Understanding Collective Play in an Urban Screen Game

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ABSTRACT
In recent years there has been a growing interest in urban screen applications. While there have been several deployments of these technologies in our urban environments, surprisingly little research has aimed to explore the detailed material practice of people’s engagement and interaction with these urban screen applications. In this paper, we present a study of collaborative game play on large urban displays situated in three city locations in the UK. The study highlights ways in which collaborative play is initiated and coordinated within the context of an urban environment. These experiences are related to physical characteristics of the architectural spaces, the people populating these spaces and the interactive properties of the game itself. The study moves on to discuss issues relating to audience and spectatorship, an inherent feature of interaction in urban environments. The issues of audience and spectatorship are discussed in their own right but also in terms of their relationship to the playing experience. Finally, the study considers these interactive experiences in the contexts of being hosted by a professional compere and also with no host present. Through the study we highlight factors to consider in the design of collaborative urban screen applications.

Author Keywords
Public displays, gaming, urban screens, collaborative play.

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION
Over the last decade we have seen a proliferation of digital displays within our urban environment. Such displays, using a variety of form factors, are being used for a wide variety of commercial and cultural purposes, ranging from advertising and branding through to entertainment, art and community support [7, 8]. The potential of these urban screens to transform the urban environment and people’s experiences of the public spaces within which they are located is considerable [43, 25].

Understanding the nature of public engagement with these screens, from peripheral and passive engagement to more interactive participation is an important consideration for the design of successful urban screen content. In recent years we have begun to see a concerted effort to develop such an understanding through both public experimentation in the arts and through the commentaries of cultural, architectural and new media theorists [e.g. 16, 18, 23, 24, 25, 27, 43]. The work in these forums has provided us with important insights into these technologies and the possibilities for the medium. Much of the work, though, has tended to favour grander levels of analysis, often focussing on abstract theoretical concerns and generalisations such as spatial theory and the urban condition, with reference to key thinkers such as Habermas [11], Castells [4], Lefebvfre [22], and Foucault [9]. The insights of these works are important and valuable but by operating only at this level we can lose sight of the detailed material practice of people’s engagement and interaction with these technologies and applications and the factors that shape these [cf. 2, 39, 41, 21]. To compliment these higher explorations of urban screens, we need to embark on a more systematic articulation of actual user practices around these urban screens, building a corpus of studies that unpack the particular social and interactional mechanics for different types of urban screen applications, such as games. To date we only know of one significant effort towards this aim, namely Peltonen et al’s recent study of CityWall [33].

Toward this aim, we undertook an ethnographic study of the BBC Big Screens Public Space Broadcasting project (PSB). The PSB project began in 2003 as a collaborative effort between the BBC, Philips and Manchester city council with the instalment of a Big Screen in Manchester City Centre. Since then, several other BBC Big Screens have been rolled out in major cities in the UK. The screens are 5 x 5 metres and are situated in prominent outdoor public spaces within the city centres and broadcast continuously around the clock. They are used to screen a wide variety of nationally and locally sourced content including news bulletins, soap operas, sports events, live music, interactive games and experiences. These screens provide us with an important opportunity for understanding the development of everyday behavioural practices around urban screens: First, because they have been present in several of these cities for a number of years and as such have gone beyond novelty to be part of the established city framework; second, because of their association with the BBC, a well known and respected broadcaster and content provider, lending public credibility.
to the content it can source; and third, by being situated in multiple locations there is opportunity to explore the effects of particular architectural arrangements on practices around these urban screens.

In this paper we present a part of this work that relates in particular to interactive games on the BBC Big Screens. More specifically, we do this through the lens of a particular game that was developed for the Big Screens, namely the Red Nose Game. Our primary concern here is not with a presentation of the game itself [17] but rather with an evaluation of people’s behaviours and interactions with the game. The game, then, is a means through which we can explore some of the social and behavioural aspects of urban screen gaming. Of course there will be particular behaviours that relate to specific properties of this game but in highlighting these particulars, it will also point to general factors worth considering in the design of these games.

**Related work**

From a technical perspective, large screen games that employ image-processing techniques to support audience participation have been around for some time [e.g. 26]. Our concerns here though are not with the novelty of technology per se but understanding the social and behavioural dynamics of the interactions with such technologies in urban contexts. Maynes-Aminzade et al, [26] did run some trials of their system with audiences and offered some high level high level design principles for crowd-based participatory games such as these, e.g., making the control mechanisms obvious and facilitating coordination between the crowd. There is good sense in their principles, though they are very high level. We get little in the way of behavioural details. As such it is not always clear how these recommendations are achieved in a design sense, in particular within different environmental contexts where the social dynamics of emergent group behaviour are potentially different.

More specific user research work has been conducted in relation to the BBC Big Screen in Manchester, UK [e.g. 38] The work offers some general qualitative characterisation of behaviour around the Big Screen such as the different ways people attend to the screen as they pass by or wait. But in the main, the work favours a higher level of abstract analysis and is focussed on the use of screens for public artwork as opposed to interactive gaming experiences. As such there is still much scope for further analyses of the everyday material practices around these screens and other areas of engagement. Finally, this work is focussed only on the screen in Manchester. There is need to explore behaviours around these Big Screens across a wider range of different urban environments in order to understand the impact of particular architectural city characteristics in relation to these screens.

For more detailed analysis of the everyday material practices with these large screen technologies, we turn to work in the related field of public and situated displays where detailed analyses of practice help articulate the relationship between characteristics of displays, the applications, the environment and the audience and resulting behaviours and value [e.g. see 1, 5, 13, 14, 19, 20 31, 26, 32]. The particular applications and environmental contexts of this work are not the same as the particular technology and urban contexts of the work in this paper. Nevertheless there are some important themes that can be drawn out to facilitate our discussion of the fieldwork.

In O’Hara et al [31] we are introduced to the notion of *catchment areas* for a screen. That is, how the positioning of the screen defines the potential audience who may come to see or interact with the screen. With Churchill et al’s work [5] and O’Hara et al [32], the audience is the users of the café; with Brignull and Rogers work [1], it is the conference delegates; with Luff and Heath, it is the museum visitors. The relationship between potential audience members and what they are doing in particular locations bears on how they come to interact with the Screens.

O’Hara et al and Streitz et al also discuss the different zones of interaction around a screen from passive viewing to areas of more active engagement [31, 37]. This too is of significance in the key work of Brignull and Rogers [1]. In their study of interactions around their Dynamo shared public display, Brignull and Rogers highlight social barriers to interacting with shared displays in public spaces such as in a conference venue. They argue that people can initially be self conscious and embarrassed in relation to such public interaction and that this needs to be overcome in order to engage with the screen. They discuss in particular the notion of the *Honey-Pot Effect* of public screens in which people at a safe distance from the screen can passively observe ongoing interactions with it before choosing to join in with the interaction. This, they argue, allows groups to congregate spontaneously without specific coordination efforts, an issue with important bearing on our discussion of the game later.

Also significant in the understanding of shared interaction around public displays concerns issues of access and control. O’Hara et al [31] discuss how public displays and applications have different ways of distributing control across potential users that affect the way groups organise themselves and their interactions. This theme is further articulated by Hornecker et al [15] who talk about the notion of access points and the potential of technologies for simultaneous access and participation. These authors show that it is important to understand the ways different displays, input techniques and applications together shape the distribution of control and provide points of entry for a group of people. Of particular importance to understand here is that such access and control distribution is not simply a physical capability but also a highly social one. The social context of the space in which these technologies are immersed defines the relationship and movement between the people using the space [e.g. 8, 13]. This in turn affects how access and control are managed. As we will see, the particular urban context of these Big Screens, with users both familiar and unfamiliar, is significant in how shared participation occurs.

The visibility of public interaction around large screens raises a further issue, namely that of spectatorship. In this
sense, interactions in public space are not simply a means of effecting particular results with a technology but rather a performance. This is seen, for example, in games such as Dance Dance Revolution, an arcade dance music game that uses dance steps to progress the game. As Smith [36] notes in his study of this game, players don’t simply dance for the game but also for the audience that typically gathers. This notion of spectatorship in public interactive experiences is perhaps best articulated in the taxonomical framework of Reeves et al [35]. In this framework, public interactions are described in terms of manipulations – the actions necessary for interaction; and effects – the results of the manipulations. Interfaces can be characterised by the extent to which manipulations and effects are either hidden or visible. What is significant about this framework is that it provides a basis for relating to some of the other social effects seen earlier, such as the social barriers, apprehension evaluation and the honey-pot effect.

These works provide a foundation for thinking about the fieldwork presented in the paper. In contrast to the previous work, the current work is focused on an interactive collaborative game. The urban environment of an outdoor city space provides an important source of contrast with existing social studies of such public screen technology – in terms of activity context and the relationship between the potential users of the system. But also of note are the specific architectural and spatial features of these spaces and the significant ways these shape how interactions and collaboration occur with these games. Some of these issues have come to light in recent work by Peltonen et al [33] in their study of CityWall. This work provides one of the first detailed analyses of social interaction at an urban screen in Helsinki. This work starts to extend some of the themes of the public displays literature to specific features of urban displays, highlighting issues to do with entering interaction, coordinating with strangers, collective interaction and interaction performance.

Of note too with the work presented in the current paper is the established nature of the screens within these contexts, having been there for a number of years. While particular applications may not in themselves be familiar to people, the presence of the screens is familiar. This has a bearing on issues of novelty and the ways that these screens come to have actual meaning in people’s lives [cf. 30, 34, 12].

In presenting the fieldwork, we aim to provide insights into the social dynamics and values that shape audience interaction with large display games in public settings.

THE RED NOSE GAME
The Red Nose Game is a collaborative game played on the BBC Big Screens in various city locations across the UK (see figure 1). The game begins with small red ‘blobs’ (like clown noses), splattered randomly across the screen. These blobs are superimposed over a live camera feed from a camera directly above the Big Screen pointed towards the area in front of the screen where the players are located. The aim of the game is to manoeuvre the blobs together. Blobs are moved by players virtually “pushing” them around the screen. Image processing techniques are used to detect movement of players in the live camera feed so that when the camera image of the player “touches” a red nose they are able to push it around the screen towards other blobs. As one blob touches another blob they blend together to create a larger blob. This is done with all the blobs until only a single blob remains. When that occurs, a point is scored. The game can be played by any number of players as can comfortably fit within the active camera area in front of the screen. The players can divide their activity as they see fit, pushing on different blobs or pushing on the same blob. Before the next round begins a scoreboard is displayed showing the total scores for all the cities currently participating in the game. In this way, different cities can play against each other to create a sense of competition.

THE STUDY
The study was conducted over a 4-week period in the summer of 2007 and comprised 5 days of study. On these days, observations and interviews were conducted in 3 cities...
where a BBC Big Screen was located and where the game had been scheduled to run. The three sites were Bradford, Birmingham (see figure 1) and Leeds. Study days were organised with the help of the screen managers who were responsible for the scheduling of content and, therefore, when the game was to run. On each of the study days the game was scheduled to play on the screens for a couple of sessions with each session lasting approximately 2 hours. For 2 of these sessions the schedules were coordinated between Bradford and Leeds and between Bradford and Birmingham to allow the different cities to play against each other. Over the course of the 5 study days, of the order of 200 people played the game. At the Birmingham site, the running of the games was accompanied and managed by a professional compere with a microphone. In Bradford and Leeds, no compere was used, leaving participation to be self initiated and managed.

Observations at the different sites were conducted at various different times of the day, on weekdays and at weekends providing a range of different atmospheres and activity contexts within which people would experience the game. The observations focussed on people’s behaviour within the immediate vicinity of the screens and people in the surrounding area within which the screens were immersed. In conducting our observations, the aim was to get a sense of what people were doing in and around the space where the screens were located, and any ways that the screen and its content played a role in shaping these behaviours. Sessions were video recorded to allow a follow-up more detailed and reflective inspection of particular behavioural episodes, the details of interaction with the screen, and coordination patterns between players. The video recordings were primarily of the screen and player area (see figure 1 for an indication of approximate framing) but also included some recordings of the broader surroundings and people watching the screens.

Interviews were conducted in situ on the same days as the observations. Approximately 50 people were interviewed. Interview times ranged from 5 to 20 minutes depending on how much time particular individuals were prepared to give when approached. (It is important to recognise that these were done "in the wild". As a consequence, it was difficult to conduct interviews of a consistent format and length in a way one might expect from a standard study set up specifically to test the game rather than observing “it in wild”). People were chosen if they were in the vicinity of the screen and judged by the interviewers to have been engaged with the screen in some way either through direct participation or spectatorship. Recruitment of people on the fly like this, in the context of other activities they were doing was dependent upon the willingness of people to help out. Again within this context it was difficult to be completely systematic and balanced in an approach to recruitment sampling. The sample of people we interviewed, though, did cover a broad range of participants of different backgrounds and ages (from young children through to retired senior citizens), alone or with others and in the location for different purposes (work, shopping, etc).

In conducting the interviews, we used a series of basic themes to focus the interview as well as exploring any noted episodes from our observations that were considered worthy of further elaboration. The pragmatics of conducting these in the wild with people not specifically there to do a study also impacted on our choices for data collection. Field notes were used as opposed to audio recording simply because of the social circumstances of these “in the wild” interviews. As such, in our reporting of the findings it is difficult to include many detailed quotations from interviewees that might be standard in other field studies.

Further interviews were conducted with the Big Screen managers and the compères at each location. Interviews with the Big Screen managers offered an additional long-term perspective on participation in the game but also provided insights into the practicalities and factors shaping game set-up that come to bear on how the games are played.

FINDINGS

Physical space, health and Safety

Before launching into a discussion of the game play and experience, it is first necessary to consider some important context in relation to the management of these Big Screens that arise from their position within an urban context. As permanent installations within these urban contexts (as opposed to temporary prototype installations), particular health and safety issues and local authority regulations come into play. Any content shown on these screens has particular implications for the way a surrounding crowd will behave. For example, with certain popular sports events, large crowds can gather. With interactive applications, different types of physical interaction, such as kicking a virtual ball, can potentially interfere with other people who are around or the natural flow of a crowd through the urban space. Where it is judged that content will shape crowd and participation behaviour in ways that risk public safety, measures have to be in place to control or bound the potential risks. Screen managers have a responsibility to the council to ensure that for any content shown on the screen or for any interactive applications used, appropriate health and safety measures are in place. This is to ensure that public behaviour around the screens is managed in an orderly and controlled manner. Such measures are dependent on architectural characteristics of the spaces where the Big Screens are located, combined with the content, but might include extra policing, erection of temporary boundaries, or use of a professional host.

From a purely technological point of view, the architectural qualities of these spaces around the screen and the regulatory requirements for orderly crowd behaviour might seem a peripheral concern. However, as we discuss later, the nature of the spaces and crowd control measures imposed in each location, have significant bearing on how the game was experienced in the different urban contexts. Such issues are a consideration in the way these ubiquitous screen technologies and content are created and deployed in real environments for long-term use [cf. 29].
Let us consider the Birmingham Big Screen where such concerns were apparent. As can be seen in Fig 1, the area in front of the screen was a temporarily installed urban beach. During the day people would sit in this area and young children would play in the sand. The Red Nose game, because of its requirement for large physical movements by multiple players was considered to be a potential hazard to those people using the urban beach. In response to this and through discussions with the local council it was felt necessary to erect a temporary barrier around the active game play area to keep the distinct parts of the crowd safely separated. In consequence, the Screen manager in Birmingham decided to introduce a professional compere to help manage the game and crowd in an orderly way.

In contrast to this, no barriers or professional comperes were used to accompany the game in Bradford. This was at the discretion of the Bradford screen manager: the active play area in front of the screen in Bradford was not a busy walkway. The screen manager thus had little concern over play interfering with general people flow in the space. It is important to note here that decisions to erect barriers are taken as and when deemed necessary and depend on how manipulations required in a game interact with the architectural and spatial qualities of the area in front of the screen. With some other interactive games that have been played in Birmingham, the required game manipulations have not always been considered by the screen manager to be a threat within the context of the space. In Bradford, other interactive applications and their particular physical manipulation requirements have led the screen managers to erect barriers. Such considerations, then, are specific to particular game designs in relation to particular urban screen space. From a design perspective, it is important to consider interactive characteristics of the game not simply from playability and engagement perspectives. It is also worth considering how interactive qualities of a game create health and safety concerns. Such concerns incur financial costs impacting the economics of screening these games and the frequency with which they can be made available.

Initiating participation
Starting a game in the social context of these urban settings presented some challenges to potential players. Playing within the social context of a public setting like this was for some potential players a social inhibitor. Several people we spoke to exhibited some form of evaluation apprehension, a fear of their behaviour being judged by social others in the vicinity witnessing the behaviour [cf. 6, 44]. In Bradford for example, where there was no compere running the game, getting participation started proved to be a difficult task. No one wanted to be the first person to start the game and be the lone participant playing the game. In part this can be attributed to a lack of understanding of the game. But active exploration of a game in a public setting through trial and error (in a way one might do with screen based games at home) can be socially awkward. In particular because the manipulations required in this game are very big and physical. As such one’s exploratory mistakes are highly visible in themselves as well as being amplified by their visibility on the large public screen. In addition within a public space, large parts of the audience are unknown to potential participants. This created a reluctance to initiate game play. Indeed in relation to this we observed two important things that helped people understand the game and encouraged participation in the game when no compere was present (as in Bradford).

One of these things was the notion of accidental interaction. Accidental interaction occurred in this game when a member of the public walked across the area in front of the screen on the way to somewhere else with no intention of playing the game. In walking across the area in front of the screen the person was in the field of view of the camera. As such when their image touched one of the red blobs on the screen it picked up the blob and moved it as the person walked. The simplicity of the game interaction mechanics helped make such accidental interactions possible. These accidental interactions of course may be a source of potential frustration during game play. However, within public settings where deliberate trial and error can be inhibited, these accidental interactions can play a role in demonstrating the game mechanics to the public and thereby overcoming some of the barriers to entry. The potential for such accidental interactions can be an important resource for starting a game in public settings. On another occasion in Bradford, there was more explicit example setting. In this instance, a visitor accompanying the research team wanted to try it out and so was happy to be the first to go up and use it. Following these visible incidents there was a gradual flow of people who would get up and use it. These accidental interactions and visible examples of use would appear to be a potential resource for those watching to understand the game, highlighting how to interact and the game mechanics [cf. 1, 15].

Watching others before participating also appeared to be of importance in Birmingham. However, there were notable points of contrast with Bradford in terms of getting the game to start. First, with the physical barrier around the play area in Birmingham, people spoke of how it created a psychological barrier to entry. But it also prevented any “accidental interactions” caused by people wandering in front of the screen – and thereby the entry points to the game that these created for observers seen in Bradford. Of significance though was that the Birmingham screen had a compere in charge of the game. This compere played an important part in initiating participation by members of the public for a number of reasons. First, the compere provided a role in explaining what was going on to people in the vicinity of the screen who might be potential candidates for playing the game. In her utterances, there were frequent references to the purpose of the game, how to play it and where to play it (namely within the barriers that had been erected around the active area). While the rules were relatively simple, this explanation was nevertheless a resource for understanding the activity. Having knowledge of the game can help reduce uncertainties about how to get involved and thereby some of the potential evaluation apprehension associated with public space participation.
The compere also provided a broader context for the game giving it a sense of meaning. In this regard she referred to the fact that the game was being played simultaneously in Bradford establishing it as a competition. This gave the game further purpose, again encouraging participation.

Second, the compere would make explicit utterances to passers by and those within the vicinity inviting them or encouraging them to play the game. Subtle persuasive tactics were used to draw people into the active area in order to play. Invitational utterances would be directed at individual passers by, focussing the crowd’s attention on them, and thereby creating social pressure to participate. In this way, they were embarrassed into playing albeit in good humour. In other instances the invitations were more about positive encouragement and giving people the confidence to participate in the game. Others were about challenging individuals goading them to see how good they would be.

Third, the presence and actions of the compere helped legitimise the activity and provided a rationale for participation to those in the public space. In this way it provided participants with a sense of accountability for participation to those in the public space. In this way, it legitimised the activity and provided a rationale for the activity. In particular this was important for some of the older people around the screens for whom the activity was otherwise regarded as somewhat frivolous and unbecoming of their age.

Organising Collaborative Play

A significant question for these kinds of games within public settings concerns the ways in which players who may or may not know each other come to collaborate and coordinate their game play effectively. Of relevance here is the flexibility of the Red Nose game in terms of the number of people playing it and the way the collective organises itself during the course of play. It is possible to play the game entirely as an individual, but performance can become more efficient (e.g. merging blobs more quickly) through collective efforts where more than one player joins in. Underlying the potential strategies are particular social relations that are possible within the context of the urban environment.

In our observations we saw a number of different strategies of play taking place with progressively more levels of coordination and collaboration. At the one end of the spectrum there was individual play in which a single player would “push” a red nose towards another red nose and continue until just a single blob was left. In this strategy there was no real need for coordination.

At the next level up we observed multiple individuals playing the game together but in a loosely coupled fashion. This strategy was enabled by a particular characteristic of the game design. Having multiple discrete blobs on the screen at the same time meant the game could progress with discrete but parallel play. The players worked in parallel but on different blobs in different parts of the screen. In this sense, progress was achieved by players through summative strategies in which discrete contributions could simply be added together towards the goal of the game. That is, there was no explicit and observable effort to coordinate their movements together to achieve the goal of the game.

At the next level up we saw greater coordination efforts in which small subgroups worked more tightly together. In this strategy, multiple people would push different blobs towards each other, working together on the same bit of the game. Again it is important to consider the underlying social relationships demanded by this strategy. This type of collaboration happened primarily among small groups of existing friends or families though it did happen to an extent among strangers in particular where there was a natural leadership position assumed by one player. In this strategy verbal utterances played a part in coordinating the moves of the people making up the subgroups. For example, in Bradford a man playing with a group of children, shouted instructions such as ‘move forward’, and ‘no, get nearer’.

Finally, there was a very coordinated collaboration strategy. This involved a whole group of people linking arms together to make a person-wall and then as a whole make a sweeping movement across all the balls on the screen. The linked line of people gathered the blobs together much like drawing a net round the blobs until all the blobs came together.

Of note here is that this highly coordinated strategy occurred primarily in Birmingham. On the one occasion when such a strategy was seen in Bradford it involved 2 mothers and their 3 children joining hands. The differences in choices of strategy in different locations suggest a number of possible explanations. In part, this may be attributed to the smaller and bounded space in which the Birmingham game was played. This smaller space created a certain physical proximity that was necessary for such a strategy to occur. However, there is also an argument to be made here about the role of the compere in Birmingham in facilitating such a strategy. In our observations, the compere, with microphone in hand, projected instructions across the whole group of players, helping them work together in the achievement of the game’s goals. The role of compere signals permission to give out instructions that allows players to coordinate. So for example, the compere was able to link arms with the players and encourage the creation of the “person-wall” that enabled the sweeping strategy. We would argue that such permission to “direct” in this way is not something easily assumed by other individuals within these public spaces when they are among strangers. Only when subgroups players know each other might it be socially easier to provide instructions in support of more coordinated strategies; and socially easier to engage in coordinated strategies that require close physical proximity to strangers (e.g. holding hands and linking arms). If we consider the previous summative strategies in which parallel activity occurred, our interpretation is that being able to do this in a game allows engagement while maintaining a “socially safe” distance from unknown players present in urban spaces. This may be particularly important given that play in these urban spaces is relatively fleeting and of short time scales (between 30 seconds and 10 minutes) and where little practice is undertaken.
Performer experience

As we have already mentioned, these games take place within the context of an audience. In line with the existing literature on public displays, we also discussed how this created a sense of social inhibition for some people creating a barrier to participation. There were a number of interesting ways that people responded to some of this social pressure in their participation. Over the course of our observations, there was a tendency, for example, for people to avoid playing on their own and would only perform with strangers if also accompanied by a member of their close social group or family. This was consistent too with comments from some interviewees who would only play if accompanying friends would join in. Some adults we interviewed about why they had played the game said that they only did so to join in with their children. These people expressed that they wouldn’t have played on their own as it wouldn’t have felt appropriate doing so. Their visible role of carers in this scenario was sufficient to legitimise their participation in something that they might otherwise have been embarrassed to do in the public setting.

It is important however, that social inhibition and evaluation apprehension are not seen as the only social consequences of having a public audience present while playing the game. Rather, the social context provided by the public audience creates a range of different possibilities for social actions, meanings and motivations to be manifest. In contrast to some of the other work on public displays the characterisation of the performers experience needs to be considered more broadly. Let us illustrate some of these through examples from our observations. An example here is the encouragement and motivation that can be provided by the audience and in particular friends or family in the audience. In one situation in Bradford, one woman was encouraged by her group of friends (who were sitting with her outside on of the cafes) to play one red-nose game on her own. As she moved around in front of the screen her friends shouted out instructions, ‘Get nearer!’, and ‘Only 41 [points] to go!’. When she completed the round and won a point she turned around cheering, seeking her friends approval. She smiled as a few people seated outside the café clapped and cheered her. She bowed and shouted ‘thank you’. The whole activity was watched by many other people in the square. What we see here then is a strong interaction between the audience and the player. It is not simply a question of the audience watching or the players playing but an interaction that was of significance. The players weren’t simply playing for themselves but at times were also performing for the audience and motivated by their audience. In another example, a young male player in Bradford being watched by a group of his friends would play using very acrobatic movements, doing somersaults when scoring a point. The nature of the movements was not necessary from an interaction efficiency point of view but rather were manipulations designed to show off to his friends. This kind of behaviour has parallels with the work of Jacob Smith in his ethnography of the Dance Dance Revolution arcade game play in which players were seen to dance not just for progressing the game but also explicitly to entertain the crowd [36].

Indeed for some people, once social inhibitions were out of the way, there was excitement simply about being on the screen. A feature of the red nose game was to overlay the game components over the live camera feed. This turns out to be notable for how people are able to display themselves. While people are visible in public space regardless of Screen presence, having one’s image on the screen is a more powerful experience, amplifying the player’s visibility because it exists within the framed focal point of attention that is the screen.

Spectator experience

In considering our understanding of the user experience with regards to these kinds of games, an emphasis is typically given over to the actual players of the game. Even when making reference to an audience, this is often done in terms of impact on the player’s experience along the lines discussed above. Of significance here though is the way that the game was a public spectacle - one that was an interesting experience for the people in the vicinity of the Big Screens as well as the players. In all locations where we carried out observations, there were always people avidly watching the game as it was played by others. People in the audience were observed cheering and laughing at particular points during the game. For example, when the points total went up, or when a struggling player eventually managed to push some blobs together. People on the tables in Bradford and Leeds were also heard discussing players’ behaviour as it happened. There was also banter and affectionate mockery if the players did something funny or silly.

Considering the Red Nose Game within this context there are particular characteristics of the game that contributed to the spectator experience. Drawing on the taxonomy of Reeves et al, (2005) the game had a high level of expressivity. This was both in terms of visible manipulations and visible effects. That is, the movement of the players necessary to manipulate the interface were highly visible to the audience within the vicinity of the screen. They could see the players move in the physical environment as well as view them on the screen. Indeed one of the key values for people watching was to see people they know on the screen - celebrating a kind of localised fame. The effects of the manipulations too were visible to the audience in the sense that they could see the blobs move around the screen. As a consequence the game was understandable to the viewers in a way that supported their engagement with it. For example, as blobs got closer together, some audience members were observed willing the blobs to touch and expressed a playful frustration if the blobs just missed each other.

One aspect of the game that helped contribute to the audience experience was the inter city rivalry. At the end of
each round, as the score board showed the different scores for the different cities, we observed spectators commenting on the scores of the different cities and how their particular city was doing against the others -“Birmingham are catching up”. This was particularly the case in Bradford and Leeds. There is a well-established rivalry between these two cities (the cities are positioned close to each other in the same region of the UK) that extends to all forms of competitive activities. When we spoke to spectators in Bradford about their engagement, they commented that they were happy so long as they were ahead of Leeds. As a social phenomenon, this attachment to an in-group (local city) and competition with an out-group (remote city), is well recognised – for example in sports. But it is nevertheless interesting to see how this phenomenon was played out within the context of a large screen public gaming experience and how it was a significant part of the overall experience with this game. It is worth reflecting on how this experience took place even with fairly minimal cues as to what was going on in the other cities - the only view the local spectators had on the remote experience in this particular game was the score board on the screen displayed at the end of each round.

The compere too played a notable role in the spectator experience in Birmingham through her commentary on the game it was played out. While this commentary was in part about an ongoing motivation of the players, the language used and the nature of the vocal projection was also indicative of a performance for those watching the game. The commentary added an additional layer of information, providing further explanation for the already visible movements of the players, building anticipation verbally as the players got blobs closer or moved towards achieving the single blob, highlighting player achievements, and commiserating errors. The commentary also made numerous references to the inter city aspects of the game building up spectator engagement with the local players and against the remote city players. All of these comments provided additional hooks into the experience for those watching. They helped project the experience beyond the players and the play zone to the surrounding areas where audience members were located and provided a unifying rhythm to help coordinate crowd response.

**The game as social resource in public space**

While we have characterised some of the engaging aspects of the spectator experience, there are other aspects of the experience that need to be considered. In the main, people were not in these public spaces with the primary intention of viewing the Big Screens and playing an interactive game. Rather, the people we interviewed came along to these spaces to have a rest and a break from primary activities such as shopping or work or simply to sit and socialise. Watching the Big Screens and people playing the game comes to be used as a resource within the context of these waiting activities. For example, for individuals waiting in these areas, focussing attention on the screen and game play can be a way of making themselves look occupied and with purpose to other people in that public space. To just sit or stand around waiting can look odd in certain places and consequently being socially uncomfortable for the person concerned. To present yourself as occupied and with purpose by looking at the screen and players can make that waiting more psychologically comfortable [cf. 10, 30]

Families and small groups of friends would also use the Big Screens as a place to wait or have a break often using this waiting as an opportunity to have something to eat or drink. In particular when it was fine weather, it was a place where people would sit and enjoy the sunshine. Watching the game was something that accompanied these primary behaviours – a resource which contributed to the general atmosphere of the place and their sojourn. Within these social contexts, the detailed nature of the spectator engagement with the game and screen cannot be characterised in any homogenous way but rather is dependent upon the particular social dynamics of the groups concerned. For some groups that we observed and overheard, watching it was a resource for conversation - a background activity that was then interleaved with conversation. For others, watching the game was much more focussed, a way to avoid conversation or manage conversational lulls.

The game was also a means by which the pragmatics of family group coordination were managed. For several families we observed and spoke to, both game playing and spectatorship were used as a form of baby-sitting; a way of keeping the children occupied and busy while the parents rested and socialised. In Bradford for example, one father sat down at a coffee table with his two young daughters in order to have a drink. The father was happy to sit and rest for longer than his daughters who were getting bored, so he let them play the game while he sat and finished his coffee. He was watching them as they played, enjoying it as a spectator experience but also, as he explained to us, so that he could see they were safe and occupied. For him the game was a visible way of keeping his children safely entertained while he rested. In another example, a mother in Birmingham was with her children and getting ready to leave the area around the Big Screen. This involved her having to put the coats on her young children. As she attended to putting one child, she was unable to devote visual attention to the other daughter. As such, she made sure the other daughter was watching the screen so that she was occupied and not tempted to wander off. The point of these episodes is not to provide a complete characterisation of watching and waiting experiences. Rather they are illustrations of how the Big Screen game came to be appropriated as a social resource within the context of everyday activities within this space.

**DISCUSSION**

In this paper, we have presented a study of social and behavioural practices that occur around a multi player interactive large screen game in various urban locations. Through the study we have been able to highlight several factors relating to how a large screen game such as this comes to be played in a public setting.
The first key concern is with the physical space where the particular screens are located. As we saw, the locations in Birmingham, Bradford and Leeds where the Big Screens are situated had their own particular characteristics that shaped people’s experiences with the game. Introducing a game into such spaces is done within the context of how these spaces are used on an everyday basis; how people flow through the space, how they wait in the space and their primary activities while there. The health and safety regulations that accompany a real world deployment of an urban screen as opposed to a short term prototype system has highlighted a need to consider interactive properties of an application within this context. The particular interactive properties of the Red Nose game (e.g. large physical movements and number of players at a time), in certain spaces can be deemed to interfere with normal everyday behaviours in the space. These considerations are important for designers of such games, over and above simply the interactive experience itself. As was seen in the study, the consequences arising from the relationship between game interaction characteristics and spatial configuration can have profound implications for the game experience and the financial costs of running them – for example, the introduction of dedicated physical barriers and comperes.

A second issue of note is the public nature of the interaction and particular social configuration of the urban space and how this influences behaviour around the game. Other authors have of course discussed issues around public interaction with large displays, for example in conferences, cafés and the workplace. While at a high level, there are related concerns, the urban context is different from these other settings in terms of the number of, and relationships between, the people occupying the settings. This comes to bear on the way high-level social phenomena play out within the context of a particular game design. For example, we discussed the social barriers to initiating a game and joining in a game. We also discussed the practical issues of coordinating game play and how these relate to the particular social configuration of potential game players within the urban space. What was highlighted in the fieldwork was the importance of designing game mechanics that map onto the particular social structures of the potential player base. Some examples of where this worked well in the Red Nose Game included the ability to play effectively together either in parallel with loosely coupled groups, or more cooperatively in more tightly coupled groups.

A third issue of significance is the role of the audience in understanding the gaming experience. Important here is the impact of the audience on the player experience but also the impact of the player experience on the audience. From the performers perspective the audience creates a social context within which their play occurs. The relationship here is much more than the socially inhibitory ones that have been reported elsewhere in the public displays literature. Rather, there are also social facilitation effects of the audience as well as players conducting behaviours specifically to show off to or amuse the audience. What has been important in this study is that the audience experience is important in itself, over and above its effects on player experience. This then becomes a significant consideration in the design of games for these large public displays. As we saw in the current game, making the interaction behaviours salient is important, as is the long-range visibility of the interaction effects. But what is also useful is the promotion of team support and fandom in the design of the game. Inter city game-play allowed the audience to get behind their local players creating a much more engaged audience experience.

A final point of note from the findings concerns the extent to which such public screen gaming experiences are considered as unhosted (where players simply walk up and use) versus hosted experiences (where an interactive experience is professionally compered). We saw with facilitated experiences, ways in which both players and audience engagement could be enhanced, providing explanation, motivation and commentary. But such facilitation may not always be possible on a long-term basis in an urban context. As such it is also important to think about how these games must work as unhosted experiences. Issues such as supporting game initiation, become a much more important consideration depending upon a much more immediate understandability of game rules and goals. Likewise techniques such as accidental interaction can come to play a more significant role in supporting game initiation in unhosted settings. It might also be possible to draw on characteristics of the facilitated interaction and provide automated interventions. For example, automatic detection of significant moves or play behaviours that can then trigger automated responses for player and crowd motivation.

In sum, the study has shown some of the unique characteristics of playing a game such as this on large screens in public places. While some of these findings are particular to the specific settings and mechanics of the game presented here, they are illustrative of the more general factors and concerns relating to collaborative public screen gaming. We hope this provides more general insight into the understanding and design of large public screen gaming experiences.

REFERENCES