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Urban Playfulness: Fostering Social Interaction In Public Space

Robert Praxmarer, Thomas Wagner

MultiMediaTechnology, University of Applied Sciences Salzburg

Abstract

In this paper we present our perspective on the role of playfulness regarding large scale, interactive floor projections in urban public space. We start with a model to identify the key elements and their interplay within this experience design space. This model will develop a deeper understanding of the design space in order to act as being a conceptual tool for creating interactive projects. We discuss the potential of playful projects to reconfigure public space in terms of the performative and motivational aspects of play. We conclude with our findings from observing playful projects built or supported by our research team.

1 Introduction

"Public space is our open-air living room, our outdoor leisure centre." (Lipton, 2002)

This open, collectively owned space provides a neutral ground for social interaction and hence is a space of possibilities for playful engagement and communication. However, for the younger generation the internet and mobile communication increasingly fulfill these roles (Rogers et al., 2011). Youths might rather sit on a park bench talking and playing with someone miles away, looking at a small screen, rather than engaging with the space or people around them.

As research group[1,2], we believe that squares and parks are deeply social (Lefebvre, 1991). They are not just pure geometric spaces: they become meaningful through interaction and context. A look into the history of public squares (Sitte, 1901) reveals their varying functions – e.g. political, economic and social. These are subject to constant and substantial change. Small markets where local goods were traded now become arenas for interactive advertisement via public screens. Commercialization is on the verge of ruining this experiential space. As media artists and researchers we want to contribute these thoughts and findings to discussions on how to shape the appearance and function of urban public space in the near future. The number of people working and living in urban areas is bigger than it ever has been and new technologies offer exciting opportunities to create novel experiences in urban public

[1] PELS (Pervasive Experience Lab Salzburg), http://www.pels.at
[2] CADET (Center for Advances in Digital Entertainment Technologies), http://www.cadet.at

spaces, while pervasive computing and mixed reality provide new visions on how to blend these experiences with our everyday life. We try to leverage technology to reconfigure public space in a dramaturgic, respectively game design space and thereby stimulate social interaction and communication.

In the following sections we will discuss our perspective on urban playfulness and urban public space as a design space, and later analyzing prototypes and experiments in terms of their implication, success, and challenges.

2 Urban Playfulness

In our work we interpret urban playfulness as broader than the mere act of playing a game. We consider interactive artworks or reactive musical instruments with less rigid structures also playful. Salen and Zimmerman (2003) define play as *free movement within a more rigid structure*. This relates to Huizingas understanding of play (Huizinga, 1949) as an integral part of human culture, not only associated with games, but e.g. also performing arts, literature and religion. Designing playful experiences in public space however entails different challenges in comparison to designing games for computers, or installing interactive artworks in a confined space like a gallery or the living room. In order to get a better understanding of the design space, key elements and their interplay were identified. The elements found were: the space itself [S], the people currently inhabiting it [P], not to be confused with just the active players, the rules [R] implied by society as social rules and the rules in the context of the individual person (in our case the game/interaction logic). Together these components form a dynamic system, in which interaction and behavior [I] is shaped by the mentioned elements in an evolving feedback system. What we describe is a transformation process, triggered by a change in context involving all three elements.

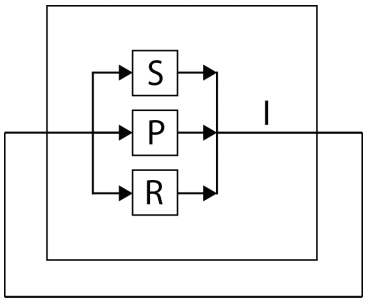

Figure 5: Key elements within the urban public design space.

2.1 Space

This basic model is greatly inspired by Goffman (1966), from a sociological point of view, and Gehl (2003), from an urban design perspective. Both note that the environment (in our model defined as space) significantly shapes the interaction that occurs in public space. Public space can facilitate varying forms of activities, which Gehl groups in three categories,

namely necessary activities, optional activities and social activities. While necessary activities are compulsory and will take place under almost any condition, optional and social activities are influenced by spatial conditions enabling or constraining certain behaviors or interaction. We see space as the geometric structure including visual and auditory displays, but not the context or social meaning, which is in accord with studies in HCI (Akpan et al., 2013; Harrison & Dourish, 1996). It becomes evident that this quality of public spaces itself is an essential element of the dynamics shaping interaction and behavior in public space.

2.2 People

Another influence for our model was the research conducted in the human-computer interaction domain regarding large-scale public displays (Müller et al., 2010) and collocated interaction (Voida & Greenberg, 2009). Müller et al. describe the various interaction phases in the form of an audience funnel, which is similar to the contextual awareness model and the roles offered by pervasive games as discussed by Montola and Waern (Montola & Waern, 2006) extending Reeves et al. model for designing the spectator experience (Reeves et al., 2005). The audience funnel is a fine grained model which consists of (1) passing by, (2) viewing and reacting, (3) subtle interaction, (4) direct interaction, (5) multiple interaction and (6) follow up actions. In contrast Montola and Waern introduce the following roles: (1) active participation as a player, (2) participation, but not in a direct player role, (3) spectatorship and (4) refusal. Taking only the player/user experience into account is definitely shortsighted. Voida & Greenberg, who discuss the role of the game console as a computational meeting place, come to a similar conclusion. They point out that due to the often diverse individuals participating, games need to provide different modes of gameplay and should *foster audience participation or an otherwise enjoyable audience experience*. For projects on public squares as a design spaces, multiple levels of engagement and interaction need to be taken into consideration.

2.3 Rules

Beside the space itself and the people inhabiting it, also the rules are an important element in this dynamic system. As mentioned earlier, there are social rules and rules that belong to the context the individuals are acting in (Goffman, 1959). Creating a game or playful installation means bringing a change to the context that people are interacting in through introducing new game/interaction rules to the system. The characteristics of these rules are essential. Rules that are easily explored and understood and that result in a discernible outcome offer an invitation for those willing to play and spectate. An important thing to remember is the collocated nature of public space. Offering just a single-player experience with short game sessions is one solution for gameplay in a collocated interaction space (Voida & Greenberg, 2009). Another option is to offer a multi user/player experience, which we will discuss in Chapter 5 in regards to our experimental prototypes.

2.4 Summary

In reality public space is highly complex: the space underlies exterior transformations e.g. weather and time and people belong to different groups in terms of motivation and engage-

ment, so the game/interaction rules should ideally reflect this heterogeneity. The main questions which arise from this configuration are: (1) How to design rules for installations and games in a way that people become active players/users? (2) How to deal with non-players or passive observers? (3) How to stimulate engagement and long-term motivation? (4) Which modalities can increase social interaction and communication?

3 Designing for Performative Play

"All game play is performance. There is no gaming without performance." (McGonigal, 2005)

Performative play is our weapon of choice and a key to understand how playfulness offers different levels of engagement, while fostering the transition from passer-by to observer and from observer to player. McGonigal is not the only one arguing that game play has an inherent performative aspect, but this can be found in a variety of domains ranging from psychology (Bateson, 1955), sociology (Huizinga, 1949) and game studies (Bogost, 2008; Salen & Zimmerman, 2003; Wardrip-Fruin & Harrigan, 2004) to performance studies (Dixon, 2007; Schechner, 2006). There is an in-game performance that relates to the role of players both as performer and audience, but more interesting for us is the out-of-game performance. There are clear indicators for play as performance. On one hand, there are e-sport events, where computer game matches are broadcasted live and players earn respective prize money and gather a loyal fan base watching them - the performance is a show of attained skills. On the other hand, there are games like Dance, Dance, Revolution or Guitar Hero and game controllers ranging from the Wii-Mote motion sensor to the Kinect full-body tracking that foster theatrical performances. *"Guitar Hero and Rock Band are deeply theatrical by design and many players choose to enhance that theatricality in their gameplay. […] a parody of rock authenticity."(Miller, 2009).* The performance is mimetic play and a form of creative expression.

The act of playing creates a framing (Huizinga, 1949), which is commonly referred to as the magic circle (Salen & Zimmerman, 2003). Play needs to be recognizable to create this protective and liberating framing. It provides the players with a certain degree of freedom, different to the role Goffman (1959) points out, which people impose on themself restricting their behavior in public space. To support performative play the space needs to be reconfigured, so that play becomes obvious and the connection between play and its outcome is clearly visible.

4 Designing for Long-Term Motivation

Things that are pleasurable keep us engaged and motivated. Researchers at Nokia Research introduced PLEX the pleasure experience framework (Arrasvuori et al., 2011), which is based on the framework created by Costello and Edmonds (2007). Both frameworks are conceptual and evaluation tools for playful experiences with interactive applications and products. They built up on theory ranging from psychology (e.g. Csikszentmihalyi's flow theory) and philosophy (e.g. Callois) to game design (e.g. LeBlanc). While Costello and

Edmonds relate their framework to interactive artworks, the researchers from Nokia tried to widen the approach to interactive products in general. The results are categories that contribute to a pleasurable, respectively playful experience. Here the list from the most recent publication (Arrasvuori et al., 2011): Captivation, Challenge, Competition, Completion, Control, Cruelty, Discovery, Eroticism, Exploration, Fantasy, Fellowship, Humor, Nurture, Relaxation, Sensation, Simulation, Submission, Subversion, Suffering, Sympathy and Thrill. We were interested, which of those categories contribute to long-term motivation for games and playful installations in public space and will discuss this after presenting our experimental prototypes.

5 Experimental Prototypes

There are already a great variety of projects, experiments and prototypes dealing with playful interaction in public space, including art projects, games and commercial applications like playful tourist guides. A lot of research has been done in the field of pervasive games including the IPerG (Integrated Project on Pervasive Gaming), an EU funded project. In terms of interface and technology we see three directions concerning playful interaction in large public space, which can also be combined: (1) Mobile and wearable personal devices are an inherent part of our everyday life. Mobile phones have been successfully incorporated in experimental and commercial projects ranging from location-based services to multi-player scenarios adopting public space as a narrative or playful space (Ballagas, 2006; Benford et al., 2006; Brown et al., 2005). (2) The public space with its public displays, media façades (Fischer & Hornecker, 2012) and open spaces for projections offers new means for interactive experiences. (3) Physical computing provides new multisensory experiences in public space and real physical manifestations, which do not rely on light conditions (hence the time of day) in the way projection systems and media façades do. Regarding interaction paradigms that support urban playfulness we identified presence in space, movement, full-body interaction, gestures and facial expression, remote interaction via mobile and wearable devices and physical interaction with any sort of mechanism. Voida and Greenberg (2009) mention that players preferred gestural and physical input devices over button-based input devices and suggest an intuitive mapping in a collocated design space.

This research project has focused on large-scale projections, creating interactive façade and floor projections. While we created several interactive façade projections with the Kinect as single user experience, this paper will focus on multi user, interactive floor projections in this paper. To create these games and installations, we developed a low-cost tracking system for use in large public space areas (> 100m^2) based on thermal imaging technology, which can be used in conjunction with projections. The concept of the LinkedDots System was to create digital playgrounds (overlays) on public squares, and has been presented in an earlier paper (Wagner, 2012). We imagined it as a system that invites people to collaboratively explore and play. The people interact with the system by means of presence and movement. To enable more complex scenarios, our main challenge was to create a robust tracking, which provides consistent IDs for the people within the interaction area. Leaving removes the player's ID and when re-entering a new ID is assigned by the system.

Figure 2: LinkedDots System. Camera and Projector mounted above (left). GUI of the tracking (right).

5.1 Reactive Visuals

During Schmiede[3], a media art festival in Hallein/Salzburg, Austria, we offered a workshop with our tracking and projection system. Several reactive visuals were created and the user's position was used as input parameter. On the users' position meta-ball objects magnified the texture of the visuals and a slight trail marked their paths. The rules of interaction with the visuals were quite simple and the visuals indeed an eye-candy, so people were attracted to explore them, but just for a very short amount of time (2-3 minutes). The expressiveness of the interaction in this scenario was very limited, so performative play could not emerge. The rules did not incorporate a connection of some sort between the participants, which resulted in a lack of social interaction and communication. These simple reactive systems are not enough to keep participants engaged and the audience entertained.

5.2 Fragments

Fragments is an audio-visual installation that was created for a public square as part of the foundation event of the "Salzburger Hochschulkonferenz". People within a defined proximity form clusters, which are reflected by visuals and sound. The system assigns a different fragment (sound generated e.g. birds or water drops) to each of the clusters. The sounds' position in the multi-channel audio environment is determined by the central positions of the clusters. The density of the cluster controls the frequency of occurrence and pitch of the sound. The variance of the sound within each cluster is controlled by the sum of motion within the cluster. The maximum motion vector in the scene controls the intensity of the beat, accompanying the sound fragments.

The visible connection of the people in the clusters worked quite well and people started to collaborate. They realized that the maximum motion controlled the beat, but could not figure out how the sound fragments (clusters) worked in detail. The link between the action (repositioning) and its effect (auditory) was not clear to them. This lack in control hindered expressiveness. Overall we observed a slight transformation process and people mentioned, that they loved the idea and would like to see such things to happen more often. The most challenging part in the design was to create a discernible mapping between the cluster properties and the sound. In an interactive audio-visual dance performance, created later, we used a

[3] http://www.schmiede.ca/

similar system, but reduced the complexity of the mapping. We used very distinctive sound samples, where we connected the maximum motion vector of the cluster nodes to the speed of the playback, which also influenced the pitch. The density was mapped to an echo effect. After the performance, we invited the audience to play and observed an increase in performative play and mean residence time.

To sum it up, curiosity, exploration and collaboration can contribute to long-term motivation, when the rules (mapping) are simple and discernible. Audio installations, resembling a musical instrument are challenging to create, because on one side they need to be easy enough to understand and learn in a very short amount of time and on the other complex enough to enable expressiveness.

Figure 3: People exploring fragments (left). People playing Absorbit at Schmiede 2012 (right).

5.3 Absorbit

Absorbit is a multiplayer movement based game built by Adam Awan (an artist from the UK) and Rene Baumgartner (a student at our MultimediaTechnology program). An orb follows each player, which is growing as the player absorbs stars and smaller players. The game ends when one player accomplishes to reach a certain size of his or her orb. Once out of the game, people can either wait for the next round or start anew by exiting and re-entering the game area. There is no constraint for people to join a round, which has already started. There are clear roles of fleeing and hunting defined by the simple rules of the game. Absorbit was installed at several locations and proved to be a very captivating project, mainly due to the following reasons: (1) The barrier of entry was lowered due to the simple set of rules of the game. (2) The game consisted of short but intense sessions with immediate feedback. (3) The competitive character of the game fostered long-term motivation. It is a good example of meaningful play, which Salen and Zimmerman define as follows: *"Meaningful play occurs when the relationship between action and outcome in a game are both discernible and integrated into the larger context of the game."* (Salen & Zimmerman, 2003) The players were quite enthusiastic about the game. The majority of the people played several times. The audience gathered around the interaction area watching others play.

Reflecting on the design and development process, the game was comparatively easy to create and balance. Competitive play offers a distinct opportunity to transform the context of a public square, to become a playful gathering.

5.4 Findings

In the process of conceptualizing, creating, staging and later discussing our own work with players and spectators, we realized that the categories presented in the PLEX framework can be applied to playful experiences in large public spaces. How people interact in public space is affected by the very fact that they share the same space with others. In this regard Hall (1966) discusses the concept of proxemics, dividing the area around individuals into zones, which reflect the level of intimacy in relation to others. These zones define some sort of personal bubbles that individuals build around themselves. Both competitive and collaborative play provide different means to invite people to let their personal bubbles burst, which liberates them to get in touch with each other. To foster long-term motivation in multi user public space settings, competition, exploration and collaboration (fellowship in the PLEX model) are strong ingredients. Overall Absorbit was the most successful project in terms of long-term motivation, but collaborative and expressive audio installations have a high potential for performative play and create potentially interesting settings for the audience.

6 Conclusion

In this paper we presented a model framing key elements of interaction in public space: space, people and rules. We analyzed in which respects playfulness can contribute in reconfiguring this experience design space. The performative aspect of play invites people to spectate and participate by offering different levels of engagement. This can be achieved by taking the different roles into account, when designing interactive applications for large public spaces and by reconfiguring the space in a way that supports performative play. By adding new rules for interaction and play, to enhance competitive, collaborative and explorative aspects, long-term motivation and social interaction can be fostered. Currently we are investigating the possibilities that arise from the usage of physical computing, to create interfaces that promote collaborative engagement with real world objects in public space. We started working on concepts for interactive fountains and physical interactive artworks.

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References

Akpan, I., Marshall, P., Bird, J., & Harrison, D. (2013). Exploring the effects of space and place on engagement with an interactive installation. *Proc. of the SIGCHI Conference on Human Factors in Computing Systems - CHI '13*, 2213. New York: ACM Press.

Arrasvuori, J., Boberg, M., Holopainen, J., Korhonen, H., Lucero, A., & Montola, M. (2011). Applying the PLEX framework in designing for playfulness. *Proc. of the 2011 Conference on Designing Pleasurable Products and Interfaces - DPPI '11*. New York: ACM Press.

Ballagas, R. (2006). *REXplorer: A mobile, pervasive game for tourists*. *Citeseer* (Vol. 1, p. 5).

Bateson, G. (1955). A Theory of Play and Fantasy. *Steps to an Ecology of Mind*.

Benford, S., Crabtree, A., Reeves, S., Sheridan, J., Dix, A., Flintham, M., & Drozd, A. (2006). The frame of the game: Blurring the boundary between fiction and reality in mobile experiences. *Proc. of the SIGCHI conference on Human Factors in computing systems* (pp. 427–436). Montréal: ACM.

Bogost, I. (2008). Persuasive Games: Performative Play. *Gamasutra Features*. Retrieved January 18, 2013, from http://www.gamasutra.com/view/feature/3703/persuasive_games_performative_play.php

Brown, B., Chalmers, M., Bell, M., & Hall, M. (2005). Sharing the square : Collaborative Leisure in the City Streets. *Proc. of the Ninth European Conf. on Computer-Supported Cooperative Work* (pp. 427–447).

Costello, B., & Edmonds, E. (2007). A study in play, pleasure and interaction design. *Proc. of the 2007 conf. on Designing pleasurable products and interfaces - DPPI '07* (p. 76). New York: ACM Press.

Dixon, S. (2007). *Digital Performance: A History of New Media in Theater. Dance, Performance Art and Installation.* Cambridge: The MIT Press.

Fischer, P. T., & Hornecker, E. (2012). Urban HCI. *Proc. of the 2012 ACM annual conference on Human Factors in Computing Systems - CHI '12* (p. 307). New York: ACM Press.

Gehl, J. (2003). *Life Between Buildings: Using Public Space*. Copenhagen: The Danish Architectural Press.

Goffman, E. (1959). *The Presentation of Self in Everyday Life*. (E. University Of, Ed.)*Teacher* (Vol. 21, p. 259). New York: Doubleday.

Goffman, E. (1966). *Behavior in public places: Notes on the social organization of gatherings*. Simon and Schuster.

Hall, E. T. (1966). *The Hidden Dimension*. (Anchor Books Doubleday, Ed.)*The Hidden Dimension* (Vol. 6, pp. 94–94). Doubleday.

Harrison, S., & Dourish, P. (1996). Re-place-ing space: the roles of place and space in collaborative systems. *Proc. of the 1996 ACM conference on Computer supported cooperative work - CSCW '96* (pp. 67–76). New York: ACM Press.

Huizinga, J. (1949). *Homo ludens: A study of the play element in culture*. London: Routledge & Kegan Paul.

Lefebvre, H. (1991). *The Production of Space*. (D. Nicholson-Smith, Ed.)*Production* (Vol. 9, p. 454). Blackwell.

Lipton, S. (2002). *The Value of Public Space*. York.

McGonigal, J. E. (2005). All Game Play is Performance: The State of the Art Game.

Miller, K. (2009). *Schizophonic Performance: Guitar Hero, Rock Band, and Virtual Virtuosity*. *Journal of the Society for American Music* (Vol. 3, p. 395).

Montola, M., & Waern, A. (2006). Participant roles in socially expanded games. *Online Proceedings of the Third International Workshop on Pervasive Gaming Applications*

Müller, J., Alt, F., Michelis, D., & Schmidt, A. (2010). Requirements and design space for interactive public displays. *Proc. of the international conference on Multimedia - MM '10* (p. 1285). New York: ACM Press.

Reeves, S., Benford, S., O'Malley, C., & Fraser, M. (2005). Designing the spectator experience. *Proc. of the SIGCHI conf. on Human factors in computing systems - CHI '05*. New York: ACM Press.

Rogers, Y., Sharp, H., & Preece, J. (2011). *Interaction design: beyond human-computer interaction* (3rd Ed.). John Wiley & Sons.

Salen, K., & Zimmerman, E. (2003). *Rules of play : game design fundamentals.* Cambridge: MIT Press.

Schechner, R. (2006). *Performance studies: An introduction* (2nd Ed.). New York: Routledge.

Sitte, C. (1901). *Der Städtebau nach seinen künstlerischen Grundsätzen*. *City Planning According to Artistic Principles* (4th ed. re.). Basel, Boston, Berlin: Birkhäuser.

Voida, A., & Greenberg, S. (2009). Wii all play: The Console Game as a Computational Meeting Place. *Proc. of the 27th international conference on Human factors in computing systems - CHI 09* (pp. 1559–1568). New York: ACM Press.

Wagner, T. (2012). Urban Playfulness: Creating novel experiences in an urban environment. In K. Mitgutsch, J. Wimmer, & H. Rosenstingl (Eds.), *Applied Playfulness - 5th Vienna Games Conference -FROG11.* Vienna: Braumüller Verlag.

Wardrip-Fruin, N., & Harrigan, P. (Eds.). (2004). *FirstPerson: New Media as Story, Performance and Game*. Cambridge: The MIT Press.

Contact

Mag. Thomas Wagner,
University of Applied Sciences Salzburg, Urstein Süd 1, 5412 Puch/Salzburg, Austria
thomas.wagner@fh-salzburg.ac.at, http://www.fh-salzburg.ac.at/