

Involving Non-Players in Pervasive Games

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ABSTRACT

In traditional computer games, it is not uncommon for the game world to be inhabited by numerous computer-generated characters, Non-Player Characters (NPCs). In pervasive games, players play among human non-players as well and it becomes very tempting to use them as a game asset; as non-playing characters. Humans behave unpredictably and intelligently, and for this reason games set in real social context become more challenging for players than any preprogrammed environment can be.

But however tempting the idea is, the use of non-players has implications on people's personal privacy. We report on a scenario-based study where people were interviewed about a set of game designs, all to some extent relying on information about non-players. We propose that in particular non-player *anonymity* and the ability to hold players *accountable* for their actions will affect non-player acceptance of pervasive games.

Keywords

Pervasive gaming, proximity games, locative games, non-player characters, Bluetooth, privacy, integrity

INTRODUCTION

Pervasive applications are very often used within context where the people surrounding the user are not themselves users. One example is the perpetual discussion about when and where it is acceptable to carry out mobile phone conversations. The effect is accentuated for games. According to Johan Huizinga [5], a game is a *voluntary agreement* to step into a game environment, where the rules of conduct of everyday life are temporarily replaced by the rules of the game. Gamers must volunteer to enter the game and also be free to leave the game, opt-out, whenever they please [2]. To enter the game, to opt-in, is in other words a choice made by the player.

Pervasive games extend the game world by incorporating elements from the real world, or conversely, augmenting the real world with virtual components. As players move through the real streets of a city, information about this context will alter their gaming experiences [1]. The real

world and the game world become mixed. For good or ill, this mix may 'spill over' into the real world, affecting bystanders and invading their privacy.

People expect a certain amount of privacy even in public spaces, which Batya Friedman has shown in a recent study on surveillance of public space [4]. Situated actions are often considered intrusive if people are exposed to them in ways that they do not understand or that scare them.

We have focussed our investigations around a technical feature of Bluetooth: a phone which has Bluetooth set to 'accept connections' will display a unique identifier to other Bluetooth devices. It is easy to imagine a number of services (including games) which flaunt this feature in ways that violate the privacy of the phone owner. In our study we wanted to explore factors that may redeem the integrity-violating aspects of this technology. Although we did this for games, the factors we explored are generic and apply for other applications as well.

FOUR PERVASIVE GAMES

For the study presented in this paper we developed four phone-based game designs, all featuring some measure of non-player involvement. Before going into details on the design factors underlying these games, we here briefly describe them.

Yum Yum Sheep. The Bluetooth connections encountered by the player are depicted on screen as sheep. The player's avatar (a monster) will try to catch the sheep to earn points. If several sheep are present on the screen at the same time, they will instead attack the player.

Hot Potato. The purpose of this game is to earn points by handling as many 'potatoes' for as long as possible. While a player is holding a potato, it heats up, and the player has to pass it on to a non-player to cool. If the recipient is another player unknown to the player, he or she will receive the option to throw the potato back to the first player who will then get burned.

Your Story. This game is primarily a single-player game in which the player unravels a mystery. At certain points in the story, the player must send a Bluetooth message to

a non-player asking for his or her help. If the non-player accepts, the player can continue with the game.

Spy Blob. In Spy Blob, players are requested to stay within contact of one and the same Bluetooth contact for a fixed time. This will typically require that the player follows the non-players. The result is reported to a website where the contact's nickname is displayed. Since this comes close to stalking, Spy Blob was restricted to be played within limited areas (e.g. a galleria) where it was publicly announced that the game is played at this location so that non-players could avoid getting involved by shutting off Bluetooth on their phones.

DESIGN FACTORS STUDIED

It is of course possible to state - as a basic principle - that games never should involve non-gamers. Without diminishing the importance of such ethical guidelines, the fact remains that pervasive games never fully can leave non-gamers unaffected. Our goal in the study was to investigate common attitudes towards such effects. So instead of just questioning our subjects about general ethics, we divided the concept down into four design factors which we believed could affect acceptance for a pervasive game that involves non-players. This way, we were able to investigate the issue on a more detailed level, outlining design properties that affect people's sense of privacy and integrity.

The design factors we used were *anonymity*, *accountability*, *informed consent*, and *reward*. These design factors are based on previous work in privacy in computer services, and described in more depth below.

Anonymity

Anonymity is frequently mentioned as affecting people's sense of privacy [3]. By not disclosing any personal information about the non-players to the players or the game service, non-players are guaranteed to be anonymous and equal. Yum Yum Sheep and Hot Potato make use of anonymity since non-players are not identified in any way. But whereas Yum Yum Sheep is fully anonymous, there is an incentive in Hot Potato for players to identify and stalk non-players, to take back potatoes that have cooled off.

Accountability

Accountability means that actions are traceable back to the source (which can be a single person, people or an institution) who can be held responsible for the effects [3]. In the context of pervasive games, accountability can be recast as the ability for non-players to identify the players and affect them. In the designs presented above, accountability primarily occurs in Hot Potato. Since other players can throw potatoes back to punish the player who offloads a potato on them, players are put players at a risk whenever they place a potato on a passer-by. Accountability also occurs in Yum Yum Sheep, since non-players can gather in order to attack the player. However, this will rarely happen in practice as non-players are not likely to notice when people play this game in their vicinity.

Reward

Another option is to give non-players a reward for their participation. The reward option has not been extensively explored in literature, but is common in mass media entertainment such as 'Candid Camera' which was the reason we decided to include it as an option to explore. This is the main factor used in the design of Your Story: the non-players that accept the incoming 'help me' message are provided with an opportunity to download a game or a game logotype as a reward.

Informed Consent

It is often possible to gain people's acceptance and agreement by offering voluntary participation on terms of full comprehension of risks and benefits [3]. This takes us very close to Huizinga's original requirement for the establishment of a magic circle. However, since our study goal was to explore non-player involvement, we decided to avoid an explicit 'opt-in' scenario and instead include only an explicit 'opt-out' alternative. This was done for the 'Spy Blob' game scenario, where people were informed about the game by posters and thus given the possibility of not getting involved in the game by turning off their Bluetooth.

STUDY

Prestudy

Prior to our study, we conducted a survey which included 150 people living in and around Stockholm, Sweden. The purpose of this survey was to identify who were the likely players and non-players of pervasive games on a Bluetooth phone. The results showed that people aged 30-40 were most likely to have Bluetooth activated on their mobile phones. However, the most likely mobile game players who also owned Bluetooth phones, were 15-16 year olds. This means that we can foresee an age division between the players and the non-players for this type of games.

Game Scenarios

It should be noted that none of the games were actually implemented for our study – they were presented as (text) game scenarios. This was necessary as all of the games potentially could be perceived as violating privacy.

Two scenarios were written for each game design. The *ambiguous* scenarios were descriptions of a non-player who observes gaming behaviour in his or her vicinity, with no explanation of what was going on. The *in-context* scenario described the rules and goals of the game both from a player and a non-player perspective.

Study setup

Due to the results from the prestudy we decided to use two distinct age groups in our study, the adults aged 28-46 (the presumed non-players) and the youths aged 15-16. Ten

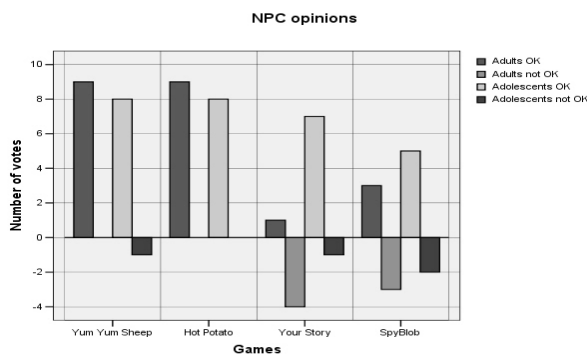


Figure 1. Non-player acceptance of each game scenario.

people participated from each age group. The study was carried out in the following steps.

- 1) Each participant was first presented with the 'ambiguous' scenario and interviewed about his or her potential reactions to the experience.
- 2) After the ambiguous scenarios had been discussed, the participants were provided with the 'in-context' game description and asked to consider the game both from the gamer and the non-gamer perspectives.
- 3) To conclude the interview, ethical considerations for these types of games were discussed at a more generic level. Finally the interviewees filled in a poll about which of the games they found acceptable and which were not acceptable from the non-player perspective.

RESULTS

Most of the results in this study are of qualitative nature as it was carried out as a free-form interview. The results of the final poll are shown in Figure 1.

The interviews were analysed based on the four design factors discussed previously. An interesting result was that the two groups differed in how they placed importance on the different design factors.

Anonymity

Anonymity proved to be important for both groups. The game Yum Yum Sheep which provided non-player anonymity was largely accepted in both age groups (one adolescent thought that it was unacceptable to represent non-players as sheep). In addition, all participants accepted Hot Potato which also offers a certain level of non-player anonymity. However, in the ambiguous scenarios some participants expressed concerns about Hot Potato due to the risk for stalking behaviour.

Accountability

In the game reinterpretation of accountability which we used in our game designs, accountability was generally regarded as fun. Several participants also commented that the games became more acceptable when it was possible to punish the players (in Hot Potato and Yum Yum Sheep). Although most of the participants did not find these games intrusive, one adult and two adolescents mentioned that they felt less like victims when they were given the opportunity to get back at the players. Four

adolescents also commented that the most fun part of Hot Potato was that you (as a player) could unexpectedly get punished. This increases the risk level of gaming, something that often is perceived as fun.

Reward

In our study, the game that used rewards (Your Story) got bad reviews by the adult participants. One reason might have been that the reward was not good enough; only one of the adult participants would download the game. Four adults commented that they wanted more tangible rewards such as money or drinks. Six of them commented that they never would download anything to avoid malicious software. However, several of the interview subjects that did not want rewards still accepted the game – the reward of being nice and helping somebody was enough for them. One adult commented that Your Story was like a pyramid game because of the spamming and subsequent rewarding.

The adolescents on the other hand, liked the fact that they could download things for free. Seven would download the game and two of them would also download the logotype. Four of the adolescents thought it was unnecessary to reward the non-player.

Informed Consent

The groups differed highly in their valuation of informed consent. This was clear from their comments about the game SpyBlob which offers the option of opting out of the game by shutting off Bluetooth. All participants in both age groups except one adolescent (who was neutral) thought this was better than no information at all. However, the groups differed in their opinion on whether a poster and the 'opt-out' option were sufficient. Six of the adolescents accepted the game announced by the posters (if they were sure to be seen), while the remaining four wanted complementary messages, opt-in, or could not come up with a good way to make the game more acceptable. In comparison, only one of the adults found the game acceptable if it was announced only by posters. Three adults wanted an explicit opt-in and the rest gave various conditions such as accountability, rewards and no registration on server or website. Two adults and one adolescent could not suggest any way to make SpyBlob acceptable.

General Ethical Considerations

At the end of the interviews the participants were asked to provide their own opinion on each of the games from an ethical standpoint. In general, most participants found the games acceptable when they did not affect the non-player or the phone. This requirement on 'no effect' was highly emphasized in the general ethical reflections provided towards the end of the interviews.

An interesting result was that in the adult group, out of nine people who did not think Your Story was acceptable, only two thought the game was unethical and one said it was dubious. The rest were just irritated about being disturbed by Bluetooth messages. The game that was considered most unethical was SpyBlob, where four

adults thought it was unethical and two that it was dubious.

Finally, the participants were asked where their ethical boundaries lie. Five of the adults thought that the critical issue is if the service or the player can register or record something (e.g. a hardware ID) without permission. When asked about their reaction to the server registration in SpyBlob, only two adults thought it was OK. Four adults thought it was unethical to affect a person when they were not aware of what was going on. One explicitly mentioned the stalking element in SpyBlob.

The adolescents found it harder to judge whether a specific game was unethical or not. When we asked them when a game becomes not acceptable, four answered that their boundary laid at physical interaction: the player should not be physically reached or harmed. Two adolescents said that it was not OK if people got scared by the player's gaming behaviour. Only two expressed ethical concerns about registration on a website (as is done in SpyBlob), and nine of the youth participants found SpyBlob acceptable. In fact, three of the adolescents liked the fact that they could get exposed on the website, and three were indifferent to this feature.

Other Differences Noted Between the Age Groups

The most interesting result of our study was that there were so large differences between the two age groups. The adolescents as a group do not consider the server registration as a serious privacy intrusion, whereas the adult group clearly did. Furthermore, the youth participants were much more accepting towards receiving messages from strangers. An interesting note is that none of the adolescents perceived the messages in Your Story as 'spam' while four adults immediately associated to 'spam' already in the ambiguous scenario descriptions.

The age groups also differed in their reactions to the Hot Potato scenario. In the ambiguous scenarios, six of the adults were slightly on their guard. When they found out that the scenario was a game, only two were negative towards it. This means that four adults became more positive towards the game when they found out that it was not dangerous and not affecting them in any serious way.

This shift in perspective, from slightly negative in the ambiguous scenario towards more positive when the game was explained, was only observed for Hot Potato. The 'Your Story' scenario featured a shift in the opposite direction, where a subset of the youth and the adult felt 'cheated' by the fact that they had been asked to help in what turned out only to be a game.

CONCLUSIONS

In this study, the two factors anonymity and accountability were the most important to yield non-player acceptance. Based on this, we can conclude that

Yum Yum Sheep proved to be in all ways the better game. This game was considered harmless by both age groups and furthermore the youth group tended to like the game. Your Story and SpyBlob were not acceptable for the larger group of adults. Since this group is the most likely non-player group, these games are not to be recommended for realisation.

It is particularly interesting to note that the study uncovered large differences in the attitudes between the two age groups. It is not entirely easy to put down the reasons for these differences; they can be attributed either to lesser experience in the youth group or to a generational difference in the attitudes towards privacy. It is possible that the teenagers of today, who are used to phenomena such as community sites and blogs and reality TV, may place less importance with privacy than those that are ten years older.

Future Work

Based on this study, we have selected to implement Hot Potato for further studies. The main reason for choosing this game was that it was largely – but not fully – accepted. A particularly interesting aspect of Hot Potato is the shift in judgement between the ambiguous mode and the in-context mode. Through implementing Hot Potato, we are able to study if this difference can be observed in real usage.

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REFERENCES

1. Benford, Steve, Carsten Magerkurth, and Peter Ljungstrand. The disappearing computer: Bridging the physical and digital in pervasive gaming. *Communications of the ACM* 48, 3 March 2005.
2. Caillois, Roger. *Man, Play and Games* Translated by Meyer Barash. The Free Press of Glencoe, Inc., 1961. Reprinted, Illinois: University of Illinois Press, 2001.
3. Friedman, Batya, Peter H. Kahn, Jr., and Alan Borning. Value Sensitive Design and Information Systems. in P. Zhang & D. Galletta (Eds.), *Human-Computer Interaction in Management Information Systems: Foundations*. M.E. Sharpe, Inc: NY.
4. Friedman, Batya, Peter H. Kahn, Jr., Jennifer Hagman, Rachel L. Severson, and Brian Gill. *The Watcher and the Watched: Social Judgments about Privacy in Public Place*. In Online Proceedings of CHI Fringe 2004. Vienna, Austria: ACM CHI Place, 2004.
5. Huizinga, Johan. *Homo Ludens – A Study of the Play Element In Culture*. Beacon Press, 1971 (reprint)