

Reflective Practice: Lessons Learnt by Using Board Games as a Design Tool for Location-Based Games



Catherine Jones and Konstantinos Papangelis

Abstract Location-based gaming (LBG) apps present many challenges to the design process. They have very different requirements compared to games that are aspatial in nature. They take place in the wild and this brings unique challenges to the practicalities of their design. There is a need to balance the core game play with the spatial requirements of location-aware technologies as well as considering the overall theme and objectives of the game together with the motivations and behaviours of players. We reflect upon this balancing act and explore an approach to creative paper prototyping through the medium of board games to co-design LBG requirements. We examine two case studies of location-based games with different goals. The first case study discusses the CrossCult Pilot 4 app built to trigger reflection on historical stories through thoughtful play. Whilst the second case study uses the City Conquerer app designed and played in Suzhou, China with a view to exploring notions of territoriality. The paper considers how spatial, social and interaction metaphors are used to simulate location-based games in a board game and discusses the lessons learned when transforming the paper game into a digital prototype. It forms part of a thinking by doing approach. By comparing the board games to the technical counterparts, we consider how effective are the features and activities implemented in the technology prototypes. We propose a set of 11 design constraints that developers must be mindful of when transitioning from paper to digital prototypes.

Keywords Location-based games · Design · Prototypes · Board games · Game design · Urban games · Smart cities · Playable cities

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1 Introduction

We often take our cities for granted. Passing through them as we go about our daily routine as we travel to and from work. So busy engrossed with our daily activities, we stop noticing, exploring and interacting with that which is, and those whom are around us. With the advent of location-enabled mobile phones, we are witnessing the emergence of new playful forms of interaction and participation between and within citizens and the city. Which changes the activity and materiality of the city and supports different types of encounters. Take for example here in Luxembourg at the height of the Pokémon Go phenomenon, the city parks were transformed from the domain of the family and in particular, children to that of couples and individuals, they became crowded with players actively using the space to catch Pokémon. The geolocated game on the mobile device transformed and disrupted the normative materiality and activity of the place, into a place of hybrid play. Seamlessly intertwining the digital and the physical worlds bringing a blended approach to the city.

The embedded nature of locative technology within our smart phones has paved the way for a broad range of research in this field (de Souza e Silva and Frith 2012; Saker and Evans 2016). We are witnessing a growing market in location-based games, which engage millions of players, take PokémonGo, Geocaching and Ingress as examples. In addition to these global successes there are also many niche apps that still successfully engage outdoor play and urban discovery, albeit at a different scale of engagement. GPS and mapping technologies provide users with playful experience where the city is transformed into a living board game or playground. If designed appropriately location-based games stimulate playful urban discovery, interaction, sociability, information retrieval and the like (Ahlqvist and Schlieder 2018; Nijholt 2017).

1.1 *Board Games and the Design of Location-Based Games*

To summarize, the studies noted above illustrate that the City is an intrinsic component of a geo-located game (Evans and Saker 2017) but often it forms a passive component because the game play simply uses the city as a container of activity but not much more. To provide a fully immersive and embodied experience that shapes our playful interactions we need to design location-based games that facilitate interaction and dialogue between the city and its citizens. If carefully planned and developed, these transformative forms of city-based engagement could be encouraged and achieved using geolocated gaming apps. Such technology ecosystems need novel techniques and methods that enable them to be (co)designed creatively and efficiently. This is because location-based gaming apps present many challenges to the design process. They have very different requirements compared to games that are aspatial in their nature. They take place in the wild and this brings unique chal-

lenges to the practicalities of their design. There is a need to balance the core game play with the social-spatial requirements of being outdoors together with the overall theme and objectives of the game with the motivations of players. There must also be consideration for notions of place attachment and territoriality that manifest because of the place-based ties players have.

There are many existing methodologies for designing and evaluating online games or websites that have been tried and tested ranging from cardboard prototyping (Ehn and Kyng 1992) to Wizard of Oz prototyping (Li et al. 2004). Thus, it seems natural that board games can aid in the planning of location-based games, especially since they are intuitive, playful and sociable and incorporate many elements that are used in location-aware games (proximity, movement, social interaction). It seems sensible that common metaphors such as those used in board games should become part of the location-based game designers' toolkit. Indeed, the Carcassonne game was used as the starting point for the development of a geolocated game discussed by Matyas et al. (2008). In the literature, a few studies integrate board games into the iterative design process of location-based games. These studies take inspiration from existing board games (Mateos et al. 2016; Schlieder et al. 2006) or custom design a game based on their unique scenario (Jones et al. 2017a; Marins et al. 2011). They build upon notions of paper prototyping incorporating playfulness and sociability to foster a co-design process.

1.2 Methodological Overview

We reflect upon this balancing act and explore an approach to creative paper prototyping using the medium of board games to co-design game requirements. We examine two case studies with very different goals. The first case study in the spotlight, discusses the CrossCult Pilot 4 app, designed to provoke reflection and reinterpretation on historical topics through thoughtful play, whilst the second case study uses the City Conquerer app that was designed and played in Suzhou, China that explored notions of territoriality. We use reflective practice to look back on the paper and technology prototypes to form part of a process of thinking as doing. Thus, the discussion reflects upon our lessons learned that result from our thinking and observations of the process that started with board games and comparing them to the technical implementation that were subsequently evaluated. We identify strengths and weakness of the use of board games for this design process.

2 Case Study 1: CrossCult PILOT 4—Designing Games for Serendipitous Urban Discovery and Personal Reflection

2.1 App Overview

The app is motivated by the desire to foster reflection and reinterpretation through location-based experiences by encouraging participants to encounter different types of historical stories, which relate to current social challenges such as migration. The app is best described as a serendipitous urban discovery game. It triggers reflection on the cultural heritage of cities and their public history by encouraging users to engage in playful encounters. This supports an intellectual journey. Through geolocated play with the city, its history and its people are brought into our consciousness. As player’s walk through the city they choose which points of interest (POIs) to discover based on where they are and where they are going (Fig. 1). They can also have the phone in their pocket and it will vibrate if they are passing through a POI.

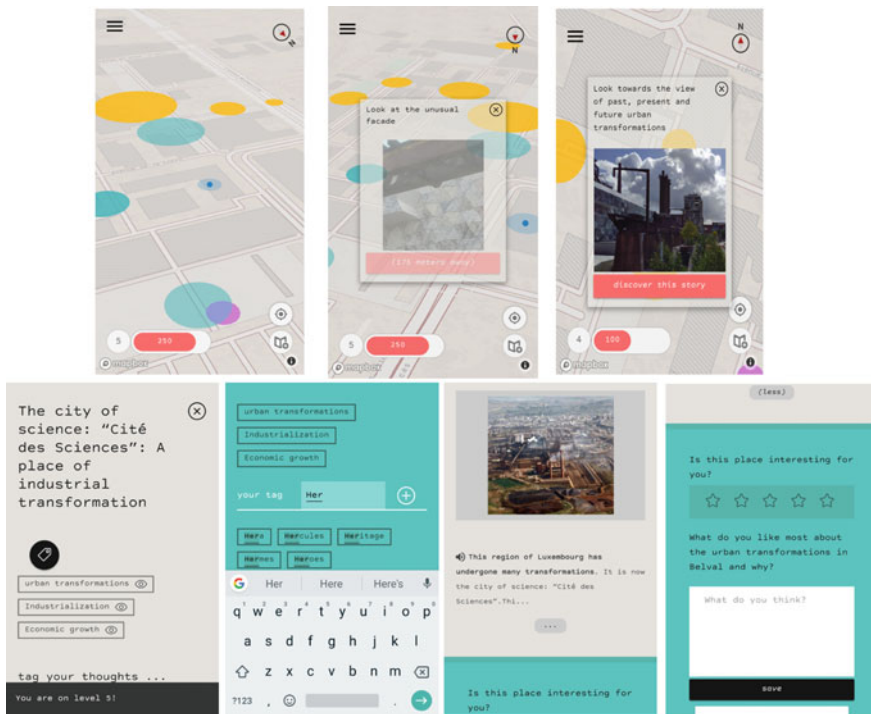


Fig. 1 Screenshots showing CrossCult Pilot4 App. (top left) birds eye map, (top middle) navigational clue, (top right) story discovery, (bottom left) story window with title and tags, (bottom middle) story media and text (bottom right) rating and answering a question



Fig. 2 Board game set up (left) and game play (right)

POIs are comprised of navigational clues (a title and an image) which indicate to players the story locations. The text of a navigational clue hints towards the topic of the story. The POIs are symbolised on the map as yellow or purple circles—yellow for curated stories and purple for player-contributed personal stories, see Fig. 2. As soon as the user’s physical location (blue dot) is located within the yellow or purple circle, users can open, read and interact with the story.

The stories discovered can have either a direct connection to the POI or a metaphorical connection to the location. Each story is comprised of short self-contained texts together with a contextual image. As part of the game, players can win points, move through game levels, unlock functionality and earn achievement badges for completing different tasks including answering questions based on the stories. Comments on questions are marked as pending until they have been moderated via a companion app. The backbone of the app is the location tracking system and its ability to function as a sensor capturing the player’s location and deliver information accordingly.

2.2 Board Game Design Approach and Discussion

We used an initial scenario to inform the design of a board game that became a tool for both paper prototyping and co-design. The final design results have been previously described (Jones et al. 2017b), but in essence play tests were conducted with 16 participants (from the author’s institute), across three play sessions. The game attempted to mimic how players would move, discover and interact with stories by building upon existing intuitive representations of movement and play that established in board games. We used a game master to organize the play sessions, their role was to explain the rules, log the points on the scoreboard and manage the content interactions (making it available when players reached points of interest).

Urban movement and playspace: The act of movement through the city and discovering POIS, central to the mobile game, was simulated using a combination of

features. That were typical of many board games in which players move around a board depicting an imagined landscape. By rolling a dice they could move their *playing piece* by counting the number of steps and stopping when they reach a landmark (POI). For our play space, we replicated this movement metaphor using a paper map (Luxembourg). Onto which we marked the real locations of the POIS (aligned to their GPS coordinates) and then drew paths between them. Stepping-stones that represented nodes on the street network were marked at junctions in the real street network. They represented the choice of turning and changing direction midway through long streets—they marked the effort required to move along long streets (see Fig. 2). The stepping-stones together with the score from the roll of the die restricted how far you could ‘walk’ in an attempt to simulate the physical effort of moving in a city. We replicated autonomy of movement by enabling individual players to begin the game at any location marked and then with their roll of the die they were free to move towards any POI of their choosing. The design supports serendipitous discovery of stories as opposed to traditional linear tours through a city that have a designated start and end-point, players could ‘walk’ towards any POI they wanted and change direction at any time.

Situated story activation: In board games, players land on special tiles where players collect or pick up playing/event cards (think of monopoly and the chance card). These cards require the participant to take an action (go straight to jail, pass go or collect \$200). We took this idea of the event playing card to replicate the screen of the mobile (creating a postcard size booklet), simulating the access to content that could be discovered. Story discovery was activated when a user reached a POI icon on the map. When players found themselves in the correct location, they were given the option to open and interact with the story booklet or they could move on if they were not interested. Players were under no obligations to interact with content unless motivated to do so.

Context awareness: We were keen to design the game to provide a mechanism where players were not obligated to spend the entire game looking at their mobile phone. Context awareness was an important concept. The phone automatically notifies you when are in the vicinity of a POI, using haptic feedback if the app was open in the background. To evaluate this type of feature in the board game, a game master played a sound when a player approached certain POIs.

Reading stories and reflecting: In board games playing/event cards, have actions, rewards, or penalties that contribute to the winning conditions of the game. Thus, we adapted the concept of event cards to create a postcard booklet—which you could open when you arrived at the POI. Players could not read the hidden story until this point was reached. We also used the small a5 size booklets as an imitation of the mobile screen with each page more or less representing a scroll down on the screen. Page 1 showed the navigational clue picture and a more detailed map, the second contained a historical picture and the story whilst the third page focused on the interactions of tagging and responding to a question (see Fig. 3).

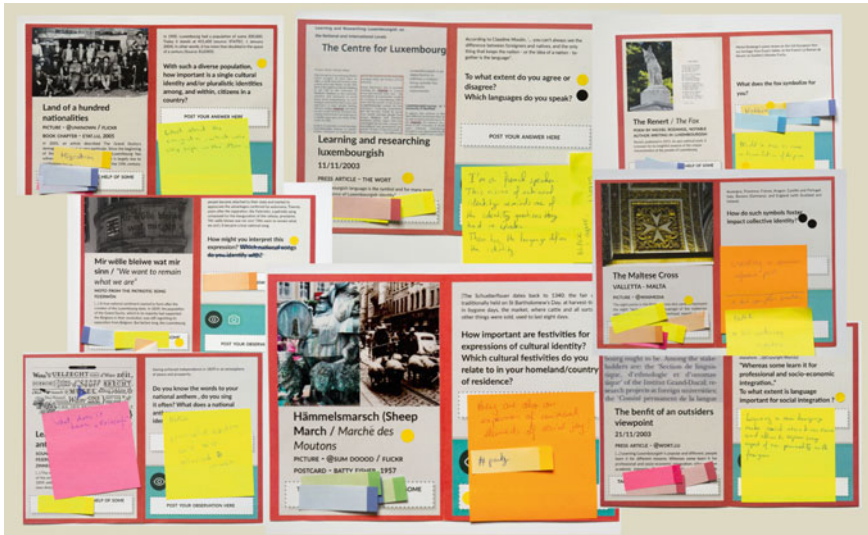


Fig. 3 Postcard booklet with participant interactions

Social interaction and player contribution: A key aspect of board games is their ability to create shared social experiences. They come in many different formats which include designs to create competition between players or those that are based on consensus where players work together to achieve a common goal. We needed to design elements of the game that would collect user-generated content and encourage other users to view the contributions of others. When a player landed on a story they could choose from a number of interactions: (1) tagging a thought on a story, (2) rating your reaction to a place, a story or content or question (3) answering a question designed to stimulate reflection. We used post-it notes together with agree/disagree stickers (see Fig. 3) and all interactions with the booklet won players points.

Geolocated reflection(s) and personalized stories: We had one further game mechanic designed to enable users to share their story at location of their choosing. If players rolled a 1, they could spend that turn to pick a *treasure card*. In the first iteration of the board game players would write on blank treasure or read treasure cards provided by others. In subsequent iterations (there were 3 in total) story cards used intuitive symbols to prompt a personal memory that could be pinned to any location. This interaction simulated co-creation of user-created points of interest.

2.3 Lessons Learnt

With the Pilot 4 app designed in beta version and undergoing an extensive evaluation, it is time to reflect back on the design process. Paper prototyping has long been recognized as a useful tool for human computer interaction design (Snyder 2003)

and so it seems only natural that in the design of location-based games we combine the notion of paper prototyping and board games—there are so many that simulate interaction of being in the city. We were able to evaluate and co-design a number of different aspects including the (a) cultural content presentation and quality (historical objects and narratives), (b) the participative activities (reflections, interactions and user memories), (c) the winning conditions, and (d) the game design. The implementation of the digital app led to a series of evaluation experiments results of which are described in a publication (Jones et al. 2019).

2.3.1 2D Paper Maps for Complex Topography

We used a 2D paper map as game board. With such a flat object, it is difficult to replicate the presence of urban barriers such as landscape topography. In the board game, people had no worries moving freely. In reality Luxembourg is undulating, it lacks spatial continuity and has natural barriers (a large valley) which requires extra physical effort. These barriers are challenging to replicate on paper and the app requires game mechanics to motivate you to go to inaccessible places.

2.3.2 Sociability and Competitiveness

Social interactions are often a driver of the gameplay and help to stoke competition amongst the players. In board games players are able to see each other positions and observe their paths of movements and this helped to motivate players. This is where there is a slight divergence with the technology prototype and the board game design process. We felt it inappropriate to reveal the locations where other players had been—due to data privacy and ethical issues of mediated co-proximity and geostalking (Licoppe and Inada 2009).

2.3.3 Modelling Asynchronous Interactions

The mobile app of Pilot 4 app was always conceptualized as an asynchronous game, players interacted by leaving their reflections which other players discovered. In the board game, this asynchronicity was simulated by keeping the story booklets closed and only allowing players to interact with them when it was their turn and when they arrived at the correct location. To replicate the true form of asynchronous game, on a board game we would have had to hold separate game play sessions with each individual participant playing on their own—which we chose not to do so for logistical, social and playful reasons. We made a compromise.

2.3.4 Bird’s Eye View of the Map

In the board game the players had a birds eye view of the locations of the POIS and their distribution in the city. We failed to carry this perspective through into the technical implementations. During an early prototype, we restricted the zoom level, preventing players from seeing this bird’s eye view of all the locations. The team thought this would be a more playful interaction. An early round of testing with an external participant indicated the value and importance of players that this view had. In later experiments we observed participants using the bird’s eye view to plan their routes and decide where to go. Mirroring the same behavior patterns that was used in the board game, indicating its use and benefit to participants.

3 Case Study 2, CityConqueror—Designing Games for Exploring Territoriality

3.1 App Overview

CityConqueror was inspired by the board game ‘Risk’. In this board game a player conquer countries on a world map, deploying units to defend and attack countries (Fig. 4 left). In the game CityConqueror, players can conquer territories in their physical location, deploy units to defend their territories and attack those of other players that are nearby. It was designed for the neighbourhood scale.

In the technology prototype when conquering a territory, the player gives it a name that is then visible to other players. They can deploy units to defend the territory and hide a treasure in it. Territories are conquered and plotted on a map of the “real” urban terrain, showing the player’s location. The map is covered by the *Fog of War* similar

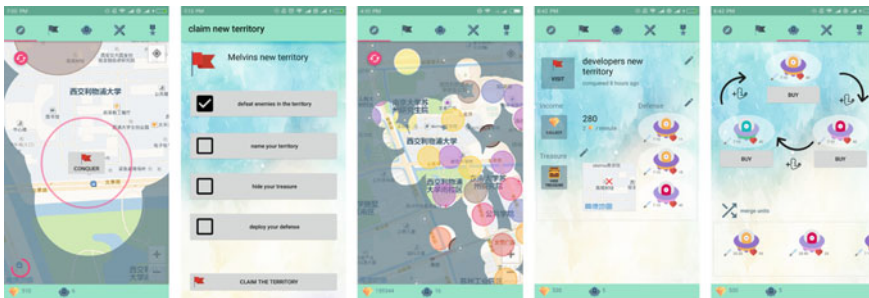


Fig. 4 (left) Fog of War: player conquer territory based on h current physical location. (middle left) To conquer a territory, the player gives it a name, hides a treasure and deploys units. (middle) Territories are plotted on the map. (middle right) A territory generates resources. (right) There three different types of units

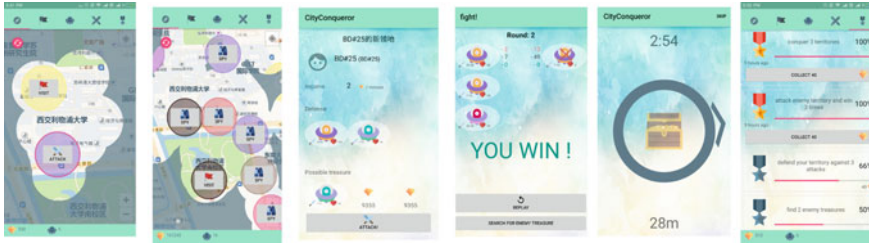


Fig. 5 (left) To conquer a territory the player must defeat all enemy territories (the pink ring in this figure). (middle left) Players can spy on enemy territories from outside their range. (middle left right) When spying on a territory, players can see who conquered the territory, the name of the territory, and other information (middle right left) The result of a fight. (middle right) After winning the player can try to find the treasure by getting to the indicated position within the time limit. (right) player can complete achievements

to other popular games that deal with territorial conquests, such as *Age of Empires*.¹ Players uncover the Fog of War by physically exploring the urban space. When a player visits a physical space they remove the Fog, they are able to see the enemy territories. To motivate exploration of the player's physical surroundings, hotspots in the undiscovered spaces are marked on the map, indicating the location of enemy territories in the Fog of War (Fig. 5 left). Territories generate resources over time, which can be collected to buy units to defend their own territories or attack enemy territories (Fig. 4 left).

To conquer a new territory, players must defeat all enemy territories in their range (Fig. 4 middle). If a player attacks an enemy territory and wins, they have the chance to find the hidden treasure. Searching for a treasure is a mini-game. The player is given a compass that points in the direction of the treasure, told how far away it is and the has three minutes to find it (Fig. 5 middle right). The objective of *CityConqueror* is to: (1) claim as many territories as possible, (2) generate income, (3) defend territories against attacks from others or (4) to attack others and (5) conquer their territories (Fig. 5). Thus, the game experience of one player is highly dependent on the actions and interactions of other players.

3.2 *Design Approach and Discussion*

We began by brainstorming. This resulted in an approach that involved developing the core functionality of *CityConqueror*, and testing various mechanics in the wild. This seemed like a good idea but once we started thinking of the practicalities, it became immediately apparent that it would take time until there was a viable technical prototype. Therefore, we changed tactic. At the same time as developing the game

¹<https://www.ageofempires.com/>.

engine we employed Schlieder's (Schlieder et al. 2006) approach and designed a board game to explore the game experience and mechanics.

Play space: We developed the play space by mapping the city of Suzhou in a hexagonal 60×60 in. game map using hexographer.²

Urban movement: To create synchronous movement and asynchronous gameplay, we used the *turn tokens* mechanic of *Camelot*.³ In brief, the "the turn token" comprised of 2 tokens that were passed in opposite directions. The players with the token can move 1 hex or complete an action. Once the turn is over, they pass *token 1* to the person in their left or *token 2* to the person to their right. This allowed players to take turns quickly in an asynchronous manner. It forced a fast and intense game.

Interacting with territories: Individuals were actively encouraged to pursue a goal by interacting with each other and the play space. We employed goals (e.g. capture a territory) and winning conditions similar to *Risk*.⁴ *Tokens (game pieces)* denoted *interactions* with territories and players used tokens to simulate interaction with different territories. All players started with 30 area tokens. It cost 1 area token to conquer an unoccupied area (removing the fog of war), attacking territories cost 2 tokens whilst defending your area did not cost tokens.

Conquering territories: The conquering and defending of territories was simulated using a simple *rock-paper-scissor-lizard-spock* game. In this variation *Spock* smashes *scissors* and vaporizes *rock*; he is poisoned by *lizard* and disproven by *paper*. *Lizard* poisons *Spock* and eats *paper*; which is crushed by *rock* and decapitated by *scissors*. *Spock* is signified with the Star Trek *Vulcan* Salute, while for "lizard" you form the hand into a sock-puppet-like mouth. This variation led more often to a win rather than a draw.

3.3 Reflecting on the Design Process—Lessons Learnt

Once we were happy with the game and the rules we organized a series of play sessions with 12 groups of 8 players each (79 male and 97 female). They lasted approximately 60 min per group and involved (1) a brief intro presentation to the game, (2) playing the game and (3) an informal group discussions on how to improve the board game and how to make a mobile game out of it. The results of which are describe in (Papangelis et al. 2017a, b). By reflecting on the observations we identify a further group of lessons learnt.

²<http://www.hexographer.com/>.

³<https://boardgamegeek.com/boardgame/14812/camelot>.

⁴<https://www.hasbro.com/en-us/product/risk-game:2C7C6F52-5056-9047-F5DD-EB8AC273BA4C>.

3.3.1 Social Interaction and Combat Systems

During the play test it was clear that the combat system, whilst fun, would not transfer easily to the mobile device. We had to develop a ‘turn-based’ mechanic used in popular pen and paper role-play games such as Dungeons and Dragons.⁵ A player in a turn-based game is allowed a period of analysis before committing to a game action, ensuring a separation between the game flow and the thinking process, which is thought to lead to better choices.

3.3.2 A Light-Weight Digital Game Layer and Story Plots

The board game constructed an imagined layer of the city, which was transposed to the digital prototype. This created a lightweight and thin virtual world. It offered a ‘real feel’ and enabled players to have the illusion of playing in the real world. The use of game mechanics blurred the borders and interpretations of ordinary space and play for the players because the game was based on an ‘*actual*’ map of the city.

We chose not to include a plot or characters in the game, we wanted to create a thin hybrid reality to blur the borders and interpretations of ordinary space and play for the players. Such an approach is based upon Flanagan’s view (Flanagan 2013) that locative media and pervasive games should refer to, and not appropriate spaces, therefore not divorce them from their meaning, history, and significance.

3.3.3 Personal Perceptions and Use Urban Space

Players used different strategies to conquer territory in the board game compared to the digital prototype. In play tests with the app, players used established strategies based upon personal attachments and perceptions of place to influence where they went. For example, players took control of familiar areas and then expanded by conquering neighboring territories. This behavior was less dominant in the board game, so game mechanics must be mindful of this. Players’ perceptions of space and place such as the way meaning, history, and the significance of place are appropriated (e.g. historic city centre) are difficult to simulate in the board game.

3.3.4 Hybrid Nature of the Magic Circle

In game design, the magic circle describes when players start using games (location-based) they implicitly agree to some interactions happening in the virtual world, these virtual interactions stand consciously outside of everyday life (Huizinga 1955). The magic circle helps to transport the players into hybrid space where physical and digital play meet. We observed a difference between the imagined spaces created in

⁵<http://dnd.wizards.com/> accessed 12/21/2016.

the board game to the technology prototype. In the city players were neither “in” or “out” of the magic circle, but rather continuously hoping between both. In the board game it was easier to be drawn into the magic circle. LBG should not draw the players into an entirely imaginary world in the way board/video games do, rather they should encourage play with real spaces (Benford et al. 2006) by a focusing on the interplay of the gameplay, content and physical locations. This could be achieved by (1) incorporating elements of the ordinary world into the gameplay, and (2) through designers taking into account both physical attributes of cities and digital media.

4 Reflective Discussion Constraints of Using Board Games of LBG Design

The use of board games in both case studies provided a tool to encourage dialogue between project members and participants and helped the evaluation of early game scenarios. They also assisted in the co-design of the requirements, aiding the identification of refinements and new ideas through collaborative participation, helping to stimulate imagination and enthusiasm in a playful manner. It was a fun way to engage people outside of the project in the design process. Researchers observed the players interacting with their scenario from the outside-in, noting what worked or not as they watched the gameplay. Players were also able to comment, contribute and thus become collaborators with the research as part of the creative process of the project. This provided an inside-out perspective resulting from involvement in the participation. The board games prototypes supported the process of thinking by doing and reflective practice.

By examining the two case studies, which focus on different types of LBG, we were better able to understand the advantages and limitations that result. The case studies illustrate that even though board games can be a useful tool in the arsenal of an LBG design and co-design, they cannot fully emulate all the necessary mechanics for an engaging gameplay. This is because of the limitations of modelling the complexity of the real world in a constructed environment of a board game. Thus, we propose a set of constraints that one must be mindful of when is transitioning from a board game paper prototype to the technical prototyping, see Table 1.

One of the most significant differences we observed were the manifestation of local attachments that emerge during real location-based game play in areas that are familiar to us. Any such playfulness should be designed to mediate and moderate the inherent local ties and place-based bonds that we have. Particularly if the game play is to take place in areas that are familiar to us, we are more likely to be comfortable playing in neighborhoods that we feel connected to, so players are likely to feel an outsider in unfamiliar parts. These feelings are less likely to emerge in a paper prototype. When one adapts a board game to an LBG it is necessary to pay attention to the person-to-person and person-to-place aspects of place attachment and sense of place. As these relationships can result in expressions of attachment that are played out because there is a sense of belonging to one place and not to another. It is our

Table 1 Constraints of using board games in the process of location-based game design

ID	Description	Category
1	In the board game players tend to be engaged in playful and competitive interactions that are beyond the rule of the LBG	Playful interactions
2	The magic circle of the board game is more pronounced as the players are strongly embedded in creative play	Playful interactions
3	LBG facilitate asynchronous and anonymous interactions with strangers—less likely in a board game as players are together	Playful interactions
4	Effort and fatigue required to go to more distant parts of the city need to be designed for in LBG technology prototypes	Discovery
5	Autonomy of movement and choice of content should be facilitated	Personalised discovery
6	Depending upon the LBG game person-to-person and person-to-place attachments emerge which are not evident in the board game	Manifestation of local attachments
7	People are comfortable in certain real locations, potentialities of power emerge (such as expressions of territoriality, place attachment and avoidance of locations)	Manifestation of local attachments
8	A sense of commonality and relationships can be fostered in players of LBGs which are absent in the board game	Social-spatial bonds
9	Cities can actively contribute to the co-creation process of local knowledge in LBGs because they offer a multisensory and immersive environment	Co-creation of local knowledge
10	LBG create a collectivity of movement beyond the everyday	(Re)familiarisation
11	LBG are prone to privacy and surveillance issues (e.g. location tracking of real-time movements) which is not an issue with board games	Ethics and privacy concerns

belief that the management of these ties should be designed to either avoid/enhance these expressions of territoriality and attachment and/or to encourage the discovery on unexpected, surprising locations. This depends upon the underlying goals and objectives. We suggest designing features and gameplay that support such goals.

Firstly, we suggest the implementation of features to the articulation of sense of identity and place attachment as part of the gameplay. Secondly, designs should consider the power of the player-place attachments and be mindful to reinforce or challenge them. This could be implemented using game missions, which require participants to go to unfamiliar parts of the city and to complete participative situational-based tasks motivated using incentives and rewards as part of the game framework.

Moreover, person-to-person and person-to-place ties to places are forged by groups of people that have relationships that embody a sense of familiarity or commonality (Chamberlain et al. 2017) with each other and with places (social-spatial bonds). These again are not explicit in board games since the play-space is static and less relatable—it is an abstraction. An imagined representation of reality. One that is simply a model, a more immaterial version of reality. To encourage sociability that is present in board games we suggest functions that promote the creation of communities are taken into account. These may be user defined based on preferences (e.g. students of Xi'an Jiaotong-Liverpool University) or system created based on the place attachments, a particular group of users. Since these interactions are hybrid, they exist both in the virtual and the physical realm we suggest their design incorporates both in-place and out-of-place interactions. This might encourage self-awareness in their personal place-based meanings and consequently payers become aware of their influence on their personal identity (Chorley et al. 2015). Avatars can be also integrated into the design to build up digital identities that individuals/groups can identify with.

5 Conclusion

Board games are fun and playful and are a valuable tool for the co-design process of location based games. They provide many advantages since they are easy to facilitate and are more playful than chauffeured pencil-paper prototyping methods. Chauffeured pencil-paper prototyping requires the designer and the players to be in the city and interact with pieces of paper that simulate the interface. They involve the designer describing to the user and manually demonstrating how the interface would respond to different actions that they make. In a board game form of prototyping, the designers and developers can play the game alongside participants. This offers a richer embodied experience as demonstrated by the case studies. In both cases, we observed the use of representation and symbolization of the city (its space, place, and people) and used various metaphors to simulate interactions in a board game. In both case studies, effective use of board game play was used to symbolize the sociability and spatiality of the city as cultural metaphors of the everyday. They were

able to adopt board game as a tool for representing movement and context awareness, essential features of location-based games.

The paper prototypes were successful in incorporating freedom of movement and directionality but were limited when trying to represent the physical effort experienced by an individual who is traversing and discovering a real city. Although they did not sufficiently represent and manage the place attachments that we have with real places. They are a helpful tool for simulating movement in the city when time and resources do not support being there. They are a useful tool for co-designing elements of gamification and defining and redefining game rules. We also found that they are invaluable method for trialing content (form, style and quality). They are not without their limitations especially since the paper map is a simplified model of a complex reality—one that can only ever be partially modelled and the complexity. So when making the transition from the board game prototype one must be careful to consider these limitations and the different nature of the experience players have when they are out in the wilds of the city.

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