

Ethics and Persuasive Technology: An Exploratory Study in the Context of Healthy Living

Rachel E. Page
School of Computing Science
Newcastle University
Newcastle upon Tyne, UK
r.e.page1@ncl.ac.uk

Christian Kray
School of Computing Science
Newcastle University
Newcastle upon Tyne, UK
c.kray@ncl.ac.uk

ABSTRACT

Persuasive Technology has been heralded as a new paradigm to change people's behavior to improve various aspects of everyday life. In combination with mobile and ubiquitous delivery mechanisms, persuasive technology has the potential to reach and influence people everywhere and at any time. While there are clear benefits to be gained from this approach, there are obviously ethical considerations that need to be taken into account and that currently are not well understood. This paper aims to contribute towards a better understanding of ethics in persuasive technology. We present results from a focus group session and an online survey on the use of persuasive technology in the context of healthy living. The results indicate that the "golden rule of persuasion" [5] might not always be applicable to persuasive technology, that self-initiated persuasion per se may always be acceptable, and that there may be a link between the purpose of persuasion and the means used to persuade. The findings can be used to inform the design of future persuasive interventions.

Categories and Subject Descriptors

H.5.m [Information Systems]: Information interfaces and presentation – *miscellaneous*.

General Terms

Design, Experimentation, Human Factors.

Keywords

Persuasive technology, ethics, healthy living, user studies.

1. MOTIVATION

Persuasive technology can be defined as "any interactive computing system designed to change people's attitudes or behavior" [4], which can be applied in a wide range of scenarios. Mobile (and ubiquitous) devices are very well suited for the delivery of persuasive content as they can sense contextual factors of relevance to a specific user (such as location and/or task) and tailor messages so that they are delivered in the most effective way. Considerable potential has been attributed to this technology in terms of helping people to change their behavior [10].

One key area, which could greatly benefit from persuasive technology, is healthy living. For example, it could be applied to areas such as disease management and prevention, improving care

and assisting people in living a healthy lifestyle. Particularly in industrialized nations, the latter is rapidly becoming a very pressing issue. In the UK, for example, an estimated 24.2% of adults are considered to be obese [1], a condition which has been shown to cause a number of short and long-term illnesses such as diabetes. Alcohol abuse is a similar problem of comparable proportion and impact [9]. These two issues are predominantly a result of misbehavior, and specific persuasive technologies could be created to help to correct this behavior and thus to reduce the number of people affected by these problems. However the use of such technology does also raise some ethical questions, e.g. with respect to which measures are acceptable in what context, and it is these ethical issues that this paper is investigating.

Ethics can be defined as "the moral principles governing or influencing conduct" [2], and it is clearly dependent on the cultural context, as moral principles will differ between cultures. (Therefore, the results of the studies are limited to Western European/British context.) When considering ethical implications of persuasive technology, there are a number of factors that could potentially play an important role in determining whether a particular piece of persuasive technology is considered ethical or not. These factors include: the user of the persuasive technology; the commissioner behind the persuasive message; the persuasion method used; and the technology being used. One goal we were pursuing with our research was thus to identify the relative importance and relationships of these factors.

In the following, we first briefly summarize related work before discussing insights gained through a focus group session. We then present the questionnaire study we conducted based on the findings of the focus group, and discuss its results as well as its implications for the design of persuasive technology. A brief summary concludes the paper.

2. BACKGROUND

Persuasive technology [3] is a relatively new area in Human-Computer Interaction, which focuses on using technology (such as mobile phones, web sites and other means) to change the behavior or attitude of people. According to Fogg [3], computers benefit from several advantages over humans when persuading others such as being able to persist indefinitely or the option to exploit the positive image of computers. Fogg also asserts that one has to analyze intentions, methods and outcomes of an instance of persuasive technology in order to assess its ethical implications [4]. In our studies we considered these as well as further factors.

Berdichevsky and Neuenschwander [5] focus directly on the ethics of persuasive technology. They outline ten principles for ethical design of persuasive technology, including the so-called *golden rule of persuasion*. It states that designers of persuasive technology should not create any artifact that persuades someone to do or think something that they (the designers) would not want to be persuaded of themselves. One of the goals of the work reported in this paper is to test this golden rule in a specific context (i.e. healthy living).

Persuasive technology does not exist in a vacuum, so we need to select an application domain. We chose to focus on healthy living [6] not only to control the complexity of the user study but also because it is a global and growing problem that has been identified as a key future research challenge [7]. Chatterjee and Price [8] provide an overview of specific issues and challenges. The study presented in this paper expands on their work by including further persuasive methods and empirically assessing their ethical implications.

Our work uses key factors of ethical relevance that were identified in previous work. We extend the list of these factors and study the ethical acceptability of specific combinations through focus group sessions and a questionnaire-based survey.

3. FOCUS GROUP SESSIONS

In order to gain a better understanding of relevant aspects relating to ethics and persuasive technology in the context of healthy living, we organized two focus group sessions. We were particularly interested in people’s understanding of persuasive technology, their reaction to different types of persuasive techniques, and which combination of factors would be perceived as being ethically acceptable. In addition, we wanted to test a set of scenarios in order to select the most useful ones for the subsequent survey study.

In total, seven students from local universities were recruited through word of mouth and via a group set up on a social networking website. We ran two separate focus groups to keep the number of participants manageable. Both sessions were recorded on video, which was later partially transcribed. After a brief initial discussion about ethics and persuasive technology in general, participants were asked to fill out a brief questionnaire, where they had to rank several scenarios according to how ethically acceptable they were. The scenarios were then discussed within the group on an individual basis first. At the end of the session, we encourage subjects to discussing and comparing all scenarios.

In total, we designed five scenarios based on the factors identified in previous work (intent, methods, outcome) but we also included the commissioner of a piece of persuasive technology, the influencer as well as the actual recipient of the persuasive content. By focusing the discussion on five distinct scenarios, we aimed to limit high-level/matter of principle types of discussion, and to probe specific combinations of factors. We also hoped that concrete examples would provide participants with a better understanding of what persuasive technology could be in practice.

3.1 Scenarios

Scenario A was a food diary mobile phone application for teenage girls that provided incentives and motivated the users to follow a healthy diet. It was created and influenced by a private company. We designed this scenario to spark a discussion about using persuasive technology on a group that may be vulnerable in a

certain area, as teenage girls often are with regards to weight and body image. We also hoped that the fact of a private company being behind it would be picked up by the focus group.

Scenario B was a website for young adults to monitor their alcohol intake and be persuaded to drink less through social comparisons. The website was provided by the Government to support people to change their own behavior. Questions driving this scenario were whether website would be perceived as an effective way of delivering persuasive content relating to healthy living, and what subjects would make of the use of social comparisons in this context.

Scenario C was a purpose built embedded device for morbidly obese adults to change their eating habits by delivering drastic messages such as “Keep eating like that and you’ll be dead soon”. It was commissioned by their doctor and paid for by the NHS. This scenario was designed to test extreme conditions and their impact on perception of what would be ethically acceptable. It was also meant to evoke an emotional response to be discussed and any limits that should be placed upon this kind of technology.

Scenario D was a text message system, similar to the warnings on cigarette packets, which were being sent to a mobile phone at the time when the user was about to have a cigarette. A commercial company was presumed to be behind the messages. Key features of this scenario were the pro-active delivery of persuasion as well as the inclusion of contextual factors into the equation.

Finally, scenario E investigated the use of a game to persuade children to eat more fruit. It encouraged them to ask their parents for fruit. The initiators in the scenario were their teachers, who encouraged them to play the game. The main goal of this scenario was to investigate if manipulating children in this way was acceptable and whether ‘disguising’ persuasion as a game would raise any concerns.

3.2 Outcomes and Observations

The results from the ranking task administered prior to the discussion are summarized in Figure 1. The diagram highlights that except for scenarios A and D there was a very clear ordering, where C was rated as being lowest, E rated highest, and B second highest. While the limited number of scenarios used prevents a

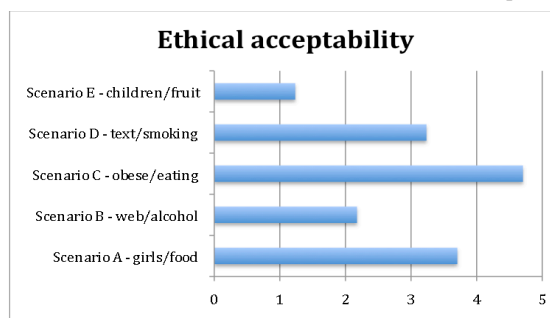


Figure 1 – Ranking of scenarios according to how ethically acceptable they were rated, 1=very ethical, 5=very unethical.

direct analysis with respect to which factors are the key drivers behind people ranking the scenarios as they did, the ranking provides some initial indication that the severity of an outcome may have some considerable impact. Results with respect to the vulnerability of the recipients of persuasion are somewhat inconclusive (as the two scenarios including children and girls)

are rated quite differently. We were somewhat surprised by the comparatively low ranking of the texting + smoking scenario, which we believed to be much more acceptable. This might indicate that the proactive delivery of persuasive content may be an important factor to consider (which is a key reason why mobile devices and ubiquitous environments are considered to be very well suited for persuasive technology).

From the video material we also transcribed a number of comments that highlighted various aspects and relationships with respect to applying persuasive technology in the context of healthy living. For scenario A, one participant remarked that “if the NHS was behind it and it was backed up by research it would be ok, the problem is the private investor and influencer”, which hints at the importance of who is commissioning an instance of persuasive technology when assessing its ethical acceptability. Another subject stated that “girls have their mobile phones with them all the time and might receive the incentives all the time, but it still encourages healthy eating so it’s still a good thing”, which provides some evidence that context-awareness may be considered ethical under certain circumstances.

Most comments about scenario B questioned the effectiveness of this approach (“people would use this to compete on how much they could drink, especially groups of guys on a night out”) but were not concerned about the ethical implications it might have (“It is not unethical but unworkable, you wouldn’t check the website as you were drinking”).

Scenario C attracted a lot of discussion, in particular with respect to the ‘shock tactics’ being used. Participants voiced concerns about the effects of this method on people’s well-being, e.g. “people who are obese may have low self esteem and if they use this it may make them depressed”, “this is controversial because of the messages, if users are repeatedly told they are going to die, they might give up and eat more anyway”, or “the messages can’t be impersonal and attack people or it will have an effect on their psychological well-being.” However, subjects also came back to the question of who commissioned the technology: “The use of this device depends on a person’s character and self esteem, it’s ok if it’s their choice to use it, it’s person specific.”, “It is being given to them by their doctor so it will be ok, their doctor will check their mental stability.”

This aspect of who was behind the persuasive message was discussed for scenario D as well: “c company is making money and they could use it to take advantage, if the NHS were behind it, it would be ok; if it is promoting other products such as patches, then it is unethical.”, “but some private companies already prompt people not to smoke, it is just another venture.” The discussion also brought up a general benefit of computer-based persuasion compared to a human trying to persuade someone: “you would get cross at friends trying to make you stop, it’s a good thing, persistence is good.”

4. SURVEY STUDY

Based on the observations and feedback we gathered during the focus group sessions, we created an online questionnaire to investigate ethical issues pertaining to the use of persuasive technology in the context of healthy living. In order to narrow down the number of factors being investigated simultaneously, we chose to focus on the three aspects that were mentioned most frequently during the focus group sessions: the recipient, the commissioner and the means of delivery.

4.1 Material and Procedure

Three scenarios from the focus group sessions were adapted for the questionnaire: one scenario related to encouraging people to exercise more while at a gym, a second one picked up on helping people to quit smoking, and the final one was built around helping people to change their eating habits. Instead of fixing the three factors mentioned above, we systematically varied them and then asked participants to rate them on a five point Likert scale.

For each scenario, we asked people to assess the ethical appropriateness of a particular technique for two distinct groups of people: healthy people and people who had a condition, which meant that they could greatly benefit from changing their behavior. For the eating scenario, for example, we asked the same questions twice: once for regular people and once for morbidly obese people.

In terms of initiator we also considered two levels for each scenario. One always referred to self-persuasion (i.e. the user chose to use a piece of persuasive technology to change their behavior) and the other one was an external entity. In the first scenario, this entity was the gym (a commercial company), in the second on it was the NHS (National Health Service – a governmental institution), and in the third one the Quick Smoking Campaign (a not-for-profit organization).

The final key factor identified during the focus group sessions was the means used to persuade people. We chose five different techniques, four of which are feasible with today’s technology, in particular using mobile phones, and one that was meant to be an extreme example (electric shocks). The four feasible techniques were: text messages sent to a user’s mobile phone, public announcements at the location of the user (so that bystanders would know about the failure of the user to change their behavior), notification of friends on Facebook (so that friends would learn about a user’s performance), and restrictions to the user’s bank account (e.g. restricting the amount of money being available to the user depending on their behavior).

For each scenario, there were 20 questions, where participants had to rate the ethical acceptability of statements describing a specific combination of factors in the context of this specific scenario. We published the survey on a commercial web service and advertised it through a number of mailing lists, web sites and groups on social networking sites. 72 participants (36 male, 36 female) completed the survey. The majority of subjects (61%) fell into the 18-25 years old bracket, with a further 9.7% reporting being between 26 and 35 years old. Equal numbers (11.1% each) indicated their age as being between 36 and 45, respectively 46 and 60. 6.9% reported being over 60 years old.

4.2 Results

We analyzed the results according to different dimensions and factors but due to space (and time) restrictions, not all results of the study can be reported here. In the following paragraphs we summarize some key results that potentially have some implications for the design of persuasive technology in the future.

With respect to the initiator/commissioner of an instance of persuasive technology, we re-affirmed that if a person decides to use persuasive technology, then even drastic measures such as electric shocks are considered predominately unethical. Figure 2 summarizes the responses we obtained for the three scenarios.

The picture was more diverse when looking at how ethically acceptable rated various scenarios. We were not able to identify a clear trend across all three scenarios. When analyzing different means to deliver persuasive content, we found that they varied considerably in terms of how ethical they were considered to be. Text messages were the least problematic, followed by public announcements and Facebook notifications. Interestingly, Facebook announcement appeared to be rated slightly more unethical than public announcements. The most unethical means were bank account restrictions and electric shocks, with the latter consistently being rated as being unethical or very unethical.

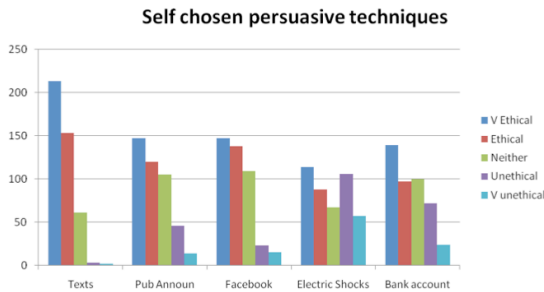


Figure 2. Ethical acceptability of different means to deliver persuasion when self-chosen

The third factor that we had identified during the focus group sessions was the recipient of the persuasive content. For each scenario, we had asked about a healthy and an ill adult. Figure 3 depicts the results we obtained when plotted according to this dimension. As can be seen from the graph, there are considerable differences in terms what participants deemed to be ethically acceptable depending on whether or not the recipient is healthy or ill. For example, almost twice as many subjects considered it to be ethical or very ethical to restrict access to a person’s bank account if they were ill (and would thus suffer potentially fatal consequences if they did not respond to the persuasive message).

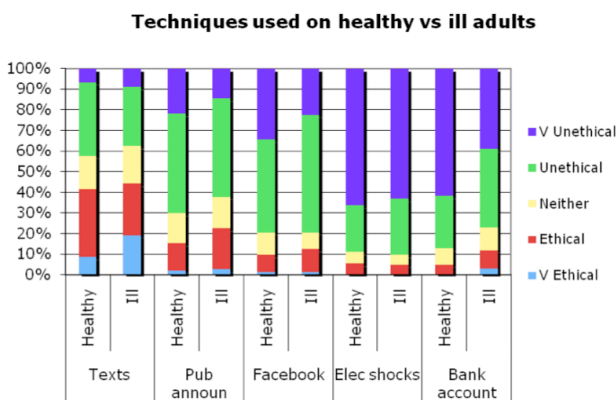


Figure 3. Distribution of ratings sorted by technique used contrasting ill and healthy recipients

5. CONCLUDING REMARKS

The results reported in the previous section as well as the outcomes of the focus group sessions provide some initial insights

into the ethics of using persuasive technology to promote healthy living. One interesting aspect relates to the golden rule of persuasion [5] – based on our observations, this rule may have to be revisited as self-chosen persuasive technology appeared to be perceived as being generally more ethically acceptable irrespective of the means being used. Related to this, there also was a trend to rate more drastic measures (such as electric shocks) more ethically acceptable in cases where there was much at stake (such as persuading people with cardio-related illnesses to exercise in order to improve their condition).

There are some lessons designers of future persuasive technology can draw from our studies. We identified three factors that seem to be relevant for people to assess the ethical acceptability of this kind of technology: the recipient, the commissioner, and the means of delivery. It may thus make sense to clearly convey these aspects to users when implementing persuasive technology. We also found evidence that social pressure, such as caused by public announcement or automatic posting on Facebook groups, can be very problematic. Consequently, such techniques need to be carefully analyzed before being implemented. Finally, we specifically included aspects of context adaptation, which are key benefits of persuasive technology built on mobile devices and ubiquitous environments. The focus group sessions hinted at this being perceived as ethically questionable but we did not find a clear trend with respect to this aspect in the survey study. Further research in this area is therefore needed.

6. ACKNOWLEDGEMENTS

This work reported in this paper was partially supported by the EU-funded Balance@Home project.

7. REFERENCES

- [1] BBC News. 2009. Obesity in Statistics. <http://news.bbc.co.uk/1/hi/health/7151813.stm>, retrieved 10 May 2010.
- [2] Def. of ethics, Compact Oxford English Dictionary, 2009.
- [3] Fogg, B.J. 1998. Persuasive Computers: perspectives and research directions. Proc. of CHI 98, ACM, 225-232.
- [4] Fogg, B.J. 2003. Persuasive Technology: Using computers to change what we think and do. Morgan Kaufman Publishers.
- [5] Berdichevsky, D., and Neuenschwander, E. 1999. Toward an ethics of persuasive technology. Communications of the ACM, (42) 2, 51-58.
- [6] IJsselsteijn, W., de Kort, Y., Midden, C., Eggen, B., and van den Hoven, E. 2006. Persuasive technology for human well-being: setting the scene. Proc. Persuasive '06, Springer, 1-5.
- [7] Intille, S. 2004. A new research challenge: persuasive technology to motivate healthy ageing. IEEE Transactions on Information Technology in Biomedicine, 8 (3), 235-237.
- [8] Chatterjee, S., and Price, A. 2009. Healthy living with persuasive technologies: framework, issues and challenges. American Medical Information Association, 16 (2), 171-178.
- [9] Lehto, T., and Oinas-Kukkonen, H. 2009. The persuasiveness of web-based alcohol interventions. Proc. of I3E '09, 316-327.
- [10] Törning, K., and Oinas-Kukkonen, H. 2009. Persuasive system design: state of the art and future directions. Proc. of Persuasive 2009, 30