'Knock Once for Yes' – Knocking as Feedback in the Location-Based Game *Passing On*

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ABSTRACT

In this paper the design, implementation and testing of the Location-Based game *Passing On* is explored. It is a multi-player game for mobile phones, with a focus on asymmetric and limited communication. While one player can communicate by talking, the other can answer only by knocking. This limited and asymmetric communication became one of the central gameplay resources in the game, shaping much of the experience for the players.

Using observations and interviews, the knocking and the experience it created is analyzed and discussed. It is shown how this made the game emphasize social interaction, moving the focus from the phone to the environment, and how the knocking helped create a sense of presence for the player feeling them.

Categories and Subject Descriptors

H.5.2. Information interfaces and presentation (e.g., HCI): User Interfaces.

General Terms

Documentation, Design.

Keywords

Location-based; asymmetric gameplay; negotiating language; physical feedback; player behavior

1. INTRODUCTION

The game *Passing On* was designed as an exploration of physical and location-based play. It is a ghost story where players take on two different roles: as a ghost trapped in a castle, or as an investigator trying to find clues to why the ghost is trapped.

The game was designed to leverage on location-based technology. Whereas many such games primarily rely on a pure 'run to the location and catch a point-style of gameplay, we wished instead to create a slow pace game with a focus on communication.

1.1 Design Goals for *Passing On*

In designing *Passing On*, we wanted to explore the design space of location based, mobile mixed reality games. Based on location information, the game blends real-world objects with virtual content.

The genre of location-based games has developed a significant style. Today there are commercial examples of location based and mobile mixed reality games [8]. Most of them focus on a very simplistic play model with a map and screen interface, gaining points in locations, and very little coordinated play between players. Among the exceptions is Shadow Cities [17] in that this game focuses on synchronous battles between multiple players.

There are forms of location-based games with a higher focus on communication and social interaction. When a game moves outside of the screen and uses the location of the player, it to some extent pervades into the players life. In these pervasive games [11], a common design goal is to deliberately blur or break the ludic markers (or 'the magic circle' [9,13]) that usually separate game and everyday life, e.g. by playing without a designated playing field or time limit of the game.

There are design examples in pervasive games with similarities to *Passing On*, among them "Can You See Me Now" [2], "Uncle Roy all Around You" [3], and "SpyGame" [5]. All of them rely on asymmetric game roles, dividing players between online and 'onstreet' players. The setup of *Passing On* is similar but places a higher focus on human-to-human communication. While experimenting with the communication model is less common, it is not unheard of. Among the examples is the above mentioned SpyGame which uses communication within the different teams that can sometimes be overheard by others, and hence managing communication became a goal of its own.

The aim of the design in *Passing On* is to explore a slow paced, location-based game with focus on communication and awareness of the surrounding.

2. METHOD

The project was designer-lead and created over a one-week 'game jam' (in form inspired by e.g. [18]), in connection with the TOTEM project [19]. The game jam had a double objective of generating creative design solutions, but also to test the tools from the project. It used an iterative design process with fast iteration cycles of about one day each. The development and programming was done in an intensive build-and-test cycle, solving problems as they arose. The focus was on finding fast and functioning solutions, rather than robust and perfect. The working game prototype was tested at the end of the week, and semi-structured group-interviews were conducted with the participants. The final game test allowed for interviews and observations, but also the

design and development process is considered as data in this paper.

The research was designer-lead, focusing on development and exploration rather than a clear research question. This approach, with a vague research question and a strong focus on the designer's intuition, and only in the concluding phase taking a more research-oriented approach, was used to give a better understanding of the tacit designer knowledge. The approach can be compared to Fallman's [7] view on design research creating knowledge in the movement between practice, exploration and studies, and in more practical situations to Wilson [16], separating the activities of design and research, describing it as 'research *after* design'.

2.1 Game Design
Our design proposal was a multi-player game with an asymmetrical gameplay. We focused on how the language between players worked, and how the players could provide a feeling of co-presence even without actually meeting each other. A deeper explanation of the game design can be found in [10]. In short, *Passing On* is played in teams of two players, with one taking the role of a ghost and the other the role of an investigator. It is story based, in that the role of the investigator is to help the ghost to understand how and why it was murdered, and finally to pass on to its final rest.

The mood of the story was not intended to be a scary horror game, but rather a pleasant spooky 'Canterville' [15] or campfire style ghost story. The player playing as a ghost stays in a fixed position while the investigator moves around the game area, looking for clues. In total three ghost stories were created so that the game could be played by up to three teams at the same time. The game was designed for one specific location: the Birlinghoven Castle.

2.1.1 Investigators
In the story, the investigator arrives at Birlinghoven Castle. The role of the investigator is to find physical clues in the environment and tell the ghost about these, so that the ghost can solve a puzzle. The investigator knows nothing of where to go, but can talk to the ghost. The phone interface is completely black, and the interaction with the game is through verbal and haptic communication with the ghost. By lacking a visual interface the game encourages the players to focus on their surroundings.

The clues of the game are provided as messages on paper, hidden in bottles, in locations near the castle. Each bottle contains a poem, giving a bit of the story of why the ghost is still in the castle. The poem is also a solution to a riddle for the ghost player, unlocking where the next bottle is hidden. This physical component of the game further ties it to the environment; the downside being the game is tied to one physical place. The balance between using the environment and turning the game location specific, or abstracting it from its environment and thereby making it possible to play anywhere, has no simple solution (e.g. [4,11]), and is best seen as a design choice.

2.1.2 Ghosts
The ghost can see where the investigator is, as a dot on a map, and can also hear the player through the phone. Furthermore, the ghost can see where the investigator needs to go next. However, the only way to communicate back to the investigator is by knocking on the device. The knocks are presented to the investigator as vibrations in the phone. By obstructing the communication, it moves to the forefront of players' attention. The design also slows down the pace of the game, as the cryptic messages need to be understood before moving on.

2.2 Implementation
The game was developed for Android phones and tablets. In the game tests the investigators played from a phone and the ghosts from a tablet. The game utilized tools developed within the TOTEM project [19].

2.3 Problems Encountered
Among the design difficulties in realizing the game, we needed to find a technical solution for how to transfer knocking patterns while keeping the rhythm intact. We could not simply send them as soon as the ghost player knocked since delays in the connection meant we could not guarantee they arrived in the same rhythm. Our solution was to measure the time between knocks and then assume a standard length of the actual knock. This way we could, as soon as the knocking stopped, send the full pattern of knocks and pauses.

Also, varying GPS and WiFi coverage would hamper the accuracy of the ghost's understanding of the investigator's current position. Technically most of these problems are handled by the tools developed in the TOTEM project [19], but the effect of delays are still visible. Similar problems have previously been solved by 'seamful' design solutions [6], and similarly in our case this was solved within the narrative as the ghost not having a clear communication channel to the physical world.

2.4 Playtest and Observation
The final game prototype was tested in two sessions, one with guests to the game-jam, and one with other game developers. The game was set up for three simultaneous teams with a ghost and an investigator in each. In the first session with external guests there were six players, one for each role. In the test with other game designers, teams of about 2 – 3 players collaboratively played each of the six roles. By separating the teams before the game began, we ensured that players did not know whom they were playing with, and had no chance to decide on a communication strategy before the game started.

The player sample was opportunistic, using the people who came to see the games at the end of the one-week event. This turned out to be people of mixed background, mostly academic, and with little or no previous experience of this kind of games. The internal group of game designers was mostly master student level computer or game design students with a good knowledge and experience of gaming and location-based games. The external group was mainly observed, but some informal interview questions were asked. The game designer group was observed and a group interview was conducted.

3. DATA ANALYSIS
The interviews and observations were studied and analyzed, structuring observations around common activities and emotional reactions. From this process, we can discern three main topics.

3.1 Pace and Positive/Negative Uncertainty
The game was played in a slow pace. With the investigator players we saw much walking, some standing and no running. Most of the time, players were talking or waiting for answers. We could tell in the group game that the slow response from the knocking resulted in some uncertainty as to whether the ghost could hear them, as the investigators would discuss if there were an answer. While the investigators talked about this uncertainty as a positive experience, the ghosts did not appreciate it. When they

got a delay or a false GPS-position, they say they did not know where the investigators were, and they did not know how to answer their questions and had a hard time deciding how to handle the situation. They also talked about having little to do while the investigators were walking.

3.2 Developing a Language

A large amount of the conversations among investigators focused on how to get the ghost to answer. The most common solution was a binary system. Most often the investigators would tell the ghost to 'knock once for yes, knock twice for no'. Alternative systems included signal systems for left/right, forward/back, or more specific, e.g. the path by the trees/the asphalt road. In one instance, we even saw a player who played in complete silence. It was only after a while that we realized the ghost actually gave instructions every time the investigator needed to turn left or right. Sometimes more than two response alternatives were used. When the number of alternatives exceeded three the system tended to create confusion, both for the ghost and the investigator.

Sometimes, ghosts would not keep to the signal system. In interview and observation these players said that this would be used when the alternatives did not fit the situation at hand. Another common behavior by the ghost players was to use many repeated knocks to indicate that something was wrong or that something needed attention.

In the interviews, the ghost players also commented on how the investigator would change their language over time. They started saying things like left/right, but realized that it was hard for the ghosts to tell the direction they were facing, and changed the mode of reference to talk about objects (e.g. 'towards the castle' or 'follow the path').

In post-game interviews, the players stated that they liked that the device did not limit the responses for ghosts. If the player asked a question with two response alternatives, the ghost could still answer 'three'.

3.3 The Pervasive Feel of the Knocking

The perhaps most important aspect of the knocking as a means of communication was that it contributed to the investigators' sense of the ghost being with them. When the physical device vibrates, the focus seems to be more on the actual device than on the player behind it.

During some of the playing/testing, the knocking did not work, due to technical difficulties. In those sessions, the ghost players were instructed to answer by saying 'knock' (over voice communication) rather than actually knocking. In the interviews afterwards, the investigators talked about a distinct difference in feel to the game:

"When it was voice instead of vibration, [...] it felt like it was actually another person, and I wanted to just yell at them to just tell me what I was supposed to do. When it was just vibration then ok, it really feels like one-way communication. But as soon as I intuitively feel it is two way communication, I just want to punch them!"

Where the saying of the words made the investigators frustrated that they did not answer more concretely, the buzzing phone did not give this feeling.

4. DISCUSSION

In the design of *Passing On*, there are two main findings. 1) it has given a clear, practical example of the difficulty of making a game interesting for both online and onstreet players, showing

Figure 1. One of the investigator-players has found one of the poems/riddles and is reading it before reading it back to the ghost. The phone shows the completely black interface. This handling of the phone, nearby but not with a focus on it, was common during the game. (The image is arranged, based on game observations)

differences in design approach. And 2) it has given a design example of how to use non verbal, non visual communication to make the social interaction into gameplay, and to enhance the focus on the environment in the gameplay.

First, in the game we managed to create a situation where the game answered slowly, due to the limited communication between the players. This slowed down the pace of the game. It worked well for the investigators, who had thinking and observing to do meanwhile, but felt too slow for the ghost players.

A contributing factor to the difference in perception was that it was only the investigators who were playing a pervasive location-based game, in which their own movement and the environment contributed to the design experience. The ghost players got their whole play experience through the device interface, and even if the environment strongly affected their game, it only did so indirectly. To add, the game did not give them all that many play options, why they became dependent on the investigator players. Similar problems have been observed in earlier online-onstreet games (e.g. [3]). This provides a clear example of how the expansion of the game into the 'real', onstreet, creates limitless affordances for the players [11], as the world in itself creates things for the players to do, meanwhile this is not happening for the online players. While there might be enough to set a goal in the real world, and trust the world to create the obstacles, we as designers becomes directly responsible for the player to always have obstacles to struggle against, and active choices to make in the online part of the game.

Secondly, one of the most liked parts of the game was the knocking, and especially the 'non digital' quality of how they were implemented. Several users liked the fact that the answers could be unclear and fluid. It helped to keep the game feeling 'real'. This also created a sense of presence, as if the device was

'haunted'. The players talked about it with words like 'yes, I can feel it' and 'yes he knocked', similarly to how an Ouija board [14] is used in spooky sleepover parties to call upon the spirit, asking them to leave a message and thereby moving the actual delivering of the message from the individual to an inanimate object. While they talk about the ghost player, they direct their attention to the phone, rather than to the person behind the phone.

This non-visual, non-audio, feedback transformed the phone from being a pure game consol to an actual in-game object. The phone was in the game, rather than the game in the phone, and the players' were focused on the environment, or on the phone in the environment, but not on the screen and the online part of the game. In this way, we could design for the environment and the phone itself, rather than the spoken or visual communication via the phone, to become the game's focus.

Further, the deliberate obstruction of voice communication created a situation where the development and negotiation of a new way to communicate created interesting gameplay in itself, and seemed to come to good use in location-based gaming. The focus moved from interacting with the screen to social interaction between players. It differed between groups how well thought through this language was, and effectiveness in communicating became in itself a game element. To use strategies of communication as gameplay is not unheard of. It can be found in board games such as Pictionary [1], and Aargh!Tect [12] where it is used in a way that takes communication performance into account in scoring the game. In both these and *Passing On* the goal is to solve the problems as fast as possible. However, the slow-paced communication in *Passing On* effectively rules out competitive, fast-paced play, resulting instead in a slower pace of the entire game.

5. CONCLUSIONS

With *Passing On* we sought to create a location-based game, with a focus on social interaction and slow paced playing, rather than running and catching points. Our solution was to create an asymmetric game with two roles, one online and one onstreet. The roles had different information and limited possibilities to communicate. This did indeed lead to a game with communication in focus, slowed the game pace and made the players aware of their surroundings. The limited communication lead to a situation where the gaming device was experienced as more than just a way to talk to the other player. It seemed to be experienced as 'magical', turning it from a communication channel to an in-game artifact experienced in the environment instead on through the screen.

The two roles also lead to trouble satisfying both groups of players as the online group felt the slower pace gave them to little to do. This serves as a design example for the problem of design asymmetric play for location based and online-onstreet games, and provides some insights into the different approaches that need to be taken in designing goals and struggles for the different types of roles.

6. ACKNOWLEDGMENTS

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