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Fostering Social Interaction in Playful Cities

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Abstract. This paper describes different types of activities/challenges designed for social interaction, while discussing the performance of such challenges using the mobile digital game "Secrets of the South" (http://secretsofthesouth.tbm.tudelft.nl/, Secrets of the South). The game was played as part of a scientific meeting, with participants from 25 to 62 years of age and a varying degree of cultural differences. The presentation and discussion of the results of the gameplay provide insights on the appropriateness of the different challenges for social interaction in a playful city. Directions for future work for such challenge designs are presented.

Keywords: Serious games · Social interaction · Playable cities

1 Introduction

To achieve greater social inclusion, to make people feel they belong to a society, and to value diversity is a difficulty that today's humanity is facing [20, 23]. Games can foster play and participation in playful cities, support citizen communication, social inclusion and coordination, and develop capital in social relationships [1, 9, 10, 17]. Mobile outdoor games in particular promote significant social interaction via physical activity, engagement, face-to-face interaction, mobility, health benefits, and extra motivation and enjoyment [3, 4, 11, 22]. In urban environments games can bring people with different social, cultural and emotional backgrounds [18] and behaviours [6] together.

This paper explores the design of challenges for social interaction between participants of a scientific conference. The game framework[1] in which these challenges are implemented has been designed for (1) meaningful interaction in the public space/neighbourhood, (2) with a smartphone, (3) with the potential to engage as many people as possible, and (4) in a fun way, criteria for a playable city [15].

In the following sections, this paper explores how serious games can support the concept of playable cities, and briefly describes the game framework. Further sections focus on the experiment, report on 5 different types of challenges played by strangers in a new environment, and discusses the lessons learned on the appropriateness of these challenges for a playful city. This paper closes with overall remarks and future steps.

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[1] http://secretsofthesouth.tbm.tudelft.nl/, Secrets of the South.

2 Related Work

Playful technology embedded in urban environments can make life more enjoyable, in particular when such technology supports collaboration, enabling people to work/play together [14]. Common places for the use of technology range from home, work environment, and public places such as musea and city festivals, while technology typically explored ranges from street furniture (e.g. lamp posts, mail boxes, or trash bins), smart chromogenic materials, LEDs, brain-computer interfaces, movement cameras, sensors and actuators (e.g. in smart watches/phones), and augmented reality devices (e.g. Kinect or similar devices) [15].

Playable cities can be supported with games that can range from (1) playgrounds without any technology, to (2) games predominantly played with smartphones, and (3) other types of technology and custom-made installations. An example of (1) is "A playful street", a project that sets up several traditional playgrounds on the streets of Dublin without technology, and invites open play behaviour from the young and the elderly with objects put on scene[2]. An example of (2) is "Koppelkiek"[3], a game created to stimulate playful encounters and interactions in public spaces, using smartphones' cameras to take pictures of players with random people, and placing those pictures in a neighbourhood centre to encourage conversation between neighbours. "Hello Lamp Post" is a game designed for city dwellers to converse with urban objects in Bristol, where a playable city app allows communication with chatbots via text messages and can answer questions about the environment[4]. With regard to example projects of type (3), a well-known game for playful cities is "Social Stairs", a subway staircase that has been turned into a giant live piano as a way to seduce travellers to climb the stairs instead of taking the escalator [16]. Other examples include "Shadowing" that uses infrared cameras to record shadows of passers-bys and provokes humorous situations by impacting people's awareness of other people's shadows[5]; "Urbanimals" that uses projectors to cast tailored images of animals onto the physical environment[6]; and "ActiWait", with a set of pedestrian semaphores equipped with devices that allow the play of Pong game between people waiting for a green light[7]. Smart's "Dancing Light" ad campaign installed a dancing booth and connected it to pedestrian semaphores. While not being a game, it also invites playful behaviour via performative dance acts displayed in the semaphore[8]. While the three mentioned types of games for playable cities (1), (2) and (3) are not exhaustive, they indicate the nature of work done on turning cities into playful scenes.

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[2] https://www.aplayfulcity.com/the-lab, "A playful Street" project.

[3] https://whatsthehubbub.nl/projects/koppelkiek/, Koppelkiek, 'couple snapshot' in Dutch.

[4] http://panstudio.co.uk/, "Hello Lamp Post" project.

[5] http://shadowing.cc/, "Shadowing" project.

[6] http://urbanimals.eu/, "Urbananimals" project.

[7] http://urban-invention.com/, "ActiWait" project.

[8] https://www.youtube.com/watch?v=SB_0vRnkeOk, "The Dancing Traffic Light by smart".

3   Game, and Challenge Designs

The "Secrets of the South" (see footnote 1) (SotS) is a mobile outdoor serious game that lets players walk around their neighbourhood and other public spaces, engage with people they (might) have never seen or spoken to before, go to places that they might have never been or seen before, and solve challenges together with other people (actively playing the game or not) to advance throughout the game. It is designed to support people playing together, hunting for QR codes that other people have, perform in multiplayer challenges, and solving single player quiz challenges designed for face-to-face interaction in the neighbourhood (Table 1).

Table 1. The Secrets of the South serious game
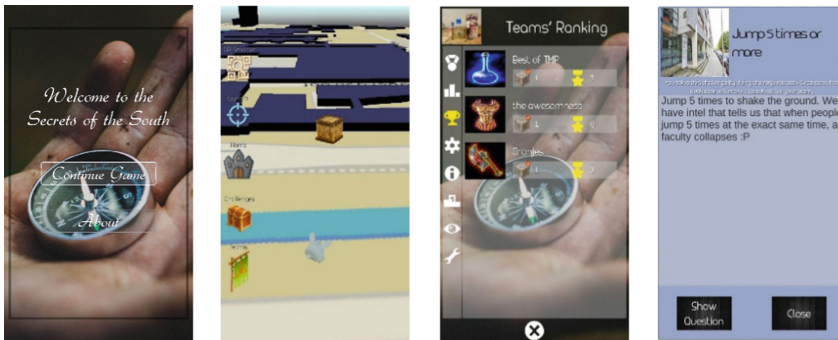
Challenges within the game framework are purposefully placed in specific places to expose players to unnoticed details of a neighbourhood, to other people in public spaces, and to promote playful behaviour and fun. These places can be related for e.g. to the history of a city (e.g. the birth of a legend, the biggest port in the world, a local star) or to local activities. The game framework currently supports two different types of challenges, quiz and multiplayer: quizzes are designed for single player gameplay, and multiplayer challenges for groups of people playing together in teams (teams against teams). This paper explores multiplayer challenges in which teams solve a challenge, get points/rewards for the quality of their performance, and compete with other teams.

3.1   Challenge Designs

To foster social interaction in urban environments this paper explores the impact of 5 different challenges for scenarios in which people (most likely) do not know each other beforehand (common fact in public spaces). It explores the goal of fostering social interaction, and uses several factors from the social cohesion framework [9] to design these challenges. This framework distinguishes 3 factors that influence social cohesion

with regard to an individual (in contrast to communities and formal institutions): (1) self-motivation, (2) perceptions, norms and values, and (3) participation and performance. Social interaction, a means to acquire social cohesion [8, 12, 19], is influenced by aspects such as for e.g. intimate face-to-face communication [5], quality of intimate topics shared [21], degree of like-dislike [13], sense of belonging [7], individual participation [2], and task competence [8]. Table 2 lists both the factors linked to social interaction in this framework, and aspects of influence.

Table 2. Main goals for challenge designs, and aspects that can achieve them

Factors fostering social interaction	Aspect influencing the factors
Self-motivation	1. Intimate face-to-face communication [5]
	2. Quality of intimate topics shared [21]
Perceptions, norms and values	3. Degree of like-dislike [13]
	4. Sense of belonging [7]
Participation and performance	5. Individual participation [2]
	6. Task competence [8]

The following challenges for social interaction in playful cities are designed to explore the influence of these factors in practice.

Challenge 1: Guess If You Can. The objective of this challenge is to introduce players of a team with each other to jointly solve in a collective problem solving task. It consists of estimating the precise volume of a big and complex building at a given location, while stipulating a time limit of 5 min. This exercise is designed to require the least effort and act as ice breaker. It addresses the aspects in Table 2 by initiating communication and collaboration in the same location (aspects 4, 5) without need for intimacy, and making people solve a common problem with time pressure (aspect 6).

Challenge 2: Shape In. The objective of this challenge is to interact in a fun and different way, and to tap into each other's creativity. It consists of having all team members putting on blindfolds and forming a large circle with a rope on the floor. Together they must create a geometric shape with the rope by communicating. It addresses the aspects in Table 2 by requiring imagination (aspect 6), using blindfolds (aspects 1, 4, 5), and implementing intercommunication to coordinate the task (aspects 1, 3, 4) in close body proximity (aspect 1, 2, 4).

Challenge 3: Creative Dance. This challenge is designed to stretch comfort zones, and foster the thrill of creative effort in an engaging and fun way. The team can earn rewards by uniting as a group and making a performance of the three musketeers fighting for a princess (they choose the princess). This entails placing a speaker on the floor, playing music of choice, and team performance. It addresses Table 2 by creating memorable experiences via a joint dance (aspects 1, 3, 5, 6), and stretching comfort zones in close body proximity (aspects 1, 2, 3).

Challenge 4: Creative Talk. This challenge is designed to overcome communication barriers through creativity, to build on each other's knowledge and consider other

perspectives. This is done by making the team coordinate without speaking out loud. A unique secret number is whispered to each person, and the team has to line itself up in a numerical order without talking. Difficulty can be added by using numbers from 11 to 99. It addresses the aspects in Table 2 by deploying blindfolds (aspects 1, 4, 5), requiring creativity in new ways of communication (aspects 5, 6), inviting communication through gestures and close proximity (aspects 1, 2), and inviting touching between players (aspects 3, 4).

Challenge 5: Knot. This challenge seeks to enable team members to provide support to each other to solve a problem. It requires players to create a knot with their own hands, and untangle themselves. To do so, they are asked to form a circle, stretch their right arm forward and grab a random hand. They then do the same with their left arms. It addresses Table 2 by deploying touching (aspects 1, 2, 4), mutual support (aspect 4), and close body proximity (aspects 1, 2, 3, 4).

Below, the suitability of these challenges for playful social interaction are explored, within the mentioned existent game framework, and targeting strangers within a playful city. The order of the challenges is relevant, because there are challenges that require levels of intimacy (due to blindfolds, touching, and dancing acts) to be played, and build on top of previous interactions. The following section explores whether these challenges foster interaction between strangers attending a scientific meeting, via reported levels of (1) self-motivation, (2) perceptions, norms and values, and (3) participation and performance.

4   Experiment

An experiment was conducted to assess the validity of the proposed challenges introduced in the game framework SotS. It was executed within the context of the TMP graduate consortium[9] in The Hague, an annual meeting for doctoral candidates, their direct supervisors, and faculty member representatives from around the world. This meeting provided an opportunity to test the challenge designs with people in a (for most) new location, whom belong to a varied age group, do not know each other, and are in the city for a 2-day visit.

4.1   Participants

Of the 26 participants of the workshop, 14 people participated in the experiment: 6 women, and 8 men. The participants' ages were within the range of 25 to 62 years of age, and only 2 had been to The Hague before. Of the 14, 1 is a male full professor aged 62, 3 professors/researchers aged 35 (2 males, 1 female), 2 female researchers aged 31 and 32, 4 researchers aged between 28–29 (1 male, 3 females), and 4 younger male researchers aged between 25–27.

4.2   Procedure

The gameplay was executed between two points A and B in the centre of The Hague, where A is the consortium's venue, and B the restaurant where all the participants had a joint dinner on the first evening of the event. Participants signed consent forms for data collection, and when possible installed the game on their own phones or phone provided (not all phones met the specific requirements of the game).

Participants were divided into 3 groups of up to 5 people with at least 2 smartphones with the game running per group. The geographical position of the 5 challenges provided the context of the activities involved. Each position was also marked by a facilitator whose task was to oversee and rate each team's performances. After 30 min of gameplay, the winning team was rewarded with free drinks at the restaurant.

4.3   Method

Each group was followed by one or two observers whom did not interfere with the gameplay. Each observer collected video recordings of his/her group's gameplay, for each challenge and across all challenges. The three groups of participants, the 5 facilitators and 4 observers were interviewed at the end of the gameplay. The interviews were semi-structured, addressing what the participants thought of the game itself, their overall game experience, whether they had noticed any difference in social interaction resultant from having played the game and the challenges, and which challenges worked best. The results reported below are based on the transcriptions of these interviews. The transcriptions label all the participants as PX (being X the number of participant; e.g. P1, P5), and these labels are used when citing what a participant has stated. The video recordings are used to better understand both the gameplay and the feedback from the interviews.

4.4   Results

Game Experience: In general, players said that the game experience was positive, it did not take much effort to play, the challenges were within a comfortable walking distance, the overall game mechanics of collaboration and meeting other people in and out of the group was appreciated, and that it was overall a repeatable experience. The challenges were reported to be good ice breakers and good to create experiences with people on the street that they can remember later on. They also mentioned enjoying particular challenges that had a nice themed description (for e.g., prisoners back in the era did…), as a powerful means to learn about the history of the place. They said that not all participants were as active as others (some refused to play certain challenges), and that leadership behaviour was noticed in some teams.

Challenges: Challenge 1 was reported to be a positive warming up experience that provided limited opportunity for communication. Challenge 2 was reported to be very positive because they were blindfolded and that it required a bit of imagination while still being achievable. Challenge 3 was reported to be weird, with the dancing and singing being too much. They said that role playing is nice and should be kept, but that

more appropriate music, in line with the history of the place, should be used. Players thought challenge 4 was too difficult and frustrating. Challenge 5 was too easy to solve (mostly solvable within 10 s) and groups did not have strong opinions except that holding hands at that stage was already within their comfort zone. In general, they reported that themed challenges should be used. The use of rope in the challenge 2 was named as a prime example of disconnection between the places and the challenge. They also reported that two blindfolded challenges were too much, even though they felt comfortable performing these tasks.

Impact of Game: Players recognize that the game with the challenges was designed for social interaction and that it did that. They argued that, if they would not have played the game, they would not have had the chance to talk as much as they did with other players. They reported that the gameplay forced them to collaborate, and that this provided them with circumstances to have natural conversations outside the scope of the game. They also reported that some of the activities ended up being fun, but that the overall experience could have been better if technical difficulties had not occurred. They also referred to a good build-up of the comfort zone within the group across the challenges: the first ones did not require touching but the last ones did.

Gameplay With/Out Smartphone: Team players without a smartphone with the game running reported a more frustrating and mixed overall experience than those with phones with the game. These players communicated a greater difficulty to participate, lower engagement, perceived the existence of bigger technical difficulties when reported by other players with the game as compared to the reports of the players that actually played (for e.g., "…every time we tried to do something, it was, like, it didn't really work…" (P5)).

4.5   Discussion

The challenges were reported to be good ice breakers and good at creating memorable experiences with people on the street. All groups commented on the high difficulty level of challenge 4, but none commented on how easy a challenge was (namely, challenge 5, where all groups took less than 10 s to solve). This raises the question on the level of difficulty that is the most appropriate to facilitate social interaction and gradual participation and performance to occur. On the one hand, harder challenges might imply a bigger barrier for participation than easier challenges, but an easier challenge might fail to mediate observable face-to-face social interaction. On the other hand, a harder challenge does not necessarily imply lack of self-motivation to play, as all participants performed challenge 4 (allegedly the hardest) but not all of them performed challenge 3 (which has a lower level of complexity than challenge 4).

   The challenges were designed to promote participants' self-motivation to interact, by influencing their levels of intimacy (intimate face-to-face communication and quality of intimate topics shared). In and between challenges, players had plenty of opportunities to have natural conversations outside the scope of the game, which might have led to certain levels of bonding observed at the end of the gameplay. The order of the challenges proved to be relevant: challenges requiring intimacy due to specific requirements (e.g. blindfolds, touching other people, and dancing in public space) were

built on top of previous interactions, which also helped to provide with circumstances to initiate dialogue. Results from the execution of challenge 3 show that, when players are faced with a task that demands too much intimacy, their degree of like-dislike is negatively affected and they end up not participating. It was observed and reported during the interviews that groups behaved friendlier and closer after the gameplay, being an anecdotal remark that a WhatsApp group was created with the participants of the winning team, which is something that would otherwise not have happened ("this happened because of the game" (P3)). The impact of the group's cohesion of the winning team was also observed through the act of taking selfies of the group when they were announced as the winners, which shows a certain pride and happiness in their overall performance.

The degree of like-dislike seems to be affected by the players' perceptions of how good or bad they think they will perform, which could be observed by seeing certain players purposefully avoiding doing certain challenges that could be perceived as rendering them more exposed to the public eye (e.g. dancing). Players also mentioned liking particular challenges that had a nice themed description, and this might indicate that having challenge designs that take the physical space more into consideration can be appreciated by the players and even affect engagement.

5 Conclusion

This paper explored the suitability of 5 different challenges purposefully designed for playful social interaction in urban environments, within the SotS game framework, and targeting strangers within the context of a conference. The results from the executed experiment provide insights on the appropriateness of the proposed challenge designs for the fostering of (1) self-motivation, (2) perceptions, norms and values, and (3) participation and performance between team members: they show that the overall experience of the players was pleasant, that there was a desire to keep playing these types of challenges and games in the future, and that levels of comfort were apparent during and after the gameplay, both between players and in regard to the challenges themselves. This indicates that the proposed challenges within the used game framework were appreciated and appropriate for these participants.

The results show that participants of a scientific conference that (mostly) do not know each other are willing to play a game with challenges designed for a fun and collaborative gameplay experience with others, that the build-up of the comfort zone of players within groups is noticeable and appreciated, and that the game also promotes circumstances to have natural conversations outside the scope of the game. This indicates that face-to-face social interaction between strangers in a scientific conference can be fostered by the proposed challenge designs within the SotS game framework.

Direction for future work start with the study of different levels of engagement that can stem from further challenge designs, divided in different categories, and designed for different types of players of diverse target ages. Different types of categories can be based on, for e.g., augmented reality, puzzles, or sensors/actuators from the internet of things, which can provide different levels of immersion in the overall intended experience. Further research will also seek to understand whether social interaction via these

and other challenge designs within the SotS game framework can be fostered in other urban environments from different countries. Such research across different societies can provide added value insights on the heterogeneity of the provided gameplay experience, which can inform other researchers on designs for digital mobile gameplay experiences that promote social interaction in playful cities.

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