The Urban Screen as a Socialising Platform:
Exploring the Role of Place within the Urban Space

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Abstract

In this paper we explore shared encounters mediated by technologies in the urban space. We investigate aspects that influence the interactions between people and people and people and their surroundings when technology is introduced in the urban space. We highlight the importance of space and the role of place in providing temporal and spatial mechanisms facilitating different types of social interactions and shared encounters.

An emperical experiment was condeucted with a prototype that was implemented in the form of a digital screen, embeded in the physical surrounding in selected locations with low, medium and high pedestrian flows in the heritage City of Bath, UK.

The aim is to create a novel urban experience that triggers shared encounters among friends, observers or strangers. Using the body as an interaface, the screen acted as a non-traditional interface and a facilitator between people and people and people and their surrounding environment .

Here we outline early findings from deploying the digital screen as a socialiasing platform in a city context. We describe the user experience and demonstrate how people move, congregate and socialize around the digital surface. We illustrate the impact of the spatial and syntactical properties on the type of shared interactions in and highlight related issues.

The initial findings indicated that introducing a digital platform as a public interactive installation in the urban space may provide a stage for emergent social interactions among various people and motivate

users to actively and collaboratively play with the media. However, situating the digital platform in various locations, and depending on the context, might generate diverse and unpredicted social behaviours designers might be unaware of. In this respect we believe that the final experience is shaped by interconnection of structural, social, cultural, temporal and perhaps personal elements. We conclude by mentioning briefly our on going work.

1 INTROCUTION

The public arena provides temporal and spatial mechanisms for generating and promoting various social interactions, offering a “stage” for events and activities on which people negotiate boundaries of a social and cultural nature. With the introduction of mobile and media technologies within the urban space, and in order to identify the impact of the deployment of pervasive technologies on people’s relationship to each other and to their surrounding in particular, we need to achieve a better understanding of the notion of place and the role of context as an emergent situation- physical, social and mental-of surrounding aspects that give meaning to our activities.

When situating a digital platform in a city context, which includes both humans and the digital platform as componenets, it becomes part of a larger and a more complex system, spatially (ie physically), digitally and socially. Whereas the social aspect is often taken into account in designing interactions enabled through digital technolgy, relatively little attention has been given to date, however, to the spatial properties and the individual aspects of the place, and so to address their impact on forming shared encounters, in particular within the urban context. In this respect it seems that we face the challenge of developing strategies for articulating the new public arena that connects the urban space and the potential space created by the new media technologies.

In this paper we report on our investigations within an ongoing research project that aims at developing a better understanding of the urban scape augmented with the digital space in the heritage City of Bath. A long term goal of our research is to inform the design of pervasive systems that are deployed in the urban environments. In (O’Neil et al., 2006) we described our development of novel methods for systematically observing the city, physically, digitally and socially in order to analyse and understand mobile and pervasive computing features as integral part of that environment. Does the space act as a place for urban performance when introducing a new digital element into the urban space? How do people negotiate relationships with technologies in a pervasive era? Do social interactions change or remain the same when introducing the digital element ? The Cityware project is applying a series of different methods. In this paper we demonstrate applying a digital installation within the urban space. The aim is to engage the general public in our research, encouraging playful use of technology. In this experiment it is hoped that interventions can serve as a methodology for better understanding of social and digital interactions and underlying affordances (Fatah gen. Schieck et al, 2006). In order to investigate the impact of the spatial and temporal properties on the type of shared interactions within the

city context, we have deployed a socialising platform, in the form of a digital screen, in three selected locations in the city. The aim is to generate a rich urban experience among friends, observes or strangers.

Here we explore the relation between the type of shared encounter and the spatial and syntactical properties of the space in the specific location. The selected locations vary in the pedestrian flow rate and in the visibility and accessibility of the location. We analyse these locations and demonstrate that the physical setting of the built environment had a direct influence on the movement flow of passers-by and the activities taking place near the locations, which in turn had an impact on the characteristics of the social encounter and the shared experience. Our observations suggest that public interactive installations, like the one presented here, provide a platform for rich social interactions and awareness among the various people involved. However, situating it in different locations and within different social and temporal situations, and depending on the context, diverse and unpredicted social behaviours may emerge.

In the next section we review projects in the fields of ubiquitous computing. In particular, we focus on projects that have embedded technological artefacts into urban situations. In section 2 we provide a brief introduction to Space Syntax, describing some of its main features and methods, and highlight the spatial analysis of Bath using these methods. In section 3, we outline our methodology, describing the digital prototype and its deployment in selected part in the city. In section 4 we review the evaluation methods we applied. We then discuss preliminary findings from the early implementation of a digital prototype in the city of Bath. Specifically, we highlight the role of place within the urban space. Finally we draw conclusions on certain aspects and outline our ongoing work as part of a systemic approach for analysing and understanding ubiquitous computing systems as integral facets of the urban environment.

2 EXPLORING TECHNOLOGY ENABLED ENCOUNTERS IN THE CITY

The urban environment, in the way it structures space, plays a critical role in the construction of social behaviours. The city can be considered as a pattern of connected spaces that take on a social meaning by constructing patterns of co presence between people (Hillier and Hanson, 1984). In this respect space does not only reflect social patterns, but can also play an important role in generating these patterns, providing a platform for rich and diverse social encounters. For instance, public spaces such as the bus stop or the cafe can act as an ‘encounter stage’ on which people negotiate boundaries of a social and cultural nature. With the advent of pervasive technologies (always and everywhere present) building pervasive systems into our urban environment requires a new way of thinking about the design and use of the digital layer and how it interweaves with the built environment. We need to achieve a better understanding of how to compose the necessary framework for allowing a better integration of the built environment and the digital layer and it seems that designing new technologies within our built

environment is often accompanied by speculations about their potential for influencing social behaviour or promoting shared encounters within the built environment and it is here that designers, working with radically new and disruptive technologies, tend to work on the boundary of existing knowledge.

Recent research has tackled issues related to implementing pervasive systems inside the built environment. Many projects have been developed within a workspace environment in order to create opportunities for informal interactions and communication, such as “Hello Wall” (Streitz et al., 2003), or “Wallmap” (McCarthy, 2002). Other cases of large interactive systems, have been introduced into social settings with the aim of extending existing activities and practices or helping people to talk to people standing beside them, for instance “Boundary Functions” (Snibbe, 2005), “The Opinionizer system” (Brignull, H., & Rodgers, Y., 2003) and “Dynamo” (Izadi et al., 2003). In relation to projects that have tended to investigate interventions or experiences in specific urban situations, the Mobile Bristol group (Reid et al., 2005) developed a range of outdoor situated experiences, such as the interactive play “Riot! 1831”. The Equator Citywide project (Benford et al, 2003) has developed games played in urban settings. The goal of those activities was to overlay an experience on city spaces, by giving mobile devices with GPS receivers to users, rather than by placing technology into the settings themselves. We have reported in (O’Neil et al, 2006) on several projects the fields of ubiquitous computing that have embedded technological artefacts into urban situations. The Active Print project (anon & anon 2006) worked with the BBC to place barcoded signage in urban seaside locations, which users with camera phones read to obtain content about their locations. Urban Atmospheres’ Jetsam project (Paulos & Jenkins 2005) augmented a city rubbish bin, so that it projects on to the pavement a representation of the activities in which it is involved, which are otherwise concealed.

All of these projects are city probes: a technological perturbation of the city experience made with the aim of understanding more about how to design experiences in the city. Other work has attempted to understand existing city behaviours, mainly as a resource for designing new applications. Paulos and Goodman (2004) studied the phenomenon of familiar strangers – people we become familiar to seeing in urban settings but do not communicate with – by asking subjects in Berkeley to record the people they recognised. This became the basis for tools designed, for example, to augment the user’s sense of social relationship to different parts of a city. Others have looked mainly at physical behaviours in cities, which themselves are often rooted in social behaviours. Höflich (2005) studied the movements and body language of people in the Piazza Matteotti in Udine as they made mobile telephone calls, relating them to the architectural features of that square and the different types of engagement people have with their interlocutors versus their surroundings. He identified signature patterns and paths of movement reflecting an interest in how technologies affect paths through space. This informal study gives a flavour of aspects of city life in different places. A few urban projects have been designed to use body movements and gestures to activate the digital media without using portable devices. For instance the work of the Mexican-Canadian artist Rafael Lozano-Hemmer, such as “Urban Scan” and “Body Images”

use body-input interaction (in this case user's shadows) creating a direct relation between the human body, the technology interface and the urban space (Lozano-hemmer, 2005). The Citywall project developed portable environments for on-site configuration, mobile and light-weight mixed reality interfaces with the ambition to weave them into 'the fabric of everyday life'. Using a series of intuitive gestures users can navigate and arrange media as if they were manipulating physical pictures of city events in an engaging installation where passers by playfully manipulate media and learn about anniversaries, events and festivals.

Unlike our approach, projects developed in the urban contexts have not tackled the spatial setting of the city as a potentail facilitator for social encounters. In our research we aim at developing the basis for a systematic approach, by looking at the urban environment as an integrated system mediating both the built environment and pervasive systems. This is achieved by applying different methods in different phases, in this paper we report on our investigations of the deployment of an urban installation taking into account the bodily experience as essential factors of human experience.

The design of pervasive systems may change the environment for interaction and so stimulate the emergence of new social behaviours. Inevitably then, designing new technologies tends to modify existing social practices, and on occasion stimulate new ones. Feenberg has argued that new technologies tend to undermine existing social practices, requiring new ones in their place (Feenberg, 1999). We believe it is important to understand, when studying any type of technology, how these technologies reflect the social relations and how they might change the social relations.

In our approach an attempt was made to map and understand existing social practices in relation to the space and in respect to the heritage value in Bath. We believe that identifying these practices and their location within the city would help gain a better understanding of the underlying affordances. These can then be addressed and taken advantage of in designing the new technologies and interventions.

In the following sections we explain our approach and illustrate the methods we applied in the conducting our empirical study. We discuss limitations encountered during their application.

2.1 Understanding the urban space in Bath

The structure of the built environment in Bath is by no means a unified, planned whole. The expansion that took place in a relatively short time span in the 18th and 19th c. created a collage of separate, largely unconnected, and often incomplete pieces of speculative development, each shaped apparently by accident (Forsyth, 2004). In order to understand the urban space in Bath we use Space Syntax methods. Space syntax, first developed by Hillier and Hanson (1984), analyses cities as systems of space created by the physical artefacts of architecture and urban design. It takes the position that the key to urban function, at the level of movement of people, is the way in which each space is accessible from every other space in the city, not merely in terms of metric distance, but rather in terms of topological distance, or the number of changes of direction needed to move from one space to another.

In that respect the space is understood as a fundamental aspect of everything human beings do. The experience of the space is related to the movement, the interaction and the visual fields. Each of these concepts describes different aspects of how we use or experiences the space and they are all related in a geometric language that reflects human behaviour (Hillier, 2005).

We apply Space Syntax methods as an aid to understanding the configuration of the urban space in Bath. The reason is to a great degree based on the correlations found between the measures generated by Space Syntax spatial analysis, and flows of people counted in real urban space. The ability to interrogate the spatial structure of a city plan and to investigate what factors lead to the presence or absence of people on the street is one of the central contributions of space syntax methodology.This is supported by many studies, mainly of pedestrian movement, indicating that under normal conditions the spatial configuration of the urban grid is in itself a consistent factor in determining movement flows (Hillier, 2000). Some key studies in Space Syntax are reported in (Hillier et al., 1987, Hillier et al., 1993).

Using a range of qualitative observation methods one can gather data on people's obvious behaviours and revealed preferences. Using the quantitative analysis of spatial morphology one can then investigate the degree to which behaviors appear to be related to spatial design, and the degree to which other explanatory factors must be invoked. By applying Space Syntax spatial analysis coupled with using qualitative observations we were able to identify potential spaces for investigating the impact of introducing a digital platform on the nature of shared experience.

2.2 Understanding Bath with Space Syntax

A fundamental concept of space syntax is that a city can be represented as a graph of nodes and links. The graph is constructed from a map of the city by first making an "axial map" of the streets. In an axial map, the longest lines passing down streets are considered as nodes and their intersections as links in the graph. This graph can then be analysed in terms of its properties such as the depth between the nodes. This is characterised in Space Syntax as the level of integration of a node, i.e. the deepness or shallowness of a node in relation to the other nodes in the graph. Shallow streets are essentially fewer changes of direction from the other streets of a city, while deep streets are relatively isolated from other streets. Space syntax has found a consistent correlation between the shallowness of streets (in terms of integration) and pedestrian flows in the city. Observations are then made at different times of day of movement flows along each street segment by counting people passing points on a street, 'imaginary gates [1]', and indexing them in flows per hour through that gate. The various spatial values for the lines are then compared to the movement flows by simple and multiple regression. The only other variable required to model movement is knowledge of the special attractors, for instance average building height, development densities and land uses in an area.

[1] "A brief lesson in Observations" Space Syntax Lab, 1997.

In the first phase in our approach to understanding the urban space in Bath, we have applied a syntactic analysis of Bath city centre. The city was analysed as an independent system.

This was followed by an observation study, which was carried out over 2 days. Data about pedestrian movement were gathered using an observation-based pedestrian survey conducted in the study area. We established 96 gates throughout the city, and counted the number of people crossing them. Our observers took 5-minute samples from each gate in 5 cycles throughout the day, from 8:30am to 4:00pm. Observed flows of people ranged from high flows of 2750-4000 people per hour to low flows of 250 people per hour or less. The local integration was correlated with pedestrian movement data. The correlation between the predicted and actual flows of people is low in comparison to that found in other cities. This indicates that patterns of movement are likely to be heavily influenced by a range of other factors. For instance location of tourist 'attractors' (Fatah gen. Schieck et al. ,2006).

This study was coupled with a rapid survey of land use for the main retail area, which was supplemented by the retail survey of central Bath undertaken in 2004 by the Bath Council.

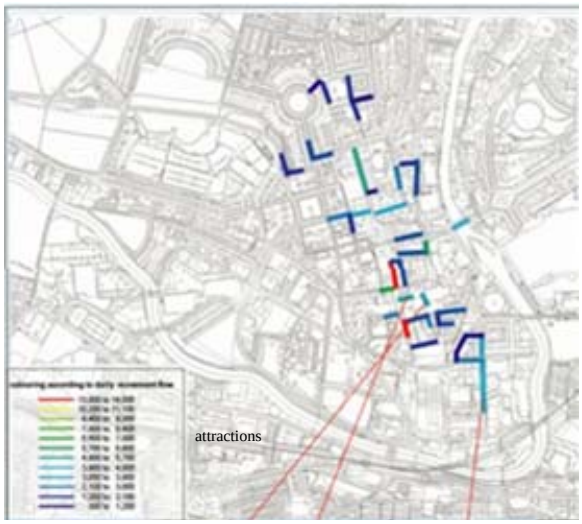

Figure 1 is a representation of part of the street network of Bath as the 'fewest and longest' lines that cover the system (the axial map). Shallow streets are represented in red. Deep isolated streets are represented in blue. (source: Space Syntax Limited).

Figure 2: Daily movement flow in Bath. Observed flows of people ranged from high flows of 2750-4000 people per hour to low flows of 250 people per hour or less.

2.3 Areas definition

Using a range of qualitative observation methods drawn from ethnography we gathered data on people's behaviours and by applying quantitative spatial analysis of the urban morphology we could investigate the degree to which behaviors appear to be related to spatial design, and the degree to which other explanatory factors arise. These methods allowed us to identify various social interactions within various social groups.

Early findings indicated clear differences in the social behaviour and the movement flow in different parts of the city. For instance, some of the streets were mainly used by locals. Other static locations, which are characterized by low movement flow, were dominated by tourist. This appears to be determined, to some extent, by the spatial configuration of the city. As a result of the analysis, we were able to identify potential areas for carrying out the empirical studies. The aim is to investigate the impact of deploying a digital platform on the social and shared encounters in these areas.

We have identified 3 areas for conducting the empirical studies. These areas differ in the spatial characteristics, their connection with the adjacent areas, the surrounding attractors and activities, the visual fields, the movement flow and static activities. The main characteristic of the selected areas are described below:

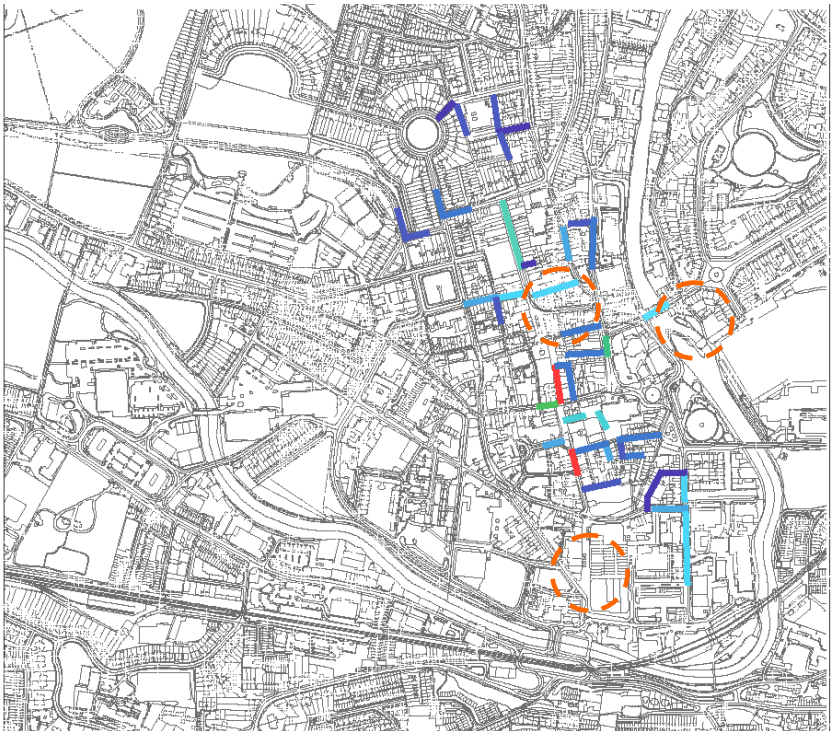

Figure 3: Three areas were selected for conducting the empirical studies.

1) Area One: The River Side

This area is located along the river side. It is situated on a different level, which is separated from the main level of the city centre. Adjacent land uses include a restaurant and a children playground. On the local scale there is a bench and tree close to the area. Some people walk along the riverfront, however, the area is relatively isolated from the city centre, and therefore, characterised with a low movement rate. In order to reach the area people need to use a stair, which would lead them to the lower level of the city. Having said that it is important to outline that visually the area is highly connected to the city centre (it could be seen immediately from the main movement route).

2) Area Two: New Bond Street

This area represents a highly used space that connects 4 different pedestrian routes in the city centre. It is surrounded by shops and cafés. The movement rate is higher than in Area One (the River Side). On a local scale there is a bench in the middle of the square. In terms of static activities, people tend to sit on the bench and have lunch, use their mobile phone or observe the surrounding. Many tourists appear with digital cameras. Generally, people tend to meet in this area. Many people tend to walk with their children or with a pram. In the afternoon most of the people tend to walk north, moving away from the city centre. The installation was tested in this area during the afternoon and the evening.

3) Area Three: Stall Street

This pedestrian area is situated on the main shopping spine in Bath along the North-South axis. The wide route is highly integrated with a very high movement flow. People tend to move fast to their destination this varies depending on the time during the day. The area is mainly surrounded by shops and it is very well connected to the main shopping spine in Bath. On a local scale there is a big tree, which is used by street performers as a base for their performance and equipments. A few benches are situated close to this area. In terms of static activities, people tend to sit and have lunch or observe. The spot in front of the tree, which was selected to test the installation, is highly connected, visually, to the main entries to that location.



Figure 4: Area One: The River Side. Figure 5: Area Two: New Bond Street. Figure 6: Area Three: Stall Street.

We have carried out experiments in the above mentioned locations and implemented a digital prototype in the form of a digital screen, encouraging playful use of technology that triggers shared encounters among friends, observers or strangers. In these experiments it is hoped that these interventions can serve as a methodology for better understanding of social and digital interactions and underlying affordances. We believe that in order to introduce a digital platform into the urban environment we need to think of the design and use of the digital layer and how it interweaves with the built environment. Key to this integration is the concept of space, by which we mean not only physical location but also the social protocols, conventions and values attached to the particular physical space (Harrison and Dourish, 1996; Tuan, 1977).

In the next sections we review our methodology and describe preliminary findings from the early implementation of the digital prototype in the three selected location in the city, we then discuss related issues before we conclude by summarising our ongoing work

3 IMPLEMENTING THE PROTOTYPE

The urban prototype, figure 7, was implemented as a portable digital screen that can be embedded as an interactive installation in different locations in the city (Briones et al, 2007). It is made of two layers. The first layer is a grid of LEDs (light-emitting diodes) embedded in a surface (1.8mX2.8m) that contains 21 units of rubber door mats. The second layer is a grid of pressure pad sensors, which is located under the LEDs layer. Both the LED and the pressure pad layers form a unit that sends the user's input to the computational program and performs the outputs as well, in the form of seagulls. The pressure pads detect people walking on top of the surface. In response, it illuminates the series of LEDs. The lights turn on or off depending on a computer program, which defines the behavior of each light at every instant.
When pedestrians walk over the surface a pattern of blinking lights is generated dynamically following the pedestrians' movement over the surface. The aim is to generate a rich urban experience that can be introduced in various locations in the city. Using the body as an interaface the digital screen actsas a non-traditional interface and as a facilitator between people and people and people and their surrounding environment.

Figure 7: the prototype is a digital surface that can be embedded into the urban environment (Credit, Carolina Briones, 2006)

The interactive installation was tested in three different locations in the city of Bath, with low, medium and high pedestrian flows, figure 3. The selection of the locations makes use of space visibility and connectivity in the urban space and in relation to attractions and services that work as movement attractor. Four test sessions were carried out over three days. Three of these sessions were performed during daytime (one for each location). An additional test session was conducted during the evening (in Area Two: New Bond Street).

4 EVALUATION METHODS

Our approach in the real setting, and unlike in a 'lab' setting, requires applying a range of methods from interpretative-ethnographic to experimental approaches. In this section we explain the methods we implemented together with the limitations and constraints that were encountered during its application.

During the study we have applied the following methods:

1) Before running the experiment:

Information about the physical conditions of the space was mapped; this includes defining the boundaries, exits, entries, street furniture for instance mapping the position of benches, trees. In addition active and passive facades[2] were mapped in order to understand the relation between interactions triggered by installing the digital platform and the immediate surrounding. Before the actual test sessions we have implemented a range of empirical observation methods in the selected areas. We have conducted a ' static snapshot' recording the static use of public space by people. Moreover, pedestrian flow levels and people's movements in and out of the space were observed, and the type of activity taking place in the immediate surrounding was captured.

2) During the experiment:

Each test session lasted for two hours. During the sessions people's movements in and out of the interaction space were observed and recorded. The form of interactions with the prototype, and with the other people in the area was observed and recorded. Shared encounters were captured using a digital camera. Various interactions were video taped by two researchers using Digital Video Camera. Finally, peoples' movement on the digital surface was tracked using a computer program, which maps the sequence of people's position on the digital surface . The aim is to identify the interaction pattern and the movement paths taken by people.

3) After running the experiment:

Following the test sessions, a selected number of participants (20) were debriefed in both a semi structured discussion and using a questionnaire.

5 EVALUATION AND EARLY RESULTS

Our observations of the test sessions indicated that public interactive installations may provide a stage for emergent social interactions among various people. However, situating the digital platform in various

[2] Active facades are building frontages that attract people movement such as commerce or cultural venues. Passive facades are building frontages without interaction with the public space for eg empty shops or blank walls.

locations, and depending on the context, might generate diverse and unpredicted social behaviours designers are unaware of.

During the sessions, we observed the following emergent patterns of behaviour:

- **Awareness:** from peripheral awareness to focal awareness to direct interaction.

Different levels of awareness were observed among people walking around the area, from those simply glancing at the interactive prototype, to people stopping around the prototype and asking about it, trying to understand how it works.

- **Shared experience:**

People behaved differently in different situations and the experiences varied depending on whether the interaction took place among friends or strangers (Briones et al., 2007). During the test sessions, most people shared the experiences with friends; however, a few of the participants shared the experience with a stranger. The most common pattern observed when strangers were interacting was that they were waiting for their turn, providing a platform for an unintentional shared encounter.

Figure 8: Awareness varied from peripheral awareness to direct interaction. Figure 9: Different levels of interactions were observed among people walking around the area, some were simply glancing at the interactive prototype, which indicated a certain level of curiosity. Figure 10: The most common pattern observed when strangers were interacting was that they were waiting for their turn.

- **Physical properties of the installation**

The physical properties of the digital platform can have quite profound effects on the way it is used in a public setting. One of the central issues in introducing a new form of technology in the public space is people's uncertainty regarding how to interact with it. One factor, which needs to be taken into consideration, is the physical affordance of the interactive display. In our case, installing the large interactive platform as a horizontal surface in a public space encouraged people to walk over and congregate around it in a socially conducive way. People move around it or over it, in a non-hierarchical manner, where each user has the same possibilities for controlling the interaction performance. Moreover, the rubber mat was very attractive as a material especially for children who were jumping and dancing over it for a longer period of time.



Figures 11 and 12: The physical properties trigger various types of interactions.

Figure 13: Top view of the digital platform showing the rubber mats with the blinking LEDs

- **Social proximity**

The social proximity or person-to-person distance has played a profound role in influencing the shape of interactions with other people on the digital platform. The distance was different between strangers compared to that between friends and it seems that this aspect has influenced peoples' perception of their personal space. The interactive media artist Scott Snibbe (Snibbe, 2005) has explored this aspect in more details in his installation Boundary Functions 'Our personal space changes dynamically in relation to those around us'. According to Snibbe the personal space exists only in relation to others.

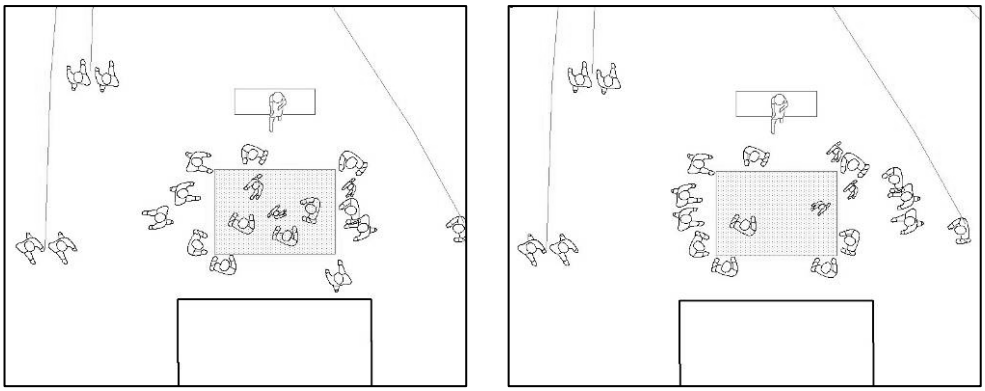

Figure 14: top view of interactions on the digital surface: among friends (left) and strangers (right)

- **Playful use of technology**

We have implemented a digital prototype in the form of a digital screen, encouraging playful use of technology that triggers shared encounters among people. In some cases this was built up amid anticipation as people used relevant prior experience and expectations of a new experience e.g. often people recognized the prototype as a "dance floor" before they interacted with it. We also observed differences between singles and groups behaviour. In a group we see a dynamic flow of interactions. People tend to play with the installation while interacting with of the group members.

Figures 15 and 16: The digital platform as a dance floor. Figure 17: Group interactions among friends.

- **Temporal**

One of the interesting aspects we observed that during the evening session the nature and duration of the interactions were different than those during day time in the same location. Although a few number of people stopped to engage with the installation, during the evening session people tended to be 'themselves' and express different visions about the digital installations. Some of them continued dancing for a long period of time.


Figure 18: Two friend interacting for a long period of time during the evening session.

Figure 19: A man trying to convince his dog to move over the digital surface.

- **Spatial setting**

Our evaluation demonstrated that the physical setting of the built environment had a direct influence on the movement flow of passers-by and the activities taking place near the locations, which in turn had a direct impact on the level and the properties of the social encounter and the shared experience.

Early findings indicated clear differences in the intensity of interactions with the digital surface and with other people in the different locations in the city. This seems to be determined, to some extent, by the spatial configuration of the city.

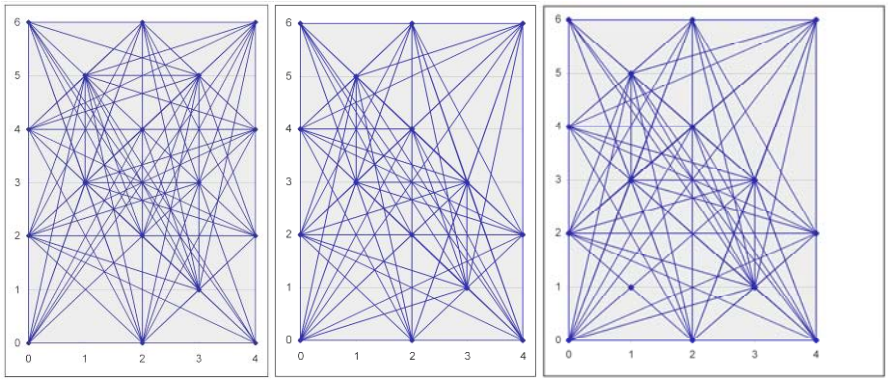

Figure 20: A diagram illustrating pressure pad points and the aggregate path of the movement on the digital platform (Area One, Two and Three). Unlike Area One, in Area Two and Three the platform was mainly accessed from one side, this was due to the spatial setting of the surrounding.

Different types of behaviour were observed in relation to the space properties. For instance, in Area Three (Stall Street), a wide and highly integrated street, which was characterised with fast walking pace people had the tendency to simply glance at the interactive prototype and continue walking in the same pace towards their destination. In contrast, in Area Two (New Bond Street), a highly integrated area with lower walking pace, characterized as being an intersection of more than one pedestrians routes, people tended to stop around the prototype and share the experience with other people around the area. This has varied during different times of the day. This seems to be supported by the temporal and the spatial properties of the physical space. Whyte (1988) in his study of cities found that people will tend to chat the longest in the busiest areas, those areas where there is most visibility, light and people.

Figure 21: in a highly integrated area people tended to stop around the prototype and share the experience with other people. Figures 22 and 23: in a highly integrated street with fast walking pace, most people had the tendency to simply glance at the interactive.

- **The prototype as an urban performance**

During setting up the installation, people started gathering around waiting for the ‘event’ to start. This has created a feel of an urban performance that unfolds in real time. Many people were looking first at the poster that was displayed on the wall next to the digital installation. Although the poster was not related to our study but it seems that people tend first to look for information before deciding to engage with it.



Figures: 24, 25 and 26: Installing the digital stage created a feel of an urban performance people were gathered around waiting for the 'event' to start.

5.1 Limitations of the methodology

During the test sessions many people have commented that it was not easy to understand what the system was doing. This has raised a few issues in relation to three aspects: software, hardware and the presentation of the prototype in the social environment.

- The software does not allow many people interacting with it at the same time, the blinking/lights only respond to one input at each time. Also because of the way the sensors are distributed it wasn't always possible to detect the accurate position of the user.
- The hardware posed some limitation caused by the low brightness of the LEDs. As a result during a sunny day, the LEDs were not always visible.
- Prototype: The size of the prototype was rather small for the urban scale. Therefore in some locations such as Area One (The River Side) it wasn't immediately possible to trigger a real impact on the social surrounding. In this regard, the size of the LEDs surface was a weak point. For instance in Area One many passers-by did not realized that the prototype was there and in Area Two it was not big enough to host interactions between large number of people at the same time.

Because of these issues the evaluation sessions were sometimes accompanied by technical glitches and inconsistencies, and it was clear that these hindered users from interacting and engaging with the system and the other people around. Having said that, many users found the system both enjoyable and to offer a potential for engaging with other people that happen to be at the same spot and it seems that if technical and human factors barriers can be overcome, the introduction of digital interactive media in this form in the urban space may lead to a diverse type of social interactions supported by a playful use of technology that triggers shared encounters among friends, observers or strangers and it seems that the ability of an urban interactive platform to encourage and enhance social interactions depends on dynamic interconnections of elements including the social setting and the temporal dimension, where it is

located, the type of audience and cultural background, the affordance of the prototype, and the affordance of the environment in which it is located.

6 CONCLUSIONS

In this paper we described initial findings from the deployment of a digital installation in various locations in the city. The aim is to create a novel urban experience that triggers social interactions among friends, observers or strangers. The installation is implemented in the form of a digital urban screen, embeded in the physical surrounding, and acting as a non-traditional interface and a facilitator between people and people and people and their surrounding.

In our study an attempt was made to map and understand shared social encounter mediated by digital technologies and to establish the relation to the spatial properties of the surroundings. Our investigations suggest that the success of implementing a large interactive display in the urban environment depends on the properties of the digital platform and on the external factors relating to the social, temporal, and physical settings of the surroundings.

We have presented a digital prototype that was implemented in three locations in the city. These locations differ in the way they relate to the built environment and the way they construct users' relationships to the surrounding. While demonstrating differences in how users' intention to interact and their awareness of the various interactions have influenced the type of shared interactions, our prototype illustrates an approach to facilitating and encouraging shared encounters in the city.

Our initial evaluation suggests that introducing a change in an area within the urban space, by setting up the digital platform, made people aware of the existence of other people in the same area. This can possibly influence their behaviour or provide a motivation to change the way they communicate and engage with others, generating diverse and rich shared encounters.

In this paper we have demonstrated a prototype that explores the role of technology in supporting social encounters within the surrounding environment. The example we described here investigates the relation between the type of shared encounter and the spatial and syntactical properties in a city context.

The prototype supported the spatial configuration in which it was embedded, and was similarly affected by it. What about the city as a whole? Could digital technologies re-create a sense of collective place and a kind of belonging? Considerably more research is required in order to inform the understanding the relation between new pervasive technologies and the urban realm. As part of our ongoing work we are trying to address a number of issues that came up through our study. Specifically, we are exploring how digital interactions can alter the experience of the urban space itself.

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