

Situated Play and Mobile Gaming

Barbara Grüter

University of Applied Sciences Bremen
Flughafenallee 10, 28199 Bremen
+49 5905 5486
grueter@informatik.hs-bremen.de

Miriam Oks

University of Applied Sciences Bremen
Flughafenallee 10, 28199 Bremen
+49 5905 5602
moks@informatik.hs-bremen.de

ABSTRACT

There is no other play than situated play. A game becomes situated via play activities. Without playing we have the mechanics of a game, the elements and the relations, the roles and the rules. Situated play emerges within playing when the skeleton becomes alive, the role becomes a person, and the abstract game system becomes a concrete unrepeatable gaming experience. For mobile games having permeable borders questioned permanently by everyday life circumstances the creation and recreation of the magic circle is decisive. At the core of the situated mobile play we found the relation of the player to herself, to the objective conditions, and to others.

Author Keywords

Mobile game, pervasive game, situated play, mobile play activity, mobile gaming experience, social interaction.

INTRODUCTION

There is no other play than situated play. A game becomes situated via play activities. Without playing we have the mechanics of a game, the elements and the relations, the roles and the rules. Without playing we have the abstract game system, the space of play possibilities, foreseen by the game designer, and we have the runtime system, the sequential order of possible actions and possible choices, either leading to the final decision or if open-ended structuring possible developments of the game.

Situated play emerges within playing when the skeleton becomes alive, the role becomes a person the abstract game system becomes a concrete unrepeatable gaming experience. And everything what game designers or even players have foreseen is different to what happens when the game play starts. The difference between the abstract game system and the concrete playing is decisive for understanding and designing games and becomes even more important for understanding and designing mobile games. Studying concrete play activities only from the perspective of the abstract system we reduce the player to an exchangeable function owner. From this point of view we never understand the player, his experience and his power to maintain, modify or even change the game system and to teach us future play possibilities.

Situated play is a concept to understand the transition from concept to game play and vice versa. For mobile, pervasive or ubiquitous games having permeable borders questioned permanently by everyday life circumstances this transition becomes crucial.

In the following we present and discuss elementary meanings of situated play in a mobile game with reference to our research on mobile gaming experience. We, the research project Gangs of Bremen, study mobile gaming experience and their conceptual, aesthetical and technological foundations by means of prototyping and play testing mobile games [3,4]. For diving into the matter at hand we start (1) with a definition of mobile games. What is a mobile game? In what respect is it different to other games? And we conclude this chapter with a presentation of one example, the prototype On the Streets we have developed so far. We proceed then with (2) some theoretical remarks on situated play and mobile play activity for positioning ourselves within different communities and (3) outline the design of our play tests in the summer 2006. We then present (4) our empirical findings on situated mobile play and finally (5) draw some conclusions regarding the theoretical meaning of our findings and possible consequences for game design.

MOBILE GAMES

Mobile games are like other games and they are different. Mobile games are like other games in that they are “a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome”. They follow an own logic and “maintain a boundary to the so-called ‘real life’” [8]. The game world created within and by the play activity is delimited by the magic circle, which separates the game play from the outer world with respect to space and time [6,8].

But mobile games are also different to other games. They are based on the bodily movement of the players in an augmented or mixed game world the players get access to by means of computational technology. The computational technology works either on player side or on side of the objective conditions or to connect these two sides as done by mobile devices. The game world consists of the player’s environment, an urban or rural area, which is enriched by

virtual dimensions or even combined with parallel virtual worlds. Consequently the situation of a player in a mobile game is completely different to the situation of a player in a computer game, a board game, or an online game. Mobile players don't sit at their desk or at the table at home. They play in the public, in the so called "real" world, which is not defined, developed and controlled by the designer, the developer or the player. The situation of a mobile player is also different to the situation of a player in a traditional outdoor game with regard to the virtual dimension of the game world.

The mobile game On the Streets

The game On the Streets is played in a part of a city that is virtually divided into squares, we call fields in the following. Players are organized in gangs. A gang consists of one to five runners and a boss who is sitting at a PC and located in the home base. The goal of the game for each gang is to gain power and influence in the city by capturing as much territory as possible that means fields, and particularly the home bases of the other gangs.

All runners have a virtual map of the game territory displayed on their PDAs where they can retrieve detailed information about the field they are currently on and about the eight surrounding fields (see figure 1). They also have access to their inventory and their character stats indicating their player and gang identity as well as their life energy.

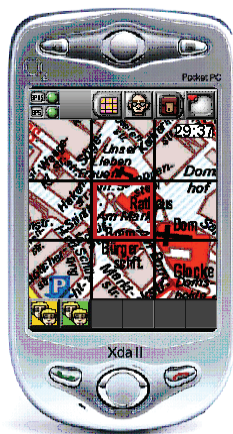


Figure 1: Screen-shot of the main screen of the PDA during a game

In the game world there are also neutral, non-conquerable fields. They contain hospital buildings for recharging life energy that can be used by all gangs. Other fields contain bank buildings. Conquering these fields the owner gang will get money on their gang account in periodical intervals. The boss can buy virtual robots with this money, so called Bots,

place them on the map and let them defend conquered fields for him.

When players enter an empty field it is automatically passed into their holdings. If one player enters an occupied field both attacker and defender can choose whether to fight for it by virtual means or to flee quickly. Players fighting and being hit will lose life energy, which can be recharged in hospitals. If a player misses to recharge his energy soon enough he will become deactivated and can only reactivate himself in his home base, as long as it is in the holding of his gang and not occupied by an enemy.

A conquered field can be searched for items like med-packs or stroke-proof waistcoats, which may increase the player's power.

The game technology

Our game is based on a client server system. Our system comprises two servers for two different tasks: The game server manages all game events, and the tracking server visualizes the player movements during a running game for the audience and records them for further research purposes. On client side again different types of clients are used: PDA clients for the runners and PC clients for the boss of each

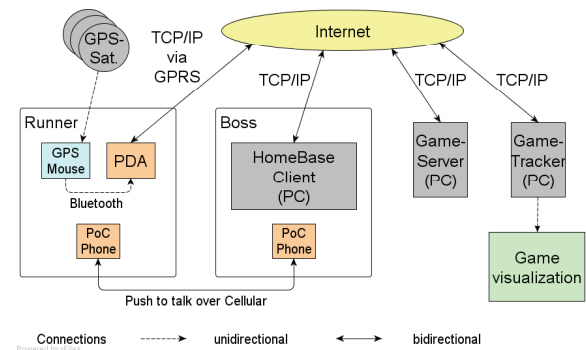


Figure 2: Game Technology On the Streets

gang as well as an admin client to administrate the game.

The runners' technical equipment consists of three elements: a PDA, a GPS¹ mouse and a PoC¹ phone. The PDA is the platform for the game software, controlled via touch screen. The data link between the client and the servers is established by a TCP/IP connection via GPRS using the integrated radio module. The position-data of a single player are provided by means of a GPS mouse connected to the PDA via bluetooth. Via the PoC phones all players within one gang may communicate with each other (see figure 2).

¹ Push-to-talk over Cellular

Mobile games and everyday life

Mobile games belong to the domain of pervasive games. They penetrate everyday life. Aspects, objects, sites of the real world, circumstances and events are integrated into the game world. If the players are not marked by shirts or by caps as it is the case in our game they may not recognize a non-player as a non-player and therefore interpret him as a player within the game logic. In fact belonging to the outer world non-players and circumstantial events may introduce novel possibilities into the game world but being unpredictable they also may cause problems and disturbances for the game world.

This and the still complex technology -another part of the outer world- needed to get a mobile game going makes the magic circle of a mobile game particularly vulnerable. The spatial, temporal, and social limitations of the game world are becoming permeable to that extent that if one limitation vanishes the game is no game anymore as Montola and others had put this characteristic trait [7].

The vulnerability of the magic circle of mobile games must have consequences for the particular meaning of situated play in a mobile game.

SITUATED PLAY AND MOBILE GAMING

For getting a deeper understanding of situated play and to position ourselves within the different communities we start with some remarks on situated play.

Situated play and play activity

Situated play is -to begin with- play within a state of being immersed in a game. Only then a game is situated, only then the game system is alive. All elements of the game - variables in the state of planning - are instantiated then, all relations are dynamic then and may even change within this state. This concept of situated play has in our view a close kinship with the concept of embodied interaction [2] and guides our understanding of context. Slightly expanded situated play is not only the play action at a given state, but also the play activity of becoming, being and ending of being immersed. By this means the power of the player being responsible for situating the game is considered explicitly. The instantiation of a game is first of all an act of the player.

From this perspective situated play is not only playing within a game world, but also the creation and recreation of the game world by the player. As "the film is realized (...) not on the screen but in the head of the spectator" [11]² a game world becomes a game world within and by the players' activity. Playing and being a part of the game world the player also reproduces himself as a player in his relation to the objective conditions and to other players.

Becoming immersed is a transition from mere anticipating game play to playing. This difference and its consequences

may be further studied by means of the concept of the double character of play activity: the structural, logical dimension of the play activity and the contextual, intuitive dimension of the play activity.

The player has a concept of the game and a motif for playing and we assume that the game goal is at least partly identical with the motif. The motif structures the activity of the player. This is the plan, the foreseeable and organized structural dimension of the activity. The game concept, the mechanics we mentioned in the beginning of this paper and the underlying technology are integrated in this structural dimension³.

Following the goal under the upcoming circumstances foreseeable but also unforeseeable, unexpected events will happen within and by the concrete interaction of the player with the circumstances. Those events will have an impact on the conduct of the game play and might even change the motif. No game designer, no researcher and also no player can foresee the mood of the player in a certain situation, the anger, ambition, fear or lust, which fuels the mode of interaction. And no game designer and again no player can foresee the particular meaning a game object becomes within that concrete interaction. Throughout the play activity constraints, disturbances and novel possibilities emerge and have an impact on the further conduct of the play activity. This other side we call the contextual or intuitive dimension of the play activity.

For understanding situated play we have started with the difference between the abstract game system and concrete playing. We found this difference defining the double character of play activity, structure and context. And we introduced situated play as the transition from anticipating a game to playing and thereby creating and recreating the game world.

Being drawn and actively going into the game each player individually encounters and deals with the difference. He may suppress disturbances, compensate technical shortcomings, or even use them for enhancing game play.

Gaming experience

Play experience, the players' sensation mediating the play activity, encompasses the transition between expected and unexpected aspects of the play activity. Compare the concept of meaningful play introduced by Salen and Zimmerman [8].

Mobile play activity

What are the criteria to talk about a particular game process as a mobile play activity? And what is a situated mobile play?

² Translation by the author – BG.

³ The degree of integration depends of course on the player and the degree of his appropriation of the predefined game concept.

The physical movement of the player within the game world is decisive at least for the runners in our game⁴. They move and conquer fields repeatedly. Physical movement is a movement within the given space and time of the game world⁵. But the physical movement from A to B within a certain time is not a sufficient criterion to mark the play activity as a mobile play activity and to understand situated mobile play. Such a definition of mobile play activity would be one-sided, reduced to the structural side of activity assuming a game world, which is fixed like a building.

The mobile game world is a *dynamic world*. The framing conditions of the mobile game world are uncontrollable. The magic circle separating the game world from the everyday world is questioned by the influences of the outer world, by the complexity of devices and technologies and also by the individual ways of dealing with those challenges. To understand mobile play activity and situated mobile play we have to consider not only the structural, but also the intuitive side of the play activity and the interplay of both sides. The players physically move within the game world and have to take into account circumstances nobody can completely anticipate. For understanding the particular single mobile play activity, and the particular space and time coordinates relevant for the single player we have to understand the *individual game concept embodied within and by the physical movement of the player* hopefully revealing itself throughout the game play.

Particular we are looking for hints during the game play suggesting that a player is surprised, angry or insecure. Dealing with unexpected events players following the goal may develop play possibilities we haven't thought of till now thus transforming the given game space and potentially transforming even the game mechanics.

Via integrating the opposing tendencies of the both sides, the logical, structural and the intuitive contextual, within a novel form players create novel game possibilities.

Coping with the dynamic character of the game world mobile players not only confirm the predefined game logic by maintaining the magic circle – they permanently expand and redefine the magic circle by means of invention and enhancing the game possibilities.

Planning situated mobile fight

We started our game design with the idea of situating a virtual world within the context of our city – where the name of our project comes from – and within the life context of urban male and female youth. Bremen is a Hanseatic City and “Hanse”, or “Hansa” is a term used in

early medieval times for gang. We phrased the main theme of the game, gangs conquering territory and getting influence on the streets by that, with regard to issues everybody knows at least from the time growing up.

Planning situated play On the Streets we particular designed the fight mechanism within the game. In the very first version the fight was only the computed equation between the amount of fighting strength points of player one and fighting strength points of player two both having entered the same field. Obviously we avoided any game experience with this design.

The now running version: As soon as a runner enters a field already occupied by another runner, both of them have the possibility to fight. They have to identify the other runner in the real world. Usually fields are huge and often crowded by non-players, so they have to look for each other and to identify the color of the enemy's shirt indicating the gang-membership, and the color of the enemy's cap indicating the individual gang member. Both colors have to be selected by the attacker at the main screen of the PDA in the bottom line – thus initializing the fight.



Figure 3:
Screen-shot of
the fight-screen
for the attacker.

Then the fight screen appears for both players offering fight options to be selected within a certain time limit indicated at the top line of the fight screen. The attacker has to select the body part she wants to attack – and the defender has to select the body part he wants to defend. Players fighting and being hit will lose life energy points indicated in the bottom line of the fight screen (see figure 3).

By connecting “real” and “virtual” color and introducing decision-making and fight action we wanted to enable the mobile fight experience⁶.

⁴ We ignore here the boss player who is sitting at a PC in the home base.

⁵ Traditional concepts of development are derived from this model of physical movement.

⁶ Of course we had visions of Nintendo's Wii-like fight formats. But our first goal was and still is to study mobile gaming experience with the developed system before

Organizing play tests we encountered further aspects regarding the vulnerability of the magic circle: (1) the risk of playing the game and being distracted from the traffic; (2) girls don't like to wear technical devices as necklace in the public. We coped with both aspects: we placed the game in the inner city area not crossed by thoroughfares and the girls luckily forgot about the ugliness of the devices during game play.

PLAY TESTS

In the summer 2006 we conducted the first series of play tests. From fall 2006 to spring 2007 we further developed the game for preparing the second and so far final series of play tests in the summer 2007.

Situated play, the activity and experience of playing, is accessible for game studies only by means of two forms, first by playing yourself and second by means of process studies and a methodology for reconstructing mobile game play. We deployed both forms.

First play test of the core mechanics

On the 13th of June 2006 we realized a play test of the core mechanics of On the Streets. A core mechanics is the most reduced, but still recognizable version of a game described by Salen and Zimmerman as the “essential play activity players perform again and again in a game” [8]. Within this play test the game has been reduced to four fields (A1, A2, B1, B2), two gangs each with one runner and one boss - no items, no Bots, no bank, no hospital (see figure 4).

The play activity of a runner in this game consisted in general of the following actions

- Running, changing fields and conquering them if they are vacant,
- Fighting against the opponent to conquer occupied fields respectively the home base of the other gang.

The play activity of a boss in this game consisted in general of following actions

- Observing the map, the movements, the fights, and the status of the own runner,
- Fighting against the opposing runner to defend the own home base.

Further the members of a gang, the runner and the boss, communicated with each other by means of Walkie-Talkies⁷.

In this game the gang Red consisting of the boss Paul and runner June competed against the gang Blue consisting of

heading for novel fight mechanisms based on advanced technology.

⁷ In this state of development we still used Walkie-Talkies for the gang communication. For reasons of transmission quality we switched to PoC phones after this play test.

the boss Hodi and runner Hank. The home base of gang Red was located at field A1 gang Blue's home base at field B2.

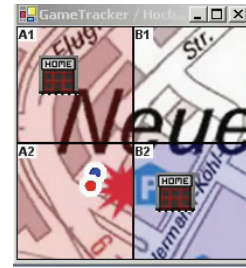


Figure 4:
Screen-shot of the visualization of a four field game world with two gangs.

Data collection

We organized the data collection within this play test for making sure to get information about the game play as a whole process and about play activities of selected single players:

- A visualization of all players' movements; the changing ownership structure of fields and the fights throughout the game
- Recordings of the communication within each gang⁸,
- Participating film observation of the red runner and the red boss;
- A capture of the PC screen of the red boss;
- Film observation from the perspective of the blue runner by means of a head camera.

Evaluation methodology

We report own experiences and present observational data. For analyzing the observational data of play tests we follow a process-oriented methodology consisting of the following steps:

1. Identify the process of the whole game and the steps by which it is unfolding.
2. Identify game events, which change the conduct of the game.
3. Identify the game and play activity states before and after the game process changing events.
4. Differentiate the dimensions of the play activity: the goal oriented structure of the play activity, the rational

⁸ The recordings of communication functioned only partly because of technical reasons.

behavior of the player following the game logic on the one side, and the context of the play activity and the intuitive behavior of the player on the other side.

5. Understand the changes in the game process by means of the results gained in the steps 3. and 4.

We present our empirical findings in form of tables for each example filled with the information about the process of the activity and the relevant context that may have been the trigger to the change of the activity.

Results

This first play-test in summer 2006 was successful. The empirical findings we present in the following come from this first play test.

Further play tests

Further play-tests with four to six players have been successful. We organized in the summer then a play test with 12 players, 8 times 8 fields and the full range of play functions we mentioned above. This test revealed serious performance and scalability problems nearly destroying any mobile gaming experience. The problems always happened when many game events had to be computed in a short time. In the literature we found many hints to performance and scalability problems within mobile applications and particularly network applications. But none of them seemed to be helpful in our situation. Nevertheless and to our surprise the players high-school students at the age of fourteen, were engaged, compensated actively the technical shortcomings [1] and had obviously fun⁹.

SITUATED MOBILE PLAY – EMPIRICAL FINDINGS

We defined situated play first as playing in the state of being immersed and second as playing for becoming, being and ending of being immersed. From the latter perspective we understood situated play as a process of creating and recreating the game world done by the player.

The players themselves *play and enable the game* at the same time. For mobile games having permeable borders questioned permanently by everyday life circumstances the creation and recreation of the magic circle gains in relevance. The magic circle has to be regularly and actively created and maintained by the players with regard to the coherence of the game world as a merger of virtual and real world and with regard to the game world as the inner world being separated from the outer “real life” world.

At the core of the situated mobile play we found the physical character of the player’s relations to the main instances of the mobile play activity: the relation to the player self, to the objective conditions and to the others.

Sensing the player self ‘s

Situated mobile play consists (1) of a strong sense of the player’s self being in the game.

The player is present in the game as a “real life” person moving bodily through the game world and the player has a virtual presence. Within our game the virtual presence of the player has been indicated indirectly by the field in the middle of the map at the main screen of the PDA (see figure 1). The field in the middle is the field in which the player in our game is located at a certain time. If the player moves and enters another field the map is scrolled and the entered field becomes centered in the middle of the map. Thus the player can identify himself on the virtual level indirectly by means of the field in the middle of the map and by means of physical movement and thus scrolling the map.

Playing we experienced this indirect version as completely insufficient. Just to make sure, where we are and how we can effect the game world we tried to identify ourselves during the game play by moving in certain directions and changing the fields – a time consuming inquiry in a field of 60 times 60 meter, which rules out play activity.

For situated mobile play the player’s self, her body, is the main anchor for her relation to the virtual world. Therefore a constant and direct indication of the player’s position is needed. This can be done for example by a dot in the virtual field whose movements indicate directly the physical movement of the player in the real world (see for example the form of visualization of players’ movement in figure 4). Meanwhile we realized that not only such a dot is needed, but also the visualization and sensing of the direction of player’s movement.

We are convinced that the strong sense of the players double-self, the real and the directly connected virtual self, has to be enabled for meaningful mobile play – because only then players will situate themselves within their game world.

Sensing the game world – feedback and the relation to the objective conditions

Situated mobile play is based (2) on a meaningful relation of the player to the objective conditions of the game world. As we have seen with regard to the player’s self the meaning of a play action emerges in the feedback relation between player action and outcome. The player moves physically and understands, who and where he is physically and virtually – compare the concept of meaningful play [8]. The same feedback relation accounts for meaningful sensing the objective conditions. The player takes action, the game world responds and the player understands the meaning of his action including the meaning of the particular aspect of the game world having revealed itself within this feedback relation.

The summer tests with 12 players, 64 fields and the full range of play functions demonstrated that players initialized play actions, but received feedback sometimes minutes later.

⁹ We meanwhile solved the problem – see also the text passage on mobile game event in the following.

One reason for this problem was a shortcoming in our understanding of a *mobile game event*. Our technical definition of a mobile game event and the activity-based definition of a mobile game event have been insufficient conceptualized and synchronized.

The technical defined game events in our software system have been atomized to smallest units of change of a game status and processed according to the FIFO principle. The reason was the goal to build a general system applicable for different kinds of games not only mobile games.

But for the player and his play activity an event in a mobile game requires usually a certain time and a certain amount of effort. For altering the game status in our mobile game by changing the field, the player needs another amount of time for traversing the physical space [9] than for example a player in a board game or a computer game needs for traversing the physical space by hand movement.

The dissection of a meaningful coherent game event in smallest technical units, initializing themselves further internal technical game events, has lead to the consequence that the consistency of the mobile gaming experience from the players' perspective was nearly destroyed as soon as a certain amount of players were engaged in the game.

Sensing the others - the physical dimension of social interaction

Situated mobile play consists (3) of the physical character of the relation to others, be they players or non-players [5].

Reconstructing the whole game process and the single play activities by means of the process data we also included the analysis of the social interaction. In studying those data we stumbled across some aspects, which added up to one meanwhile obvious feature, which we hadn't considered in that depth till then: the implicit, tacit, physical dimension of social interaction.

Fighter's Pas de Deux

The main goal of a runner is to conquering fields via physical movement. Runner, being owner of a field, are challenged as soon as an enemy runners steps on the same field. Within this particular game both runners have just started to move from their own home base field to the home base field of the enemy. And very soon both runners see each other. According to the game logic they may start a fight as soon as they enter the same field.

What happened was the perfect harmony of the synchronization of both runners approaching each other for first helping each other and then fighting against each other (see Table 1).

Table 1: June and Hank – mutually synchronizing their actions

June		Hank	Time m:ss
	The game starts		0:00
June walks from A1 into the direction of B2		Hank runs from B2 into the direction of A1	
Starts running		Comes running	0:21
	They approach each other		0:25
Slows down		Slows down and stops	0:28
Stops in front of Hank			0:36
	They communicate with each other actively maintaining the magic circle		0:39
June responds fighting		Hank starts fighting	1:51

Face to face - sensing the enemy and acting on him

The fight in the game is done on a virtual level. The game logic requires knowledge about the real player to select the enemy on the virtual level. But if you know the other one, as it has been the case in the first play test with only two runners, there is no need to face each other – you can concentrate on selecting and performing the action of attack or defense.

The protocol of the Hank's play actions demonstrates Hank realizing that June -and not the home base and thus the boss of the enemy gang- is the one he attacks turns immediately towards June (see Table 1).

Obviously the players need to face each other thus (re-) creating the magic fight circle.

Table 2: Hank's play activity – actions and context

Hank's actions	Context	Time mm:ss
Hank runs into the direction of the enemy's home base (A1)		
Hank entering A1 approaches June	June says to her boss, she can't recover	
Hank slows down giving an advice to June		3:19
Hank moves on some steps		3:21
Hank stops, his back turned toward June, and attacks the enemy	Fight dialog pops up, pointing to June being the attacked enemy	3:25
Hank turns toward June		3:35
Hank fights		

Physical intention to integrate the real into the virtual world

The obvious need of the players for having a physical contact to the main instances of their game world is further supported by findings about the PC player in our mobile game, the boss of the gang. The boss communicates with his gang members via walkie-talkie. And he has access to the virtual game world where his gang members are displayed as avatars, and the movements of the players, the changing ownership of the fields and the fights are visualized and the bots are stored for further use. Beside of the walkie-talkie he is in a similar situation to a player in an online game - but he behaves very differently.

There are three situations in which the boss of the gang Red Paul demonstrates a behavior unexplainable within the framework of the game logic. The boss Paul sits at the PC in a room located at the first floor of a building around which the play test takes place. The windows of his room point into the direction of the street, where the main part of the mobile game play takes place. From his sitting position the boss can only observe the game play as it is indicated at the screen, he can't see and can't hear what is going on outside. During the game the boss turns towards the window several times well knowing that he isn't able to identify something outside from this perspective.

- The first situations of looking out the window, is, when the boss realizes, what his runner June is doing just now, and participates in her play actions at least on the level of communication and imagination.
- In the second situation he fights against the enemy runner Hank. Suddenly and against the rules Hank annoyed about Paul's play actions, switches channels of his walkie-talkie and gives demands to Paul. Looking out of the window Paul astonished, disgusted and amused proceeds with this behavior.
- The third situation takes place when the boss Paul is involved in the fight against Hank, and has to select his next fight move. Looking towards the window may help him to assess Hank's next move by means of imagination.

Mobile play activity and the magic circle

In difference to the play activity in other games the focus of the play activity within a mobile game is shifting between the virtual and the physical world.

The relation between the both worlds, the virtual and the real or physical is defined by the game technology. But within the game play the game world and its coherence, as a whole is actively created and maintained by the players themselves.

Within the play activity of the players of On the Streets we found different kinds of actions during the game play: the first kind followed immediately the game logic, the second kind served the creation and maintenance of the magic circle by assuring the framing conditions of the game with reference to the contextual conditions of the game play.

Thus the activity of a player consisted on the one hand in immediate actions regarding the game logic: in our case

- Physical movements and changing contexts
- Orientation, perception and comprehension of situations and game possibilities
- Decision making on game options
- Completing actions
- Evaluation of (interim-) results
- Communication with other players for understanding and dealing with particular situations with regard to the game logic

The activity of the players consisted on the other hand in actions of creating, maintaining and shaping the magic circle regarding its spatial, temporal, and social limitations under the concrete conditions of the game play:

- Physical interaction and communication between enemies preceding and accompanying the fight to enable the fight.
- Acceptance and individual compensation of technical shortcomings of the game world as for example a feedback delay.

- Help for each other for interpretation and social support in coping with technical shortcomings.

These kinds of actions are particularly related to the contextual conditions of the game play. The interplay of both kinds of play actions makes mobile play activity visible as a process of using and reproducing the game world.

SUMMARY AND CONCLUSIONS

For mobile games having permeable borders questioned permanently by everyday life circumstances the dynamic character of the game world is reflected by the play activity.

Mobile players face more than other players the difference between concept and playing. Situated mobile play is defined to be this transition from concept to play and vice versa. Encountering the uncontrollable framing conditions mobile player play and –playing- reproduce their game world by integrating unexpected aspects, inventing novel possibilities and thus enhancing the magic circle.

At the core of this we found one dimension connecting our concepts, experiences and observations of situated mobile play: the physical dimension of mobile gaming. The physical dimension characterizes the relation of players to the self, the object, and the others.

We presented empirical findings from our play tests confirming that situated mobile play, playing and the experience of playing, encompasses the relations of the player to those three instances:

- Sensing the player self and acting with regard to it – the self-awareness
- Sensing and acting on objective conditions – the instrumental relation
- Sensing and acting on others – the social relation

All three instances seem to be inseparable intertwined and essential for meaningful and situated play.

(1) The feeling of immediate real and virtual presence in the mobile game world is supported on the virtual map by means of a sign for example an arrow indicating the movement and the direction of the movement of the player.

(2) The meaningful feedback of the game world to play actions takes into account the particular mobile game event as initialized and experienced by the player.

(3) The physical dimension of social interaction supports essentially the mobile gaming experience

- The two runners in their Pas de deux react synchronized and thus develop a shared experience while getting into the fight.
- The runner shifting his focus from a considered virtual opponent to the real physically present opponent - thus physically embedding the virtual fight - has a stronger connection to his opponent in the fight. He faces her, he

communicates with and he celebrates his advantage over her to show his power.

- The boss takes part in the actions of his runner, playing for their gang, tries to estimate the behavior of his opponent in the fight and to understand it in an unexpected situation. Emotionally he shares the experiences with the other players but he lacks a good part of the natural possibilities of social interaction. He wants to close this gap by establishing an eye contact with them or at least support his imagination of them.

On the theoretical meaning of our findings

From the perspective of the situated mobile play elaborated so far the three instances circumscribe the intuitively emerging contextual dimension of the mobile play activity and are the forming part of the mobile gaming experience.

The self-awareness

Without enabling self-awareness the mobile game won't work. The players are not able to play if they have no clue about who they are and where they are. They try desperate to anchor themselves within the game world thus establishing and reassuring the reference point of their play activity.

The instrumental relation

The players are also lost without meaningful feedback of the game world to play actions, meaningful with regard to the particular space and time of their play action. Getting now immediate feedback players try irritated to make sense of the situation by means of further increasing ambivalent play actions.

The social interaction

Particular the physical social interaction turned out to be naturally used and strongly featured by mobile players as it increases the joint game possibilities and the intensity of the gaming experience. Not the pure verbal communication or the indirect combat on the virtual level expressed most strongly the immersion of the players. It is the physical dimension of the social interaction, the possibility to use facial expression, body language and the synchronization of physical movement.

Regarding the particular role of the physical social interaction we may refer to Sniderman. He notes in his article Unwritten Rules that humans are "constantly noticing if the conditions for playing the game are still met, ... always aware (if only unconsciously) that the other participants are acting as if the game is 'on'." [10]. For doing this they constantly monitor and react to the behavior of the other players. One form to monitor and to react to the behavior of the other players is the physical dimension of social interaction.

By means of the physical social interaction players assure themselves about the 'ongoing' of the game and by means of the physical social interaction they constantly (re-) create

the mobile game world and the magic circle at least on the social level.

The magic circle is regularly and actively created and maintained by the players.

Instrumental and social relation

The instrumental and the social relation play particular and necessary roles for the reproduction of the game world within and by the mobile play activity.

- Via instrumental action the players notice differences between their expectation and their actual experience.
- Via social interaction they share their experience, develop a common understanding of the game, maintain and strengthen the limitation of the magic circle against disturbances and integrate novel aspects to be part of the game.
- Via the physical dimension of social interaction they do this spontaneously and fluently without explicit endeavor. And they do this by means of the whole person, the face, the body and the physical movement of the player.

Further studies are needed regarding the particular meaning of the instrumental relation and regarding the interplay of all three instances.

First Conclusions on Mobile Game Design

All instances are needed for understanding mobile play activity and experience and all instances have to be taken into account for designing situated mobile play, the transition from concept to mobile playing and vice versa.

Understanding the meaning of situated mobile play we may support the transition from concept to mobile playing directly. This may happen for example by means of reducing, expanding or shaping the sensing and acting abilities of the player.

The instrumental and the social relation in our game On the Streets may be transformed by designing the PDA as a weapon for direct interaction with the enemy. Thus we may integrate the virtual and the physical level in form of a tangible means and emphasize the physical dimension of the fight.

Understanding the meaning of self-awareness in the mobile game world being supported on the virtual map by means of an arrow indicating the movement and the direction of the movement of the player we may create feelings of getting lost or feeling weak – exactly by modifying the virtual presence and the relation to the physical or we may create feelings of irresistible power by enhancing the sensing abilities.

Understanding the interplay of double character of the mobile play activity, the logical structural side and the intuitive contextual side we may focus on and play with the contradiction between both tendencies and challenge the gamer as producer of novel play possibilities.

REFERENCES

1. Chalmers, M, MacColl, I. Seamful and Seamless Design in Ubiquitous Computing. Technical Report Equator-03-005, Equator [Technical Reports, 2003] <http://www.equator.ac.uk/index.php/articles/c96/>.
2. Dourish, P. (2001). *Where the Action Is: The Foundations of Embodied Interaction*. MIT Press.
3. Grüter, B., Mielke, A. & M. Oks. Mobile Gaming – Experience Design. *Proc. Workshop: user experience design for pervasive computing at The 3rd international conference on pervasive computing* Munich, May 11th 2005, <http://www.fluidum.org/events/experience05/>.
4. Grüter, B., Gröning, S., Milszus, W., Oks, M. & O. Schneider. Mobile Gaming Experience – Working on an Empirical Prototype. *Proc. Workshop User Experience – Towards a unified view. at NordiCHI 2006*.
5. Grüter, B. & M. Oks (2007). *On the Physical Dimension of Social Interaction in Mobile Games*. 4th International Symposium on Pervasive Gaming Applications, 11. – 12 June 2007, Salzburg, Austria.
6. Huizinga, J. *Homo Ludens: A Study of the Play Element in Culture*. Boston: Beacon Press, 1955.
7. Montola M., Waern, A. and Nieuwdorp, E. Deliverable D5.3: *Domain of Pervasive Gaming*. Integrated Project on Pervasive Gaming 2006 <http://iper.sics.se/downloadsub1.html>.
8. Salen, K. & Zimmerman, E. *Rules of Play. Game Design Fundamentals*. The MIT Press, Cambridge, Massachusetts, 2004
9. Schlieder, C., Kiefer, P. & Matyas S. Geogames - Designing Location-based Games from Classic Board Games. In *IEEE Intelligent Systems* 21(5), Special Issue on Intelligent Technologies for Interactive Entertainment, Sep/Okt 2006, pp. 40-46
10. Sniderman, S. Unwritten Rules. Available at <http://www.gamepuzzles.com/tlog/tlog4.htm>
11. Schulte, C. Dialoge mit Zuschauern - Alexander Kluges Modell einer kommunizierenden Öffentlichkeit. In Schneider, I. et. al. *Medienkultur der 70er Jahre*, Wiesbaden: Verlag für Sozialwissenschaften 2004. http://www.kluge-alexander.de/aufsatz_dialoge_m_zuschauern.shtml