Participatory Game Design to Engage a Digitally Excluded Community

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ABSTRACT
This paper explores issues around using a Participatory Design of a Location Based Game (LBG) developed as part of a project to connect young people (11-19 years old) in Lancaster and Manchester by exploring issues surrounding place and their sense of belonging within their community. Both these communities were chosen, as they are representative of particular socio-economic conditions that have led them to be considered digitally excluded. The results highlight issues researchers face when working with such a group and the importance of building trust and being sensitive to the lives of the participants.

Keywords
Participatory Design, Mobile, Location Based Gaming, Socio-technical, Socioeconomic, Community

INTRODUCTION
Over recent years we have seen a growing awareness, both in research and the media of the creation of a 'Digital Divide' (DD) within sections of our society. The DD in its simplest form relates to the differences in availability of access to the latest forms of digital systems and services across communities within society and the resulting limiting of opportunity for these communities.

Although the DD covers a range of topics it is most often referred to when discussing computers and access to the Internet. One of the most important areas of computer and Internet access after the 'finding information' is communication. The Internet provides a means for users to communicate through many different mediums such as email, instant message, video chat and social networking.

In the UK, research by Ofcom has reported seven out of ten homes have a fixed broadband connection (32% of homes without Internet access) (uSwitch 2011). Usually poorer families are more likely considered classed in the DD and are 2.5 times less likely

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to have an Internet connection in their home (Guardian 2010). On the surface, the issues surrounding the DD are primarily this lack of access, but when you look closely the causes are more complex and based on many external influences and often those considered digitally excluded are generally socially excluded. .

Studies into the relationships between digital and social disadvantages have already been undertaken to investigate the likelihood of users considered digitally disengaged are also socially disadvantage which indicates they are seven times greater than those who are socially advantaged (Communities and neighbourhoods 2008). The DD for Internet access can be broken down into three categories "*basic*", "*intermediate*" and "*advanced*". A "*Basic*" user uses the Internet to seek information (learning), make purchases and individual communicating. An "*Intermediate*" user is more likely to interact with online gaming, financial services and discussion boards/forums. However "*Advanced*" users will use the Internet to interact with things outside their normal network, i.e. Social Networks and petition signing (Communities and neighbourhoods 2008).

The DD can also be broken down into trends that seek to determine the root of the exclusion. There can be multiple trends associated with exclusion; these can be from socio-economic status (low levels of income), education, family structure (age gap between parents and children), age, race, gender, geography and culture. In many respects some of the trends are associated with one another, for example geography, usually considered a greater divide in rural and inner cities however when socio-economic trends are considered this may not be so obvious.

The DD also includes mobile technology but does however differs in terms of how it's classified as it focuses on the advances in mobile functionality, as opposed to whether a person has access to a mobile or not (Katz et al 2003). This recognises the fact while mobile phone ownership is more ubiquitous than personal computers, the mobile environment is highly heterogeneous in terms of the functionality the devices support and the ability of the networks to support differing data services.

In England an estimated 1.4 million children are reported not having access to the internet in their homes and one million 16-24 year olds are classed as NEET (Not in Education Employment or Training) (Netimperative 2010, Guardian 2010, Telegraph 2011). In an attempt to address this issue the UK government launched a scheme to offer low-income families access to the internet (Home Access) in 2009. The scheme offered those eligible grants to purchase IT equipment (laptop or computer) and broadband access (for one year) (The Independent 2011). The scheme also offered parents online control, service and support. It is clear that the scheme was set up to provide technical infrastructure to those eligible, however it is not known if this scheme solely helped raise the numbers of homes without access or if it had any real educational benefit. Eight months after the launch, the new government scrapped the scheme.

In addition to government initiatives a number of private organisations have been set up to help the UK become the first nation, where everyone can make use of the Internet. Race Online 2012 are one of these organisations where their aim is to provide cheap low end computers (costing £98) that can access the Internet (also at a low cost), to promote awareness of the importance of Internet access in the home. Studies show that on average, those consumers that use the Internet can save an estimated £560 a year by using online services (Race Online 2012). Catch22 is an organisation set up to help young people get online and access IT. Catch22 understands the importance of digital engagement for

young people. The programme develops young people's confidence and skills to move forward in life and provides opportunities to further their education by schooling or training. The scheme also attempts to influence young people away from crime (Catch22).

Participatory Design (PD or formally cooperative design), is a method of bringing together participation from all stakeholders (partners to users) in the design process. PD originated from action research and socio-technical design, which has been around since the 1960's and is particularly prominent in Scandinavian countries. Using a PD approach combines skills and knowledge of those who are using or will use the technology. There isn't one ideal PD approach for every environment. There are many terms for understanding PD, these include viewing each participant as an expert in the field, being aware of individual's creativity and innovation, through collaboration, understanding the user's environment; more time should be spent in their normal environment and being aware of each and everyone's role in the PD process.

The objective for PD is to seek user involvement, in order to realise their requirements and produce an experience that ensures their final needs are met. PD focuses on the processes and procedures involved with design rather than the actual design style. We have seen an increase in PD being adopted in many different fields' software design, architecture, product design, medicine etc. What has become apparent is different approaches to PD must be embraced that are sensitive to the groups involved, to realise the potential rewards of the methodology (Muller et al 1992).

Thus far the research on applying PD in communities for profit and non-profit organisations (Cecelia et al 2004) has provided scant detail in relation to assessing the challenges faced working with these groups or what is considered a successful outcome (Cecelia et al 2004). Additionally, it is notable that little research appears to have been done into engaging the digitally excluded in two socio-economic communities, through the use of PD in games. The use of PD combined with an agile software development method is one approach to be considered when challenging the issues with engaging the disengaged.

COLLABRATIVE GAME DESIGN

There are many forms of collaborative design, one being PD which has similarities with User Centred Design (UCD). However, UCD focuses on refining rather than conceptualising, in essence, sanding off the rough edges by viewing the game from the player's perspective and seeking to fully understand the user experience (Raph 2005), in PD, the user is involved with conceptualising, testing and evaluating the design produced by the designer (Read et al 2002). Participation was an essential component of this study as its aim was to fully engage them with the technology, rather than simply assess their experience of a given service and why a PD approach was adopted rather than UCD (Read et al 2002).

Whilst it is still unproven whether PD improves a games idea/story, strategy, usability, experience or target audience compared to other techniques, what is apparent is by adopting a different approach you are more likely to see different outcomes. This maybe due to the very nature of including multiple participants into the design process, as games designers are not always able to separate their own ides from those they may be designing for.

For game designers, new insights into game development can be gained from PD by having to rationalise certain points to all members of the group in terms of what will be achieved and why the design is being done in a particular way. This potentially improves the quality of the design, as users will often ask a wide range of questions due to their misunderstanding, skill or knowledge which serves to prevent the game designer from assuming a certain degree of understanding in potential players of the game.

Many difficulties arise when using a PD approach with young people (Read et al 2002). This is often from the misunderstanding of the common goal of distributing the knowledge to the entire group. This provides valuable social learning opportunities by sharing the experience within the group (Danielsson et al 2003) .The physical environment where learning takes place is also considered to be integral to the PD approach and given that one of the goals of this project related to the young people, local environment was a particularly important aspect, but as it turned out one of the challenges of this research. .

Whilst it has already been acknowledged that PD should be tailored to the particular group involved, it can still be characterised through tasks such as brainstorming, user analysis, task analysis and taking an iterative approach. Brainstorming techniques allow the group to boost creativity and encourage communication, for which in this study is integral to the overall objective of engagement. Introducing prototyping into PD from brainstorming allows users to visually realise the starting point of the project and to see what is possible with little skill involved, not only is it useful to the group but it is essential to the whole design process. Making this an iterative approach, users can express feedback and can be modified to fully realise expectations (Sotamaa 2007).

Group participation requires trust to be built up; relationships must be made amongst people, achieved by tailoring the communication to the demographic. With any group work, members within the group will have different skill levels, interests and ideas. Challenging those members that lack interest, unwillingness to adapt and moulding the participants to understand each other's contribution, are a few highlighted issues faced when dealing with a PD approach.

To overcome these issues the environment must be considered and adapted for different demographics. For PD to be truly successful, users need to be fully aware that what it is they are doing will affect real development, which encourages others to get involved and take a sense of ownership. On the other hand participants shouldn't be confused with actual designers, so their input shouldn't be considered as final, more as a focal point to build upon.

ENGAGING THE DISENGAGED

Dealing with a diverse group of young people that have different interests, backgrounds and understandings from a community considered digitally excluded, requires greater emphasis on getting across each individuals purpose in participating (Johansson et al 2002).

This is why numerous hours of relationship building through non-traditional methods (play) should be considered. The non-traditional methods require more play like environments, mock up evaluations (prototyping and brainstorming), and workshops (used for the sharing of information). By providing users with the sense of ownership, it allows users to be directly involved with design decision-making and gives them an

active role within the projects development (Abras et al 2004, Cherry et al 1999). By taking this approach the users are able to see their ideas grow and therefore encourage future involvement.

To engage with those disengaged user characteristics must be realised. The willingness, ability and attitudes of the users form the characteristics of the entire group. The term young people can be classified as 'users', 'informants', 'testers' or 'design partners' (Ermi et al 2004), however they are not to be confused with designers themselves.

Defining the motivations for PD helps define the end goal, whether its personal development, learning, user satisfaction or improving accuracy for user requirements, all affect the final outcome. Different demographics will require different motivations for a PD approach. The digitally excluded community considered in this paper, involves motivations leading towards personal development and understanding how technology can be tailored to their own needs and thus potentially improving their future digital participation.

Social usability refers to a broader understanding of the ways and needs to use and consume media products, as well as habits and practices involved with them (Järvinen et at 2003). Social usability in this study refers to the group of young people that participated in an interactive experience, sharing interpretations and experiences to assist the development of a mobile LBG to promote the awareness of engaging the disengaged.

PROJECT BACKGROUND

A local arts organisation Folly set out to enable two communities to embrace technology in a fun and interactive way, by engaging one community with another through play using a PD approach to mobile game design. The project, funded by Mediabox [//www.media-box.co.uk] and Trafford Housing Trust [//traffordhousingtrust.co.uk] was devised such that two youth communities from Trafford in Greater Manchester and Lancaster would develop and showcase their own interactive mobile games. The games would be developed separately and then played by one another, thus enabling both groups to explore each other's community. In this paper we present the PD with the community at Lancaster and the subsequent playing of the game by the combined groups of both communities. The young people considered in this study are considered digitally excluded by their socio-economic status, education and culture. Other trends such as gender and race were noticeable when working alongside the young people, as the when it came to visiting the local centre (Lancaster) there were an apparent gender separation and a clear racial difference compared to the community in Trafford.

In this paper we present a method of engagement within a certain demographic, by adopting non-traditional methods of PD. The games discussed in this study are prototype designs or a fully functioning prototype development that is yet to be fully developed into a publically commercial game. *marshOtron* was developed to provide us to form results based on playtesting, to gather information on developing a LBG through PD to engage the digitally excluded.

INITIAL GAME CONCEPTS

The initial aim was to spend the majority of the time allocated for the project designing and developing the game, however, after our initial visit to the community centre, which provided a range of facilities for the young people, it became very evident that much of the initial period would have to be spent building up a relationship and trust with

potential participants before any game creation could take place. This is equally important when involving users in PD, as everyone involved is able to get to know each other, building up a relationship and thus being able to work more efficiently together. The particular challenge in this case was that the artist and designers were obvious outsiders, to close knit community and sceptical of our motivations.

Therefore the artist on the project spent the majority of the time getting to know the group and build up a rapport, from September until November 2010 attending the centre every Thursday evening playing pool and table tennis, trying to engage a group with the project. The artist was able to engage a group of nine (all male) with the project and to 'kick start' their ideas the group were taken to play a commercial Laser Tag game as it was felt this was the closest experience to a location based game that group already understood. It is worth noting that the project was intended to address both genders, this however proved difficult in project. This may have been different if the artist was a woman (although same issue appeared in other group where artist was female) or perhaps it is more likely due to a general perception of games by girls in this age group. At the community centre the genders are often separated by females wanting to use the computer to access their Facebook accounts usually posting status updates, (often their computer access was limited at home), whereas the males of the group tended to want to use the pool table and DJ equipment. The artist did however informally interview the female group to see what technology interests they had including gaming.

The female group of six were aged between 11 and 13, and had little gaming experience apart from pre-installed games on their mobiles. The group had a 50/50 split on knowing what handset they had, and one just knew it was a Vodafone mobile. The group also had similar traits in choice of handset manufacturer (Samsung Genius and LG cookie). Only one in six of the females studied, said she had downloaded games onto her phone but the others had only played pre-installed games of none at all. When asked about social networking all six have and use Facebook, four of them had and used Twitter (but deleted since). Again Facebook use came up again stating their wish to have free Facebook on the handsets and little interest was shown in developing their own mobile games. It was clear by this time the group limited interest in the study and couldn't be persuaded in participating further.

The artist also informally interviewed the males who went on to form the design group on an individual basis. The male group were considerably older than the females (aged between 14 and 17), maybe this was another factor that contributed towards the females adopting a less participant approach to the study. All four males have contract mobiles, two of which were smartphones (iPhone 4 and LG viewty), the other two weren't 100% sure on the model, but knew the manufacturer. The major difference between the females and males were their attraction to playing on an XBOX and games like the FIFA and Call of Duty series and although their mobiles had the capabilities to access social services like Facebook, the majority weren't bothered. The iPhone user did indicate he uses his phone for surfing the Internet, watching movies, listening to music and downloading/playing games.

It was very important for the artist to spend three months rapport building with the group, as this allowed them to trust and open up creatively and generate their own game ideas. By engaging with the group through play, the artist was able to get them to think about designing their own location based game. Misunderstanding of the technology to be used became apparent when two of the group thought GPS was only a functional in the iPhone

and the other two knew it was used in Sat Navs (Satellite Navigation systems). It was at this point when the male participants came up with initial ideas they thought would make a good mobile game. The group didn't have issues with sharing their physical locations for game.

The first encounter with game design came through brainstorming around the table after an evening of playing Laser Tag. This then lead to the group mapping out their ideas on paper, which in turn were storyboarded by the designer for the project. Figure 1, shows some examples of the ideas generated by the participants. Figure 1a is a simple capture the flag idea. Figure 1c a single player game, where a player goes around environments collecting items. The idea which was furthered in this study best resembles Figure 1b, where players would have to move around a map, lighting up areas similar to Tron light cycles. However this differs from the final game as the idea involved too much complexity for the initial study, the game idea was a mix between lighting up areas and holding the package the longest. The mobile handsets and platform technologies used in this study (Nokia N8 and Flash Lite 4.0) didn't provide us the capability to further the idea of holding and transferring packages, as this was designed to use RFID technology.

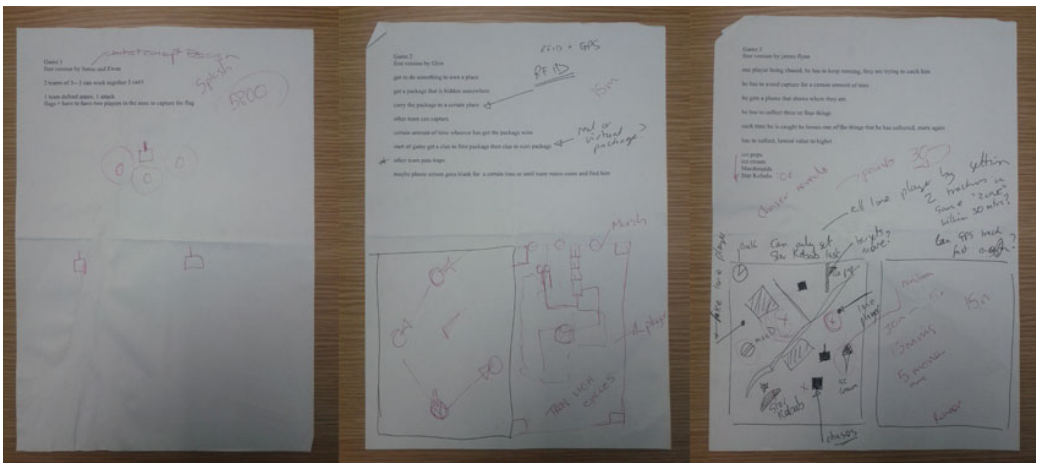

Figure 1: Participants mobile game designs (left to right) capture the flag (a), light up areas (b) and collect items (c).

For the group to understand and appreciate the storyboards, it was decided that the storyboarded images would be developed as an interactive set of moving images that would appear on the mobile phone (similar to what their games would look like as if they were developed on the handsets). This is also known as 'informant design', which is commonly used when developing prototypes with young people in mind (Read et al 2002, Scaife et al 1997). This approach provided the group with a visual representation of what their game ideas would look like when developed.

Figure 2: Participants mobile game prototypes (left to right) marshOtron (a), Marsh Munchies (b) and Capture the Marsh (c).

The first game the group came up with was '*Marsh Munchies*' (Figure 2b), where the player would move around hunting for food items that randomly appeared on the game map in an allotted time limit. The second game was a variant of Capture the Flag (Figure 2c), which many of the group had played and dubbed '*Capture the Marsh*', whereby two teams would have a base in each half of the map and players from the opposing team would have to capture their opponent's base undetected. Note some members of the group had already played their own analogue version of the game. The final game '*marshOtron'* (Figure 2a), was inspired by the movie Tron Legacy, which had just been released at the time of the study and attempted to recreated the light cycles games from the movie, in which players would move around the arena creating a light trail, which, if crossed by other players would end their game and the player with the longest trail at the end would win the game.

Because of the limitations in time for creating a full working game, the group decided to concentrate on *marshOtron* and adapted the design, so that players capture squares on a grid overlaid on a map, rather than continuous trails to allow both for inaccuracies of the GPS and variable mobile network connectivity.

MARSHOTRON – LOCATION BASED GAME

The main game objective for *marshOtron* is to increase a player's physical movement whilst underlining the importance of player awareness within their surroundings. Many LBG's are often actually location insensitive in that they rely solely on player's physical movement through running and chasing. LBG's that try to be more location sensitive such as; Big Game Huntr [//biggamehuntr.com], Free All Monsters [//freeallmonsters.com], MyTown [//booyah.com] defer away from the players physical movement and emphasises the actual games location, where time limits don't necessarily impact the game's outcome. Therefore within the design process this goal was kept as a

primary focus for the group, who seemed to gravitate towards a principally chase mechanic.

marshOtron combines player physicality with a strategic element to game play usually seen in less time constrained games. It was apparent from an early stage that the event organisers by default would have some influence on the type of game play, due to the nature of the game and its audience (young players, playing outside with no real bounds and the competitive element), the design needed to consider combining the positive elements of both physical movement and strategy LBG's and address the concerns over risk from the organisers. This is hopefully emphasised with the style of mixed LBG mechanic developed in *marshOtron*.

Concept

As previously discussed the core concept of *marshOtron* is to create the longest light trail across the map using their light cycles (player's physical movement). This is achieved by augmenting their own physical position (using GPS to determine a players location) as an individual player marker (Tron inspired), on top of a fixed pre-defined futuristic styled map, overlaid by rows and columns made up of individual squares making 'The Grid'.

The game commences when all four players elect a different coloured light cycle (red, green, yellow or blue) and reach their 'home' square. Game play involves player movement to initiate the light trails (represented as captured coloured square in the players colour their mobile device), the game is finally complete when there are no active players left on 'The Grid' and is won by the player who lights up the most squares in 'The Grid'.

Game Design

The game space of *marshOtron* comprises of 120 squares set out in rows and columns making a grid overlay, of which each square represents a physical location in the game arena (fixed area predefined before game player). Players are allowed to move outside the map, the players marker changes from a circular icon into a halo, this represents the player has gone off the screen and is out of bounds (Figure 3b). Home squares are located in the four corners of the map. Each player will start his or her game in one of the corners; this is known as a traditional setup (Figure 3a).

Once game play commences, players navigate their way around the map by using the mobile as means for obtaining and displaying their position (Figure 3a), the idea behind this is to light up non captured squares on the map. A square becomes captured when a player has already waited the allotted time and received confirmation from the game server in the form of two playing states (Figure 3a).

Figure 3: marshOtron in game view (left to right) initial load (a), out of bounds (b), player's marker (c) and game over (d).

In order to light up squares; players must occupy that square for 15 seconds (Figure 3b). During this time players are encouraged to move around in the square whilst the capture takes place (building up a strategy). Note the 15 second time, was a compromise between the young people who wanted a shorter time to increase the speed of the game and the concerns of the organisers over safety as previously discussed. To determine the state of the square occupancy, communication between the players mobile and a game server is required, the response is made up of two outcomes; the players light cycle lights up the square (square not occupied, represented on the mobile phone by the changing of the original square colour to the players colour, Figure 3b) or the players light cycle runs out of light (signalling to the player their game is over, Figure 3d).

The ordering of capturing the squares is not fixed as this allows players to develop their own emergent tactics within the gaming arena, which is an important means of ensuring such games continue to engage (Sykes et al 2006). Also the game permits for players to leave the bounds of the game area in order for players to escape into different areas of the map.

The motivations for combining the use of player's physical movement and awareness of environment is outlined in the core mechanics of the game, as each players device represents only their active location but all other players light trails, this forces the players to develop a strategy (i.e. to see if other players are around them and to determine player movement in order to block players off) to win the game. This is where the game combines the physical aspect with a strategic game play, as players aren't allowed to re-capture a square that has already been captured (square that have previously been lit up on 'The Grid').

It's worth noting, although the game could be designed for a specific location and the design and mechanics of the game could be adapted to fit many different environments from open spaces to crowed cities, players 'home' squares can be modified to alter the style and type of game play, thus increasing the difficulty (for example by modifying

players starting grids to the centre of the map, players are more likely to physically see where everyone is starting from and requires a greater strategy in order to break from the pack).

Design Process

Throughout the study the young people were continuously asked for their input. The only way this was possible was by engaging them with playful boys club activities like table tennis, pool etc. The group also had opportunities to visit the Lancaster University to participate in test trials of the game, to explore and ask questions. Whilst out of their usual habitats, the group were able to focus on the task in hand, in this case 'game design'.

The processes in which the group were involved with, consisted of outlining the requirements of the community LBG, brainstorming sessions to boost creativity for the game ideas, design mock-ups around the ideas generated, produce prototypes on the based on the mock-ups created, seek feedback on prototypes, decide on one prototype to invest time to develop further, develop into a fully functioning game, playtest the game to allow for feedback, encourage participants to be forthcoming with feedback in order to fine tune the game, make amendments to the game based on feedback and to seek reassurance the initial concept has been portrayed in the final development.

PLAYTESTING

In the final version of the game, each player is equipped with a Nokia N8 mobile phone which is used to display the games interface and interacts the player with the game server, using a mobile data connection and the phones GPS to obtain players position.

The first trial (internal test with the Lancaster youth community only) took place at Lancaster University on 17th January 2011. During and after the trial, the players gave running feedback on their game play experiences and displaying of information, this allowed the group to confront the problems that occurred during game play (Sotamaa 2007). Playtesting with the group ensures a balanced, fun and fully functioning game (Sotamaa 2005).

The points raised were mainly the misunderstanding of capturing squares but otherwise they perceived they game enthusiastically and this seemed a catalyst for even greater engagement with the project.

One interesting aspect was that the nature of the University, which exposed issues of GPS and mobile connectivity, which the group then became much more expert in considering when modifying the design, taking into consideration about environment and infrastructure.

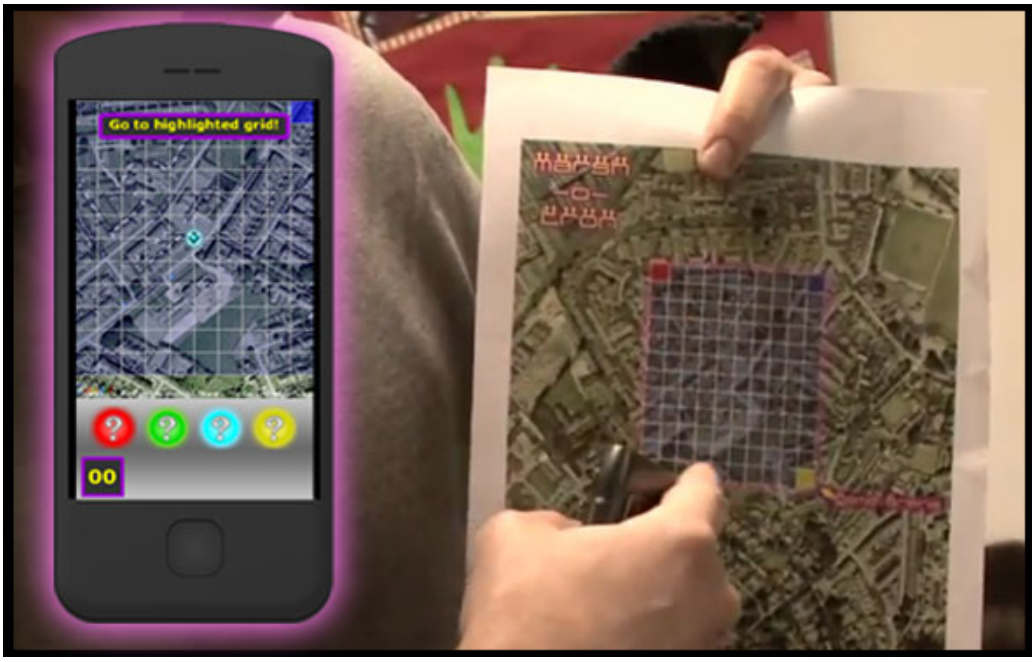

Figure 4: marshOtron mobile client screenshot with physical map of the game arena.

During game development and internal testing, it became apparent that a physical map would be required to coincide with the mobile phone. The physical map would identically represent the same view of the game arena on the mobile device, (Figure 4) plus surrounding areas, to give new players (that aren't familiar to the area) a real sense of awareness.

The final trial of the pervasive game project took place on 28 April 2011 at the Community Centre in Lancaster, which was host to the Trafford group from Greater Manchester. During the trial, a video camera followed the group around, prompting players for a running commentary of vital feedback. This was introduced to see the reactions of players while participating in the project and to determine the success of adopting a PD approach for the disengaged in the DD. Since the trial, the video has been uploaded onto many social video-sharing websites [folly video].

It was apparent from watching the video, the users that took part in the PD process showed a great sense of ownership to the game and willingness to interact and engage with members from different communities.

The idea behind developing the game to adapt to any location was initially discussed so that the game could be played at the Lancaster event and also the Manchester Event (should this be necessary). Including this functionality in the design allows for practical public domain use, should the game be distributed onto the leading mobile phone app markets.

Trial Results

During the event GPS data was captured and stored locally on the handsets, this data captured stores a player's longitude and latitude alongside the current time (retrieved from the device). The GPS data was captured in order to see if players stuck to the boundaries of the map or chose alternate routes.

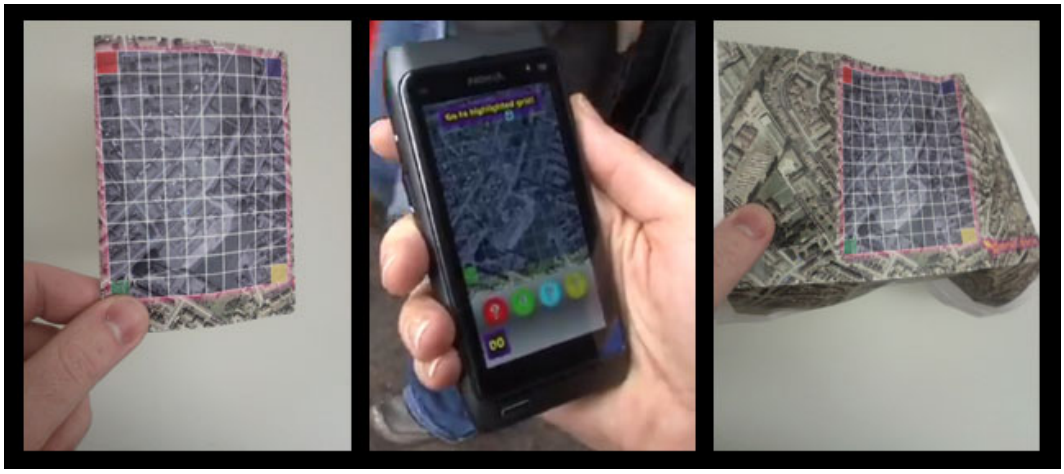

Figure 5: Physical map and demo of marshOtron (left to right), folded map (a), in game mobile client demo (b) and unfolded map (c).

The game was designed to have a static game arena (map) and promote a continuous game play (based on a player's time within a square, Figure 5). Players are encouraged to leave the map to pause their time to plan new routes, in order to capture squares that otherwise would have been considered unreachable to capture. At the event players were provided with a physical map to help their awareness of the area. What was interesting to observe was that players folded the map (Figure 5a, Figure 5c) in a way that identically matched what was displayed on the phone (Figure 5b).

Based on the GPS data captured, players spent around 10 - 15 minutes per game, and based on the player footprint and grid overlay, we can see that the majority of this time would have been active participation apposed to players escaping the map to pause time. Those that left the gaming arena did so to reach squares that otherwise wouldn't have been possible as shown in Figure 6.

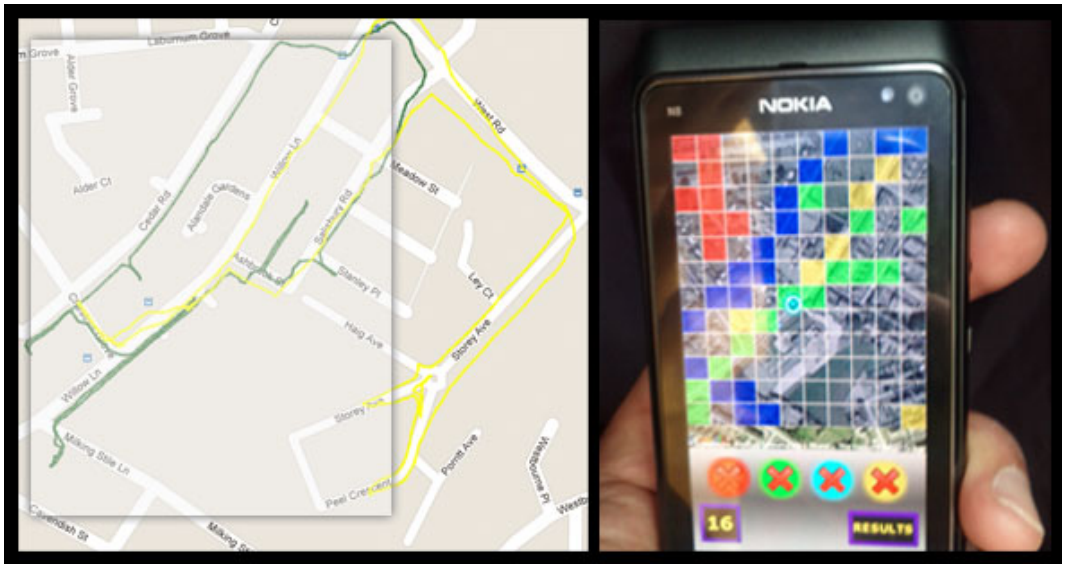

Figure 6: marshOtron game arena with plotted routes (left to right), gps plotted routes with game bounds highlighted (a) and matching end game of the corresponding light cycles (b).

The feedback during the event highlighted areas that could have been designed and developed further. The group all commented on not knowing when they had a GPS fix (once a GPS fix is obtained the grid appears, maybe some kind of icon could have been used as well to assist players). As the game was intended to test out a practice to engage a digitally excluded community, rather than for public consumption; functionality such as exiting wasn't considered at that stage, as the game would be played under supervision.

However, it seemed necessary on the day, to have had this functionality as manual exiting and server restarts were required (the games were reset and game data stored in the database for later analysis), this caused slight delays between gaming sessions. It was evident from watching the video, the game required knowledge and understanding in order to play, hadn't the Lancaster group of participants supported the Manchester group there would have been clear misunderstandings when it came to playing the game (Figure 7c, Figure 7d). Some of the players were interviewed about their experiences after the game took place, two of the young people quoted:

"Sometimes it's a bit confusing! but when you get tha hang of it, it's easy"

"It's kinda complicated like! The GPS thing it moved kinda slow, so when you're on the next square you're not sure where you are, coz it's taking so long to move. It was alright like, coz when you get the hang of its good!"

The above statements show that the young people lacked the knowledge of such technology, but once shown and trailed, they seem to understand it and found it relatively easy (Figure 7a, Figure 7d).

Figure 7: The Folly event at Lancaster Marsh Community Centre 28/04/2011 (left to right), player's introduction (a), pointing out boundaries (b), players locating their home square (c) and in game discussions (d).

As the game was developed as a prototype using the Flash Lite 4.0 platform, there was no functionality to store location data to the phone; this is why an additional application was developed in J2ME, to capture player's co-ordinates of where they went, to enable routes to be plotted (Figure 6). By having to run something in the background wasn't ideal, but essential for this study. If the game was to be developed for public consumption, Adobe's AIR platform would be implemented, as this would provide the development with the necessary functionality.

CONCLUSIONS

In this paper we have outlined the need for such participation to engage a considered digitally excluded community. The mobile game developed in this study, *marshOtron* was used to demonstrate how participation in mobile game design could help a digitally excluded community.

Before the event, the artist who built up the trust with the group attempted to gain a deeper understanding into each participant's mobile traits, habits and knowledge. The outcomes from this research conducted, were to find out if by engaging a group of young people with mobile game design through participation, would increase their awareness to digital technologies thus bridging the DD gap.

Although the original project did not provide for a further study it has since been proposed that with the same group of participants and using a similar approach to observe what the young people learnt about the technology and LBG's. This time around it is proposed that the participants are taken out of their normal environment to spend one or two days at Lancaster University, to enable the young people to have a more hands on experience with mobile game design through greater participation in the development process. Follow up studies with the same group is essential as the great deal of effort it took to build trust with the group, took the majority of time and this would be a dis-justice to the study loosing the trust and relationship previously built up.

Overall, the project highlights that one of the key factors for the success in this type of study relies on building a relationship of trust in order to engage with the particular community. PD requires a more direct communication and interaction between developers and communities, to maintain focus and constant dialogue in order to engage the community throughout the process.

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