action, pirating software for instance, eventually came to be regarded by individuals as morally justified or harmless actions. The process can also operate in reverse, from harmful to harmless.

The moral code of users (MCEU): General and context-specific issues

Age: An important finding in this study is that older respondents are more likely to moralize their viewpoint, to feel that an act is wrong and harmful, to be bothered by the action, and to feel that interference is necessary. This coincides with other

research in two ways. First, Turiel, Killen and Helwig (1987, p. 177) reported, based on their literature review, that the distinction between moral and nonmoral behaviour is less stable and less generalized in younger adults than in older adults. Second, McClosky and Brill (1983) reported that responses for endorsing civil liberties drop significantly when respondents are asked about their perception of context or specific situations. The virus scenario is context specific because most computer users have either had a personal experience with a virus, try to protect their machines and software from virus contamination, or know endusers who have experienced the hassles and headaches of computer viruses contamination. Therefore, computer users are probably more leery about the virus scenario because of the contextspecific experiences.

With the encryption scenario, the data indicate that while younger people feel it is okay to use encryption technology, older respondents feel it is bothersome, should not be permitted and harmful to others. Moreover, older respondents tend to moralise their standpoint. For the current Capstone/Clipper chip discussion in the US, these findings suggest that younger people are more open to the use of privately designed approaches (encryption software in the public domain is available on BBs outside of the US because the distribution of this software is illegal in the US!). Therefore, enforcement of a standard technology may meet with substantial resistance from the younger generation who has grown up with computer technology. Even if the law requires the use of the Capstone/Clipper chip technology, enforcement will be difficult and use of additional non-standardized encryption devices by users is likely Therefore, one questions the to be rampant. practicality, enforceability and usefulness of a legally sanctioned standard for encryption devices.

Gender: Haste and Baddeley (1991) pointed out that Western men believe that justice has ethical precedence, while, in contrast, many women award priority to contracts of personal responsibility to others. However, Walker (1991) reported that gender differences in moral orientation are infrequent and "that such differences can be best attributed to dilemma content" (p.333). This study reports gender differences, especially that women appeared more cautious and protective than men about the harm caused by computer-based technology. Men appeared more tolerant with the distribution of a game to individuals abroad, even when it was illegal in the

country of the user performing this act. Men compared to women were less likely to be bothered by the distribution of the game and felt the person should not be stopped. Finally, men compared to women appeared to moralize less about the ethical issues addressed in this study.

For the game vignette, men's and women's responses, except for the universal probe, differed significantly. Gender differences were less obvious for the other two vignettes. In most instances, men and women felt that using a private encryption device was okay, not harmful, did not bother anyone and did not necessitate interference. For the virus vignette, however, women compared to men were less permissive and more likely to be bothered by the scenario. For the encryption vignette, no significant gender differences were found.

These findings would suggest that women compared to men appear more cautious regarding moral and nonmoral acts of computers users. This is especially apparent in real-life scenarios where respondents might have had direct experience with the action or have heard about their colleagues' experiences (e.g., virus). Based on women's responses regarding the vignette describing the distribution of banned games, it appears that women are more likely to abide by the law (see Appendix 1, Vignette 3).

General and context-specific issues: This study raises a concern in that the results indicated that the current discussions regarding the Clipper/Capstone chip's threat to civil liberties in the US may, in part, simply reflect general and abstract nature of the Our study suggests that few people have experience with encryption technology, so their perceptions of this issue are likely to be more general. Therefore, responses to the issue endorsing civil liberties will, of course, be high (e.g., McClosky & Brill, 1983). Experience or vivid accounts from other stories with context-specific questions/scenarios may change people's perceptions regarding computer-related behaviours. Individuals' social judgment regarding computer-related behaviours, especially in contextual situations, appear to consider justice and welfare issues in determining whether an action violates a moral code or norm.

Our research efforts are based on working hypotheses because the range and boundaries of the MCEU are still not well understood. There does not appear to be a single list of content values for MCEU which captures the moral world of cyberspace for all computer users, even when the values are defined

abstractly (e.g., harm, rights, justice). The participants of this study do represent the growing number of users and may, therefore, be representative of what is to come in the near future. However, since early social interactions are the foundation of later social development comparisons between children's and adults' responses to contextual situations pertaining to the morality of computer-related behaviours seems necessary.

Limitations of the present study: One of the limitations of this study may have been the limited control we had regarding who responded to the survey. In contrast, using a mail-out survey would have improved our control, while reducing the likelihood of receiving responses from individuals for whom the vignettes represented contextual or specific situations (e.g., knowledge or experience with Another potential computer-related actions). limitation is that these data are from a pilot study and the sample (a) is relatively small and (b) cannot claim to be representative of all computer users. Within its acknowledged limitations, this study did produce significant results and the design did permit the elimination of generally recognized threats to validity.

Research and Practical Implications

One major thrust of this research is to highlight and test issues addressed in the psychological literature regarding moral development and to determine how it relates to issues currently gathering more and more limelight from the media and the public, namely what behaviour might be considered moral and how a person should behave if he or she disagrees with a certain behaviour. The current discussions about software piracy, the electronic highway and the mushrooming of information exchange, and dependency upon and playing with computers, information systems, BBs and electronic newsletter/listserver(s) (EDLs) make this research timely for all of us.

Moral reasoning often exists within individuals as representations of their collective beliefs regarding what is just or unjust. While past research has addressed primarily the development of moral reasoning in children, this study has carried these issues into the cyberspace domain asking experienced end-users to state their opinions about issues that are currently being addressed in the media, parliaments and courts around the world; we are struggling to determine which behaviours are morally appropriate, which might be considered harmful, and how the

harmful behaviours can or should be stopped. Public opinion polls about these issues are important. Nevertheless, if the computer and cyberspace issues which respondents are asked about are kept general and/or abstract, participants who have limited or no experience with the subject, will likely endorse a civil liberties response (e.g., 1994 TIME/CNN public opinion poll about privacy of phone calls). Unfortunately, our study suggests that such research may be irrelevant for the real-life decisions that people have to make when working with computers and participating in the electronic highway.

Although we have learned something, much remains to be learned and much more must be synthesized. If we want to guide future research and policy for the information highway, we must meet the challenges regarding the study of moral development with respect to the behaviour exhibited by the growing numbers of users.

Appendix

Vignette 1: One of your friends is a technical whiz and has just developed a new data encryption device (i.e. similar to a phone scrambler the device helps to protect conversations against wiretapping) and software. Your friend quickly demonstrates how the device works by sending an encrypted message to you. Your subsequent decoding efforts fail, illustrating that the encryption device does its job very well. You and your friend then proceed to install this device and software on both of your machines for utilisation when communicating with each other.

Vignette 2: One of your friends is a real computer nut and has just written a new computer virus. Your friend then proceeds to load the Virus program onto a BB or an electronic newsletter/listserver (EDL).

Vignette 3: Your friend has just received a new computer game through an EDL located abroad. The game is banned in this country because of its violence, sexual and racist content. Your friend tests the game. Although he/she finds it somewhat disgusting, your friend sends a copy to another friend abroad, where no regulation exists possibly banning the game. Your friend does not keep a copy of the game.

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