Perceptions of Ethics in Persuasive User Interfaces

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Abstract. We explore the perceptions of the ethics of persuasive technology as applied to the design of user interfaces. We learn whether consumers of software see persuasion through technology as ethical, whether producers of software view the development of persuasive technology as ethical, and whether these opinions can be reconciled. This research consists of a review of relevant literature on the topic, a survey of software consumers, interviews with software producers, and an analysis of the data, resulting in conclusions intended to influence the responsible design of user interfaces in the future.
We find that persuasive technology is effective, that software consumers do not necessarily recognize persuasion when it is applied to them, and that they do not generally wish to be persuaded, unless they view the motivation of the persuader as being morally admirable. Software developers, on the other hand, do not intentionally behave unethically, but are open to the development of persuasive technology, and even deceptive technology, under some conditions.

Keywords: Ethics · Persuasive interfaces · Consumer perceptions · Software developer perceptions

1 Introduction

The study of user interface and user experience design is meant to help producers improve the user experience of hardware and software, but the definition of improved user experience is not always clear. In the case of persuasive technology, the user may have the experience of being persuaded to behave in a particular way, with the interface having been intentionally designed to obtain this result. This includes benign persuasion, such as persuasion to guide users in the most effective use of the technology, but also persuasion to influence users for the persuader's benefit.

Many software professionals design and implement interfaces that are persuasive or even deceptive for the persuader's benefit, rather than, or in addition to, the benefit of users. For example, persuasion can be used in web-based software to convince users to click on ads or links. It can be used in social media software to increase the time people spend using the software. It can be used

in social networking software to encourage users to invite or engage with others to attempt to increase the number of users. While the user may interpret the experience as positive, the truth is that users may not be aware of the persuasion having taken place. It is worthwhile to ask if persuasive design is an ethical use of technology.

The answer may depend on whether the intentions of the producer are seen as morally admirable, morally neutral, or morally questionable. Or it may depend on people's perception of having been deceived and their reaction to the deception, even if it was done in the service of a goal that is seen as morally admirable.

The perceptions of both consumers (users) of technology and producers (software development professionals) are of interest here. The first contribution of this research is to learn whether consumers see persuasion through technology as ethical, and if so, under what circumstances they are comfortable with it being applied. The second contribution is to learn whether software professionals view the development of persuasive technology as ethical, and if so, under what circumstances they are comfortable with developing it. Finally, we attempt to reconcile these opinions.

The remainder of this paper includes a brief assay of the background, a report on a survey of consumers, and a report on interviews with software developers.

2 Background

Reviews of the literature have been conducted in [13] and [21], both calling for more research into the ethics of persuasive technology. The more recent review, [13], studies [7, 1, 6, 10, 3, 12, 18] among other important sources. These date back to the 1999 introduction of the oft-cited Golden Rule of persuasive technology design, as well as including the main textbook for the topic, [7], by the coiner of "captology", as well as its critique in [1], and sophisticated definitions of voluntary persuasion, such as that tendered by [18]. Relevant work not covered in these reviews include [5] and [19] the latter advocating for *libertarian paternalism* in *nudges* or persuasive techniques to encourage people to act in their own best interest as judged by choice architects. Some prior work considers surveillance and persuasion. Leth Jespersen et al. in [15] believes the intent of a persuader should be made clear to avoid being cast as manipulation. Nagenborg [16] claims that persuasion is not unethical but sees potential ethical challenges in the way that data collected by surveillance is used to influence users. Barral et al. [2] go further, asserting that subliminal persuasion technology is ethical if it is consistent with participants' goals and intentions, although they leave open how the producer could possibly know the participants' goals and intentions. By contrast, Timmer et al. [20] consider transparency to be of critical importance, and propose methods such as value sensitive design and participatory design to maintain it, approaches also advocated by [6]. Other work such as [22] cast only a glance at ethics. A similarly brief discussion of ethics can be found in

[14], along with the exhortation that ethical analysis of designs from behavioral economics would be a fruitful and important area for future work in HCI.

Kaptein and Eckles [11] explore the idea of persuasion profiles – adapting persuasive technology to individual differences in the effectiveness of a particular persuasion strategy. Tristan Harris [9] describes ways in which technology hijacks users' minds and persuades them to act in ways that benefit the technology company.

The term *dark patterns* was first coined in a blog post by Harry Brignull [4], and later defined in [8]. The dark patterns concept is closely related to the use of persuasive technology in an unethical way, as explored in this paper.

3 Survey of software consumers

3.1 Methodology

A survey, given to faculty, students, and staff at a U.S. higher education institution, investigated whether computer software users (consumers) recognize persuasion in software, whether they consider persuasion to be ethical, and if so, under what circumstances, and whether consumers are persuaded by interfaces designed to do so.

The first question presents a mockup of a user interface, Figures 1–2, which differs among four conditions, selected randomly for each participant: a neutral design; a persuasive design with a morally admirable goal; a persuasive design with a neutral goal; and a persuasive design with a morally questionable goal. The following research question is addressed by this survey question:

RQ1: Are consumers persuaded using technology when the goal is (1) for their own benefit, (2) neutral, or (3) for the benefit of the producer?

The next two questions are intended to determine if consumers recognized the attempt at persuasion, if any, in the initial UI mockup, and whether the attempt was considered to be deceptive.

RQ2: Do consumers recognize persuasion using technology when the goal is (1) for their own benefit, (2) neutral, or (3) for the benefit of the producer?

RQ3: Do consumers consider persuasion using technology to be deceptive?

The next two questions were randomly assigned to experimental conditions B, C, or D. Each question is phrased to reveal the attempt at persuasion and the producer's motivation. Question X asks the participant to rate their view of the motivation on a seven-point Likert scale from *extremely morally admirable* to *extremely morally questionable*. Question Y asks the participant to rate their reaction to the persuasion on a seven-point Likert scale ranging from *extremely positive* to *extremely negative*.

RQ4: Do consumers consider persuasion using technology to be morally admirable when the stated goal is (1) for their own benefit, (2) neutral, or (3) for the producer's benefit?

RQ5: Do consumers consider persuasion using technology to be ethical when they consider it to be morally (1) admirable, (2) neutral, or (3) questionable?

Several demographic questions were included to check for whether responses differ based on age, gender, or education.

3.2 Results

We received 438 responses across the four variants the of the survey.

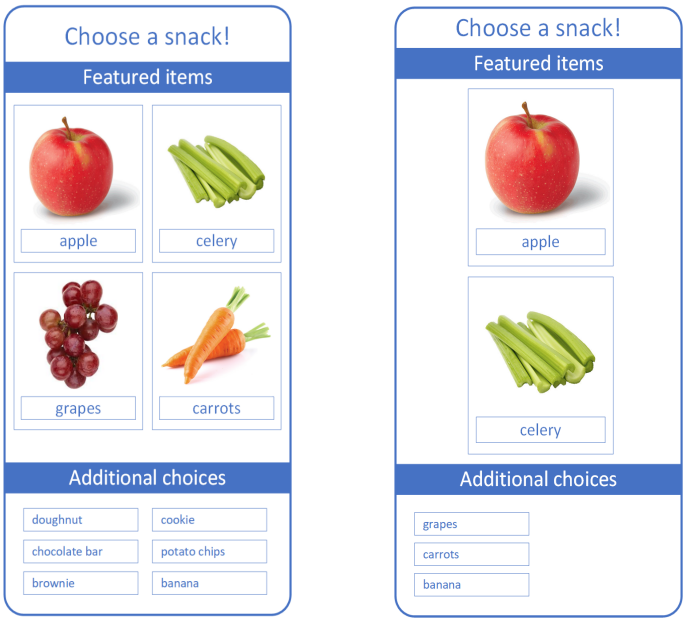

Fig. 1. Condition B (left) and Condition C (right)

To answer RQ1(1), we wanted to learn whether participants were persuaded by the user interface presented in condition B, shown in Figure 1 (left). By prominently displaying four items with photos as "Featured items," the intention was to persuade participants to choose one of these items rather than one of the less prominently positioned, text-only "Additional choices." Since the featured items were all fruits or vegetables, expected to be viewed as healthy snacks, while the additional choices included less healthy options, such as chocolate, baked goods and potato chips, this condition represented an attempt at persuasion with a motivation that would be considered morally admirable: to encourage healthy snacking.

There were 74 valid responses to this question, and of these, 53 chose one of the four featured items, while 21 chose one of the six additional choices. The expected proportion, if participants had an equal chance of selecting any item, would have been 29.6 and 44.4, respectively. A χ^2 test, $p < 0.001$, indicates

that participants were persuaded by the interface. (Note that in all cases, $\chi^2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \left(O_{i,j} - E_{i,j}\right)^2 / E_{i,j}$.)

Participants were also asked whether they felt they were persuaded by the user interface, in order to address RQ2(1). In this case, the results were inconclusive, with 58 participants answering "Yes" and 43 answering "No," $p = 0.14$. We cannot determine whether participants were aware of having been persuaded by the interface mockup.

To answer RQ1(2), we wanted to learn whether users were persuaded by the user interface displayed in condition C, shown in Figure 1 (right). Similarly to condition B, by prominently displaying two items with photos as "Featured items," the intention was to persuade participants to choose one of these items rather than one of the less prominently positioned, text-only "Additional choices." The difference in this condition was that all items in both the featured items and the additional choices categories were fruits or vegetables, and thus considered to be healthy choices, so the persuasion attempt here was intended to be morally neutral – with no obvious motivation on the part of the producer. The results here were that 44 participants chose one of the featured items, while 61 chose one of the additional choices – almost exactly the expected proportion, $p = 0.69$, and we cannot conclude that participants were persuaded by this mockup. The associated question to determine whether participants recognized the attempt at persuasion and address RQ2(2) was likewise inconclusive, with 54 participants responding "Yes" and 58 responding "No," $p = 0.71$.

Condition D was the final attempt at persuasion, an effort to answer RQ1(3) using the interface mockup shown in Figure 2 (left). Here the "Featured items" category contained exclusively items that would be considered less healthy alternatives, while the healthier items were all listed under "Additional choices." In this case, there were 83 valid responses, with 43 participants choosing one of the four featured items, while 40 selected one of the six additional choices. The χ^2 test, $p = 0.028$, indicates that participants were indeed persuaded by this mockup.

The question of whether participants recognized the persuasion, RQ2(3), is yet again inconclusive, with 59 answering "Yes" and 51 answering "No," $p = 0.45$.

Finally, condition A, shown in Figure 2 (right) was intended as a control condition, in which there was no attempt at persuasion. The snack choices were presented in alphabetical order, each with both a text label and a small photo of the snack. Healthy items were alternated with less healthy choices, with the expectation that users would choose the snack that they truly preferred, rather than being influenced by the UI. In fact, the results suggest that this was indeed the case. The χ^2 test, $p < 0.001$, reflects only the unlikelihood that the results would occur by chance.

In fact, on the question of whether participants felt persuaded by the interface, a significant result was found, with 23 of the 109 valid responses being "Yes" and 86 being "No," $p < 0.001$, indicating that participants recognized, correctly, that they were *not* being persuaded.

Fig. 2. Condition D (left) and Condition A (right)

To summarize, *when participants were presented with UI mockups intended to persuade them to choose a featured snack for their own benefit (condition B) or for the benefit of the UI producer (condition D), results suggest that the persuasion was effective. In the case of persuasion with a neutral motivation, we could not conclude from the results whether participants were persuaded or not. In all three experimental conditions, B, C, D, the question of whether participants recognized the persuasion was inconclusive. And in the control scenario, condition A, results show that participants were not systematically persuaded in any discernable way, and they correctly recognized the lack of persuasion in the UI.*

To answer RQ3, we asked participants whether or not they felt that the persuasion attempted by the UI mockup was deceptive. Since only conditions B, C, and D involved an attempt at persuasion, we consider only those responses, of which there were 323. These results consisted of 156 "Yes" responses and 167 "No" responses, $p = 0.54$, so we cannot conclude whether participants found any of these interface mockups to be deceptive. However, examining the results to this question for the control scenario, condition A, we find that only 12 participants answered "Yes" and 95 answered "No" to this question, $p < 0.001$, indicating that participants overwhelmingly recognized that this interface mockup was *not* intended to be deceptive. When contrasted with the inconclusive results in the three experimental conditions, it seems likely that more participants than would be expected found the interfaces to be deceptive, even if not to a statistically significant degree.

We turn next to the issue of whether participants considered the interfaces designed for persuasion to be ethical, when the attempt at persuasion and its motivation were revealed. For this we use the responses to questions previously denoted X and Y, which asked participants how they viewed the motivation of the producer and for their reaction to the attempt at persuasion, respectively.

For condition B, it was explained to participants that the motivation of the producer was for the benefit of the software consumer, in an effort to encourage the selection of healthy snacks. The answers to questions X and Y in this condition are used to address research questions RQ4(1) and RQ5(1), respectively. Of the 101 responses to question X, we discard the responses of the 22 participants who considered the producer's motivation to be morally neutral. Of the remaining 79 answers, 64 participants responded that the producer's motivation was extremely, moderately, or slightly morally admirable, while 19 responded that the motivation was extremely, moderately, or slightly morally questionable. The χ^2 test, $p < 0.001$, indicates that most participants found the motivation to be morally admirable. For question Y, there were 37 neutral responses, which we discard. Of the remaining 63 responses, there were 44 participants who reported their reaction to this attempt at persuasion to be extremely, moderately, or slightly positive, while 19 had reactions that were extremely, moderately, or slightly negative. The χ^2 test, $p < 0.001$, indicates that participants reacted positively to this attempt at influencing their choice.

For condition C, it was explained that the motivation of the producer was neutral, with no particular intent. The answers to questions X and Y in this condition are used to address RQ4(2) and RQ5(2), respectively. In this case, we are interested in the number of participants who viewed the persuasion attempt as morally neutral, as compared to those who found it to be morally admirable or morally questionable. Of the 113 responses to this question, 55 found the motivation to be morally neutral, while 58 participants chose one of the other six options on the Likert scale. The χ^2 test, $p < 0.001$, indicates that participants generally considered the motivation to be morally neutral. Similarly, for question Y, there were 49 participants whose reaction to the attempt at persuasion was neither positive nor negative (neutral), while 64 participants chose one of the six positive or negative responses, $p < 0.001$, indicating that participants in general had neither a positive nor negative reaction to the attempt at persuasion.

For condition D, we explained that the motivation of the producer was to benefit snack food manufacturers in an effort to sell snacks. The answers to questions X and Y in this condition are used to address RQ4(3) and RQ5(3), respectively. Of the 110 responses to question X, we discard the responses of the 31 participants who considered the producer's motivation to be morally neutral. Of the remaining 79 answers, 6 participants responded that the producer's motivation was extremely, moderately, or slightly morally admirable, while 73 responded that the motivation was extremely, moderately, or slightly morally questionable, $p < 0.001$, indicating that a large majority of participants found the motivation to be morally questionable. For question Y, we had 42 neutral responses, which we discard. Of the remaining 68 responses, 10 participants re-

ported their reaction to this attempt at persuasion to be extremely, moderately, or slightly positive, while 58 had reactions that were extremely, moderately, or slightly negative. The χ^2 test, $p < 0.001$, indicates that most participants reacted negatively to this attempt at influencing their choice.

To summarize, *participants correctly recognize differing motivations as being morally admirable, morally neutral, or morally questionable, and they reacted positively to persuasive technology with a morally admirable motivation, negatively to persuasive technology with a morally questionable motivation, and neither positively nor negatively to persuasive technology with a morally neutral motivation.*

4 Interviews with Software Producers

4.1 Methodology

The interview attempts to learn whether computer software professionals (producers) consider the development of persuasive technology to be ethical, and if so, under what circumstances. The design of this interview reflects this goal, in the following ways:

The first four questions are intended to gather some background about the participants, including the software development roles they have performed, whether they ascribe to a particular moral framework, and, if so, which one, and whether they adhere to a formal code of ethics.

The next two questions (5 and 6) are intended to determine whether producers find it necessary to consider the ethical implications of their work, and if so, in what circumstances.

The next three questions (7 through 9) are intended to determine if producers have been involved in the development of software that they consider to be persuasive, and if not, whether they would consider doing so and why.

The final three questions (10 through 12) are intended to determine if producers have been involved in the development of software that they consider to be deceptive, and if not, whether they would consider doing so and why.

4.2 Results

Interviews were conducted with 12 participants, a convenience sample of the first author's professional contacts, who ranged in experience from 1.5 years up to 37 years in software development. All of the participants had performed multiple roles in their careers, with the largest number having been developers (11), followed by designers (6), and first line managers (6). Five participants had been software architects or second line managers, four had been testers, and three reported a role of junior/senior software engineer. The following roles were reported by one participant each: UX designer, tech lead, team leader, product owner, embedded real time developer, web developer, salesperson, director, and vice president.

Three participants answered "Yes" to indicate that they adhere to a formal code of ethics such as the ACM Code of Ethics. Five answered "No," and four answers were less straightforward. The answers overall suggest that some participants believed their behavior would be in agreement with a formal code of ethics, but since they could not claim to have read and agreed to the code, they could not be certain. For example, one participant answered "I think I do," but that "I can't say that I'm familiar with the details." Another responded "Not formally," and one pointed out that many companies have a formal code of ethics that one must agree to follow as a condition of employment.

On the question of whether participants had found it necessary to consider the ethical implications of their work, there was an even split, with six participants responding "Yes" and six responding "No." Of those who answered "Yes," there was little commonality among the responses, with each answer being a distinct situation.

The next several questions ask whether the participant has ever been involved in the development of persuasive technology and, if not, whether they would consider doing so, and why or why not. On the first question, six participants responded "Yes" and six responded "No." Most participants also expanded on their answer with details of the occasions, including positive or negative reactions. Of those who answered "Yes," there was one negative comment, a participant who "did not enjoy developing for a client that used such marketing techniques on a public facing web site."

The majority of the comments from those who answered "Yes" were positive, with participants emphasizing the use of persuasion as a means of guiding the user through the proper use of the software. One participant said that the goal is "designing systems that are easy to use and intuitive." Another expressed the intent to develop "software that creates triggers for people to react to things," adding that "we want to be persuasive, and enable people to accomplish tasks by providing triggers for them to do something in the software." There are "certain scenarios that we want people to accomplish," said one participant, and another claimed to be "trying to design software that persuades them through the proper way of using it ... we guide them through the use of the software."

Some participants in this category also expressed the opinion that "everything we do influences people," stating that "the way we design software is intended for the user to do something," and that "the way we lay things out is intended to influence the user's behavior; that's not done in a negative way." One participant concluded that "you can't avoid doing it, because otherwise you can't create a product." This echoes a statement from a user experience study where the authors "acknowledge the persuasive intent underlying all of design activity" [8].

One participant answered that "I don't think influencing behavior is intrinsically bad," and that "as long as the persuasiveness is in general beneficial to the user, is clearly spelled out, and can be configured, I don't have a problem with it," referencing [19] in support.

Of the six participants who answered that they had not been involved in the development of persuasive software, four said they would consider doing so, while two said that they would not consider doing so. Of the six participants who *had* previously been involved in the development of persuasive technology, four of them nevertheless volunteered a response to this question, with three of them saying "Yes," they would consider doing this (again) and the fourth answering "No." Of the seven participants who answered "Yes" or "Maybe," many provided conditions for their agreement. Three of them argued that it's reasonable and expected to use persuasion to encourage sales of the product, with one stating that "selling a product, I probably would," because "marketing products is a part of our culture." Another participant said that "as long as the behavior is ethical, it could be considered a type of sales," and the third said that "we want people to be engaged," and "we want people using the software," because "you want to sell a product you're making." The fourth participant expressed the opinion that "persuasive software is acceptable as long as it is developed to influence the user toward positive ethical outcomes."

Of the three participants who stated that they would not consider developing persuasive technology, two provided explanations for their reasoning. One participant referred to the use of loot boxes in video games, and expressed the opinion that "a lot of that software moves toward the predatory," further pointing out that these "technologies are drawing a lot from slot machines and the gambling industry," and are "targeting people who are making impulsive decisions." "We all have moments of poor impulse control," said this participant, and "I think targeting those people is unethical." Another participant implied that persuasion can be deceptive by its nature, stating that "as a customer I wouldn't want to be deceived in any way, so I do not want to contribute to that."

To summarize, *the majority of interview participants (nine out of twelve) consider it acceptable to be involved in the development of persuasive technology, at least under some conditions. The conditions varied among participants, and fell into three categories: guiding the user in the most efficient and effective use of the software itself, using persuasive technology as part of a sales or marketing effort, and persuading the user to do something that the participant would not find to be unethical.*

The final three questions were intended to learn the opinions of software professionals when it comes to deception in software. Of the 12 interview participants, two said that they had been involved in the development of deceptive software, while 10 responded that they had not. Of those 10, when asked if they would consider doing so, six answered "No," three answered "Yes" or "Maybe," and one offered no response. When asked why or why not, the two participants who had been involved in the past both expressed that they would prefer not to do so again, with one answering "I don't enjoy building sites that market products in a deceptive way," and the other stating that "I wouldn't want to use software that's deceptive. I want to understand and be able to trust what I'm working with, so I don't want to build software that others don't trust or can't rely on."

Of the six who said that they would not consider it, three of them provided their reasoning, with one saying "I would not like to do things to others that I would not like others to do to me." Another responded that "It feels like it's crossing a moral boundary," and the third answered "I think by nature that's dishonest, and I think that would do harm."

The three who answered "Yes" or "Maybe" explained their reasoning in several ways—two of them mentioned the software itself as a deciding factor, with one answering that "It depends on the nature of the intended software product," and another saying that "It would depend on the circumstance and the ultimate goal of it. If the proverbial good versus evil can be achieved, my morals would not prevent me from working on it if I believed it was for the greater good." Two of the three also mentioned personal circumstances, with one saying that "given some (extreme) preconditions, I'd consider it." The preconditions mentioned included the need for health insurance for a spouse's (but not the participant's own) serious condition. The other offered the opinion that "the world isn't black and white," but said that "the bar would be set pretty high. I don't think I would ignore that and just do it because it's a job."

In summary, *the majority of the interview participants (eight out of 12) do not consider it acceptable to be involved in the development of deceptive software. The minority who would consider it would do so only given certain conditions of the software or of their personal situations.*

5 Discussion

A major finding from the UI mockups presented in the survey was that in two of the three conditions in which persuasion was present, it was, in fact, effective at persuading the participants, regardless of whether the producer's motivation was intended to be positive or negative toward the participant. This finding is confirmed by the control scenario, in which no persuasion was present, as participants appeared to respond in accordance with their own natural preference, and not as a reaction to any systematic influence from the UI design. Additionally, although it was inconclusive whether participants recognized the attempts at persuasion in the conditions where persuasion was present, the lack of persuasion in the control condition was clearly identified.

The finding that persuasive technology really works is to be expected, but it's significant here because the persuasion used in this study was rudimentary—involving no more than prominent placement and the use of stock images for items that users were persuaded to choose. Modern software used in mobile applications and websites—especially online shopping, social media and networking applications—uses far more advanced approaches, including not only interactive graphics and language, but constructions such as false or hidden affordance, and sophisticated techniques such as providing the illusion of choice by presenting a limited set of menu options, providing intermittent variable rewards to encourage addiction, using norms of social approval and social obligation [9].

This is the point at which the perceptions of persuasion by software consumers and those of software producers have the potential to conflict. The majority of interview participants considered the development of persuasive technology to be acceptable under some conditions; in particular: when guiding the user in the most efficient use of the software, as part of a sales or marketing effort, or when the software producer does not consider the persuasion to be unethical. But as shown by [17], it can be all too easy for software producers to determine that their scenario falls into one of these categories. For example, much software is developed as part of an effort to make money for the developers. If the use of persuasion for sales and marketing is acceptable, then virtually anything the producer chooses to do in service of that goal becomes acceptable.

Among the survey findings were that while software consumers consider persuasion in general to be ethical, they react negatively to attempts to persuade them personally, particularly when the motivations of the producer are seen as morally questionable. Since the explicitly stated motivation of the morally questionable UI mockup variant in the survey was an attempt by a manufacturer to sell snacks, this appears to be in direct contradiction with the attitude of software producers that it is acceptable to use persuasion in the service of sales.

6 Conclusion

This paper has explored the perceptions of the ethics of persuasive technology, resulting in some significant findings:

Persuasive technology can work. Even the rudimentary attempts in the survey used in this study were shown to be effective.

Software consumers do not necessarily recognize persuasion, although they correctly identify cases where it is *not* present.

Software consumers do not wish to be persuaded, unless they view the motivation of the persuader as being morally admirable.

Software producers do not want to behave unethically, but they are largely open to the development of persuasive technology, and a minority would also not rule out the development of deceptive technology, as long as their personal moral boundaries are not crossed.

The academic literature on ethics in the use of persuasive technology needs expansion. Some significant work has been done to describe, analyze, and predict many aspects of persuasive technology, but often the ethical considerations have been given only secondary importance. In a few cases, authors have expressed strong opinions about the ethics of designing and developing software.

An important limitation of this study is that the survey respondents (not the interviewees) were all associated with a single higher education institution, so the findings may be related to level of education, cultural background, or economic class.

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