

SPACE ON EARTH

A SOUND BASED
LOCATION AWARE
MOBILE GAME CONCEPT
INCORPORATING PHYSICAL
ACTIVITY FOR CHILDREN IN
THE AGE BETWEEN 10-14
YEARS

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Abstract

This thesis has proposed the design of a Location Aware Mobile Game (LAMG) concept in the genre of serious games incorporating physical activity for children aged 10-14 years. The design project was framed by the methodology of Research through Design. Using this methodology the project has had two overall foci: 1) A practical well documented design project rooted in the user- and player centered design approach from the fields of interaction design and digital game design, drawing theoretically on the fields of LAMG design and research, game and play studies, game sound design and a phenomenological understanding of computation and bodily movements, and 2) Through the design process to derive a set of research contributions relevant to designers and researchers within the fields of study.

The motivation behind the project has been the decrease in children's (aged 10-14 years) physical activity level, which several surveys point to partly is caused by the increase children's use of computer games. So far most research and commercial attempts to solve these problems of children's increasing level of inactivity have been on developing physical game controllers like the Wii and Kinect. This thesis proposes an alternative solution in the combination of computerized gaming and physical activity by approaching this design challenge from the angle of mobile and location aware gaming situated in urban physical space. Still not much attention has been given to the possibilities of Location Aware Mobile Games (LAMG) as a means to increase the physical activity level in this age group and no commercial attempts in this regard has been successfully launched. By drawing theoretically and empirically on the urban physical play form parkour in a user-centered design process empirically informed by a sequence of game design workshops with three 5th grade classes from Tove Ditlevsen Skole in Vesterbro in Copenhagen, this thesis arrives at a game concept using physical activity as a core game mechanic as well as a set of research contributions relevant to designers and researchers who wishes to design, evaluate or do research in the field of location aware mobile technologies and games. The LAMG concept proposed in this thesis points toward possibilities to successfully develop alternative solutions for raising the aforementioned activity level.

A distinct difference between screen based computer games and LAMGs is the pervasiveness, or as argued in this thesis a distribution and separation of game space and game interface in LAMGs. The findings in this thesis point to how this distribution and separation of the game space and game interface in LAMGs pose different challenges and possibilities for LAMG designers and researchers, as well as to how LAMGs are perceived and understood by the players both pre-reflective and reflective.

Changes to the Original Project Agreement as Written in the Course Base

The description and headline of this thesis have been changed slightly from the original description and headline in the course base in that:

- The design goal has changed from being an implemented educational game design within the PlayingMondo project and platform, to be a serious game concept promoting physical activity withdrawn from the PlayingMondo project. Reasons hereof are several:

It turned out that the PlayingMondo software was lacking important sonic possibilities and had a range of disadvantages for working with sonic features as well as with an overall dynamic gameplay. The PlayingMondo platform requires no programming skills or prior knowledge of design or digital game development for anyone to be able to use the platform. Unfortunately this choice in design has led the platform to be a highly rigid tool to use. Meaning that there is little room for tweaking of any parameters including few possibilities for working with a dynamic soundscape. The lack of possibilities for a dynamic sound design and sonic features made it unsuitable for my project of designing for a sound based interface. I therefore disregarded the software as a prototyping tool as well.

Because I had withdrawn my project from the PlayingMondo project I was no longer under the constraint of designing within the frames of that project. I therefore found it more interesting to work with the combination of physical activity and play with the possibilities within Location Aware Mobile Games (LAMGs), as this combination has not yet been explored as a serious alternative to screen based computer games aimed at raising children's physical activity level.

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1 Introduction

Two boys are strolling down the street on their way home from school. They pass an old bunker from 2nd World War. The bunker is open. The boys look at each other and smile while they pick up their smartphones. “This could absolutely be a great hiding!” says the tallest of the boys. His name is Marcus, the other boy is called Goffe but his real name is Christopher. “Is it reported yet?” asks Goffe. “Let’s see. We’d better check in to see if it is. Put on your earphones, we’ll check in together in case there are any missions going on round here.” The two boys check in to the Location Aware Mobile Game Space on Earth and set their status to ‘ready’. A moment later the phones get a high bip with a message from two of their friends, Rasmus and Sille. The friends, who are positioned around the corner, are outnumbered in a chase of a group of Artesurions and request help. Marcus and Goffe can hear the battle between the friends and the Artesurions going on through their headphones and they run off to assist their friends. Meanwhile, they get a call from the Office (for Extraterrestrials Affairs): “Alert, alert. Incoming unauthorized Artesurion space ship. Marcus, Goffe, Rasmus and Sille, it is in your area. You must prevent the Artesurions from getting in that space ship. All resources available are permitted!”. The two boys run off to meet their two friends. By following the guiding sound in the headphones, they arrive at the nearby square just in time. Yes, Rasmus and Sille are clearly in a battle. They are waving their arms around themselves using their smartphones to stun the Artesurions, who are trying to escape in the space ship that is about to land. Sille shouts to Marcus and Goffe: “Help me get a shield up! The space ship must not land! You cover that side, and be aware of all the trees in the way! Rasmus, cover me!” And so begin yet another set of missions for the secret agents to keep the control of extraterrestrial affairs on Earth.

This thesis proposes a game concept of a sound based Location Aware Mobile Game (LAMG) promoting physical activity for children aged 10-14 years. As such this thesis is based within the game genre of serious games, which in short comprises of games that are designed for other purposes than purely fun. Several studies and designs of LAMGs have pointed toward LAMGs’ potential as serious games (Matjeka, 2011, Admiraal, Akkerman, Huizenga and Zeijts, 2009, see also: Saarenpää, 2009, Martin, 2009). The field of serious games includes games designed for, for instance, marketing purposes or other rhetorical purposes such as education, providing information, doing tests, or promoting exercise - the latter being the underlying purpose of the game concept described in this thesis.

LAMG's are mobile digital games merging physical world locations with game mechanics and –narratives into new forms of urban play and games, using the smartphone situated in the urban physical world. One of the distinct differences from traditional screen based computer games is that LAMGs are games and play forms situated in urban physical space. The study done in this thesis focuses on how LAMGs can contribute to the range of computerized games where physical activity is a core part of the gameplay, and as an alternative to the console computer games like the Wii and Kinect in the range of welfare products.

The work in the design process also led to a set of research contributions relevant to the field of LAMG design and research. Thus, besides proposing a serious game concept incorporating physical activity, this thesis proposes a set of findings relevant to the field of LAMG design and research, as well as related studies from the field of mobile communication, interaction design and sonification.

1.1 The Break

Computer games, television and other digital media play a large role in children's lives today, binding children to physical inactivity in front of screen-based devices. Several solutions, combining computer games with physical activity, are addressing this issue with commercial success, such as the Wii game console from Nintendo¹, the Kinect for the xBox from Microsoft² and Playstation from Sony³. Nonetheless, recent research in this field indicates that the level of physical activity of children aged 11–15 years is still decreasing significantly (Sundhedstyrelsen, 2010; Pilgaard, 2007).

The two most important and recent publications in the field of sports and physical activity focused on children in Denmark are the Danish Office of Health's (Sundhedstyrelsen) *Undersøgelse af 11-15-åriges livsstil og sundhedsvaner 1997–2008*⁴ (Sundhedstyrelsen, 2010) and Institute of Analytics of Sports' (Idrættens Analyse Institut) *Danskernes motions- og sportsvaner 2007 - Nøgletal og tendenser*⁵ (Pilgaard, 2007). Both reports point out a significant drop in

¹ <http://www.nintendo.com/wii>

² <http://www.xbox.com/da-DK/Kinect>

³ <http://dk.playstation.com/>

⁴ <http://dk.playstation.com/>

⁴ Survey of Lifestyle and Health Habits of the 11–15 year olds 1997 - 2008

⁵ The Exercise and Sports Habits of the Danes 2007 – key figures and trends

activity level at the age of 11 to 12⁶ (Pilgaard, 2007, p.35; Sundhedstyrelsen, 2010, p.44). In the report from Sundhedstyrelsen, the drop in activity level match an increase in the average time spent in front of the television or the computer - a point emphasized by the authors (Sundhedstyrelsen, 2010, p.44). The report from Sundhedstyrelsen suggests that there is a direct link between the decrease in physical activity level and the increase in the children's use of television and/or computer by the age of 11⁷. These numbers point to a tendency of that the increased time of children's use of television and/or computer at the age between 11 and 12 years happens at the expense of time spent on physical activities. In other words, children's lack of physical activity at the age of 12 is partly because of time spent on television and computer usage. This distinct tendency and drop in physical activity level in the children's lives, I shall in the following refer to as the *break*.

The break highlights the large role, computer and computer games have in the lives of children today and point in the direction of exploring solutions to increase the level of children's physical activity by combining computer games with physical activity. As stated above, several solutions in this direction have already been developed. Nonetheless the problem persists. Another solution with the potential of combining physical activity with the qualities of computer games is Location Aware Mobile Games (LAMG). This combination of physical activity with computation for the particular age group between 10-14 years has of yet been scarcely explored. Therefore, this thesis is doing exactly that.

1.2 Computerized Games in the Physical World

In contrast to screen based computer games where fully imaginary worlds are created and navigated in isolation, LAMG's use physical world settings wherein a digital game layer is created (de Souza e Silva, 2008, p. 405). Thus the players must relate to the real surroundings as well as to the digital game layer. For this purpose, a visually based interface is not the optimal solution, as it will limit the players visual orientation in the physical world. In addition, vision also functions as a main ingredient in one's ability to move physically freely. To move freely is a premise in the development of a serious LAMG concept for physical activity.

⁶ The specified number is from the 2008 survey from Sundhedstyrelsen. The same survey from 2006 states the jump was at the age of 12 to 13, which is also the age found in the 2007 survey from Idrættens Analyse Institut (Sundhedsstyrelsen, 2010, p. 44; Pilgaard, 2007, p.22).

⁷ Figure taken from the 2008 survey. In the previous surveys from the two reports the age of the break was found to be a year later - i.e. age 12.

To elaborate on the above issues when occupying the visual senses, the research team from Georgia Institute of Technology Vadas, Patel, Lyons, Starner and Jacko (2006) is arguing for the use of auditory displays instead of visual displays in mobile technologies (p. 225). In a comparative experiment with participants using a visual and an auditory display, the authors found the auditory display as less demanding to manage while moving (p. 225). Prior research in the fields of mobile and location aware gaming as well as game sound design point toward design explorations centered round sound as possible directions to designing new gaming concepts and experiences (Reid, Goelhoed, Hull, Cater and Clayton, 2005; Mäyrä & Lankoski, 2009; Hug, 2011; Liljedahl, 2011).

The auditory sense is, like the visual sense, an important ingredient for the human navigation and orientation in real physical world settings. Because the auditory sense is omnidirectional, utilizing this sense for primary interactions will not limit the player in focusing on the surroundings the same way as the visual sense. Among the few studies of sound based LAMGs is the game design *Songs of the North*, a research project focused on the use of sound in LAMGs by Mäyrä and Lankoski (2009) and Ekman, Ermi, Lahti, Nummela, Lankoski and Mäyrä (2005) at the University of Tampere, Finland. Through the work with the design Mäyrä and Lankoski (2009) argue: "(...) when important information about the game world is accessible via sounds, players can still visually scan the everyday environment." (Mäyrä & Lankoski, 2009, p. 141). Studies and design work with a focus on sound as the main interactional space is scarce, and yet these few studies of sound based interaction in mobile technologies point to better user experiences.

Returning to LAMGs as a digital layer superimposed upon the urban physical world: LAMGs are situated in urban physical space and therefore share similarities with other urban play forms such as the French urban and highly physical play form parkour. Parkour is an urban play form based on principles from gymnastics, running and martial arts. Taking a closer look at the numbers in *Danskernes motions- og sportsvaner 2007 - Nøgletal og tendenser*⁸ (Pilgaard, 2007), sports like gymnastics, jogging and martial arts are popular sports among both genders, thus highlighting the connection between LAMGs, parkour and the target group of children in the age around the break. In addition, parkour, as an urban play form, also provides an understanding of LAMGs, because of the similarities between the two as both emphasizing physical movement, exploration and bodily appropriation in urban

⁸ The Exercise and Sports Habits of the Danes 2007 – key figures and trends

physical space (de Souza e Silva & Hjort, 2009, p.2). The challenge, then, was: How to combine the entertainment and engagement as found in computer games with elements from parkour into new forms of play and physical activity in the design of a sound based LAMG concept?

1.3 The Study, Design Goal, and Research Questions

Through a player/user-centered design process situated within the research through design methodology, this study is based on empirical data from a sequence of game design workshops with three 5th grade public school classes (participants aged 10–12 years) from Copenhagen, observations of parkour practice and a parkour expert interview. The study is framed within the interaction and game design studies and draws on theories from the fields of mobile and location aware communication, LAMG design and research, game and play studies, game sound design and a phenomenological approach to interaction and digital design. I have chosen to draw on theories from physical play studies from the Danish researcher Jørn Møller, because the design process is centered round the physical active play form parkour, and LAMGs as physical active games. Due to the practical and research based reasons for the focus on sound as mediator in the interactional space, I also draw on theories of game sound design. And lastly I draw on the phenomenological understanding of digital interactivity and the bodily appropriation in physical space, to inform this study's emphasis on physicality and physical activity. Because of the lack of previous solutions and/or theory concerning the design of sound based serious LAMGs incorporating physical activity, an exploratory approach to the design process and data gathering was chosen as most appropriate. Therefore this study is based purely on qualitative data and data analysis approach.

This thesis is situated within the academic tradition of research through design. Research through design provides a framework for the designer and/or researcher to conduct a design process and to do research at the same time (Zimmerman, Forlizzi and Evenson, 2007). Through the iterative and dialectic nature of a well-documented design process informed by both empirical data as well as relevant theories from the fields of study, the designer/researcher will arrive at a product and a set of research contributions relevant to the fields of study - in this case the fields of LAMG design and research herein, and also the field of mobile games and communication, game and play studies as well as interaction and digital design.

The design goal of this thesis is thus:

To explore the possibilities for, and to design a sound based LAMG concept implementing game mechanics to raise the level of physical activity for children in the age between 10-14 years.

Sub-questions during the process are:

- I. What are the challenges, as found in the empirical data, when designing an engaging, digitally mediated game and/or play form incorporating physical activity, situated in urban physical space?
- II. How can the final design concept leverage and propose solutions to these challenges in the fulfillment of the design goal as stated above?

1.4 Reading Guide

This thesis is structured round the methodological framework provided, thus starting with an overview of relevant theories to inform about the design situation. Chapter 2 therefore provides theories concerning LAMG design and research, which passes into chapter 3 about computer games and physically active play forms in relation to LAMG as a physically active digital game. Chapter 4 addresses how mobile music listening and game sound design create meaning to and transform an urban player or user experience. Chapter 5 ends the theory chapters and provides theoretical insight to a phenomenological understanding of digital interactivity and the bodily perception of physical movement. Chapter 6, 7, 8, and 9 deal with the whole design process from describing the methodology and methods used in the data collection and data analysis to the rationale behind the design features and how the empirical data analysis and theoretical perspectives have guided and informed the process to arrive at the final game concept proposal in chapter 10. The last two chapters of this thesis concern the concluding remarks and future perspectives.

As argued above parkour was found to be an ideal source of inspiration and information for the design process as the play form combines elements from several of the popular sports among the age group, and in addition is famous from movies such as James Bond Casino Royale, Yamakasi and Breaking and Entering. Before proceeding to the theoretical part of this thesis I shall provide an outline and description of the particular branch of parkour chosen for the design process and why.

1.5 Parkour

“L’art du déplacement-parkour-freerunning, is a physical training methodology and a particular approach and way of thinking about movement and creative spatial mapping. It is a physical and emotional activity that involves using only the body to overcome obstacles (physical and emotional) within a route. This may involve running; climbing; vaulting; jumping; traversing; balancing, or any other physical means to get from one point to another. Some simplify this stating it as finding a way of getting from ‘point A’ to ‘point B’. It is a method that involves learning to overcome one’s fears and limitations by mastering the body-mind-nexus and co-ordination of one’s own movement in any terrain.” (Angel, 2011, p.9).

This brief description, by Julie Angel, taken from in her book and PhD dissertation *Ciné Parkour* (2011), of the urban phenomenon parkour, states the overall role of parkour as being a way of physically appropriating play in the form of exploration of the bodily experience and limits within the urban physical world. Angel’s research is based on a study of and life with the founders of parkour through a period of 6 years. However, a search on Google of the term parkour reveals that the practice of parkour is exerted in various forms around the world from a spare time training platform to a serious sport with competitions like World Championships. The stance of this thesis is to be as close to the original source as possible from the idea that parkour is more of an urban cultural phenomenon than that of a new sport on the same level as any other sport. Therefore I have chosen to focus on the parkour form derived from the founders. According to Mikkel Thiessen from the Danish StreetMovement⁹, Angel’s research is among the only trustworthy retellings of parkour, which is approved and acknowledged by the founders. Therefore I base most of my information on these two sources; Julie Angel (2011) and StreetMovement (2010). As will be reflected in the outcome of this thesis, these sources are found to be of great inspiration, especially because the main goal of this thesis is not to implement a version of parkour in a LAMG, but to establish recommendations to design a LAMG incorporating physical activity for children. For that purpose Angel’s work is very thorough and diverse, which forms a solid foundation for various directions. In the following a brief historical and ideological outline of parkour will be sketched out:

⁹ Mikkel Thiessen is one of the founders of Streetmovement, teacher of parkour at Gerlev Højskole and co-founder of the parkour training education in England, working closely together with Laurent Piemontesi, one of the founders of parkour.

Parkour is a play form that emerged in the outskirts of Paris in the late 1980's by members from the Belle family from the Sarcelles in the North and the Hnautra family from Évry and Lissés in the South (Angel, 2011). While the play form is most widely known as Parkour and the practitioners are called *traceurs*, it goes under several names according to whom of the founders you follow¹⁰. A core component in doing parkour is to use one's imagination, to be creative and to experiment with physical movements as well as how to appropriate these to the surroundings. Though a lot of "standardized" movements have evolved and are now passed on to new participants, each individual participant looks at the environment differently and therefore interacts differently therein, experimenting with their bodies and creating new movements in new places. As explained by Julie Angel: "Parkour is not merely about jumping over walls, despite some common misconceptions, it is imaginative reworking of the existing spatial configurations as well as a reworking of the corporeal and questioning of the self. It is the combination of these elements that creates and allows for parkour to happen." (Angel, 2011, p. 130). She defines this ability as the parkour vision (Ibid, p. 134), and expands on this by viewing parkour as an ongoing dialog between the participant and the environment. Or as Laurent Piemontesi states it in the documentary *City Surfers* by StreetMovement A/S; "It's about how to live with the city." (Laurent Piemontesi in *City Surfers*, 2007, 02.17).

Through their mutual passion, the founders formed a strong community held together by their desire to challenge themselves physically and mentally through their training, "to be strong, to be useful", and always ready. The community and the tight friendship these boys shared were important parts of their training. Many of the boys had a background in other sports such as martial arts and athletics (Angel, 2011, p.15). Together the founders also shared a fascination of super-heroes like Spiderman, X-Men or the Manga figures from Dragon Ball and Dragon Ball Z. A fascination that served as great inspiration for their bodily and environmental exploration (Angel, 2011, p. 30). They learned with and from each other, and though there was a form of competition, it was not among the boys, but within each of them to continually challenge and explore their own physical and mental boundaries.

The elements described in here serve as direct inspiration for the game concept development process as well as a source of information to the field of urban physical game and play

¹⁰ The founders of parcoures (as it originally was called) are, according to Julie Angel's extensive study and mapping of the phenomenon; Phung Belle, Châu Belle-Dinh, Williams Belle, David Belle, Yann Hnautra, Frederick Hnautra, David Malgogne, Sébastien Foucan, David Foucan, Guylain N'Guba-Boyeke, Malik Diouf, Charles Perriere and Laurent Piemontesi (Angel, 2011, p. 295).

forms. I shall throughout the thesis draw on these references to parkour as an urban play form and the particular way of bodily appropriation and understanding in urban space as parkour provides.

2 Location Aware Mobile Games

The field of location-aware mobile games is still not fully matured, which can be seen in the diversity of and disagreement within some common classifications of the various game types combining mobile and location-aware technologies. There are approximately as many categorizations as there are scholars within this field. In order to try to define the boundaries of this thesis' design situation and in pursuit of a state of the art within the field of study, I shall start by taking a brief look at these definitions and categorizations, exemplified by some of the major innovations relevant to this study's main focus.

2.1 Mobile Games

The term mobile games encompasses all types of games from portable game consoles to digital versions of analog games such as Sudoku, to games leveraging the distinct qualities of mobile communication, location-aware technologies and computation such as location-based or location aware mobile games. With the diffusion of the smartphone, casual gaming has been introduced to and subsequently consumed by a larger audience, thus expanding the field of mobile games. de Souza e Silva (2008) points out that mobile games are often viewed as a smaller and more low-level type of (screen based) computer games, and this misconception of mobile games leads to two consequences in the design of mobile games. In the common discourse of mobile game design there is an increased focus on technical restrictions (graphics and connection speed) as well as a negligence to exploit the specific qualities offered by the mobile medium (de Souza e Silva, 2008, p. 406). Examples of the specific qualities of the mobile medium are the use of location information, the possibilities of being mobile, and the connectivity among people and with the web. Thus the term *mobile games* is often used to describe two different categories; 1) games that are only mobile in the sense that they are played on mobile devices – mobile phones or tablets, or portable game consoles, 2) games utilizing mobile devices and the distinct features therein, such as location- and context-awareness with a degree of mobility in physical space (Walther, 2007; de Souza e Silva & Hjort, 2009). This thesis deals with the latter category.

2.2 A Categorization

In the pursuit of defining and classifying the various forms of mobile urban gaming one common main term emerges; *pervasive games/gaming*. In the world of digital communication and games *pervasive computing* is a term used interchangeably with *ubiquitous computing*. The term

ubiquitous computing was coined by Mark Weiser at the Palo Alto Research Center (PARC) in 1991. Weiser foresaw how computation could be used and would expand into the physical world (Weiser, 1991) as a contrast to the, at that time, dominating virtual reality (VR) paradigm¹¹. The smartphone, tablet pcs and smart TV, with all their applications and uses, as well as intelligent refrigerators a.o. are examples of Weiser's ubiquitous computing. Today all these computation devices are connected and work together due to technologies such as location awareness and a seamless access to the web.

Having GPS and wifi as standard technologies in today's smartphones, location is becoming ever more central, not just in mobile games, but also in mobile communication in general. Location is now embedded in most web search results and mobile services offering various location specific information, to how people connect and communicate with their friends through Location-based Mobile Social Networks such as Foursquare and Facebook (Matjeka & Therkelsen, 2010; Matjeka, 2011b; de Souza e Silva & Frith, 2010; Sutko and de Souza e Silva, 2011; Gordon & de Souza e Silva, 2011; Humphreys, 2008; Humphreys, 2010). Today access to and communication with web services and people's online presence and interactions are based on physical location. "This is net locality. It is a world intimately entwined with the digital networks that stream through it. It is manifested in everyday social practices like mapping, mobile annotation and location-based social network." (Gordon and de Souza e Silva, 2011, p. 172). Thus digital location-aware mobile games spring from these ideas of portable computation in the physical world, where the smartphone becomes a mediator and interpreter between the users and computation all around us such as other personal computation devices and game systems accessed through the ubiquitous access to the web or ad hoc network technologies such as Bluetooth and Near Field Communication (NFC).

2.2.1 Frame of Reference

Returning to the notion of pervasive gaming, the Danish game scholar Walther (2007) introduces the term *Pervasive Games* as an umbrella term to the various game types in this field (Walther, 2007, p. 2). But Walther also refers to the pervasive games as *a mobile, context-aware, location-based game* (Walther, 2007, p. 16). The game researcher Markus Montola (2005) calls

¹¹ Virtual Reality works with ideas of how to bring humans inside the computer by creating virtual worlds. Some of the most popular and commercially successful manifestations of this paradigm are the motion picture *Matrix* (1999 - http://en.wikipedia.org/wiki/The_Matrix) and the online phenomenon of *Second Life* (2003 - http://en.wikipedia.org/wiki/Second_life)

these games *expanded games*, because they expand socially, temporally and spatially (I will be returning to Montola's expansions), whereas de Souza e Silva and Sutko (2008) call these games location-aware mobile games. However, some common features across the various definitions are: they are experienced in *physical urban life contexts*, they use *mobile technologies and computation devices* and contain some degree of *physical movement through physical space*. From there on, the definitions are slightly differentiated according to the arguments and viewpoints of each scholar. But they all agree that *pervasive* in this sense entails some kind of physically and spatially interaction with the system beyond simply using the body (Benford, Magerkurth & Ljungstrand, 2005; Björk, Holopainen, Ljungstrand & Mandryk, 2002; de Souza e Silva & Sutko, 2008; Ejsing-Dunn, 2011; Montola, 2005; Walther, 2007; Walther, 2011). Based on the diversity of the term pervasive games as presented in here, these games can be broadly understood as *a digitally rendered play and game form physically constituted in physical and/or urban space*. Within this broad description, I turn to the definitions provided by de Souza e Silva and Sutko (2008). Their definitions are based on "different aspects of the relationships between game space, game interfaces, and game time" (de Souza e Silva and Sutko, 2008, p. 3). Game time is whether the game ends (a predetermined time limit) or not. Game space is the space(s), both digital and physical, wherein the game is being experienced, and game interface is how the player interacts with the game system. The relationship between and separation of these elements is at the core of differentiating this type of games from other computerized games. I therefore use these elements as a frame of reference for later analysis of different approaches and the impact these have to the game design and player experience. de Souza e Silva and Sutko's classifications based on these relationships are:

1. Pervasive games (PG): These games do not finish nor do they stop while the player does not play and they tend to intertwine with everyday life. These games are often role-playing games and are descendants from desktop multiuser Dungeons or Domains (MUDs) and massively multiplayer online role-playing games (MMORPGs).
2. Urban games (UG): Use the urban environment as the game space but do not necessarily use location-aware technologies. These games differ from pervasive games in that they often have a determined game time.
3. Location-Based Mobile Games (LBMG): These games use mobile technologies with location-awareness as the primary game interface.
4. Hybrid Reality Games (HRG): these games are played in more than one space and are accessible through more than one display; they comprise of a mobile part in

urban space, a virtual part accessed from a desktop, and players interact across these game spaces. (de Souza e Silva and Sutko, 2008, pp. 3)

These classifications are not limited within their definition, but tend to overlap. As such a pervasive game can also be location-based and urban, or a hybrid game can also be pervasive. All the games referred to in this thesis are location aware in some form utilizing either the GPS, Wi-Fi or other position or context aware technologies. Therefore I chose to adopt the term Location Aware Mobile Games (LAMG) from de Souza e Silva and Sutko (2008) as the main term. In addition, one of the objectives for this thesis is the exploration of mobile location-aware technologies used for gaming and playing.

Montola (2005) has categorized LAMGs as *expandable games* with the characteristics of expanding socially, temporally and spatially. By expanding temporally he is referring to what de Souza e Silva and Sutko call game time (de Souza e Silva and Sutko, 2009, p. 3). By expanding spatially he is referring to the game space similar to the one explained above, where the boundaries are not limited or demarcated by the gameplay. Montola elaborates on the notion of game space with reference to HRGs, where the game space is accessed through multiple interfaces, and therefore creates a hybrid reality space (Montola, 2005, p. 2). de Souza e Silva (2008) contributed with a parallel theory of a new logic of game space also with reference to HRGs. The new logic of game space emerged from the game taking part not only in the physical environment via the smartphone, nor exclusively in the digital online domain, but in both at the same time, thus creating a hybrid reality and a new logic of game space (de Souza e Silva, 2008, p. 410).

Montola's idea of a hybrid reality space and de Souza e Silva's new logic of game space indicate an alteration of the game space in LAMG/pervasive gaming to be a ubiquitous game space distributed among several spaces encompassing the digital and physical space. Likewise, the player can interact with the game system through multiple interfaces as well as indirectly through the locations in the physical space. Thus indicating the game interface to be laid out/distributed in the physical world. The quality of the ubiquitous game space and game interface is what enables the LAMG designer to merge the physical and the digital domains into a seamless player experience. The player is constantly situated in the game space and can interact with the game system directly and indirectly, whenever and where ever.

Continuing on Montola's three expansions, the third and last is the social expansion. By expanding socially Montola means that these games, because they are played in urban space,

include other people and social contexts than the players and the game itself. For instance, these games include other people as audience or bystanders, and contain the possibilities of creating social communities among the players and with other social networks as well as face-to-face social encounters. The last element in the frame of reference outlined in here consists of this social dimension.

2.2.1.1 Mobile Social Spaces

In the field of mobile communication there is a discussion of whether mobile telephony is strengthening the strong ties at the expense of weak ties, or strengthening the weak ties and disposing latent ties, and how this tendency affects the social cohesion (Ling, 2008; Ling and Donner, 2008; Humphreys, 2008). This discussion has reached the area of location based mobile social networks (LMSNs) and games (which in here are referred to as LAMGs) as well. There are various studies pointing in either direction (Humphreys, 2008; Xiong, Ratan & Williams, 2009; Humphreys, 2010; Sutko & de Souza e Silva, in press; Matjeka & Therkelsen, 2010; Matjeka, 2011b). However, most scholars agree that location based communication in the form of either games or social networking possess new possibilities. Xiong, Ratan & Williams (2009) recommend designers of LAMGs to consider these tendencies and to design for social interaction and the strengthening of weak ties. “Specifically, the real function of location information in LBMGs is to help people bridge with weak ties, supplement strong ties, and discover latent ties in playful interactions. The objective of these interactions is to build trust and to facilitate collective action based on shared goals and needs.” (p. 49). What the authors are also implying here is the relationship between LAMGs and LMSNs; the possibility of designing for social activities is inherent in LAMGs (it is a premise in the design of LMSNs). In both LAMGs and LMSNs interaction between users is based on actions in physical space, which on the other hand rapidly can turn into social encounters and interactions face to face (Humphreys, 2008; Humphreys, 2010; Matjeka & Therkelsen, 2010). Moreover, these interactions might lead to interactions with other people outside the LAMG or LMSN, because these activities happen in urban spaces inhabited by other people as well (Gaye, Mazé & Holmquist, 2003).

Several of the popular LMSNs like Foursquare and Scvngr are also games, or *Gamifications* - having interactions designed as game elements (Deterding, Dixon, Khaled & Nacke, 2011). People interact with these networks for both reasons: As part of the game and to connect and communicate with their friends. It is also common to engage in game battles over mayorships of specific locations - like a train station, with people outside the network of

friends (Matjeka & Therkelsen, 2010). Thus residing within the field of mobile communication, location aware mobile games as well as location based mobile social networks are two intertwined phenomena sharing both history as well as characteristics. In many instances, the main thing telling them apart is the combinations and relationships between the game time/temporally expansion, game space/spatially expansion, social expansion and game interface.

For the purpose of creating a frame of reference and a vocabulary for the further design process, I will be exemplifying these notions of game time/temporally expansion, game space/spatially expansion, social expansion and game interface through a review of historical contributions to this field.

2.3 Location Aware Mobile Games

Among the first location-based service/game was *GeoCaching* by Dave Ulmer (Gordon and de Souza e Silva, 2011, p. 65). Geocaching is a simple treasure hunt where the players hide treasures in various locations (on the basis of GPS coordinates) for the other players to find them and replace either the whole content or parts of it. The first version of this service was using GPS devices to record the physical position and these coordinates were posted and shared on the web, but today the game works on smartphones and is still in function with players in more than 180 countries worldwide. The game time in GeoCaching is expandable, the game never ends in that there are always treasures to find or hide, it is also socially expandable in that the players communicate through the treasures by leaving things or notes to each other, besides being played in public places. GeoCaching uses the whole world as the game space and the game is accessed through the locations of the treasures (Gordon and de Souza e Silva, 2011, p. 65). Thus GeoCaching is both a location based mobile game, pervasive game and urban game.

A group of students from the New York University created a physical and digital version of the 80's arcade game Pacman (St. John, 2004). The urban version of the game, PacManhattan (pacmanhattan.com, 2004), is using the square grid of the streets of Manhattan as the game board. Pacman and his nemeses are played by real people running around Manhattan, each in constant contact with their 'co-pacman' (another person) situated in a control room to keep track of the game on the screen based interface. As such the game is a HRG as well as an urban game utilizing location-aware technologies to keep track of the players.

Among the main pioneers in the development of HRG is the art group Blast Theory. Blast Theory, in collaboration with Mixed Reality Lab of Nottingham University, was exploring the boundaries between virtual and real spaces mainly through the development of game/play forms centered around the use of GPS and mixing physical and virtual spaces (de Souza e Silva & Sutko, 2008b, p. 74). Together, they were the first to develop the HRG Can You See Me Now? (Blast Theory, 2001). Can You See Me Now? (CYSMN?) is a digitalized offshoot of the play 'Hide and Seek' where people either hide in a 3D online version of the city or seek the virtual players in real life 'physically' in the streets with the use of handheld computers, GPS, Walkie Talkies and a camera to document the physical 'place' of the online people (Flintham et al, 2001)¹². The game is both location based, hybrid and urban at the same time. It expands socially in that dislocated online players meet mobile players and mobile players meet non-players in the streets. It expands spatially by using the whole city (and possibly beyond) as the game space. It does end, though, when a player has been captured.

Other historically important contributions to the field are Botfighters (It's Alive, 2001), which was the first multiuser LAMG and also commercial attempt (de Souza e Silva & Hjort, 2009, p. 14; Gordon & de Souza e Silva, 2011, p. 67). Botfighters, created by the Swedish company *It's Alive*, was a first person shooter game, where the players were interacting using SMS's (de Souza e Silva & Hjort, 2009, p. 14). Inspired by this game, Alien Revolt (Mind Corporation, 2001) was developed in Rio de Janeiro, Brazil. In order to differentiate the game from and build upon the experiences done with Botfighters, the creators of Alien Revolt resolved to extend the shooting game with a role-playing narrative (de Souza e Silva and Hjort, 2009, p.16). These two games are pervasive and location-aware, but not fully location-based, because the locations move with the player, hence the notion of location-aware instead of location-based. These games are intended to never end and use the whole city and beyond as the game space, thus they are both urban and pervasive.

The popular LMSN Foursquare (2008) was founded by Dennis Crowley¹³ and is one of the most successful Locative Mobile Social Networks (LMSN) to date with more than 20 million users¹⁴. In Foursquare, the users check-in to locations using their smartphone. The game is

¹² <http://www.youtube.com/watch?v=hX4kZvEllwY&feature=related>

¹³ Dennis Crowley was also one of the students developing PacManhattan. Before creating Foursquare he had created the mobile social network Dodgeball (see Humpheys, 2008 and 2010), which was later sold to Google.

¹⁴ See <https://foursquare.com/about/>

about being Mayor of the various locations and having the highest score among the friends in the network. Besides communicating with peers and other Foursquare users through the locations, the user can gain mayorships of the various locations. Mayorships are based on various factors such as the amount of regular check-ins in general and at the particular venue as well as overall contributions to the network in the form of for instance location-specific tips and shared photos. The core of Foursquare lies within the social expansion, because it not only connects online and virtual social networks, but also connects users with other unknown users and non-users through the physical location. The users communicate with their friends and the network through the different locations creating a sense of distanceless connectedness among the friends in the network (Matjeka, 2011b). Foursquare is highly pervasive – it can be played whenever and wherever.

Turning to the main focus of this thesis, the combination of LAMGs and sonic features, one of the only documented examples hereof is the pervasive game *Songs of the North* (Ekman et al, 2005). *Songs of the North* is an adventure game inspired by the Finnish Mythology, it is pervasive, because it never ends and it uses the whole world as the game space. In the tests of this game, focus was given to the overall playability of the game and to the role of the sounds from the game in the players' ordinary life. The authors found some challenges regarding the use of sounds as related to pervasive gaming. For example, the players found it disturbing to have game sounds playing while they were taking a 'break' in the game, either because the environment demanded their attention or because they were playing while performing everyday activities such as shopping. The authors found that social playability was an important aspect of pervasive mobile gaming in urban space: "... sound design for mobile devices has to consider also how other people, of whom not all engaged with playing, will relate to the soundscape." (Ekman, et al, 2005, p. 114). Social playability is concerned with how the social expansion is dealt with in the game design, and the authors emphasize that considering social playability also means to consider the broader context outside the game and to design for a whole as opposed to thinking about the sound design as an isolated channel of information (Ekman et al, 2005, p. 115). In chapter 9 I will elaborate on the notion of social playability to include other aspects of the game design beside the implementation and use of sound.

The last significant contribution to the field of location aware sound based experiences, which I draw on in this thesis, is the *Sonic City* (SC), developed by researchers from the Future Applications Lab (Viktoria Institute) and PLAY Studio (Interactive Institute), in

Göteborg, Sweden (Gaye, Mazé and Holmquist, 2003). Sonic City is not a game but a musical instrument. Nevertheless it is included in here because it is emphasizing the combination of sonic experiences based on location awareness in urban space. SC belongs to the field of Sonic Interaction Design, a sub field of Interaction Design, which is one of the four academic corners of this thesis.

SC is a context-aware “musical instrument” where the interactions are based on the context of, and the users movements through, the city – the user “controls” the instruments through movements through space, the sounds are obtained from the surroundings and processed according to the movements and contexts recorded by the device (Gaye, Mazé and Holmquist, 2003). In SC, the experience space (game space) becomes equivalent to the interface in that there is no other possible ‘control’ for the user than simply moving around urban space. Thereby, the space in which SC is experienced merges with the interface where the user interacts with the digital system. As such SC provides an inspirational example of a sound based natural relationship between the game space and the game interface.

2.4 Tweaking The Relationships

The importance of the brief analysis above is to pay attention to how the differences in game designs in terms of the relationships between game time/temporal expansion, game space/spatial expansion, the social expansion and game interface, has a large impact on the type of game/play and the implications when playing in urban and public space. It is obvious that these differences influence the gameplay, but they also influence the focus of the player in urban space. In Geocaching the main focus becomes finding the specific locations, where in PacManhattan the specificity of the locations does not really matter, what matters is the co-operation with the control room and to move fast. CYSMN is a combination; the focus is both on the co-operation between the scattered players, but also on the specific locations in urban space (where they catch the online players). Botfighters and Alien Revolt make the players focus on moving around the city space and being aware of the other players as unknown people, thus forcing the players to look at and explore both the physical as well as the social environment in new ways. In Foursquare, the main focus is on the people and the communication in the network based on the locations and battle of the mayorships, whereas in Songs of the North it becomes similar to Botfighters and Alien Revolt, where the players experience the urban environment as a parallel to the ordinary world. A parallel, which in Songs of the North is evidenced when the game literally interferes in the player’s ordinary life by attracting attention through the sonic features (Ekman et al, 2005, p. 113).

In LAMGs, the game space is distributed to encompass the physical environment and the digital layer overlaying the physical space mediated by the smartphone. The interface, mediated by the smartphone, also becomes distributed, in the sense that in order for the player to interact with the game system, the player interacts by moving the interface through the game space as well as interacting with the physical interface of the smartphone as well. As a contrast, the project of Sonic City demonstrates how the game space can merge with the game interface. Thus changing the parameters of these elements changes the very nature of the game and the focus of the player as well. Working with these elements play a significant role in defining the fundamental design of LAMGs.

Extending this discussion of how the elements of game time/temporal expansion, game space/spatial expansion, the social expansion and game interface affect the gameplay, I will be exploring the characteristics specific to LAMGs from the angle of computerized game versus play in urban space and how these contribute to the gameplay and overall player experience.

3 Play Versus Game

Previously, I defined pervasive games as an overall umbrella term encompassing all mobile games in this genre including LAMGs to be *digitally rendered play and game forms physically constituted in urban or physical space*. As digitally rendered games, LAMGs are positioned in the field of computer games. LAMGs are also constituted in urban and physical space based on physical movement, which also position them in the field of physical active play forms as well. In a comparison to the common conception of (screen/console based) computer games de Souza e Silva and Hjort (2009) conceptualized the earlier urban phenomena of the bourgeois Flâneur, the situationists Dérive together with the recently emerged Parkour (which also is a central part of this thesis design project). By this conceptualization, the authors demonstrate how these prior urban play forms can be viewed as the predecessors of today's urban mobile games including LAMGs.

LAMGs merge physical play forms with computation to a larger extent than traditional screen/console based computer games. Screen/console based computer games demand the player to stay in front of the screen. Because LAMGs are mobile (and location aware), the player is physically free to move over larger distances in a changing terrain. Thereby the player gains a physical freedom in ways comparable to prior analog physical (and urban) play forms in the combination with computational capabilities similar to computer games.

As a digitalized play and game medium, LAMGs incorporate new factors in the field of computer game design. Traditional screen based computer games can be viewed as closed environments, wherein the designers design entire new fictional worlds detached from the physical world¹⁵. Many traditional computer games are designed with such ideal environments in mind (Stockburger, 2003). On the contrary, LAMGs are influenced by many uncontrollable external factors impacting the gameplay in unpredictable ways.

The Danish game researcher Bo Kampmann Walther (2011) has pointed toward a basic understanding of LAMGs (as Walther calls pervasive games) as a double-sided angle of play and game. Walther states that pervasive gaming constitutes two different modes and spaces; game-spaces and play-spaces in which the player can be in game-mode or play-mode. The two terms are quite similar to those proposed in this chapter of playing versus gaming; in

¹⁵ Several scholars have pointed to the fact that such an environment does not exist, and that the physical setting will always have an impact on the gameplay (Jørgensen, 2009; Stockburger, 2003)

game spaces the gamer moves according to fulfill a task in order to get a result, whereas in a play-space the player moves to explore the space and discover new stories (Walther, 201, p. 138).

Through a conceptualization of the relationship between computer game and play, I will be providing some basic guidelines for understanding LAMGs in the field between computer game and physical play in urban physical space for work in the further design process. I will be using theories concerning physical active games and play forms by the Danish professor and founder of Gerlev Legepark¹⁶ Jørn Møller in comparison to the game definitions residing within the field of computer games mainly by Danish computer game scholar Jesper Juul (2005) and Professor Katie Salen together with game design theorist Eric Zimmerman (2004). They build their work on the founding game and play theoreticians Johann Huizinga (2002), Roger Callois (2001), and Elliot Avedon and Brian Sutton-Smith (1971). As stated in the beginning of this chapter, LAMGs are merging digital and physical games and play forms through the use of mobile computational devices. Therefore I found the approach in this chapter to creating a guiding conceptualization of play and games most suitable in order to get a basic understanding of the differences as applied to this compound field of computer generated games and urban play forms.

3.1 A Linguistic Differentiation

In the differentiation of play versus game several scholars turn to the linguistic definitions from various languages as a point of departure (Callois, 2001; Juul, 2005; Salen & Zimmerman, 2004). This thesis will do the same.

In the Scandinavian languages there is a distinct difference between game (spil) and play (leg/lek) - a difference also present in the English language, but in Scandinavia the use and appropriation of those two words is a tad different (Juul, 2005, pp. 28). In the English language it is only possible to *play* a game. In Scandinavian languages it is possible to *play a play* (lege en leg) and *game a game* (spille et spil), meaning that both the notion of play and game can be used as both nouns and/or verbs. This distinction provides an important viewpoint to the discussion and definitions of play versus game.

Jesper Juul (2005) emphasize this difference in his book *Half-real; Video Games between Real Rules and Fictional Worlds* (pp. 28). The possibility of using the words play and game as both noun and verbs gives more nuanced outcomes; for example, what does it mean if the verbs

¹⁶ An outdoor amusement park with a historical angle to play and game forms

and nouns are switched to *play a game* (as opposed to *game a game*), and *game a play* (as opposed to *play a play*), as it could be done in a Scandinavian language? The next sections will elaborate on these nuances by looking at some prior definitions of game and play. Lastly parkour, in relation to this thesis purpose, is viewed in this theoretical framework.

3.2 Gaming a Game

Many scholars already have defined games and play (Huizinga, 2002; Caillois, 2001). Both Jesper Juul (2005) and Katie Salen and Eric Zimmerman (2004) come up with definitions to computer games, which both are based on summaries of and comparisons between earlier pioneering work such as Johann Huizinga's *Homo Ludens* (2002), Roger Callois' *Man, Play and Games* (2001) as well as work by Elliot Avedon and Brian Sutton-Smith (1971). The two definitions by Juul, and Salen and Zimmerman bring a useful overview to the field and provide a suitable starting point for the purpose of understanding the relation between game and play as related to this thesis' subject.

Juul defines a classic game model to encompass all game forms throughout time. He then elaborates on this definition in the light of the emerging new fields of video and computer games. According to Juul: "A game is a rule-based system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, and the consequences of the activity are negotiable." (Juul, 2005, p.36). His definition comprises six game features as listed in the book:

1. *Rules*: Games are rule-based.
2. *Variable quantifiable outcome*: Games have variable, quantifiable outcomes.
3. *Valorization of outcome*: The different potential outcomes of the game are assigned different values, some positive and some negative.
4. *Player effort*: The player exerts effort in order to influence the outcome. (Games are challenging).
5. *Player attachment to outcome*: The player is emotionally attached to the outcome of the game in the sense that the player will be winner and "happy" in case of a positive outcome, but a loser and "unhappy" in case of a negative outcome.
6. *Negotiable consequences*: The same game [set of rules] can be played with or without real-life consequences. (Juul, 2005, p. 36)

Among these six features, the word *outcome* is central in half of them, and counting the consequences as a kind of outcome more than half of these features are concerned with the outcome/consequences. This demonstrates the importance of outcome/consequences,

which in here is interpreted as results, in and of a game – also understood as what is being achieved by the player in the game. What must be understood as the most distinguishing part of a game can thus be interpreted as the following: A game must provide the player with results which afterwards can be compared to other results (variable, quantifiable outcome) with the purpose of a further analysis to e.g. declare a winner, or do better next time. Thus different actions must provide different results (valorization of outcome), which also must be emotionally attached to the player, meaning that the results must stem from and be directly linked to the player's decisions about actions in the game (valorization of outcome and player attachment to outcome). Furthermore these results can be used for real world purposes outside the scope of the game; betting, gambling or winning prizes in sports (negotiable consequences). And, lastly, the strong focus on results is likely to have a social impact when the results are compared to one another (divide players as winners and losers). The notion of, and role of, results in the understanding of games is thus one of the main ingredients for a game to be a game.

In the classic game model, Juul draws on Salen & Zimmerman's previous work and game definition in their book *Rules of Play; Game Design Fundamentals* (2004). "A game is a system in which players engage in an artificial conflict, defined by rules, that results in quantifiable outcome." (Salen and Zimmerman, 2004, p. 80). They elaborate on this statement; "The key elements of this definition are the fact that a game is a *system*, *players* interact with the system, a game is an instance of *conflict*, the conflict in games is *artificial*, *rules* limit player behavior and define the game, and every game has a *quantifiable outcome* [emphasis by the authors]." (Salen & Zimmerman, 2004, p. 83). From this definition Juul directly links to the authors' definition of quantifiable outcome and adds *variable* in the sense that a game must provide a variety of quantifiable outcome based on the player's interactions with the rules of the game (Juul, 2005, p. 38). "... if the outcome of a game is the same every time, it does not qualify as a game." (Juul, 2005, p. 30)

In comparing the two definitions *rules* are essential. Rules are, throughout the two books, repeatedly drawn upon from almost all the sources of play and game definitions used as theory in the books, explained to be a core component of games (Juul, 2005; Salen & Zimmerman, 2004). As such rules in games are designed to be above discussion (Juul, 2005, p. 30). Likewise Salen & Zimmerman's definition of game rules is that they cannot be altered in that they must be *explicit*, *unambiguous* and *fixed*, and are *binding*, in that they must be obeyed by all players involved (Salen & Zimmerman, 2004, pp. 122). An important reason for game rules to be as rigid as described above is that a game is, like argued earlier, very result-

oriented. It must provide a *comparable* result (variable, quantifiable outcome), so if the rules of a game are not fixed, binding, explicit and unambiguous the results would not be comparable. This is most notable in the world of sports. How can the results be compared if the rules are not exactly the same? How can an athlete become world champion, if the sports fields do not meet the same requirements worldwide in terms of size, equipment and conditions? And thinking in terms of the *negotiable consequences* - like for example world records; on what terms should these be calculated? It is thus possible to conclude that one other main feature for a game to be a game is that game rules are not to be altered, once commonly established. Thus two of the main components as to why a game is a game, are that they are 1) result-oriented and 2) have fixed unalterable rules.

3.3 Play, Play Forms and Playing

Møller is defining play by differentiating it from work (and not game): If the result (**R**) of any given activity is more important than the process (**P**) of performing the activity, it is defined as being work, whereas if the process is perceived as the most valuable of the two then the activity can be regarded as play. He makes this calculation; $\mathbf{P/R} > 1 = \mathbf{play}$ $\mathbf{P/R} < 1 = \mathbf{work}$ (Møller, 2010c, p. 153). The emphasis here is the *relation between the process and play*. This does not eliminate the possibility that work can be perceived (or performed) as play. “Leg er en beskæftigelse i sig selv, der henter sin grundlæggende mening udelukkende fra den grad af lyst og engagement, udoveren lægger i den, uden hensyn til dens konsekvenser. Det være sig i form af brådne pander eller samfundsmæssige nyttevirkninger¹⁷.” (Møller, 2010e, p. 43). Thus, being immersed in the process of an activity can be described as play rather than work regardless of the type of activity. Meaning that work, like every other activity, in these instances can be defined as play. But notice that the opposite is not possible; play cannot (as opposed to games) be perceived as work, because work entails focusing on a result. In that case play becomes work (or a game). The perceived emotional state of the activity is then changed but not the task or purpose. The distinction between what is play and what is not play lies in the individual perception and meaning attached to the activity. This tells that play is an emotional and individually perceived state of activity separated from, but can be experienced in, any external task or activity regardless of purpose.

¹⁷ ”Play is an activity in itself that gets it’s basic meaning entirely from the degree of pleasure and commitment the player puts into it without account of the consequences. Be it furrowed foreheads or societal benefits”.

The purpose of the above comparison is to describe and highlight some main viewpoints to what constitutes the act of playing as a verb, rather than an argument of work being equal to game. Game and play share several significant components that are different from work. One of these is that play, like games, is also rule-based. In play, as opposed to game, rules are made up as the play progresses, and the purpose of the rules in play is not to accommodate a quantifiable outcome, but forming a common basis for the act of playing to happen continually (Møller, 2010c, p. 178). Therefore an essential part of playing a play is also the continual negotiation of the rules. A common phrase among children when playing is; “Jamen, skulle vi så ikke sige, at¹⁸” (Jan Kampmann as cited in legeskab.dk, 2010b). When playing, rules are made up as the play progresses to fit the social situation.

“En simpel leg som tagfat vil mange måske anse som asocial og upædagogisk, fordi der er en enkelt, som skal ‘være den’, og fordi den principielt ender, når den er den, som alle andre kan løbe fra. Men netop på dette punkt er legen inde i en afgørende fase. Hvis den skal fortsætte, må de gode løbere vise en form for solidaritet, som ikke bærer med til selve legens bogstav, men rækker ud over det og bærer med til legens ånd. De må udfordre skæbnen og begynde at tage risici – løbe farligt nær, kravle på knæ, hoppe på et ben eller på anden måde udfordre skæbnen, så det ender med, at en af dem bliver fanget. De tvinges til at sætte det sociale højere end legens bogstav – til at vise medfølelse med den arme fanger, der ikke kan fange nogen. Det bliver deres ansvar ikke at gøre presset for stort, men ‘at holde inde, mens legen er god’ for således at undgå, at den svage ‘går grædende af leg’.”¹⁹ (Møller, 2010c, p. 178).

What in this description distinguishes a play (leg) from a game is the purpose; as stated above playing is an activity based on the player’s experience of pleasure and degree of commitment and therein presupposes an unconditional voluntariness. Thus a play is designed to

¹⁸ “Well, shouldn’t we say that ...”

¹⁹ A simple play form like ‘catch me if you can’ many people would probably consider non social and non pedagogical, because one person has ‘be the one in the middle’ trying to catch all the others, and because it in principle ends when the one in the middle is the one all other players can outrun. But especially at this point the play enters an essential phase. If the play has to continue, the good runners will have to demonstrate a kind of solidarity that is not part of the play’s nature, but extends it and belongs to the spirit of playing. They will have to challenge faith and start taking risks – run dangerously close, crawl on their knees, jump on one leg or in other ways challenge faith in order to end up with one being caught. They are forced to set the social aspect higher than the rules of the play – to show compassion with the poor capturer, who is unable to catch anyone. It becomes their responsibility not to augment the pressure too much, but to ‘to stop while everything is good’ in order to avoid that the weakest must leave the play crying.

accommodate the experience of playing and is not focused toward a quantifiable outcome or externally comparable result. Rules are often altered as the play progresses to adapt to the social context and physical surroundings. If the players are not experiencing the state of playing the play loses its purpose and resolves itself (Møller, 2010b, p. 134).

In this chapter play and game are outlined as two counterparts rather than two intertwined terms. To play (at lege) is a state of mind, an individual experience in activities without regard to the outcome, and a play (leg) is meant to accommodate this experience. To game (at spille) is to perform specific activities in order to follow a certain set of prefixed rules working towards a quantifiable outcome. A game (spil) is the designed system in which these activities are being performed. However, it is important to realize that viewing play and game as two counterparts do not exclude one another, but most often co-exist like in the idea of *playing a game*. Nevertheless, it has been important to separate the two in order to pinpoint some significant differences in order to be able to address these differences in the following design work.

Returning to Walther's (2011) two notions of game space and play space wherein game-mode and play-mode are experienced, game space is the complex space where rules are upheld (by computation) and reaching a specific goal or performing a specific task with a specific purpose becomes the main focus. In the game space the player is experiencing a state of game-mode, which can be viewed as a goal-focused behavior. In play space exploration and experimentation is in focus and the player experiences the state of play-mode, which is being caught up in the process of exploration and experimentation. There is no explicit goal or task to be performed, the exploration is the goal in itself. Following this way of thinking a game design, the two game designers and researchers Nicolas Nova and Fabien Girardin (2009) point to the idea of allowing different modes of gameplay and supporting various player types (Nova and Girardin, 2009, p. 182). Which, in other words, means that the designer should be aware of the two modes and balance the design with both modes in mind. Thus balancing these two modes of gaming and playing as explained in this chapter, is important when designing for player experiences in urban public space, as will be argued and exemplified in the data analysis and design chapters (7, 8, 9 and 10).

3.4 Parkour as Play

Parkour as a play form focuses on the process and how the traceurs can develop physically and mentally by constantly challenging their physical limits within a set of loosely ad hoc defined rules depending on the physical environment and the individuals in the group.

Parkour happens, wherever and whenever a traceur feels the urge to exert parkour, just like play happens wherever and whenever the situation affords it. In the exertion of parkour there is no winner, and no quantifiable outcome is determined. It was never the intention from the founders of parkour, nor is it part of the ideology behind, that the play form should be made into a game, and it is inherent in the appropriation (to be useful), that such a gamification would violate the very foundation of the original thoughts behind. This is a significant challenge to address in the design phase: To design a play in the skin of a game where the players will develop physically and mentally in synergetic alliance.

A main design constraint of this thesis was to diminish a visual interface as much as possible to meet some of the challenges when playing in urban space. Sound was chosen as the main modality for this purpose. The next sections will elaborate on how sound as the main interactional modality can add and change the gameplay in desired directions.

4 Sound Design Theory as Applied to the Design Work

The sound design and sonic features in the project were meant to have a larger role, but because the project so far still is on a conceptual level, the role of sound has been on an abstract level subject to thought and design experimentation throughout the process. Nevertheless, the theory concerning game sound design and sonic features has been an important source of information despite the little practical sound design work in the process²⁰. Therefore the theoretical part is reflecting a level of sound as sense making rather than practical sound design on a functional (usability) level.

Drawing on the theoretical notion of LAMGs as a mixture of mobile communication, urban play and computer gaming, I have looked at the experience of mobile listening and how it affects the perception of the physical surroundings. From there I look at sound design's role in the experience of computer games - and, lastly, I turn to some of the few studies done of the use of sound design in a LAMG. I do so to get some basic guidelines for later qualification of design choices.

4.1 Mobile Listening

The British scholar Michael Bull (2005) has conducted various studies in the culture of mobile listening. According to Bull, mobile listening supports the creation of personal narratives in urban space (Bull, 2005, p. 349). The users of mobile music listening are able to augment the experience of movement in urban space and turn these into a kind of personal film or story detached from the ordinary urban life. "However, users are often more attentive to their own mood and orientation which is facilitated by the sound pumped through the iPod in harmony with their desired mood, orientation or surroundings." (Bull, 2005, p. 348). The PhD researcher Nina Gram from Aarhus University explains how the mobile listening can transform the urban experience into an aesthetic and artistic individual experience. The surroundings turn into a perceived piece of art that is different each time it is experienced (Høgh, 2010, 26.20). She further explains the user attraction behind this phenomenon: "When controlling one's personal experience in public the listener seems to find himself in a space that is not entirely either private or public." (Gram, 2011, p. 14). This

²⁰ The only practical sound design done has been during the work with the prototype for the Superhero version. Listen to Appendix 1.6 spacing out.mp3

ambiguous, neither public nor private, space she indicates in her concept of iPublic Interfaces – the mobile listening space. “The users often feel as though the mobile music creates a private listening space through which they can experience and stage their surroundings. (...) this staged experience is a result of a synergy between the music and the surroundings.” She, too, works with the comparison of mobile listening to that of a filmic soundtrack, and she concludes the article by stating that: “the iPod becomes an interface for making sense of and staging public space.” (Gram, 2011, p. 14). The importance here is to acknowledge how music and sound has the ability to not just transform the perception of urban space, but also turns it into an aesthetic and artistic experience with fictitious qualities as well. In addition, the Irish PhD scholar Linda O’Keefe (2011) points out that sound conveys meaning and is interpreted by the individual in relation to the social and cultural context of the situation (O’Keefe, 2011, p. 56). Sound carries a message, a description of a situation that has a social and cultural context. If sound can transform the perception of a specific location, then that location can also convey altered information supported by sound to create a different universe than the ordinary. Thus a proper sound design can alter the perception of urban space and thereby support a digitally rendered game universe, be it abstract or fictitious.

4.2 Sound Design and Game-mode Versus Play-mode

The Scandinavian game researcher Kristine Jørgensen (2008) points out, in her study *Left in the Dark; Playing Computer Games with the Sound Turned Off*, the importance of sound for the player to experience the game world as complete and get the sense of *being in the game* (Jørgensen, 2008, p. 172). In the study players were playing a computer game without sound, and most players, not surprisingly, missed the sound when playing. On the functional level the sound was important for usability purposes, but more interestingly the lack of sound design affected the overall game experience on a deeper level. The players started to play more systematically. As one player expressed the experience to be easier to focus on the objectives of the game (Jørgensen, 2008, p. 173). The players seemed to be playing more result-oriented without sound. Jørgensen’s study suggests that sound is an important factor to whether the player experiences the game as a playing activity, being caught up in the process of the activity versus the result-oriented gaming activity as was argued in the previous chapter. As such the sound design of a game has an impact on the overall player experience. Thus sound can play a major role in the balancing of and design for the two modes; game-mode and play-mode.

4.3 Location-Based Sonic Application and Immersion

The pervasive computing researchers Reid, Goelhoed, Hull, Cater and Clayton (2005) from Bristol studied with which effect or impact the physical environment, in terms of natural soundscape and the user's movement, has to the sense of user immersion in location-based mobile experiences. The study is based on user experiences of the audio drama *Riot! 1831*. *Riot! 1831* is a historical drama from Queens Square in Bristol, England in the form of an interactive auditory play. The study revealed that in order for the user to feel immersed, a tight coupling between the sound design and the visual clues from the physical environment is important (Reid, Goelhoed, Hull, Cater and Clayton, 2005, p. 1735). The authors' description of immersion is; "Immersion is a powerful phenomenon that is frequently cited as a measure of success for games and virtual reality experiences. It has a strong affinity to the concept of flow where the sense of time and self are lost, and attention is completely focused on the current activity [Csikszentmihalyi, 1990]." (p. 1733). Immersion is an important aspect of how successful the player perceives the experience to be. Notice how it is obvious to make a connection between the state of immersion and the state of playing versus gaming as defined in this thesis. However, they are not to be regarded as the same in this context. The state of immersion is closer to the notion of a strong engagement. A player can be strongly engaged (immersed) in achieving the goal (gaming) and/or in the exploration of, and the process of, an activity (playing).

In location-based experiences the users are subject to many external influences affecting the interactions and feeling of immersion. Reid, Goelhoed, Hull, Cater and Clayton (2005) found that the users went in and out of immersion. This finding led the authors to define immersion in location-based experiences as being a transient state, which is demonstrated in figure 4-1.

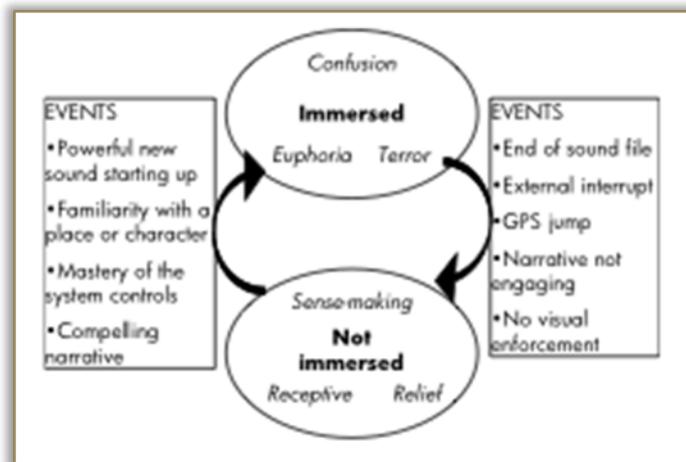


Figure 4-1. Reid, Goelhoed, Hull, Cater & Clayton's (2005) model of the transient state of immersion (p. 1736)

The state of immersion relies on the user's emotional state, which is affected by the sound design in the sonic events. The authors emphasize that the sound design should accommodate the transition between immersion and non-immersion to be as smooth as possible (Reid, Goelhoed, Hull, Cater and Clayton, 2005, pp. 1735). The Danish Phd candidate Stine Ejsing-Dunn (2005) similarly refers to findings about the players going in and out of play, because they were disturbed by the physical surroundings (p. 176). These findings demonstrate how the overall experience in LAMGs can benefit from a soundscape closely related to the physical surroundings as well as the presented game universe.

During the analysis of the empirical data it became obvious that the game space and game interface as explained in chapter 2 do not possess a natural relationship, but are separated and need to be bridged. In the section 9.2 I am arguing that the framework to support the transient state of immersion provided by Reid, Goelhoed, Hull, Cater and Clayton (2005) can aid in this bridging between the game space and the game interface.

5 Interaction Design and Phenomenology

The last leg of the theoretical chair on which this thesis rests is the Interaction Design field (the others were mobile communication, game and play studies and game sound design). This field is closely related to the field of digital game design and digital design in general. Beside methods and techniques for ideation, sketching, prototyping and ideological methodologies (like the one used in this thesis), these fields share some of the same theoretical foundations regarding interactivity in a digital context. Within the field of interaction, and especially embodied interaction as LAMGs are, Paul Dourish's (2004) theory of the same name, embodied interaction, is considered as one of the founding theories within the field of interaction design. In the pursuit of understanding LAMGs as digital games situated and experienced in urban physical space I turn to Dourish's understanding of embodied interaction. I expand on these thoughts in regard to LAMGs, by drawing on Maurice Merleau-Ponty's (2006) work on the pre-reflective cogito.

5.1 Embodied Interaction

Embodied interaction is a phenomenological perspective to how interaction with computation turns into a meaningful and comprehensible action, based on our physical and social experiences and interactions in the world. A common and very simple example of this is the use of the metaphors *desktop* and *trash bin* in the computer still in use today. Dourish's explanation of the term: "Embodied Interaction is the creation, manipulation, and sharing of meaning through engaged interaction with artifacts." (Dourish, 2004, p. 126). Dourish is concerned with how computation is designed for the user to get a meaningful experience, and he explains how meaning is created with the term *coupling*: "This idea of coupling is not simply a physical phenomenon but an intentional one too. My actions are outwardly directed, through a chain of associations (including, as we will see, social and linguistic associations as well as physical ones). By coupling, I mean the way that we can build up and break down relationships between entities, putting them together or taking them apart for the purpose of incorporating them into our actions." (Dourish, 2004, p. 138). Coupling explains the meaning created when referring to the computer interface as the *desktop*, and files that are no longer in use are being thrown into the *trash bin*. The notion of coupling demonstrates the connection between our physical and digitally mediated experiences, and how these are mutually influenced.

A central point in Dourish's term is *intentionality* (as it is in phenomenology in general), as a cognitive relationship between an entity and its meaning, and refers to a "directedness" of thought toward an entity. Intentionality in phenomenology is linked to the notion of consciousness. It is through the intention directed toward an entity that a conscious awareness of the entity can be reached, and in this regard Dourish states that computation is an intentional phenomenon (Dourish, 2004, p. 137). In physical urban play or games the players need an object (in phenomenology an object does also refer to thoughts and meanings as well as physical things) of intention in order to perceive the movements as meaningful. Dourish's notion of coupling is, in LAMGs, how the players couple things from what is being mediated through the smartphone into the physical world and vice versa. This is the theoretical foundation of the connection between game space and game interface. Demonstrating this statement through examples: In order to catch other Bots in *Botfighter* or Aliens in *Alien Revolt*, the players "direct" their physical movements to those bots, just like the users in *Riot!* 1831 move about to different buildings. A significant difference between LAMGs and screen based computer games is that players in LAMGs need to physically move in order to play the game. A large part of the gameplay is about physically moving the body from one place to the other. One of the main foci for the designer must thus be to design for physical movement. Dourish bases his notion of coupling within phenomenology with the work of phenomenologists such as Heidegger, Husserl, Schutz, Wittgenstein and Merleau-Ponty. Dourish draws on Merleau-Ponty mostly because Merleau-Ponty's work has been used in theories of the Cyborg by Donna Haraway (1991) and other related work (Dourish, 2004, p. 115). But Dourish does not draw much on his work, though. Merleau-Ponty's (2006) work was centered on a bodily cognition, whereas the other phenomenologists mentioned were more concerned about a cognitive relation between entities. However, the difference between LAMGs and screen based computer games positions the body and the bodily cognition in the center of LAMG design and thus calls for a slightly different theoretical angle of phenomenology, namely that of Merleau-Ponty's bodily cognition and theory of the pre-reflective cogito.

5.1.1 The Pre-Reflective Cogito

Merleau-Ponty was concerned with how understanding and knowledge is created through bodily interaction with the physical world (Dourish, 2004, p. 114). Merleau-Ponty's *Phenomenology de la perception* (2006) confronts the dualistic thinking of a body separated from the mind and rethinks the notion of consciousness to have ground in a bodily experience

before it becomes a thought. By rephrasing the conception of consciousness from “I think, therefore I am”, to be: “*I can, therefore I am*”, Merleau-Ponty puts the bodily cognition before the mind (Kirkeby in Merleau-Ponty, 2006;). Ole Fogh Kirkeby explains: “Kroppen bliver en ‘erkendende krop’: når vi ser, berører, taler og lytter, har kroppen allerede set, hørt, talt og lyttet for os.²¹” (Kirkeby in Merleau-Ponty, 2006, p. VIII). Merleau-Ponty explains how the body is the *pre-reflective cogito* - it is through the physical experience that the consciousness is formed and meaning is created.

In LAMGs the player creates meaning through the bodily movements in urban space. It is from the physical experience of being in urban space using all the senses that the player obtains a meaningful experience. This is evidenced in the last chapter where sound was demonstrated to alter and augment the experience in urban space. In the same way do the physical objects, including other people or any location-specific object such as stairways, monuments or buildings in urban space, impact the experience. In parkour, the traceur experiences the urban environment through the pre-reflective cogito by engaging physically with it and thereby learning how to move around it. Thus part of the experience in LAMGs is based on a pre-reflective understanding and experience of the specific environment. I will be linking these theoretical thoughts to the empirical findings, after the outline of the methodology and methods used to collect the empirical data to conduct a design process based within the methodology of research through design.

²¹ The body becomes a 'perceptive body': when we see, touch, talk and listen, the body has already seen, touched, talked and listened to us.

6 Methodology, Methods and Data Collection

“All designers engage in creative exploration in the process of designing, but the difference between design that is simply design and design that serves as research has to do with the goals and outcomes of each. Designers who are conducting research through their creative practice create work that is intended to address both a particular design brief and a larger set of questions at the same time.” (Burdick, 2003, p. 82). Contextualizing design researcher Anne Burdick’s statement about Design as Research, the (also) design researchers Zimmerman, Forlizzi and Evenson (2007) propose a framework for interaction designers to conduct research through their design practice. Borrowing from Frayling’s (1993) ideas and discussion of artists and designers doing research through their practice, Zimmerman, Forlizzi and Evenson developed a framework and set of criteria from which interaction designers by using their design skills, can contribute to the research literature and development within the field of HCI (and I will add: digital design in a broader context), by designing artefacts that “produce knowledge for the research and practice communities, [and] not to make a commercially viable product” (Zimmerman, Forlizzi and Evenson, 2007, p. 7). The authors state that design researchers aim at making the *right* thing by including knowledge based on research using methods from anthropology – including ethnographical methods, and “[t]hrough an active process of ideating, iterating and critiquing potential solutions design researchers continually reframe the problem as they attempt to make the right thing.” (Zimmerman, Forlizzi and Evenson, 2007, p. 5). Their proposed framework consists of four criteria from which the interaction designer can evaluate the process: 1) A thorough documentation of the process, 2) An established state of the art within the field of design, 3) Relevance to the field, and 4) Extensibility – for other designers and researchers to leverage the knowledge derived from the project (Zimmerman, Forlizzi and Evenson, 2007, pp. 7). Thus a documentation of the process and rationale behind the choices made for the design, as grounded in the theory and empirical data provided, is central throughout the presented work herein to ensure the extensibility as well as a transparent process. So far I have, in the introduction, stated the relevance of this thesis and to whom the findings are relevant. In the previous chapters I have presented the theoretical angle of the design situation at hand, and in the following I will present the data collection methods and process and the analysis leading toward a final game concept proposal and a set of research contributions.

6.1 Reviewing The Design Situation

The design situation of this thesis has been to design a sound based LAMG concept incorporating physical activity for children aged 10-14 years. The design situation and challenge was not fixed from the beginning, therefore an exploratory approach to inform and inspire the design process was found most appropriate. An exploratory design process is recommended when the design situation is not well defined from the beginning, as stated by the two Swedish Interaction Design professors Löwgren & Stolterman (2004): “(...) we can talk about exploration when we consider the study of the possible, or of what might be.” (Löwgren & Stolterman, 2004, pp. 69). In order to be able to answer the design challenge I found it important to get a first hand impression of the target group’s experience of and preferences with playing LAMGs. This knowledge was important as a basis for the whole design process, and thus a player-centered approach was chosen.

6.2 The Exploratory Design Process and Player-Centered Approach

A player-centered approach is a term researched and explored by the research team from Hypermedia Lab at the University of Tampere, Finland consisting of game researchers Sotamaa et al (2005). The researchers are introducing a more open and workable approach to game design as an answer to the otherwise ‘mysterious’ closed process of designing games. By ‘mysterious’ approach, the authors imply the approach where the designer gets his inspiration as lightning from above and designs based on this uncontrollable inspiration. The player-centered approach is parallel to the user-centered approach in the field of Interaction Design, with theories closely related and often entwined. The player-centered approach aims to clarify the ‘mysterious’ design process as well as ensure that the designs have some kind of connection to the intended users’/players’ world. The approach has two purposes: 1) to develop designs based on the players’ worlds to better suit and engage players and 2) to open up for explorations of new game concepts for new audiences (Sotamaa et al, 2005, p. 34). These purposes fall fully in line with the objectives in the game concept development of this thesis: to explore new possibilities for new game concepts in the field of LAMGs by exploring the possibilities of designing games encouraging physical activity for children.

Following the Interaction Design scholars Sharp, Rogers and Preece (2007), user-centered design is characterized by a design process where the user and the use situation or context is in focus from the beginning of the design process to the end: In order to be able to create a meaningful design, the designer must first understand the users (p. 425). Also Bill Buxton,

lead Interaction Designer at Microsoft, emphasizes the need for a prior understanding of the users and the use context (Buxton, 2007, p. 143).

However, the task of designing games is different in some areas than designing software for work. Though it can be argued that the fields of game design and software design are merging and game elements are being incorporated into software design (Deterding, Dixon, Khaled and Nacke, 2011), digital games differ from software, because games are considered to be voluntary activities whereas using software normally is considered a tool for performing a specific bound task (Sotamaa et al, 2005, p. 35). Software is most often purpose-driven and designed for use in specific situations or as a tool for performing specific tasks, whereas game design is mostly experience-driven. The voluntary and non-task specific 'use' of games changes the focus in the design process toward the overall experience of the design. In general player-centered design is focused on the experience and the player's perception thereof (Fullerton, 2008, p. 2), whereas user-centered design is focused on performance and task-oriented activities. It can be argued that the boundaries between these two views are blurred. Software design is changing to be as much about designing for an experience, as game design often consists of designing task- or purpose-oriented activities²². I will thus be referring to player- and/or user-centered design interchangeably as situated in the design space of designing for an experience as well as performance/purpose.

The goal with the design process presented in here has been to develop a LAMG concept with a purpose of promoting physical activity. Thus the role of the designer changes slightly to be about designing for an engaging (player) experience, as well as a more task oriented focus of designing mechanics that make the players physically active. This stance positions the design process of a serious LAMG concept as a combination of designing for an experience with a specific purpose.

In order to design for an entertaining experience versus a task performance, the designer needs to get into the mind of the players in order to get a deeper understanding of the intended audience (Ermi and Mäyrä, 2005, p. 1). In the case of the design process in this thesis, I found it important to explore how children in the specific target group of 10-14 years experience playing with LAMGs and how they would come about designing and thinking about this kind of games, in order to 'get into the minds of' and be able to design

²² An emerging term encompassing these differences is the term user experience design. However, a discussion of the differences and boundaries between user-centered, player-centered, participatory, or user experience design is beyond the scope of this thesis. For more on this subject see: Sanders and Stappers, 2008; Buxton, 2007, pp. 127; Sharp, Rogers and Preece, 2007, pp.8; Fullerton, 2008, pp. 10; Kensing and Blomberg, 1998, among others.

for this audience. By choosing a player-centered approach to the design process the target group would be central throughout as co-designers and informants, for me, as the designer, to work with during the creative phases of idea generation and design proposal creation. By doing so I aimed at having a close collaboration with the target group, in order to be able to come up with relevant and meaningful game design proposals. As such this study relies purely on qualitative research methods and data.

6.2.1 Design Knowledge Creation

The methodology of a player-centered design approach belongs to the field of game design, but is derived from the more developed ideas of user-centered design from the field of Interaction Design methodologies. Thus I draw on the methodologies of these two fields interchangeably throughout the design process.

Player and user-centered design is an iterative process based on a conversation between the designer and the information available about the design situation at hand (Löwgren and Stolterman, 2007, p. 23; Schön and Bennett, 1999, pp. 171). Löwgren and Stolterman (2007) refer to the design process as the designer constantly going from the vision - the future image of the design, and the operative image - the actual design, which is being constantly refined through this iterative process until a specification - a final design proposal, is reached (Löwgren and Stolterman, 2007, pp. 16). The Australian game researcher Andrew Stapleton (2005) points out how the design process is moved forward by the designer acquiring knowledge through asking questions and finding solutions in a hermeneutic understanding of knowledge creation (p. 3). As such player and user-centered design is based within the constructivist inquiry paradigm, where the designer is being informed by researching the users', or in this case players', constructions of the world or the context for which the designer is designing (Stapleton, 2005, p. 3, Kvale and Brinkmann, p. 233). Thus the epistemological stance of this thesis is rooted in social constructivism as explained by Professor John W. Creswell (2003): "The goal of research, then is to rely as much as possible of the participants' view of the situation being studied. The questions become broad and general so that the participants can construct the meaning of a situation, a meaning typically forged in discussions or interactions with other persons." (Creswell, 2003, p. 8). The meaning that Creswell refers to, is what informs the designer about the design situation, and is with which the designer has a conversation (see The Exploratory Design Process and Player-centered Approach). It is through this conversation that the designer creates sketches and prototypes, which again are presented and tested in the participants' own 'construction'

of the world. This iterative process is what helps the designer in designing experiences that are meaningful for the participants. Throughout the analysis this idea of meaningful experience became central to both the final design proposal as well as the final conclusion on the findings.

6.3 Who is Being Studied?

The intended audience for the design project was children in the age between 10-14 years. Conducting research with children requires a different approach than that of adults. Several non-traditional approaches has been explored in this regard, and workshops, focusing on the children's own creativity as a source of information and inspiration, has been found especially suitable for design research in the user-centered and participatory design tradition (Sharp, Rogers & Preece, 2007, pp. 300). I was provided with the opportunity of joining an educational LAMG design workshop sequence with three 5th grade classes²³ from Tove Ditlevsen Skole (TDS) in Vesterbro, Copenhagen. An opportunity I exploited for the purpose of this thesis.

In combination with the workshop sequence, the choice of inspirational starting point was the physical play form parkour, as concluded from the two surveys of children's physical activity habits in the introduction, where gymnastics and martial arts as well as untraditional sports like jogging and trampoline were in the top. As viewed these sports are closely related to parkour. Through contacts at Gerlev Legepark and Idrætshøjskole, which is the home of the first official parkour training facility in Denmark, I had the opportunity to co-operate with Mikkel Thiessen, who is one of the founders of StreetMovement A/S, a prominent community of traceurs and parkour affiliates, and also one of the developers of the certified A.D.A.P.T.²⁴ parkour trainer education. Mikkel invited me on a guided tour, with interview, around Copenhagen to see some of the most used parkour spots. I was also granted permission to observe two of StreetMovement's training sessions, one for children and women and one Sunday jam session open for all members and friends on all levels.

Thus the data collection described below reflects these choices and consists of two portions of data: 1) a workshop sequence with three (whereof one was closely followed) 5th grade classes, 2) observations of parkour practices and an expert interview.

²³ A standard 5th grade class consists of approximately 25 students in the age of 11–12 years.

²⁴ See http://www.parkouruk.org/#Adapt_intro

6.3.1 A Word About Working with Children

As Löwgren and Stolterman emphasize, the design process is a management challenge as well as a social process. When the designer is working with users, co-designers or other stakeholders in the project, the designer needs to prepare for the management and challenges of the social situation as well as managing the design workshops (Löwgren and Stolterman, 2007, pp. 32). Most design research methodology theory has been developed through various studies done with adults. However, children tend to be more direct and immediate in their responses than adults. That is, when they have not had time to prepare their answers. Therefore I chose, in the sessions where I was in charge, to let the participants prepare as little as possible to get as open a discussion as possible. To get an open and fair discussion, it was important to work on creating an atmosphere where all the participants would have courage and will to participate with their own points of view. As part of the structure of the workshops, the participants were divided into self-created groups, wherein the participants also found safety to speak up during the discussions and idea generation sessions.

During the evaluating session with 5.a, an overall common consensus emerged in the class that location-aware mobile games were not fun because the technology was not working properly. Despite my deviation-attempts by focusing on different issues, dividing the class into smaller groups, and introducing different design techniques such as drawing, recording ideas or sounds using cameras, or writing down narratives or future gaming scenarios, this consensus continued blocking for further discussion about future possibilities and designs of these games. The strong blockage experienced with 5.a, formed my decision to switch to working with the class of 5.b for the last workshop introducing the two game idea directions.

Learning from the strong blockage experienced with 5.a, I chose to, whenever possible, switch between informal talks with groups and individuals in the prototype workshop with 5.b. Using this approach, I was able to get information on a more personal level, when no other participants were listening, and by doing so I avoided too strong an in-group consensus, also because I only occasionally addressed the participants in groups. This approach turned out to give a more nuanced type of data.

Through the PlayingMondo project I had permission to video film the sessions, which I took advantage of (when ever it was possible). It is common that people tend to 'perform' when being video filmed, and the case with the children is no exception (Blomberg, Giacomi, Mosher and Swenton-Wall, 1993, p. 139). In many cases I chose not to video film in order not to interrupt the activities, and in other instances, when watching the videos, it was clear

that the participants were performing for the camera. I found it wise to have this knowledge in mind when analyzing and interpreting the videos.

6.4 Ethnographic Methods in Design Research

In exploratory user-centered design, an understanding of, and knowledge about, the users and the use-context is key to a successful outcome of the process. Subsequently methods for empirical research and data collection become central to informing the design situation properly, as stated by design researchers and professional Blomberg, Giacomi, Mosher and Swenton-Wall (1993, p. 138). Situated within the field of Interaction Design the methods used in this thesis for gathering information about the design situation, draw on ethnographic methods as adapted to accommodate design research (Blomberg, Giacomi, Mosher and Swenton-Wall, 1993; Blomberg, Burrell and Guest, 2003; Sharp, Rogers and Preece, 2007).

Research to inform the design situation can take many forms (surveys, questionnaires, interviews etc.). For the purpose of this study, a qualitative approach of ethnographical methods was used to get a first hand impression of the players in the intended use context of playing LAMGs. The main difference between ethnographic research for design versus ethnography is the purpose: the designer doing ethnography focuses on issues relevant to the design whereas the ethnographer aims for thick descriptions of human activities e.g. specific cultures or small-scale societies, without specific considerations to use contexts, needs or design challenges regarding any artifacts (Blomberg, Burrell and Guest, 2003, p. 966; Blomberg, Giacomi, Mosher and Swenton-Wall, 1993, p. 138). The challenges here are for the designer to not be biased while doing research, but to keep an open mind aiming for thick descriptions, or for the ethnographer to be able to transfer the gained knowledge to inform designers in a design process, in order to take fully advantage of the methods.

During the workshops I worked as a participating observer in my role as facilitator. As a participating observer I could take on a proactive approach toward getting information and data by asking questions and by being a central part of the design work and discussions (Blomberg, Giacomi, Mosher and Swenton-Wall, 1993, p. 131). The challenge was how to document the data. I took notes whenever possible, and video recording was also a possibility (Blomberg, Burrell and Guest, 2003, p. 970; Blomberg, Giacomi, Mosher and Swenton-Wall, 1993, p. 133). As an untraditional approach in the ethnographical tradition I, as part of the workshop, asked the participants to draw or write down design ideas, scenarios, and game preferences/likes/dislikes on posters, which I gathered for later analysis

in conjunction with the videos and notes. Because of my role as facilitator taking notes during the workshops was difficult. Therefore I ended every session by going over the session and taking notes or drawings of the observations (Blomberg, Burrell and Guest, 2003, p. 971).

For the observation sessions of parkour I have followed the guidelines by professors Emerson, Fretz and Shaw (1995), where the observer purely observes the activities and tend to interfere as little as possible with the ongoing activities. The purpose of the observation was to get an impression and description of the activities and people being studied. It is not possible for an observer to be fully invisible during the observation, therefore I was formally introduced and people were welcome to come and talk with me, which some people also did.

Unfortunately it was not possible to video record the session. By law is not legal in any official setting, like a parkour practice, to video record children under 18 years without the parents' prior written permission. As I did not have such a written permission, no video recording was allowed. In order to get permission would have to involve all possible participants. StreetMovement is a large community, and knowing who shows up when is practically impossible. Getting a permit from all the participants' parents was out of my reach. Instead I audio recorded the sessions²⁵ with my digital pen as well as note taking and – jotting as much as possible without losing focus of what was happening during the sessions (Emerson, Freitz and Shaw, 1995).

In ethnography the notes would be coded and analyzed for the purpose of creating a comprehensive description of the study. Löwgren and Stolterman (2007) emphasize that the designer should continually evaluate and adapt her methods to the design situation. I chose to code and analyze the notes from the parkour observations with reference to the themes found in the workshops. As such, the parkour observations were complementing and contrasting the knowledge created from the workshops.

6.4.1 Interview and focus groups

During the workshops, my role was radically changed from being an observing passive party to an active participating facilitator. Because of my active role as facilitator, I could guide the sessions in the desired direction, and thus I used principles from interview and focus groups from the American professor James Spradley (1979) and the Scandinavian professors Steinar Kvale and Svend Brinkmann (2009). In a focus group interview, the facilitator has the role of

²⁵ The audio recording was not worth much, though, as a core principle in parkour is to make as little sound as possible.

creating a permissive atmosphere, where as many responses as possible are heard (Kvale and Brinkmann, 2009, p. 170). In combination with Spradley's *structured questions* – for example: “what kind of games do you like to play, and why?” and *contrast questions* – why do you prefer FIFA to Call of Duty? (Spradley, 1979, p. 60). I worked toward facilitating the workshops for the participants to speak up freely in an permissive and interactive environment. Because the focus group interview was taking part in a workshop setting, I also had the role of being “teacher”. A role I am familiar with from my previous work and formal education as a music and movement teacher.

Coding and analysis approaches of the data collection are covered in the following sections and in the analysis chapter.

6.4.1.1 Interview

As the guiding principle for the interview with Mikkel Thiessen, I had Spradley's friendly conversation in mind. It was clear that Mikkel had been giving interviews and explanations about parkour before. I was gently taken on a guided tour where Mikkel did most of the talking. He was eager to tell and explain, and his experience as a teacher made him an exemplary informant. As such Spradley's (1979) explanation of a friendly conversation in an ethnographic setting, where the ethnographer strives for a relationship with the informant as the ‘teacher’, was the premise from the start (pp. 55). I had prepared some questions in the form of themes to talk about, as a type of semi-structured interview as explained by Kvale (1997, p. 133). The semi-structured interview was used as a basis for the friendly conversation where the ethnographer strives for a casual atmosphere and lets the interview take form of a conversation guided by partially the themes and stories told by the informant and partially by the prepared themes and question by the interviewer (Spradley, 1979, pp. 55).

These principles of the friendly conversation were used during the observations as well. There were a few instances, where some of the traceurs showed an interest in what I was doing and subsequently in telling about what they were doing. In those instances I let the informants' themes guide the conversation coupled with any questions I had from the observations.

6.5 The Workshops and PlayingMondo Project

In the following sections I will describe the background and structure of the workshops as background information for data collection and the proceeding data analysis and game concept development.

The PlayingMondo (PM) project is a large project, aimed at developing welfare products based on the PM game platform. The project consists of various stakeholders and there are several phases of the project, wherein the workshop sequence was only a small part. The branch of the PM project, in which the workshop sequence took part, was concerned about developing educational products for public school. Thus the official aim and learning outcome for the participants in the workshop sequence was to go through the whole process of a game design: 1) getting acquainted with the field of LAMGs by playing pre-designed PM games, 2) to work with a game idea and turn it into a game design, 3) to prototype the game using the web-based PM platform. The aim of the PM project was to develop educational products for public schools, where the educational material is based on the participants' own design of LAMGs using the platform also called PlayingMondo (www.playingmondo.com).

6.5.1 My Role

I was employed by Euman A/S and my role in the workshops was to conduct the idea generation sessions and assist the participants in working with the PM platform. I was one of four people conducting the workshops. As facilitator of the idea generation sessions my initial approach was to let the children talk, discuss and come up with as many ideas as possible. Children often answer what they think the adult or authoritative person wants to hear, instead of what they themselves think, so it was important to emphasize that there were no right answers, and that the only good answers were their own answers. Another important thing to consider is that children often tend to adopt the opinion of their fellow students and leader persons in the group. Therefore it was important to be alert to spot this tendency and support and encourage the "weaker" persons to come forward with their points.

My role in the PlayingMondo project was thus twofold, which entailed certain complications. I was not able to both assure the quality of the data documentation like making sure that the video kept on recording. Note taking during the session was also difficult, as not much time was left from my official tasks of conducting the workshops. Therefore the data sets were mostly incomplete in regard to time and quality, which meant that much of the data is based on my memory and notes taken when there was time after the sessions. Fortunately I also worked with probes, in the sense that I asked the participants to write and/or draw their meanings and ideas on the topics discussed. The data and methods used are explained below, after a description of the content and structure of workshops.

1.1 The Workshops

Table 1 shows an overview of the workshops and the specific focus of each session as well as my role in each. Table 2 shows the structure of each session. The workshops were held as part of a larger project between several stakeholders. The workshops were structured around three different sessions within each workshop (Table 2), where each class rotated between the different sessions. The participants were divided into groups of approximately four in each. The class with the team designing the best game would be rewarded with 5000 dkr. The jury of the competition was from the consortium of the project²⁶. In all, there were seven sessions: four workshops, an evaluation and award ceremony, one final evaluation and future workshop session with 5.a, and one session introducing and working with prototypes for 5.b. The last two sessions were not part of the overall project, but were held for the purpose of this thesis only. Because of the size and construction of the workshops, I chose to focus on one class in particular. This class was 5.a. The first workshop sequence was held during November and December, 2011 and the last two were held in late January and late April, 2012 (Table 1).

²⁶ The consortio consists of Euman A/S/PlayingMondo, Go Active/DGI Byen. The jury was Thomas A. Nielsen from Go' Active DGI-Byen and Jacob Fjellerad and Anders Lundgren from Euman A/S.

All Workshops	Focus/subject	My role	Data file type
Nov. 9 th , 2011	Introduction to location-aware games and the PlayingMondo platform.	Demonstrating the mobile games on the devices	Video Notes
Nov. 23 rd , 2011	Game Design	Conducting the idea generation session and assisting in the implementation in the platform.	Video Notes
Nov. 30 th , 2011	Game Design	Conducting the idea generation session and assisting in the implementation in the platform	Notes Participants drawings and notes from the idea generation session
Dec. 7 th , 2011	Test and correction of the games	Assisting the participants in their processes	Notes
Dec. 14 th , 2011	Presentation of the games and general evaluation	Assisting the session	Video Notes Posters
Jan. 30 th , 2012	Workshop on future possibilities for location-aware mobile gaming and implementation of sound	Conducting the whole session designed as a future workshop (Löwgren & Stolterman, 2004, p. 70)	Sound recording Drawings Participants sounds (recorded)
April, 24 th , 2012	Introducing and working with prototypes of two game designs in progress	Introducing and conducting the workshop	Some video and sound recorded. Notes taken afterwards

Table 1 Overview of all workshops

PlayingMondo Workshop Structure	Session 1	Session 2	Session 3
Nov. 9 th , 2011	Playing the PlayingMondo games: treasure hunt & boxing	Playing analog games	Making a predesigned game in the PlayingMondo platform
Nov. 23 rd , 2011	Idea generation and design	Playing analog games	Working on implementing their designed games in the PlayingMondo platform
Nov. 30 th , 2011	Idea generation and design	Playing analog games	Working on implementing their designed games in the PlayingMondo platform
Dec. 7 th , 2011	Test of designed games	Playing analog games	Working on the designed games in the PlayingMondo platform after test in session 1

Table 2 Overview of the structure of the PlayingMondo workshops

7 Data Analysis: Working Toward Design

In the design process, beside ideation, sketching and prototyping, I conducted three rounds of empirical data collection. The purpose of the first round of empirical data was an exploration of the field to get an understanding of the target group (to ‘get into the minds’ of the players) and there through derive indications for possible design directions, as well as to get an impression of the participants’ experience of playing LAMGs (see chapter 6 for an overview of the different data types). The second round of empirical data collection was concerned about the complementary part coming from parkour. The last round of data collection was a test with the class 5.b from Tove Ditlevsen Skole in the form of a workshop with two game concept proposals.

The design process and analysis of the empirical data presented in the following chapters reflect this chronological development starting by analyzing the exploratory first round and ending with a presentation and analysis of the last workshop that led to the final design proposal. The parkour observations and interview are presented as the second round of data collection leading toward the last portion of data collection.

7.1 Approach to Analysis

The first round of empirical data collection from the PM workshop sequence resulted in a large amount of data. Therefore I chose, as the starting point for the analysis of this data, to initially look at the two sessions with the class 5.a: 1) The first idea generation session in the PM workshop sequence 2) The evaluating session held as my own extension of the PM workshop sequence. These were chosen as starting point because a) these were sessions with 5.a, the class which I followed most closely during the workshops, b) these sessions provide the starting and end point of the PM workshops and as such embrace the participants’ entire game design process. Also, these data sets are the most consistent, whereas the videos and notes are only fragments of the workshops, because I only accounted for one third of the sessions. These data are analyzed and categorized by looking for patterns and themes as explained by Sharp, Rogers and Preece (2007, pp. 373) in respond to the questions: What are the participants’ game preferences, as reflected in the first idea generation session as well as their own game designs? How do the participants engage in, and react to, playing and designing LAMGs? And more basic questions such as: Do the LAMGs promote physical activity? And how do the participants work with sound and sonic features, and do they

reflect on any use of such features at all? I then looked at the rest of the data – the videos, the posters, the games and the notes – for similar patterns (or lack of such).

The chosen data collection methods and approaches have resulted in a variety of different data types (see chapter 6). In order to be able to sort the data into a consistent analysis across these various data types, by choosing the approach of interpreting the data into patterns and themes, I was able to interpret the different data types into a consistent set of keywords, phrases and themes to work with in the design phase.

Patterns and themes are well suited to be interpreted and transformed into useful keywords in generating design themes and -features to guide the design work (Fullerton, 2008, p. 10). In order to get a consistent analysis across all the various data types this approach was chosen for the analysis of all the empirical data collection sets.

The empirical data from the parkour observations and interview was meant as inspiration for the content of the games. Therefore questions were concerned about how parkour traceurs use and interact with the urban environment. To get background knowledge of parkour as a play form and not a sport, I was also interested in learning about the specific culture of and within a parkour community.

The third round of data collection was concerned about the initial design directions. From this portion of data I have looked at the participants' overall reception of the game ideas as general evaluation of the design directions. On a more detailed level, I found it interesting to look into what specific elements the participants would react to and how and why.

7.2 Initial Analysis: The Legacy From the Introductory Gaming Session

Most of the participants did not have any prior experience with LAMGs. In order to be able to design one the participants needed to get acquainted with LAMGs. Therefore the workshop sequence was started with a gaming session of a collection of pre-designed games from the PlayingMondo (PM) platform. The two games introduced to the participants were a simple treasure hunt (skattejagt) and a boxing game (boksespil). In the treasure hunt, the players had to collect coins laid out in the surroundings while staying alert of the hidden thieves planted to steal their coins. The objective was to collect 15 coins as fast as possible. In the second game (not all groups had time enough to play both games), the players had to

locate and fight against three famous boxers²⁷. The workshop program of the first day also included a game creation session, where the participants, for the purpose of learning the PM platform, were instructed to implement a pre-designed game. The pre-designed game was also a treasure hunting game in the skin of a monkey collecting bananas. And lastly, the PM games did not contain any sound design or other sound features than an intro-tune to the boxing game and a standard phrase at the end of a game with a voice saying: “you win” or “mission failed”.

The PM games were the only experience and practical knowledge of LAMGs that the participants were exposed to. When looking at the games the participants later designed, the influence from these pre-designed games are obvious. Most of the participants’ games were some kind of treasure hunt, although in various universes. And almost all games were without any sonic features (a point which I will return to in section 7.3 Sound Findings).

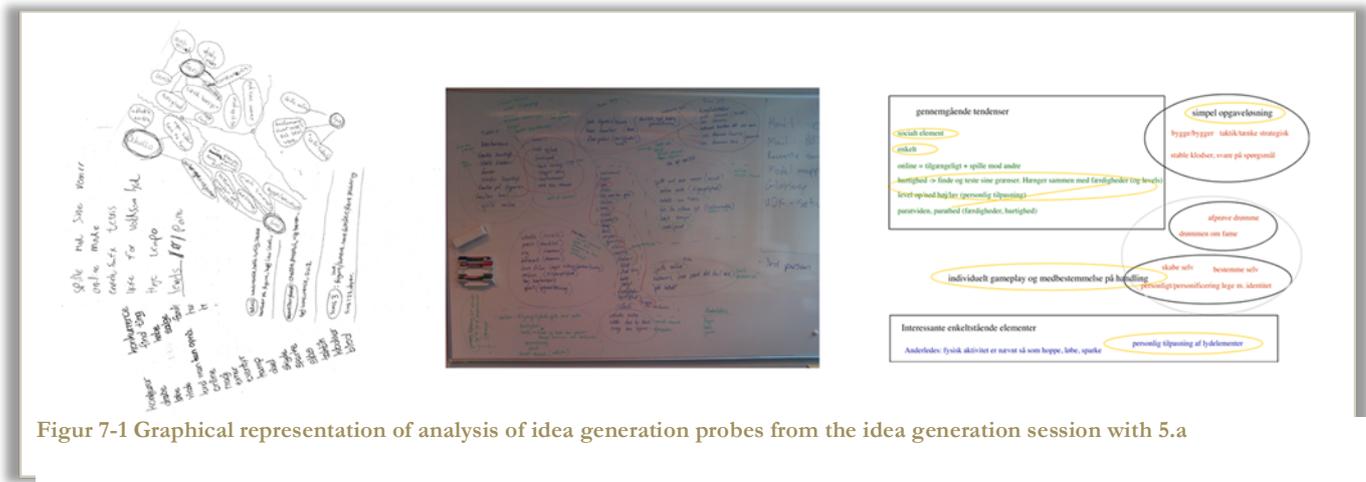
This influence clearly demonstrates how a thorough knowledge of the design situation is important for the outcome. Therefore the emphasis of the analysis was not put on the participants’ own game designs or work with, but an interpretation of the intention behind.

7.3 Game Preferences as Reflected in the Initial Idea Generation Session and the Final Game Designs

During the idea generation session a pattern of gender-specific game preferences emerged. The preferred games among the boys were the football game FIFA and the first person shooter game Call of Duty, whereas the girls preferred Sims and Moviestar Planet (Appendix 1.3). The surprise was that the old-fashion game Tetris was the dominating preferred game of all games, and Tetris was also the most preferred equally among the genders (Appendix 1.3. session 1).

As illustrated in figure 7-1 I have grouped the words from the idea generation probes (Appendix 1.3), interpreted and coded these words into a graphical affinity setup, from which I have drawn out keywords for the design. The keywords have been used to guide the design decisions either directly or indirectly. The keywords are: *Simpel opgaveløsning* (simple task solving), *socialt element* (social element), *hurtighed – finde og teste sine grænser* (speed – to find and test one’s limits), *parathed* (readiness), *levels - personlig tilpasning* (levels – individual configuration), *individuel gameplay og medbestemmelse på handling* (individual gameplay and co-

²⁷ The players would fight by ‘punching’ with the mobile phone held in the ‘boxing’ hand. A feature, on the PM platform, using the smartphone’s accelerometer.



Figur 7-1 Graphical representation of analysis of idea generation probes from the idea generation session with 5.a

determination on activities) and *personlig tilpasning af lydelementer* (personalization of sound elements).

The work with the graphical representation (see figure 7-1) indicates incorporating a degree of individually adaptable gameplay and a co-determination of actions in the games, as well as testing one’s limits as core to the participants’ preferences of a good game. There is a connection with parkour in the participants’ wish for testing and reaching their limits: Parkour is about finding and training to challenge one’s own limits (Sebastian in CitySurfers, 2010, 9.45 and section 1.5 Parkour). The analysis also indicates the need for a high degree of social elements, like communication between players, to have a network of friends, and to work together to solve a task. Specifically, the possibilities for incorporating social features in the designs of LAMGs are among the strongest design elements in LAMGs, which plenty of scholars have pointed out (see chapter 2). In general, a high degree of personalization was present throughout the analysis, not only in terms of in-game activities but also in the different elements such as sound and difficulty levels.

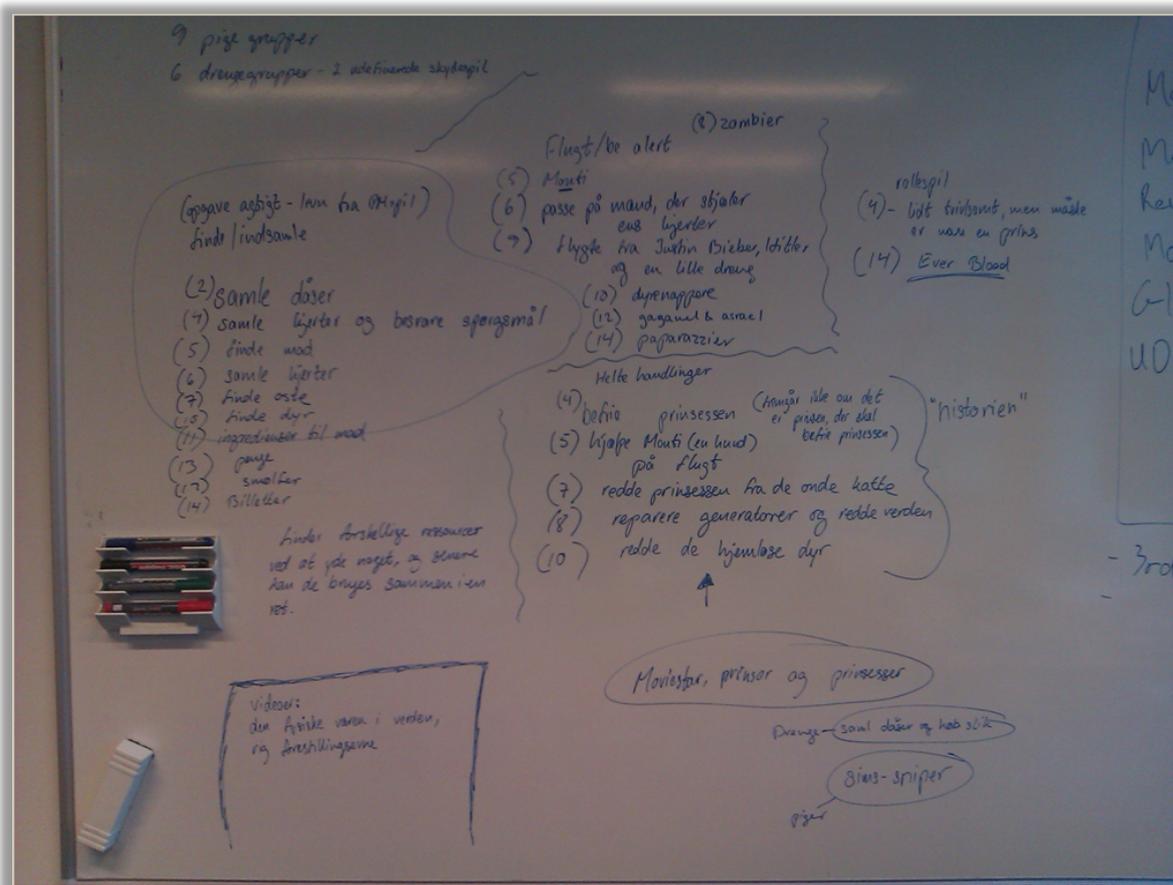
7.3.1 The Participants’ Final Game Designs

I shall now pursue the analysis of the participants’ final games. These are analyzed by looking at each group’s description of their game and affiliated poster, interpreting these as the group’s intention with the game. I did not find it useful to look at the actual implementation of the games into the PM platform, because my focus lies on the participants’ intentions with and imaginations regarding LAMGs (as opposed to the participants’ abilities to navigate the PM interface). I have treated the descriptions and posters as probes, analyzed these into

overall themes, and then interpreted those into keywords containing the compressed ideas, to inform the design (figure 7-2).

When looking at the participants' game designs, the influence from the introductory experience with the PM games are predominating, in that the dominating game mechanic in almost all the games was to find or collect a specific amount of something to win the game, while staying alert of possible "thieves" lurking.

When looking at the stories or game universes of the final games, in general, these reflect the impression from the initial idea generation session. The girls' dominating themes were romance and princes and princesses (game6.pdf, game4.pdf, game7.pdf) and saving animals (game5.pdf, game10.pdf). The dominating themes in the boys' games were first person shooter games (game3.pdf, game13.pdf, game15.pdf) and action games (game8.pdf, game9.pdf).



Figur 7-2 White board analysis of the participants' final game designs

From the participants' final game designs I found *heroic acts/rescue* as a main recurrent theme as well as *finding/collecting/locating* something. The latter theme is inherent from the PM games, but the participants did enjoy this mechanic in the introductory gaming session, in the instances where it worked properly (353.MPG).

However, three game ideas stood out: *dåsespillet* (game2.pdf), *flugten fra scenelivet* (game14.pdf), *sims-sniper* (game1.pdf), in that they use different game mechanics and/or a game universe different from the rest of the games. *Dåsespillet* is designed by boys and is about collecting money to buy candy. Though it is still "just" a treasure hunt, I notice that it is not an action or first person shooter game like the rest of the boys' game designs. *Sims-sniper* is an action game combining Sims with a first person shooter game designed by a group of girls, which is an interesting mix of the "girl-game" Sims with a "boy-game" (first

person shooter game). Flugten fra scenelivet is about the pop star Ever Blood *fleeing* from fans and papparazzis (instead of getting fans), in where Ever Blood must avoid attention. This game is also designed by a group of girls. These game designs are interesting deviations from the main themes found, in that they demonstrate a willingness by the participants to break out of the norms within the large group, and indicate that individual game preferences might not be as gender-specific as the larger in-group consensus from the initial discussion suggested. These thoughts turned out to inform my last decision about converging the two first game ideas into one final concept combining features of action with strategy and co-creation capabilities.

7.4 Sound Findings

Only two incidents of reflections or an awareness of sound were found in the data. One of the groups in the idea generation session had highlighted that sound should not be too intense (Appendix 1.3, session1_drawing3.pdf). From this comment I drew out the keyword of individual adaptation of sound objects, because 1) it was one of the keywords concerning sound and 2) is had an indirect link to the other keyword of individual gameplay and codetermination of activities.

The other instance was the Love Game (game6.pdf). Love game was the only game with a deliberate use of sound as a contributing component in the game experience. The girls had implemented a background sound to enforce the feeling of romance during the collection of hearts. During the presentation of final game designs, the group indicated as future work to extend the sonic features as a core feature of the overall experience. Thus they perceived sound design as being a large part of the game experience. No other group expressed reflections about sound on an experiential level. Some groups did talk about using sounds for usability purposes but no other group implemented any sounds in their final game.

Part of the explanation to the above finding might be that sound was not a part of the introductory games. As these games clearly had a high influence on the final game designs, this fact might provide part of the explanation. Another explanation might be that working with sound is time consuming and often involves a lot of technical equipment or is highly concerned with copyright issues. During the workshops, time was a scarce resource and the platform included no library of sounds leaving little time to explore non-introduced design directions or features.

The lack of any significant sound findings forced the design thinking to rely much on the theory provided from the field of game sound design (see chapter 4) and experiments

grounded therein. Therefore, and in combination with the design process, which so far has been on a conceptual level and little on a practical level as mentioned before, the focus on sound design and sonic features has played a smaller, but still significant role throughout the design process.

Before moving on to the analysis of the parkour observations and interviews, followed by the chapter on how the findings have informed the initial design concepts, I will outline two major findings from the workshops, which have influenced the design process throughout. These findings are also the basis for further theorization and analysis in the chapter 9 *Overall Findings*.

7.5 Led By The Mobile Phone Screen and No Fun Playing LAMGs

In the evaluation session with 5.a, it was made clear that the participants did not like the PM games. As mentioned earlier in chapter 6, section 6.3.2, the participants formed a strong consensus about LAMGs being not amusing at all. The reasons, expressed by the participants, were that it is no fun playing out in the ‘real’ (ordinary) life, there is no ‘magic’ in the ‘real’ world (Appendix 1.4, Notes evaluating session with 5.a.pdf). There are several theoretical explanations as to why, which are covered in chapter 9, but for the work with the first versions of design this finding was understood as a lack of proper play-space and a thought through game universe. Therefore, focus was increased on working with play elements such as exploration and experimentation and how to incorporate an experience of a meaningful game universe.

Another significant influence on the design work came from an observation of how the participants engaged with the PM games. The participants holding the mobile phone (they had one mobile phone for each group of 3-4 participants) hardly looked up at the surroundings, nor at their teammates, and even the teammates (without a mobile phone in the hand) were trying to orientate themselves through that interface. This was the case in all videos recorded during the introductory gaming session (344.MPG – 358.MPG). The participants let themselves lead by the mobile phone screen instead of using the surroundings. The mobile phone screen became the game space, which did not seem as intended from the game design. This finding highlighted the reasons for the objective of this thesis of designing a *sound based* LAMG, and led me to focus even stronger on the use of sound and eliminate as many visually screen based interactions as possible.

The findings from this section in combination with findings from the later prototype workshop also led to some major overall findings, which are covered in depth in chapter 9.

7.6 Parkour Observations and Expert Interview

An overall conclusion to the observations stated so far, is that during gameplay the participants were not very physical active. The physical activity during gameplay consisted of the participants slowly being led by the mobile phone screen focusing almost solely on the small dots on the screen. So far the PM games did not succeed much in making the participants particularly physically active. One of the main objectives of this thesis' LAMG design is to promote physical activity. In the introduction, I argued for the decision of using parkour as a main inspiration for the LAMG design, because parkour share elements with the popular sports gymnastics and martial arts, and at the same time it is an untraditional sport that can be practiced regardless of place and amount of people. The fact that the PM games did not promote physical activity just by being mobile and location-aware indicate yet another reason to look at parkour as an urban physical play form in order to design game mechanics promoting physical activity. In this section I will describe the relevant findings from the parkour observations and expert-interview.

7.6.1 Parkour Observations

I had two observation sessions at StreetMovement's practices in StreetMekka in Valby, Copenhagen. The first was a regular Thursday practice for kids and women. The second was the Sunday jam session for all members and interested people. These were two different kinds of observations, which fitted well for my purpose of getting an overview and first person impression of parkour as practiced from newbie to professional.

The main themes derived from these sessions were that exchanging and experimenting with new movements were at the core of the atmosphere. The highly skilled traceurs helped the lesser skilled, and there were even some instances where lesser skilled traceurs could pass on new movements to the more skilled traceurs and they could develop on these in conjunction.

7.6.2 Expert Interview

In the expert interview with one of the founders of StreetMovement, Mikkel Thissen, he highlighted how using the tactile sense is very central to practicing parkour. It is of utmost importance how and of what kind the surface is made, because it is part of defining what and how to move around the object. A slippery or indeterminable surface could mean a loss in bodily control which could result in physical injury. However, he stressed that parkour is not

about jumping on rooftops, actually the contrary. Parkour is about bodily control and a wise traceur does not overestimate his capacity. Parkour practice is about doing the same thing over and over again, until mastery is obtained. This was also an observation I did during the practice sessions. An observation similar to what is happening in computer games, where the player, in order to progress in the game, will need to learn to perform specific skills, by doing the same things again and again. Doing the same thing again and again is okay for the traceur/player, as long there is some kind of perceivable progress.

Both Julie Angel and Mikkel stress how practicing parkour changes how the traceurs perceive the city. Mikkel is describing this phenomenon as the disease and Angel is referring to this as the parkour vision (Angel, 2011, p. 134). While interviewing Mikkel, he simultaneously points out various locations for good parkour practice. These are ordinary places for everyday use, but, as he explains, traceurs see possibilities for Parkour in every place. (Appendix 1.4, Notes interview Mikkel, 00.49) It is not necessarily about where parkour is being practiced, but mostly about how. It is about being secure in the movements before going for further challenges, and this is practiced through creative and diverse ways of moving in order to achieve such a bodily security. To be creative is about seeing the possibilities in the simple, for instance to experiment with as many different ways to move around and traverse a simple bench. (Appendix 1.4, Notes interview Mikkel, 02.03.16). Thus, these themes of stimulating the tactile sense, using the imagination to experiment with the appropriation of the body in urban space, and the social element of the skilled helping the lesser skilled traceurs are transferred to the design in the form of the game concept Parkourish.

A core element in parkour is the emphasis on social interaction and the community. The community was a core element for the founders (Angel, 2011, p. 15) and, as Mikkel also stresses it is a core element in StreetMovement as well. Mikkel emphasize that in StreetMovement, as it was for the founders of parkour, doing parkour is as much about being part of a community as it is about training. The traceurs develop in synergy: The high level of the skilled traceurs will directly and indirectly improve the level of the lesser skilled. Focus is on mutual and synergetic development and not on who is the best (Appendix 1.4, Notes interview Mikkel, 01.35; Laurent Piemontesi in *City Surfers*, 2010). Thus the social element is an element permeating both the nature of LAMGs, the participants' work and preferences as well as parkour – the urban play form used as inspirational and theoretical grounding for the appropriation of urban play forms to the design process. Supported by the

LAMG theory and the participants' game preferences these findings indicate the social element to be at the core of a successful LAMG concept.

8 Initial Design Concepts and Prototyping

Early in the design process, two directions for game design emerged. According to Löwgren and Stolterman (2007) the designer “should draw on different foundational principles rather than a minor variation of the same basic idea.” (Löwgren and Stolterman, 2007, p. 69). Therefore I early in the design process decided to explore these two emerging directions: An abstract and individually adaptable play form versus a heroic game universe. These directions were based on the assumptions made from the findings described in section 7.4 of working with more play elements (exploration and experimentation) and an unordinary game universe as well as the participants’ preferences of abstract games such as Tetris and fictitious games such as Call of Duty and Moviestar Planet. I decided to work with two different game concepts in order to better assess these ideas separately. This choice was further confirmed when looking into the ideology and history of parkour. The founders were highly inspired by heroic figures like Spiderman and the figures from Dragon Balls by Akira Toriyama, and their mantra was *to be strong to be useful* (Angel, 2011, p. 30). At the same time, parkour is about exploring and using the imagination to be creative in the appropriation of physical movements in the physical environment. These two opposite directions turned into the design ideas: *Parkourish* and *Superhero*.

Because game ideas had an indirect purpose of promoting physical activity, a design constraint throughout the process was to design game mechanics, which force the player to move faster than just walking. The initial game concepts are described in the following sections.

8.1 Parkourish

The abstract game idea Parkourish emerged out of the sessions with 5.a where the participants expressed a joy for the abstract game Tetris and was inspired by the location based musical instrument *Sonic City* (described in chapter 2, section 2.3). In combination with the keywords *individual gameplay and codetermination of activities* from chapter 7, section 7.2, I saw a direction of designing for a high degree of personal narration with exploration of, and appropriation of, the body in the physical environment as the core of the idea. Together with the design constraint of minimal screen based interaction, I came up with the idea of a black screen where the black surface can be scratched off determined by the player’s speed and movements around urban space. Thereby I wished to force the player to experience and

explore the environment as traceurs do in parkour. To support the idea of an abstract personal narration I turned to the theory of mobile music listening from chapter 4 in combination with the keyword of *adaptation of sound objects*, and decided to base the soundscape on the players' own music preferences by letting them define their own playlist of music before starting the game²⁸. Before continuing with the rationale behind the game idea, I shall now describe the game idea:

8.1.1 The Parkourish Game

When beginning a round of Parkourish, the player determines a playlist of songs to function as the soundscape of the game. The screen is black while the players are moving, and only if they make a full stop, will the movements be visualized by a line of scratches, revealing a map underneath. The thickness of the scratches is determined by the speed with which the players were moving. When moving through space the player can 'bump' into 'parkour spots', where the players can watch videos of parkour movements specific to that location as inspiration for further bodily investigation of that particular spot. The video will be visible in the map afterwards, because that part of the map will be scratched off. At any time it is possible for the player to choose to make a video recording him/herself and share it with their friends by leaving it visible on the spot. The video will be accessible only on that particular location. To support the social element, the score in the game will be determined by the contributions of videos and the amount of times the videos have been watched by other players, as well as the amount of other videos the player has found and watched. An average in m^2/km^2 , calculated by how much of the map in the interface that has been scratched off will also influence the score. Finally, the score will also be influenced by how many participants who play together at the same time. The score will be higher according to the amount of players indicating that they are playing together.

8.1.2 Rationale of Parkourish Continued

The rationale of sharing of hidden videos came by inspired by the strong social element in parkour, and sharing of movements and thoughts in collaboration with others, which I found similar to what the girls do in Moviestar Planet, and parallel to that of multiplayer teams in the computer game FIFA. Therefore I envisioned how the participants could encounter and share videos in specific locations and thereby create and interact

²⁸ It is common for children in this age to have a lot of music on their mobile phones (Eckert, Matjeka, Kristiansen, Bertelsen, Baader and Stein, 2010).

through their own locations. The scoring system should reflect the idea of the synergetic development when training together, as explained in the Introduction, section 1.5.

8.2 Superhero

The Superhero game emerged out of the participants' desire for a game universe to be a diversion of the ordinary life. The outer space theme arose from the theories of how sound design can transform the perception of the situation and the environment. The physical urban environment cannot be changed, thus I wanted to design a game universe where the soundscape alone could alter the perception of the physical environment and transform the experience of the surroundings into a non-ordinary world.

One of the keywords found in the participants' own games was the heroic acts/rescue. Also the founders of parkour were highly inspired by heroic stories (see section 1.5). I therefore combined the 'unknown' universe of extraterrestrials with the idea of a heroic game of agents who continuously rescue the world from trouble from the outer space. The rationale was that no one knows what an alien looks like, nor is it common knowledge where or how a space ship can be located. For instance, Rundetårn (Round Tower in Copenhagen) could be a landing field for aliens.

8.2.1 The Superhero Game

All players are secret agents in the service of the Office for Extraterrestrial Affairs. The 'office' is taking care of all traffic and immigration to and from Earth. The agents' duties range from conflict negotiations between aliens from different planets to rescuing Earth from destruction by threats from outer space. At the day of the prototype session in Enghaven, the agents receive a call that a hostile space ship will be landing in Enghaven, and they are to prevent that from happening by laying out a force shield over Enghaven. Enghaven is a park consisting of smaller separated sections, which perfectly could fit a landing field. Furthermore there are a few trees spread out in the area, which could function as disturbances for the force field as well as the landing space ship.

The force shield must be marked in each corner. Unfortunately, any high physical obstacle like trees or houses will weaken the shield. Therefore the agents must reinforce the shield in places with an obstacle higher than 2 meters. When the agents have secured Enghaven, they will need to keep the shield up by continuously marking the corners, because the shield only holds power for 5 minutes at a time and the aliens keep returning.

8.2.2 The Main Rationale Behind Superhero

The Superhero concept was the least developed of the two, and functioned as a contrast to the Parkourish concept. Superhero was developed in close connection to the theory of sound design and thought experiments of how sonic features can be appropriated in experiences of the ordinary world turning it into a fictitious game universe. Examples are that of hearing strange (processed sounds) voices coming out of a cellar when passing by, or suddenly hearing space sounds and a space ship approaching, which alters the perception into a fictitious universe. The question then was how to prototype and communicate these ideas to the participants.

8.2.3 Prototyping

Choosing the kind of prototype is dependent on the purpose of the prototype and at what stage in the design process the design is prototyped (Buxton, 2007, Houde and Hill, 2000). Returning to Löwgren and Stolterman (2007), they state how the designer should always adapt the chosen methods and techniques to fit the situation at hand (Löwgren and Stolterman, 2007, p. 99). As the overall approach I chose role-playing with and without paper prototype (Löwgren and Stolterman, 2007, p. 87). Both designs were only tentative versions, and therefore the prototypes took form thereafter. The workshop was intended to give an impression of how the two directions would be experienced and whether to abandon one direction or go with both, as well as a further development of the game concepts and details in the designs. To follow Bill Buxton's (2007) visualization of the subtle differences of sketches versus prototypes (p. 140), Superhero is at the level of sketch, because it is suggesting and exploring, where Parkourish is closer to a prototype; although very sketchy, it is more specific and refined.

I chose to present Superhero as a verbalized analog play form with myself as the facilitator managing the story of the game. This approach was chosen because I found that making a digital prototype using for example the PlayingMondo platform, would exude a finished game and bring about reactions as if it was a final game proposal, which it was not. I wanted the participants to perceive the prototypes as very tentative in order to make them feel more comfortable in giving less positive feedback.

The way of prototyping by 'acting out' the story, I could play out my ideas in a storytelling form where I was able to alter the rules according to the situation and follow a possible turn in the development of the game. This form opens up the design space in other ways, which I found more useful at that particular stage in the design process. Buxton (2007) is explaining

how visualizing a design too soon can determine a form for the design too early in the process. A verbal approach with storytelling keep the design space open to changes because the design has not yet been put into either visual or digital form (Buxton, 2007, p. 261).

As opposed to the Superhero concept, the interface in Parkourish played a central role in the whole game concept. A physical mockup of the interface was chosen as the most suitable solution, because it was essential to get an idea of the participants' spatial perception and reactions to their own movements when playing with the interface. Figure 8.1 shows the mockup.



Figur 8-1 Prototype of the Parkourish concept

8.3 Introducing the Concepts to 5.b

Out of practical reasons, I planned the workshop to be in the nearest park of walking distance from the school, which was Enghaven in Vesterbro. I had prepared and designed the prototypes for that particular park with the physical objects and possibilities in there. It turned out to be a fine location, in which the participants felt at home.

I had also prepared to video record as much as possible during the workshop, but I quickly decided to turn off the camera, because the participants were clearly disturbed by the recording and started performing in front the camera. The rest of the data, therefore, consists of my notes, based on my memory, taken after the session.

8.4 The Structure of the Workshop with 5.b

Because Parkourish was the most developed of the concepts, this was also the first to be presented for the participants in the prototype workshop. For the presentation of the Superhero idea I had composed an outer space soundscape (Appendix 14.6 spacing out.mp3). Unfortunately, I only had access to four mp3 players, which turned out to complicate the session, because all participants wanted to hear it at the same time. A lot of time was spent on this incident, and the session took a different turn, but clearly demonstrated the interest in and effect of a game soundscape. Below is a brief description of the practical session with the two prototypes.

8.4.1 Parkourish

2 participants on one prototype: One participant playing the player running around, while the other was meant to handle the prototype and plotting in the running participant's movements by scratching the surface in figures equivalent to the running participants' movements. In the map, underneath the black coating, several points of parkour spots were marked, and each point was illustrating a video. In the prototype was included 9 envelopes each containing an image of some people doing parkour moves, as inspiration for the players (see figure 8-2). In the instructions to the participants I also included the possibility of 'recording and uploading' videos of their own movements in a chosen location, by placing a sticker in the designated spot on the map.



Figur 8-2 Parkour images of the Parkourish prototype

8.4.2 Superhero

As mentioned above, the work with this idea turned out to start as a presentation of the soundscape. Because there were only four mp3 players, only four participants could hear the soundscape, or be in the game universe, at the same time. Therefore I had based the mission on a game of four participants. Unfortunately, this resulted in a more chaotic session, because the rest of the participants were left outside the game. During the game, which only lasted short time, I as the facilitator was introducing variations like the space ship was retreating/returning and the shield was breaking down, to lay in some dynamics and uncertainty in the gameplay. The game as presented also relied very much on co-operation.

8.5 Analysis of Final Play Workshop

The workshop was held in the setting of a school activity. Introducing a game, intended as being played voluntarily, in a context that is basically not voluntary, such as school, highlights a discrepancy. In school, the context is normally about solving tasks and assignments, which was also the participants' approach to the introduction of the prototypes. Though the participants did climb the trees and jump from stone to stone during the session, they did not necessarily do so completely voluntarily, because the alternative would have been to be disobeying, which could result in some form of punishment. Apart from the fact that climbing trees and jumping from stone to stone is often a fun activity in itself, an interpretation of the interest from the participants in the prototypes might be that the participants found that playing with the prototypes was a better alternative than receiving the punishment of disobeying the rules in this scholastic situation. Thus the focus of the analysis was put on the participants' interactions between each other, the surroundings, and the prototype, and the meaning conveyed from those interactions - and keeping a critical view on whether the participants were enjoying the ideas or simply just solving a scholastic task.

8.5.1 The Superhero

General findings were that the participants enjoyed the sound and game universe of the Superhero game, because they would have liked to continue the game even when the session was over. The presentation of the Superhero game was the roughest and least finalized sketch. The game only lasted a few minutes, yet the experience pointed out a direction of sound as a possible creator of a fictive game universe within an ordinary life context. By creating such a game universe it indirectly motivated physical activity, because the game was not playable without physical movement. Comments from the participants after the game were that they would have liked to hear the space ship come nearer, and they expressed a

need for better communication between each other when coordinating and co-operating. No one expressed any dissatisfaction with the fictitious story of the game universe.

8.5.2 The Parkourish

The participants' general approach to the Parkourish prototype was problem solving and less exploratory from the start. Several groups returned with statements like: "now we have found the 9 locations, then what?" "We found 12 locations and there are only 9 envelopes, why?" Even though I stressed that they were not supposed to locate the 'video spots' but to explore the surroundings, it turned out to be a common approach. In addition, the scratching part of the interface was not working properly in that the participants were able to see through the black coating on the map and locate the hidden spots. This issue reinforced the participants' task oriented approach to the game and led them to interpret the gameplay to be about locating the spots as fast as possible, instead of exploring the physical environment. Looking at the paths (scratches) on the prototypes afterward, it was obvious that the participants had been aiming straight for the little red dots, which were supposed to be hidden on the 'black' screen.

It was not the entire experience of Parkourish that was oriented toward task-solving. Judging from the participants' responses, and also lack of responses, to the self-created spots, it seemed to be perceived as a natural and motivating feature to locate and contribute with their own spots. This observation is in line with the keywords of individual gameplay and codetermination of activities found in the analysis of the first workshops in chapter 7, and will therefore be a design features in the final game design as well.

The participants' experiences of the Parkourish idea were not as intended. The idea turned out to be little exploratory and experimental and much about locating spots. Somehow there was no meaningful mechanic to link the idea of movements in physical space to the scratches on the mobile phone screen. In the proceeding chapter I will go in depth with these findings as well as the overall findings from the whole design process, in order to inform the design of the final design concept, as well as defining my overall research contributions to the field of LAMG design.

9 Overall Findings

During the design process and work with the empirical data some overall questions and subsequently findings emerged. In the evaluation session with 5.a almost all participants expressed dissatisfaction with the games. In addition, one of the main findings from the workshop with the Parkourish prototype was the missing link between the physical environment and the scratches on the screen. The missing connection led to a task-solving approach on the behalf of exploring the physical surroundings, which resulted in a dissatisfying experience for the participants. Thus a growing question was to find some reasons for these dissatisfying experiences.

Analyzing the empirical data with this challenge in mind, through the lenses of the phenomenological theory from chapter 5, in combination with theories about LAMGs and game sound design from the chapters 2 and 4, I found several explanations to the participants dissatisfaction - explanations that led to the development of new design features for the final design concept as solutions to these findings. I found these overall findings presented in this chapter of general interest and importance for the field of LAMG design and research. Thus, the analysis provided in this chapter reaches out of the design focus of this thesis, by contributing with new knowledge and insight to the general research within this field, and thereby fulfils the second objective of this thesis within the methodology of research through design.

9.1 Bridging Game Space and Game Interface in LAMGs

In chapter 7, one of the major findings presented was the observation that the participants almost solely focused on the mobile phone screen while playing. The participants let themselves lead by the graphical interface of a dot moving in Google maps, instead of the gameplay and/or the physical surroundings. Furthermore did the coins in the PM treasure hunt game from the introductory game session appear to be randomly placed in the physical environment without any meaningful connection to any physical object. Watching the video 348.MPG, where the participants vainly are trying to collect a virtual coin getting no clues except the dot in the mobile phone screen, demonstrates the difficulty of ‘catching’ a non-physical object without any other clue than a virtual dot on a map on a mobile phone screen (Appendix 1.5, 348.MPG).

Reviewing this player experience through the frame of reference as established in chapter 2, section 2.2.1: If the only clue to finding the coins is locating (catching) small dots

represented on a map in the screen and there are no clues in the physical environment, the game becomes something else than a LAMG. Basically, the game then is about capturing the dots on the screen and not about finding treasures in the physical world. The game has no connection to the physical world at all, and the participants are left with no meaningful experience of why they should be physically moving around as the participants expressed during the evaluation session (Appendix 1.4, Notes evaluating session with 5.a.pdf).

This was also the case in the session with the Parkourish prototype. The participants were led more by the dots in the (unfortunately not fully) black screen than by the intended exploration of the physical environment. Because the dots, in the Parkourish prototype, were intended to be ‘surprises’ or rewards (in the form of videos) for the players, the only clue to locating the rewards was the idea of a good parkour spot. Thus in order to engage with the game the player would have to be motivated to do parkour in the first place, or the player would have no other reason to play the game (albeit, had it not been in a scholastic setting). Because the dots in the prototype were unintendedly visible, the participants were provided with a clue to locating the spots, meaning to solve the tasks given. Therefore the huge focus on the ‘screen’. The game itself did not establish a connection to the physical world, and thus there was no real motivation for the participants to move around besides solving the given task. The idea behind Parkourish was to support the play-mode as opposed to the result-oriented game-mode by not include any specific tasks to solve, because the main objective was to support the participants’ own exploration. But the relationship between the game space and game interface was not clear, and therefore the participants turned to the gameplay they knew from the PM games which was to locate or ‘catch’ something.

In these examples, the mobile phone screen becomes the game space, the space in which the actual game takes place, and therefore the participants all have their focus directed toward the screen. The surroundings become the interactional space of the game: It is through the movements in space that the participants interact with the game system. As such the roles of the game space and the game interface are switched: The game interface becomes the physical surroundings, whereas the game space becomes the mobile phone screen. Furthermore, there is nothing to link the two: there is nothing in the game interface (the physical surroundings) to guide the players toward the coins or the parkour spots. The missing link results in an unbalanced relationship between the game interface and the game space (see chapter 2), where the game space and the game interface become detached from one another.

Explaining this finding through the lenses of phenomenology presented in chapter 5, the players have nowhere to direct their intention, there is no coupling between the game space and the game interface. Because there are no other clues or reasons to physically move around urban space than some dots on a mobile phone screen, the players have no place to direct their intention in the physical urban space, and therefore the physical activity becomes detached from the gameplay and consequently meaningless.

During the final game presentation/evaluation workshop with all groups (see Table 1, section 6.7), no one expressed reflections about the placement of the ‘dots’ in connection to anything physically represented in the environment. Following the phenomenological notion of intentionality, a point in a map on a screen is not necessarily associated with a specific location in the physical world unless there is an intentional purpose, a directedness between the two. In the following, I will theoretically draw on some ideas from the field of LAMG design that I have not previously presented. The reason is that these theories are very case specific to the argument presented in here. These theories together with the theories previously presented help shed light on how to design for a directedness/intentionality, which can function as a connector between the game interface and the game space.

Several scholars point to the need of physical location-specific clues for meaningful player experiences. The two game designers Nicolas Nova and PhD Fabien Girardin (2009) derived from the experiences with their game design *CatchBob!* this recommendation: "Detail, discriminate, and understand the spatial features in the local environment that are meaningful to users" (p. 182). Also the location aware and mixed reality game researchers Benford, Magerkurth and Ljungstrand (2005) refer to the importance of careful considerations as to how the virtual and physical elements are incorporated into the design (p. 56), and Walther (2011) states that: "In pervasive gaming, constitutive rules are hosted by the virtual domain, while the regulative rules spring from the social and physical domain." (Walther, 2011, p. 144). Meaning that players will act according to how the game mechanics/features are designed in combination with the physical environment and the social rules herein.

To support this explanation, I present an incident where the participants did find a location-specific clue in the physical environment. This incident works as a contrast to the example of the non-catchable coin explained above. During the introductory gaming session, a group of boys, playing the treasure hunt game, located a virtual thief behind a container (the container was not a stationary feature of the physical environment, therefore I did not

regard this incident as part of any location specific design considerations). By choosing the “right” way to move around the container, the boys could avoid the thief (353.MPG). This example contrasts the other cases explained and highlights the importance of establishing meaningful connections between the game space and the game interface.

Argued in here is how physical and or location-specific clues play a significant role in order to establish a meaningful connection between the game space and game interface - in order to make the player perceive the game activity as meaningful. As was demonstrated by the descriptions of the various historically significant LAMGs in chapter 2, numerous factors come into play in order to establish this connection. One of these factors stems from Montola’s notion of LAMGs as social expandable games.

9.1.1 Social Playability

Another, and rather unfortunate, incident was the case of two girls abandoning the game because they encountered a drug addict taking drugs in an isolated spot, to where the game had led them (this incident was during a playtest of their own game). Though the social encounter mentioned here was unfortunate, the opposite can also be the case. One point here is for the designer to be aware of the non-manipulative location-specific environment on various levels including the possible human encounters and interaction possibilities inherent in LAMGs and to design with these in mind. This is also referred to as part of the social expansion in Montola’s (2005) expandable games (see chapter 2). Though Ekman et al (2005) derive the theory of social playability from the appropriation of sonic features and the impact these have for players social life, I will argue that the idea of social playability extends not only to the appropriation of sound design in LAMGs, but to the overall design of game features ranging from sound design to the use of location-specificity, meaning physical objects as well as the characteristics of the neighborhoods and cities.

9.2 Game-Mode Versus Play-Mode

It was difficult for the participants to get a meaningful and engaging player experience from looking at a dot on a mobile phone screen, which was also indirectly indicated at the evaluation session with 5.a and manifested in the prototype workshop with 5.b . The participants did not like playing LAMGs, nor the PM games, nor their own games. Like one saying: there is no fun in playing out in the ‘real’ life. Playing a game entails something magical, it needs to have magic, or it is no fun (Notes evaluating session with 5.a.pdf). This notion of ‘magic’ expressed by the participants was not further explained but referred to as being not ordinary. It was no fun playing out in the ordinary life.

An explanation to why the participants did not enjoy the games and did not experience the LAMGs as ‘magical’ might partially have to do with other things besides the lack of a magical or unordinary game universe - a game universe as being not the ‘real’ life. Returning to the missing connection between the game interface and game space, and the one-sided focus on the mobile phone screen, the game experience became much focused on task solving - catching the coins - and little on exploration or process-oriented gameplay. In other words: The games did not have a play-space, but only a game-space, and thus the games only encouraged the players to experience being in game-mode. The participants did not experience the games as having any exploratory or experimental qualities supporting the play-mode as argued in chapter 3. Highlighting the main objective of this thesis – designing a *sound based* LAMG I turn to look at how sound design and the use of sonic features could impact this design challenge.

Jørgensens (2008) study of players playing a game with the sound turned off (reviewed in chapter 4) demonstrates that sound is an important factor to whether the player experiences the game as a playing activity, being caught up in the process of the activity, instead of a gaming activity (see chapter 3) which is result-oriented actions. I am here arguing that the lack of sonic features in the PM platform as well as sound design in the PM games was part of the reason why the participants experienced both the PM games and their own games, to be very result-oriented, boring and too much alike ordinary life. A proper sound design could have helped the participants feel a greater sense of being in the game, and perhaps even abstract from the dots on the mobile phone screen and explore the urban space in different ways. From the short session with the Superhero idea in the prototype workshop, this was one of the main indicators that the soundscape, even though it was not interactive, had a significant impact on the experience.

Expanding on the idea of sound design as connector between game-mode and play-mode, a well-designed soundscape might also function as a bridge between the game space and the game interface. Following the framework of the transient state of immersion from chapter 4, a proper sound design can support the user’s immersive state when the game lacks visual enforcement, GPS jump, external interruption or if the narrative is not engaging (see figure 4-1 in chapter 4, section 4.3). In the instance of the non-catchable coin, a proper soundscape could have helped the players to get a feeling of being on the right track, and avoided the frustration of either the lack in GPS or server connection or any other technological problem that led to the non-catchable coin.

Thus the LAMG designer can benefit from focusing on designing ‘connectors’ between game space and game interface as suggested in this chapter, by being aware of the location-specific clues on various levels from physical obstacles to social playability. An increased focus on sound design and sonic features can also function as an important factor in bridging the game space and the game interface as well as help the designer to balance the game-mode and play-mode in the LAMG design.

The last finding to present here focus on the physical and bodily experience of LAMGs in creating connectors between game space and game interface and balancing the game- and play-modes, respectively.

9.3 The Physical Element in LAMGs

In the prototype workshop with 5.b, I became aware that the participants showed an immediate willingness to physically interact with the obstacles placed in the located spots, be it benches or trees, working with both prototypes. Returning again to the example of the non-catchable coin, the two girls started to wave their arms and legs out into the open air to physically catch the coin using their bodies (348.MPG). Furthermore, working with the Superhero prototype, the participants, in order to secure the field from the space ship, grasped the trees, and one even referred to it as “shaking the trees”. I found these observations, in combination with some of the findings from the parkour observations and interview, particularly interesting. For the further theorization I turn to Dourish’s theory of *Embodied Interaction* (2004), Merleau-Ponty’s *Phénoménologie de la perception* (2006), and Ole Fogh Kirkeby’s (2006) interpretation thereof from chapter 5.

During the parkour practices, it was common to physically touch and get acquainted with the object of use by doing small movements, before going on to fully engage with those objects. In the expert-interview with Mikkel Thiessen, it was also highlighted that the tactile sense is central to practicing parkour. It is crucial to know the surface and the object with which to interact. In the subject of the danger engaged when practicing parkour, Mikkel explained how the parkour tradition is about being able to do the same things again and again, and not just to do it once. This is trained by for instance playing with finding and exploring different movements over a bench. It is through the physical movements that the traceur learns about the environment. Or, in other words, it is because of the pre-reflective cogito that the traceur has learned how to move around safely, which explains why the traceurs in the practice sessions need to learn about the object of use by engaging physically and bodily with it. The

traceurs do not learn about the objects by simply looking at it, if what they see does not refer to a prior physical experience. Likewise, the girls from the example of the non-catchable coin have no prior experience of catching a digital coin, therefore they turn to using their body, which normally would be the way to catch a coin.

9.3.1 The Physically Conceivable Element

LAMGs are inherently based on bodily movements through the physical world (the location aware part). Thereby, a large part of the gameplay is stimulated through keeping a focus on physical activity, which in turn awakes the body to be alert and responsive to the physical activities and situations at hand. By looking at LAMGs through history like Geocaching, PacManhattan, Botfighters, Foursquare, Riot! 1831 (see chapter 2 and 4), they all incorporate some kind of physically conceivable object - be it the physical boxes hidden in Geocaching, the (digitally mediated) physical people as either enemies or friends in the multiplayer games Botfighters, PacManhattan or Foursquare²⁹ or the physical buildings manifesting history in Riot! 1831 (see chapter 4). Thus, incorporating some kind of physically conceivable object might add to a meaningful gaming or playing experience.

Elaborating on this statement: Playing LAMGs requires physical movement, but in order to get a meaningful experience, the player needs a reason for moving, beyond just the sake of moving. The player needs to have an object of intention in order to perceive the action as meaningful. LAMGs are situated in the physical world, and, following Merleau-Ponty's theory of bodily cognition, meaning is created through the bodily experience. Physical games and play forms rely on the pre-reflective cogito. If looking at LAMGs as physical play and game forms (mediated by computation of smartphones) experienced through the body, then consciousness and meaning is created thereof. So not only need there be an object of intention for the game to be perceived as meaningful, but it is also important to work with the physical objects from the physical world as well as the bodily understanding thereof in the designs.

As demonstrated throughout this chapter, a digitally mediated fictive layer experienced through the physical world must in some way be coupled with the physical world for the player to convey a meaningful experience. A way to do so is by (also) working with physically conceivable elements, where the player's bodily understanding of the gameplay becomes central. These elements can take the form of (location-specific) physical objects, physically conceivable feedback from the game system on specific physical actions or interactions by

²⁹ Becoming the mayor can even elicit some physical bonus like free beer or coffee in some locations.

physically moving the smartphone (the technical interface) in specific ways (and trigger the gyroscope of the smartphone), for instance getting a buzz when catching a coin, or catching the coin with the smartphone by waving an arm into the air – and get a buzz when succeeding. Sound is well suited to support the creation of physically conceivable game mechanics like escaping or capturing moving entities. The player will be able to hear how far or close to either capture or being captured by an alien, he/she is. In such an instance the player gets a meaningful experience based on his/her own bodily understanding by moving through the physical surroundings guided by a mediated soundscape. The player's bodily perception of speed, distance, range and size will have a predominant impact on the overall experience. Therefore the LAMG designer must be aware of, and design for, the player's bodily understanding of the gameplay as well as the conscious.

The physical dimension in LAMGs can also encompass external elements from the physical urban environment such as designing with height, the use of RFID tags and 2D bar codes, or the proximity of other players and non-players based on mobile technologies such as Bluetooth and near field communication (NFC).

How the findings, presented in this chapter, have contributed to and affected the final game design proposal, is demonstrated through the presentation of the final game design proposal in the next chapter.

10 Final Game Concept Proposal – *Space on Earth*

Out of the work with the empirical data the need for an increased focus on issues such as game space and game interface emerged. In traditional screen based computer games, the game space and game interface are pre-defined by the screen and the game-pad/controller. Chapter 2 highlighted how the game space and game interface in LAMGs are distributed to encompass both the device and the physical world. And the analysis (in the previous chapter about the design process so far) pointed out how the relationship and balance between the game space and game interface were not well established. Therefore an increased focus on these issues became central during the rest of the design process. The central questions to ask throughout the rest of the process were: Where does the action take place during the game? - In the virtual space or the physical? And how does the player interact with the game system? – Indirectly by moving the body over a distance, or directly through the mobile device? These questions have guided the design with the final game concept in order to design a meaningful experience.

The focus then became designing and establishing connectors between the game space and game interface. As concluded in the last chapter, there are several ways of designing such connectors. The main approaches used are the approaches derived from the theory and empirical findings established in this thesis: The use of sound and sonic features, location-specific clues, incorporating physically conceivable elements and exploiting the social dimension inherent in the medium and the participants' desire for social features. The empirical findings as well as the design work with the previous game concepts Parkourish and Superhero will form the basis of the final design proposal and the presentation hereof.

10.1 Space on Earth

The prototype workshop clearly demonstrated the potential effect of a fictitious game universe mediated by a designed soundscape, and the idea of the outer space theme transforming the perception of the physical environment. Contrasting this experience, the Parkourish idea turned out to be lacking fundamental features to convey a meaningful experience. I therefore decided to build directly on the game universe from Superhero and the rationale behind of using sound to transform the perception of urban physical space into a game universe of outer space and extraterrestrial activity on Earth (see chapter 8). Instead of Superhero, I chose to call it *Space on Earth*, which I found more meaningful. The idea of the players being secret agents also gives room for the gameplay to be disturbed by external

factors such as passersby, traffic, and traffic lights, in that those conditions would be the same if the gameplay was 'real'.

10.1.1 The Social Dimension in the Game

In the game the players are all secret agents working for the Office for Extraterrestrial Affairs. The 'office' takes care of all extraterrestrial activity on Earth. Inspired by the movie *Men in Black*, there are already foreign guests from outer space living peacefully on Earth, but regularly problems occur and the agents are 'called upon'. For a player to be called upon, the player must check into the network. After setting the status to 'ready', the player can receive calls at any time. He/she can also just check up on what is going on, and if any of his fellow agents are in need of help on a mission. The player can then check in on a mission, or call the other players to offer assistance. Likewise, players can contact other players and ask for assistance. An internal voice communication system will be build into the system. For ethical reasons players can only communicate with other players with whom they are 'friends', similar to Foursquare (entering further in this discussion of safety and ethics is out of scope of this thesis, though highly relevant. For a brief discussion see section 12.1 Future Perspectives). Likewise checking in - the player checks out, when he/she needs to exit the game.

These features are designed to meet a combination of the social space inherent in LAMGs and the strong social element found in both parkour and the workshops (see Introduction, and chapters 7, and 8). As such, the game is a social network as well as a tool for cooperation. One of the core social features of the concept, taken from parkour and the participants desire for multiplayer, is that players, in order to be on the same mission, can check in together. The missions will then vary, according to how many players are playing together. An example is the day in Enghaven, when the participants had to be a group of four players in order to solve the mission. Had they been only two players together, the mission could have been to negotiate with the space ship or in other ways hinder the aliens from getting out of the space ship.

10.1.2 The Missions

The game consists of various types of missions. For example: Earth is currently under attack from the Artesurions. The Artesurions are an invisible life form (to the human eye) from the planet of Artesuro. Artesurions, like humans, live off oxygen, but Artesuro is highly polluted and no longer capable of producing oxygen. Therefore the Artesurions need to get oxygen

from somewhere else, and they are now trying to build a pipeline from Earth to Artesuro to capture oxygen. But Earth does not produce enough oxygen to feed both planets...

The missions are ranging from avoiding Artesurion space ships to land (like in Enghaven), to capture Artesurions and locate their hidings as well as finding out how their plans are proceeding. At the same time, other missions can have the purpose to find a solution to the oxygen problem to help the Artesurions. These are missions including experiments of, for example, how much oxygen is needed to run a certain distance as opposed to bicycling the same distance. The range of and variety within the 'missions' should be designed to accommodate the participants' desires for heroic acts and rescue, readiness to find and test their limits as well as missions focused on simple task solving (see section 7.2).

10.1.3 Levels, the Score System and Game Time

Another dominating keyword from the analysis of the workshops was *levels*. The participants enjoyed the feeling of progress by completing levels. Inspired by the non-competitive character of how traceurs progress and develop in synergy with their teammates, I worked out a score system where the skilled players will gain from playing with the lesser skilled players and vice versa. The total score on missions completed with a diversely skilled team of players will be higher than that of a team of equally skilled players, and so will the individual score accordingly.

Through the scoring system, the players can gain tools and earn resources to help in missions. These tools are as diverse as tools for easy capture of different species of extraterrestrials, ability to 'run' faster (closer distance), hear over longer distances (the gameplay is mediated through sound, so hearing activity on long distance is a possibility) or they can choose to use their resources on tools - for example for producing oxygen, or containers of oxygen, or tools to help the Artesurions in how they can avoid pollution and produce oxygen at home. Tools can be traded in to accommodate the current mission at the time. The higher the score, the higher the rank and the higher the possibilities and challenges in the game – and the more the player can raise the level of other players. The scoring system is also part of the social element expressed by the participants during the workshops by being multiplayer, and the players can communicate with each other. The scoring system is also intended to facilitate a diverse social interaction between the players across levels, skills and circles of friends.

The game time is pervasive, in that it keeps running, and the players can check in and out of the game as appropriate. The missions are time limited, so that the players can 'win' and

progress in the game to new missions with new teammates, and thereby gain points and progress in level.

10.1.4 Connectors

Other keywords from the analysis of the workshops include *codetermination of gameplay* and *finding/locating something*. In order to establish connectors between the game space and the game interface, designing with location-specific clues was a way to achieve such a connection. The combination of these three keywords led to the game feature of the players to report back to the ‘office’ any suspicious activity in connection to any current overall ‘missions’ (like the Artesurions stealing our oxygen). Suspicious activity could be a suspicious looking cellar, it could be the hiding of Artesurions, or it could be to spot potential places for landing invisible space ships – such as Rundetårn or Enghaven, or it could even be to report in the home of not-registered extraterrestrial homes. The player will then have to mark these locations and the reason for reporting and characteristics of the place (landing spot, home, hiding). The locations will then form part of the gameplay as e.g. a landing spot, home or hiding. By doing so, the game space will be connected to the game interface through location-specific clues. Other instances of using location-specific clues could come from the ‘office’: “On the corner of [the street of players position] and [the nearest street] an Artesurion is trying to buy some important spare parts for the pipeline. You have 10 seconds to thwart it.”

10.1.4.1 The Physically Conceivable Element

The physically conceivable element is the idea derived from the observed need for the participants to move around and touch the physical obstacles in the environment in the same way as the traceurs learn about the physical dimensions of the physical environment when doing parkour. In LAMGs the gameplay is situated within the physical world and therefore based upon movements and obstacles therein. A bodily as well as cognitive understanding of the physical environment become important for the player to derive a meaningful experience when moving around physical urban space. Theoretically drawing on the notion of Merleau-Ponty’s pre-reflective cogito, the physically conceivable element is the element the designer uses to support the player’s bodily understanding in and of the gameplay. The physically conceivable element can be incorporated into the gameplay in various ways, for instance by location-specificity of physical buildings or obstacles (stairs, boxes etc.), or the design can use other physical players through either a social network or as ‘enemies’. In *Space on Earth* one of the ways with which the physically conceivable element is implemented is through the

social dimension, which is supposed to be emphasized by supporting a community formation and internal communication. Other ways to use this element are to implement tactile feedback in specific situations, for example a buzz when capturing an Artesurion, and using gestures like waving the arm to get a buzz when enforcing the force shield. Other ways are to use the vibrating features of the smartphone: The vibration gets stronger the nearer the player gets to the Artesurion. Using sound (a humming, or the breath of an Artesurion) will guide the player in the right direction and in combination with the vibrating capabilities of the smartphone will the player get feedback according to the distance to and direction of the pursued Artesurion (or other species). This way the player will be forcing (or relating to) whatever physical obstacles in his/her way, similar to a traceur in parkour.

10.2 Supporting the Game-Space and the Play-Space

The exploratory nature of checking in to the ‘office’ and the possibility to follow and/or aid friends on missions is supporting the play-space in the game. Also the co-operation with friends in solving the missions and the interpersonal communication features, as well as exploring how the ‘story’ develops form part of the play-space. The main feature to support the play-space is the players’ own reports of activities and locations. Thereby, the players explore and look at the urban physical environment with new eyes as well as their imagination, equal to the traceurs’ parkour vision (see section 1.5), and get to play a significant role in the determination of the gameplay.

The game-space consists of the result-orientation toward completing the missions, gaining tools and resources as well as extra powers to advance in the game. Also, the players will be awarded with ranks as well as their level of contributions of reports and locations will be marked. Thus reporting in on an activity and marking locations is a serious matter, and the subsequent use in the game of the locations and reported activities will need to be assessed by several factors such as the players rank in the game and other players reports from the same area. To support the social element, reporting in on activities and locations in conjunction with teammates is regarded as more serious than individual reporting.

10.3 Where Does the Action Take Place During the Game?

One of the dominating findings during the empirical work was that of the possibility of missing connection(s) between game space and the game interface in LAMGs. In the above sections I have described how the interactional space is defined by the use of location-specificity and sonic features, the social dimension and the physically conceivable element,

answering the question from the introduction of this chapter: How does the player interact with the game system? Likewise, I will now end this chapter by reviewing the game concept proposal answering the other question: Where does the action take place during the game?

The implementation and design of ‘connectors’ are in the game meant only to happen in the screen when ‘checking in’ and/or starting a new round of the game, when reporting in about and marking an observed probable location and/or activity, and finally when checking out again. The missions and the communication during gameplay will be mediated only by sound and sonic features, forcing the players to focus on the physical environment and the activities mediated by the soundscape. Thereby the game is designed to be happening mostly in the hybrid space of the digitally mediated game universe situated within the physical urban environment.

10.4 Physical Activity in Space on Earth

Answering the question of how the concept is intended to make the players raise their level of physical activity? The concept is promoting physical activity by basing the game mechanics on physical movements such as running by chasing Aliens, fleeing from Aliens, setting up force shields, or securing/rescuing aliens or friends in the game. As explained in the description of the physically conceivable element above, the smartphone also functions as a ‘weapon’ to stun the ‘enemies’. As such the players will need to be physically active by using the body in battles and the other instances where the smartphone resembles a kind of resource, for instance in the way of handling smartphone like waving or doing other specific movements when putting up force shields etc. Physical activity will also be emphasized in the ‘experiment assignments’ in the game. In these assignments the participants are asked to perform running, jumping or other physically active tests to measure for instance the level of oxygen needed to perform those activities, as experiments leading toward solutions to help the Artesurions. Also the various species can possess different abilities like being very fast, or jump high, or have four arms to fight with. Dealing with these diverse physical abilities force the players into different physical counter actions. The game is thus intended to incorporate physical activity on a natural level within the gameplay and game universe.

As the game is also intended to be a leisure game and play form, not all game features will need to be based on mechanics making the player be physical active. The feature of players reporting in on ‘suspicious’ activity and locations is intended to encourage a playful way of experiencing the urban space, inspired by the parkour vision. Another physically inactive feature is the social network and communication among players, which emphasize the

participants' desire found in the workshop. These features are important for the coherence of the overall player experience in the game, as all the features mentioned here are designed to engage the players on various levels both physically and mentally.

To conclude this chapter, the game concept Space on Earth, as described and reviewed here, shows potential to raise the level of physical activity for the players. Space on Earth is designed to be engaging for the players by building on representatives from the target group's preferences and experiences of LAMGs in conjunction with a theoretical review of the related fields, in regard to the procedural rhetoric of the game to force a certain level of physical activity for the players. This concept, if implemented, can function as a valid alternative to the console based counterparts Wii, Kinect and Playstation in the range of solutions to the aforementioned break (see Introduction).

11 Methodology Revisited

The choice of basing the design process within the academic approach of research through design proved to be beneficial. Research through design provides the design process with possibilities of drawing on research from various fields as well as on substantial empirical data collection techniques and methods while at the same time contribute with new findings relevant to designers and researchers in the field. The chosen methodology is here viewed in comparison to a purely design-oriented approach without the ambitions of doing research. In this comparison, the design project of this thesis not only relied on a larger variety of information to reach a higher level of quality in the final product, but the general research contributions found during the study also informed the design process in reciprocity.

The exploratory nature of a design process focusing on future potential within a field has made it possible to discover research opportunities, which otherwise would have been difficult to arrive at by theories alone. I here think of the combination of parkour and LAMGs that highlighted the importance of the bodily experience and understanding, which points to a larger variety of design and evaluation possibilities in these games as well. Zimmerman, Stolterman and Forlizzi (2010) support these thoughts by advocating that Research through Design “can be a designerly way to produce nascent theories” (p. 310).

On the other hand mixing the academic research tradition with the craftsmanship of a design practice pose some challenges in order to succeed. As pointed out by Erik Stolterman (2007) it is important that the designer understands the practice of academic research as well as an awareness of the quality of the collected data and analysis thereof, in order to be able to derive general research contributions. The execution of the data collection and analysis in this thesis has been done with careful consideration to the documentation of the process and types of data. Nevertheless several problems therein occurred. Some of these have been addressed when appropriate throughout the thesis others are mentioned below.

It was problematic to thoroughly document the workshops because I was covering the roles of the facilitator, the designer and the researcher at the same time. The workshop location encompassed a larger area than what was possible to record by either audio or video alone. And as I was busy conducting the workshop I had little time to take notes. These problems could have been solved by having a person doing only the task of data collection or having several cameras recording at the same time. By doing so the data collection would be more controlled and the type and variety of data would be more consistent to work with during

the analysis. The drawback is that such a solution might result in an excessive amount of data to process resulting in an unmanageable analysis process. In this study I was the only person documenting the workshops and therefore the data sets became varied and inconsistent as I was using what was available and possible in the various situations.

The approach of learning about the parkour culture and community could just as well have been as a participating observer. This approach would have resulted in a first hand experience of doing parkour immersed in the culture, instead of the chosen method of pure observation. However, the approach of the participant observer would though be more time consuming. Like with the workshops the participant observer is caught up in activities and will therefore not be able to observe and document as large an area and amount of activities as in a pure observing role. In a timely larger project than the one presented in here, such an approach could bring additional information, but also a larger chunk of data.

Parkourish was originally intended as a play-space emphasized by the participants own musical preferences. Due to the 'analog' nature of the prototype this specific feature of the individually created soundscape was not implemented in the prototype workshop. Looking back at the workshop, this could have been solved by letting the participants use their own mobile phone as mp3 player. Though doing so would have been time consuming, it could have affected the players' experience with the prototype. As the designer my choice was to control the process in terms of time and technicalities by not utilizing the participants' own equipment.

12 Conclusion

Through a player-centered design approach I have arrived at a sound based location aware serious mobile game concept aimed at indirectly raising the physical activity level for children aged 10-14 years, inspired by the urban play form parkour. Situated within the academic methodology of research through design, the design process has had two foci: 1) to design a LAMG concept as an alternative solution from the digital design and game field to ‘the break’³⁰ in children’s physical activity level. And 2) To conduct an academic design research study focused on the exploration of design possibilities within the genre of LAMGs, by viewing LAMGs as combinations of physical urban play forms, such as parkour, with computation capabilities mediated by the smartphone.

By designing game mechanics based on the player’s movements and speed through physical space in chases, rescues and escapes during gameplay as well as fights and protectoral movements such as putting up force shields or avoiding incidents, the game concept forges the player to physically move with an intensity similar to a sport (on various levels). This way the game concept indirectly promotes physical activity by basing game mechanics on bodily movements and thus leveraging both the qualities of computerized gaming with physical active play forms. In the attempt of exploring computational solutions to the break and as a means to increase children’s physical activity level, the LAMG concept proposed in this thesis provides a valid alternative to the console computer games incorporating physical activity such as the Wii and the Kinect as well as sports in general. By mediating the game universe through sound in the design constraint of no screenplay allowed, the project has experimented with and arrived at a new game concept merging digital and physical game and play forms.

The theoretical part of the design process has been informed by theories from the fields of mobile and location aware communication, LAMG design and research, game and play studies, mobile music and game sound design, and a phenomenological approach to interaction design. By leveraging the empirical findings based on qualitative data from a sequence of game design workshops with three 5th grade classes from Copenhagen and observations of and interview with the Copenhagen based parkour community

³⁰ The break refers to children’s (between the age of 11 to 12 years) drop in physical activity level and the matching jump in the level of inactivity due to the use of television and computer (see Introduction)

StreetMovement A/S together with the existing theory within the fields of study, the design project has also derived a set of research contributions to the design and research community within these fields.

The empirical data has demonstrated a discrepancy in the relationship between the game interface and the game space as well as the need for bridging these two. The questions for the further design process became: Where does the action take place during the game? How does the player interact with the game system? Answers to these questions have been found by focusing on implementing physically conceivable elements, location-specific clues and emphasize the social element in the gameplay.

Furthermore, the rationale by using sound as core for conveying and interacting with a fictitious game universe experienced in urban physical space was highlighted. The choice of focusing on sound as the interactional space turned out to possess several qualities important for connecting the game interface and the game space, as well as balancing the game-mode and the play-mode in the concept. The empirical data stressed the importance of a balance between the game-mode, i.e. where the player focuses on results and goals of the game, and play-mode, in which the player is encouraged to explore and experiment.

Lastly, the empirical findings analyzed through a phenomenological understanding of the body pointed toward a phenomenon, which I named the physically conceivable element: Consideration of and the incorporation of elements to support the player's bodily understanding of the gameplay. In Space on Earth this has been done in the form of tangible feedback using the smartphone's technical configurations, designing with location-specific features, as well as an emphasis on the social element and through the sound design and sonic features in the game forcing the players' to physically move as part of the gameplay.

12.1 Future Perspectives

Though the features in the final game concept are based on empirically informed data, the features have not been presented to and evaluated with the user group. And because the game concept has no predecessor or directly similar products to derive experiences from, I therefore view the game concept to have arrived at a set of probabilities for a successful serious LAMG that needs further thorough design work and evaluation. In other words, the findings found during the design process as well as the final game concept designed indicate several directions for further exploration and research in order to fully benefit from the work done in this thesis.

The challenges with the lack of connections between the game space and game interface indicate a need for further experimentation of designing such connectors and especially how these are perceived and used by the players. In the same way the influence the various types of connectors have on the gameplay and overall player experience can provide insight to working with these challenges. Developing a framework for working with the relationship between the ubiquitous nature of the game interface and game space in LAMGs could aid designers to better comprehend and design for a meaningful gameplay.

The research findings from the design process also point toward a phenomenologically explained understanding of the bodily appropriation in digital urban play forms to bring other perspectives to both design and research within LAMGs and mobile urban gaming. Working with the physical and bodily appropriation and understanding of movement through physical urban space supported by sonically and digitally mediated game universes leads to research questions such as: How does the player perceive and act in the urban space when the urban space is transformed by a specific game universe and correspondingly designed soundscape (and not just their own selection of music)? Can sound design alter the perception of the players' own movements - for instance the speed with which the players move or the perception of distance? And how would such an alteration influence the players' physical movements and subsequently player experience, gameplay and overall design of LAMGs? These questions form part of general questions on the impact of and use-cases of mobile and urban digital products on everyday life on various levels from personal to public. Thus such a study would be beneficial for a larger research community than the LAMG research and design community.

As the Space on Earth concept has no direct predecessors it would be natural to continue the design work toward a functional prototype in order to evaluate and build upon the findings from the design work done so far, and to explore i.e. the questions and challenges raised above, besides the obvious benefit of exploiting the possibilities found in this thesis of raising children's physical activity level in the combination of physical play and digital games.

Beside the benefits of a continuation of the design process toward implementation, the proposed game concept also raises issues about safety, ethics and security. These issues are particularly present when designing a game for under-aged children situated in urban space and, in addition, is built on a shared social network. Ethical problems to deal with range from traffic literacy to the potential danger of people trying to exploit the access to a social network full of children. Because Space on Earth is still on a conceptual level these issues

have not been brought up. If the concept is to be further developed and implemented these issues should be considered.

Thinking of how LAMGs can draw on the players' bodily understanding and engagement differently than traditional screen based or console based computer games, LAMGs offer alternative gaming environments with the potential of appealing to a different audience.

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13.1 Games

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Tetris, the version preferred by the participants was the online at: <http://www.freetetris.org/>

14 Appendix

14.1 Game Descriptions

game1.jpg (Sims-sniper)
game2.jpg (Dåse spillet)
game3.jpg (Call of Duty TDS)
game4.jpg (Prinsen og prinsessen)
game5.jpg (Montis flugt)
game6.jpg (Love game)
game7.jpg (Minimus)
game8.jpg (Zombie world)
game9.jpg (Run, shoot and punch)
game10.jpg (Red de hjemløse dyr)
game11.jpg (Osten)
game12.jpg (game on zZZzZzzZZzz'saj Playground)
game13.jpg (Children Killer)
game14.jpg (Flugten fra scenelivet)
game15.jpg (skydespil)

14.2 Game Posters

Game1_poster.jpg
Game2_poster.jpg
Game3_poster.jpg
Game4_poster.jpg
Game5_poster.jpg
Game6_poster.jpg
Game7_poster.jpg
Game8_poster.jpg
Game9_poster.jpg
Game10_poster.jpg
Game11_poster.jpg
Game12_poster.jpg
Game13_poster.jpg

14.3 Session 1

Session1_drawing1.pdf

Session1_drawing2.pdf

Session1_drawing3.pdf

Session1_drawing4.pdf

14.4 Notes and Audio

Notes evaluating session with 5.a.pdf

Notes observations of parkour practices.pdf

Notes interview Mikkel.pdf

14.5 Videos

344.MPG

345.MPG

346.MPG

348.MPG

349.MPG

350.MPG

351.MPG

352.MPG

353.MPG

354.MPG

355.MPG

356.MPG

357.MPG

358.MPG

Video fra evalueringnen.m4v

14.6 Sound

spacing out.mp3