

DOES ACM'S CODE OF ETHICS CHANGE ETHICAL DECISION MAKING IN SOFTWARE DEVELOPMENT?

Authors

Andrew McNamara

Justin Smith

Emerson Murphy-Hill

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ABSTRACT

Software development ethical choices have a big influence on customers, businesses, and the environment. Organizations, like the ACM, publish codes of ethics to guide software-related ethical decisions. To comprehend how the ACM code of ethics alters software-related choices, the authors have replicated a prior behavioral ethics study with 63 software engineering students and 105 professional software developers, measuring their responses to 11 ethical vignettes. Their findings suggest a challenge to the research community: if not a code of ethics, what techniques can improve ethical decision making in software engineering?



LITERATURE BACKGROUND

Researchers have been interested in identifying whether these codes affect the decisions of employees.

Prior research agrees that there are many different factors involved in making ethical decisions including individual characteristics. Prior studies have measured whether codes of ethics have effects on ethical decisions made in other domains by examining simulated decisions.

Several of these studies have found fewer unethical decisions are made in the presence of a code, but other studies have found no significant effect.

Purpose of codes of ethics:

The ACM provides some guidance on how they intend that the code of ethics should be used, namely to serve as a basis for ethical decision making

Effect of codes of ethics in organizations:

Prior studies have measured whether codes of ethics have effects on ethical decisions made in other domains by examining simulated decisions. Several of these studies have found fewer unethical decisions are made in the presence of a code

Ethics in Information Technology:

Harrington found that codes of conduct have little effect preventing Information Systems (IS) employees from misusing computing resources including cracking computing systems, sabotaging competitors' security, writing viruses, and conducting bank fraud while denial of responsibility had a larger effect .



GOAL OF STUDY

Software developers constantly make ethical considerations, e.g. when deciding how much user data to collect or time to spend on mitigating security risks. Sadly, developers are people and thus don't always make the right decisions.

To encourage ethical behavior many professional organizations, like the ACM, have published a code of ethics that provides guidelines for ethical behavior.

POPULATION TARGETED

- The authors have sought for experts and students in software engineering, not business students. By using a questionnaire to gauge whether student participants had read the code of ethics, they also improved upon Cleek and Leonards' technique.
- In this study, we present participants with vignettes derived from real-world ethical situations in software development. They asked participants to decide how they would act in each situation and compare the decisions made by participants who were given the ACM code of ethics to a control group of participants who saw no code of ethics.



RESEARCH QUESTION

If not a code of ethics, what techniques can improve ethical decision making in software engineering?



TARGET TECHNOLOGY OR APPLICATION BEING DEVELOPED OR EVALUATED

Identification of Ethical Issues.

Based on the interviews, They determined that software participants

- might not be able to recall ethical decisions they made in the workplace
- may not be comfortable discussing situations where they personally had to make ethical decisions during face-to-face interactions with a researcher.

Selection of Ethical Issues

We used the following inclusion criteria to construct our final set of vignettes:

- Keep the Waymo-and Diselgate -like vignettes to test whether prior knowledge of high-profile ethical dilemmas changes decision-making
- Keep one question per Stack Exchange cluster considering, with highest priority criteria first:
 - Variance among pilot study responses — we argue that when dilemmas are easy, participants make the obvious choice without the need for a code of ethics
 - The clearest scenarios, according to pilot participants
 - The brevity of the scenario description — in order to limit the load on participants, we preferred shorter scenarios as a
 - tie-breaker
- Three vignettes from Cleek and Leonard, selected according to the previous criteria

Study Protocol

First, the questionnaire described a fictional company that the participant had just joined as a Lead Developer. Next, participants were randomly assigned to one of two conditions:

- About half of the participants were simply told that the backbone of the company culture was strong ethical standards. (n = 34 students, n = 56 professionals)
- The other half were told that the backbone was the ACM Code of Ethics. This second group of participants were shown a brief version of the ACM 2018 Code of Ethics (n = 29 students, n = 49 professionals)

Participants

63 student participants completed the study. Most participants were 20-25 years old. Of the 29 participants that were familiar with the ACM before the study, 24 of them knew that the ACM had a code of ethics. Additionally, 59 individuals reported believing that ethical behavior is either definitely or probably important for success in an organization.

Responses were excluded from analysis if a participant either

- (a) provided nonsensical or irrelevant responses to free form questions, or
- (b) completed the survey too quickly, with a cutoff of one third median completion time, as defined by pilot run with professional developers



Survey Question

A deadline is quickly approaching for a project that you are working on. You realize that you will not be able to meet the deadline if you are working in normal working hours. you are not allowed to take the computer out of the office. what do you do?

- A) Download data on a personal hard drive and continue development at home
- B) Unsure
- C) Stay at work longer to continue development



KEY ASPECTS OF THE RESEARCH DESIGN



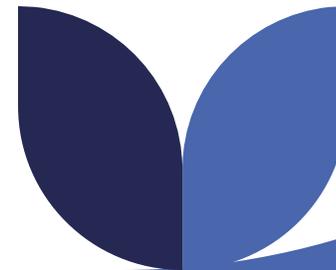
Data Collection

The primary measure we collected was participants' responses to each of the 11 vignettes. There were three possible responses for each vignette; participants could choose between two actions or indicate they were unsure.



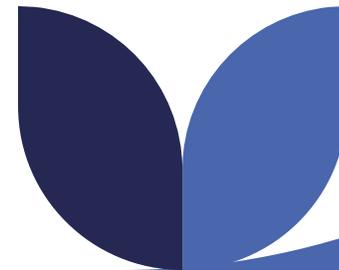
Data Analysis

we analyzed the variance between responses in the two conditions. Since the vignette decisions are not normally distributed, we used the Kruskal-Wallis Rank Sum Test with the null hypothesis that decisions are the same between the two conditions ($\alpha = .05$). Since we would be running this test once per vignette, we controlled for false discovery using a Benjamini- Hochberg correction



VIGNETTE RESPONSE COUNTS

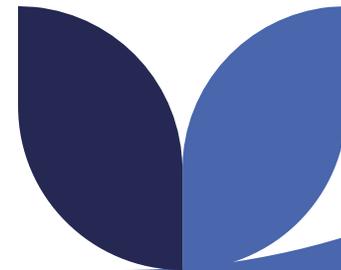
Vignette	Condition	Students			Professionals		
		A	?	B	A	?	B
Cleek & Leonard #2	CoE	10	1	18	17	4	28
	Control	10	7	17	11	3	42
Cleek & Leonard #3 (<i>Dieselgate</i>)	CoE	5	1	23	21	1	27
	Control	7	3	24	21	3	32
Cleek & Leonard #4	CoE	20	4	5	31	10	8
	Control	19	4	11	34	9	13
Cleek & Leonard #6	CoE	14	2	13	33	5	11
	Control	19	2	13	38	0	18
Responsibility to report	CoE	23	1	5	35	5	9
	Control	23	1	10	33	4	19
User data collection	CoE	8	6	15	15	5	29
	Control	15	7	12	22	8	26
Intellectual property	CoE	13	6	10	35	5	9
	Control	16	10	8	28	8	20
Intellectual property (<i>Waymo</i>)	CoE	0	2	27	5	3	41
	Control	1	1	32	6	3	47
Code quality	CoE	19	6	4	32	8	9
	Control	23	3	8	30	11	15
Honesty to customer	CoE	12	5	12	25	5	19
	Control	13	3	18	27	4	25
Personnel and time management	CoE	5	2	22	11	3	35
	Control	3	5	26	16	3	37



KEY ASPECTS OF THE RESEARCH METHODS

A survey was created that described a fictional company that a respondent had just joined as a lead developer. It presented 11 software-related ethical cases, along with an ethical decision, an unethical decision, and an “unsure” option for each case.

The survey was spread among a large number of software engineering students and professional software engineers. About half of the respondents were simply told that the fictional company had strong ethical standards, while the other half was told that the company followed the ACM code of ethics.

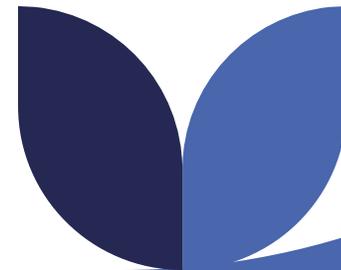


MAJOR FINDINGS

No statistically significant difference was found between the control group and the group that saw a brief version of the code of ethics. Responses from students were also very similar to those from professional software engineers.

The researchers found that those who did not recognize the Dieselgate story were more likely to favour the creation of test-evading software, whereas none of the 20 respondents who recognized the story chose to act unethically.

This suggests that engineers can be influenced to make more ethical decisions by providing examples of similar news-worthy decisions that make clear that unethical decisions can have undesirable consequences.



CONCLUSION

They investigated the ACM code of ethics' effect on software-related ethical decisions. Despite its stated goal, They found no evidence that the ACM code of ethics influences ethical decision making.

Future research is required to identify interventions that do influence decision making, such as by helping developers identify parallels between their decisions and infamous software news stories.



DISCUSSION POINTS OR IMPLICATIONS

Does the presence of a code of ethics influence software-related ethical decisions?

Does awareness of news stories influence software-related ethical decisions?



PERSONAL THOUGHTS

- There is no evidence that the ACM code of ethics influences decision making
- It's possible that awareness of news stories that involve (un)ethical decisions influences decision making



THANK YOU