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STATISTICS

- Papers received : **12**
- Papers accepted: **10**

Interactive Players. LBMGs from a Design Perspective

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ABSTRACT
Adopting a player-centered approach, this contribution delves into the relationship and interactions LBMGs activate among people (between players, and among players and non-players), with the device, and with the spaces wherein the play activity takes place. In consequence, it taps into three different levels of implications: social, technological and spatial. It reports on some empirical advances gathered from a three-years analysis on three BSc courses and a total amount of 44 Location Based Mobile Games deliberately designed for prompting challenging interactions between the digital world and physical elements in the real space. Taking advantage of the potentialities of being situated and technology-supported, they enhance and facilitate immersion and sense of agency within the game. What emerges is a novel interpretation of LBMGs players as "interactive agents", engaged in meaningful interactions with other persons, with the space and with technology.

Author Keywords
Situated Play; Location-Based Mobile Games; Narrative-Based Games; Social Engagement; Technology-Supported Games; Spatial Awareness.

ACM Classification Keywords
K.8.0 General: Games; K.4.m Computers and Society: Miscellaneous; J.5 Arts and Humanities: Arts, fine and performing.

INTRODUCTION
Ranging from uncommon topics to unusual gameplays, we are now being witnesses to the flourishing of play practices that break our ordinary conventions to trigger perspectives that differ from the ordinary. Location Based Mobile Games (LBMGs) expand outside the traditional gamespace (board or screen) [10] and open up to contextual play activities, where players are geo-located and transported into a hybrid world where the boundaries between the real and the digital spheres are blurred.

Relying on an existent literature mainly characterized by an approach that privileges case studies analysis, and speculates about LBMGs impact, this contribution raises from the need of an investigation that punctually unpacks different typologies of interaction that such games include and can trigger. Specific attention is due to the fact that they move outside the traditional frame of the screen, having different degrees of response and interaction with the real, three-dimensional world. From a theoretical perspective, this contribution reaches out to the disciplines of Game Studies, Communication Design and Interaction Design, tapping into transversal practices of interaction that link theoretical assumptions and their translation into practice.

The reasoning unfolds a three years empirical research in the Politecnico di Milano, School of Design, educational context, that has as its linchpin our research intention to question the tenet that LBMGs should exclusively rely on digital/mobile components. We asked about 180 design students of the BSc course "Augmented Reality and Mobile Experience" (a.y. 2013/14, 2014/15, and 2015/16) to conceive and craft LBMGs that mix digital contents and physical artefacts, and address societal issues. During the span of time of this investigation we collected 44 LBMGs that flash out the consistent links between real and digital spaces. In so doing we explored the forms of interactions that players activate in such less-mediated situated experiences. What characterizes this field of investigation is the spread tendency to consider and design LBMGs as *technology-sustained* games [19] – as said, utterly digital/mobile reliant. However, we consider worthwhile to challenge this assumption, exploring how games can take advantage of technology, being *technologically supported* [19], rather than strictly and wholly dependent. Such an approach has further relevance because it opens up a richer design space, of which designers can take advantage of – this in terms of communication activated by in-game elements, artifacts and activities.

In parallel to the technological perspective and the potential benefits of a game that mixes physical and digital elements, it lies an important reasoning on the advantages of including narrative as a core game component. Whereas not every game is narrative-based, stories are notably relevant for some typologies of games [16]. Among the others, pervasive, persuasive, adventure games, LARP and ARG

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recognize and confirm the central role of narrative; LBMGs as well as urban games, on the opposite, generally tend to relegate narrative to a design possibility. In the light of this reasoning, here we do not question whether or not games are narrative, but how narrative-based LBMGs activate interactions – for example attributing the device the role of storyteller. The LBMGs discussed in the following strongly rely on stories (games of progression, using Juul's terminology [16]) able to affect the way players interact with the game itself, in particular through the three perspectives presented above: socially, technologically, and spatially.

Adopting a player centered approach, we delve in particular into the relationship and interactions these games trigger among people (between players, and between players and non-players), with the device, and with the surroundings, namely the space wherein the play activity takes place. In consequence, it taps into three different levels of implications: social, technological and spatial. What emerges is a novel view on LBMGs players, here framed and discussed as "interactive players" a category that differs from those of digital games and urban games, by virtue of our peculiar way of intending LBMGs themselves. In a spectrum ranging from urban games to video games, being physical-digital its two polarities, we set the LBMGs here discussed close to urban games, mixing a small digital component with a paramount physical one, whereas the most common commercial LBMGs (e.g. *Ingress*, *Pokémon GO*) set closest to the digital pole.

Rather than using the space as interchangeable background, we propose a stricter relation with the surrounding space, aiming at taking full advantage of its potentialities. As it commonly happens in urban games, every place acquires meaning in the play activity and within the game narrative, being steps of a story that progresses according to players' movements in the urban space. The mobile device, instead of being the main mean of the play activity, becomes the main trigger for contextual narratives. In this sense, these LBMGs differ also from urban games, by attributing a relevant and essential role to mobile devices.

METHODOLOGY

The reflections here presented are part of a larger research activity based on an empirical research we conducted analyzing the processes of both designing and playtesting 44 persuasive LBMGs. Over three years, a total amount of 180 students were asked to face actual societal problems or taboos, and evolve them into concepts to be translated into LBMGs. Our aim was to study how these games function as engaging systems able to entertain players and convey information in the meanwhile. Ranging from exploring design as a process of enquiry, to assessing playing as a way to acquire knowledge, we observed and analyzed our sample of persuasive LBMGs conducting ethnographic analysis and interpretive research. In order to lessen biases and weaknesses of the chosen methodology [11, 7], we applied a mixed methods approach, collecting multiple forms of data relying on a triangulation of different methods. During the iterative cycles of design that spanned over three consecutive months for each academic year, we ran interpretative ethnography and participant observation [27,12]. In parallel, we conducted rapid ethnographies, shadowing, questionnaires and informal interviews with students – in turn as designers or players (see Figure 1).

Especially conducting moderate participation [12], we understood on the one hand how designers crafted the games embedding their point of view, on the other how players received games and made sense out of them. In doing so, we grasped an important amount of insights regarding the relationship between initial expectations and effective players' perceptions.

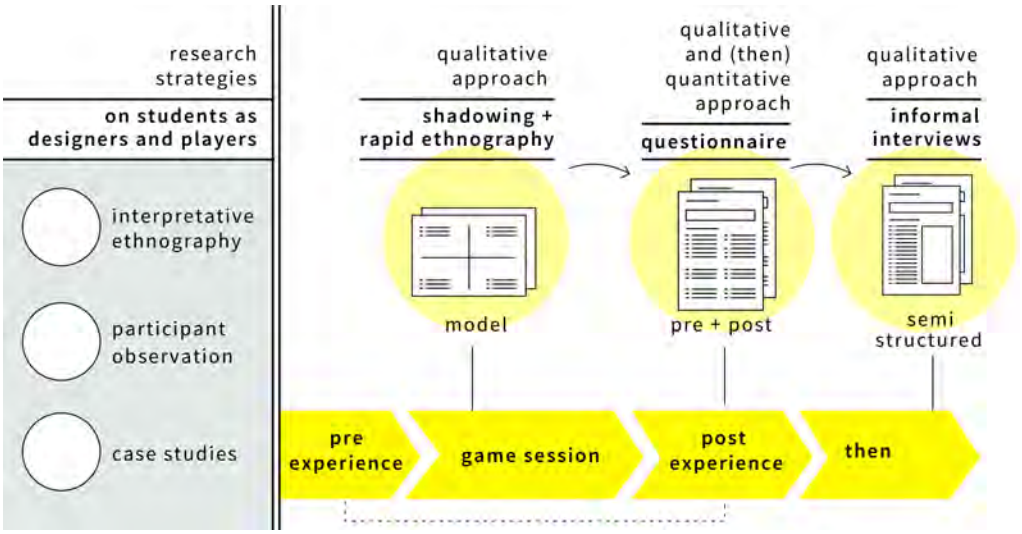

Figure 1. Strategies and tools used to observe games and collect results.

RESULTS

The results discussed in the following are mainly gathered from our direct observation of players during the playtests and from the informal interviews that followed, albeit useful reflections are triggered by some of the questionnaires we collected. Data gleaned portrait a novel category of LBMGs player, that we define "interactive" at large, since s/he is characterized by a threefold active interaction: with others, with technology, with the surroundings.

Reviewing how LBMGs are designed and played, with a consistent shift from the digital realm towards the physical one – as previously discussed – brought to rethink the way players are engaged socially, spatially and technologically. Hence, a functional way to frame the three typologies of interaction, according to which we will analyze and discuss players' interactiveness, is:

1. Player to others/persons
2. Player to space
3. Player to device

Acknowledging that games are complex systems, and that a consistent literature investigated the varied degrees of interaction between the player and the game [21,14,2,17,22], our focus here is on the specific way in which LBMGs can activate player' interactivity, distinguishing themselves from the other typologies of games. Hence, we resonate on three typologies of interaction, not reciprocally excluding, that coexist at a different extent during each game session, that portrait a more comprehensive and holistic view of the player, differing from that of video games and commercial LBMGs as well as from that of urban games.

Player to Others/People: interaction between players or between players and non-players

"Interacting with other players is one thing that makes the game bigger than just a casual on-screen experience" [19].

In-game social interaction occurs between players, and/or between players and non-players, and its dynamics strongly depend on the typology of game as well as by its design. In this sense, by virtue of their nature, partly digital and partly physical, LBMGs provide designers with the opportunity of conceiving complex social interactions, engaging players in a multitude of varied experiences.

Likewise video games, LBMG players can dialogue and have social relationships with other players, ranging from being more or less mediated by the technological device (e.g. chat or voice chat, instant messages, calls), to directly sharing the play activity with other players (in-person play activities as challenges, quests, etc., that involve more than a player in the meanwhile). What features LBMGs as pervasive games is their potential ability to involve players in richer, in-person social engagement with both other players and non-players they may encounter. A characteristic common to urban games, which, on the contrary, do not provide players with technology mediated social engagement. Different considerations should be made about commercial LBMGs, as *Ingress* and *Pokémon Go*, that mainly pertain to the category of video games and from which infer the model of social engagement, characterized by the mediation of technology [10]. In doing so, the kind of social engagement they commonly trigger can be defined as "alone-together", a sense of social contact that springs by feeling surrounded by other, albeit unknown, players [13].

When designed capitalizing on the cultural capital of play in public spaces [24], taking advantage of the potentialities of creating partially technology-mediated game experiences, LBMGs offer designers the unique opportunity to provide players with different social configurations during the play activity. In particular, wittingly embedding the way of playing typical of urban games, they can fully exploit in-person social contacts as well as the context wherein they take place. As a matter of fact, designers can provide players with a personal play activity or, on the contrary, to require the continuous collaboration of a team of players to proceed. Other games could ask a team to split in order to complete quests, or players to socialize with non-players and even unknown persons [26], namely strangers [25].

Furthermore, designers can impact on the quality of the social interaction the game triggers. For example, they can force players to go a step further from the common in-person social relation between players, and get engaged in a direct physical contact. In addition, such interactions also give room for challenging implicit social norms. This is what happen in the game *Keep (the Date) Safe* [1] aimed at sensitizing players on the pros and cons of the most common contraceptive systems. Players, in the role of couples, face diverse stereotyped scenarios, ranging from the new year eve party, to the home-without-parents night, and are involved in activities and mini-games that frequently ask for transgressive social behaviors, e.g. playing twister in a public space. Designers took advantage of the direct social engagement between players, challenging them to go far beyond the comfort zone – from 1 to 1.5 meters –, and invade that space that proxemics [15] would define as personal. The embarrassment of touching or being touched by non-intimate persons is further increased by being in a public space. This condition was taken in due account by designers that employed the twister game activity as a metaphor for an intercourse, and embedded the possible consequences of "unprotected sex" into three oversized dice (contraceptive, pros and cons, venereal disease) to roll after every in-game sleeping-with-someone occurrence.

In parallel LBMGs become trigger of social engagement with non-players, passers-by not (formally) taking part to the game. In *The Infection* [3] designers involved players in

unexpected contacts with non-players. Created to sensitize towards STDs – Sexually Transmitted Diseases – the game uses smartphones and several game (physical) elements to transform the playground into a fictional world where four bosses – symbolizing four diseases – must infect as many people as possible. Among others, one of the missions asks players to increase the amount of their disease-fellows by sticking adhesive labels – the viruses – to unaware passers-by without being caught. Another quest requires players to stop random non-players and ask them to explore their body looking for the stickers/viruses. Players are engaged not only in direct social relations with unknown persons, but also in overcoming the boundaries of the comfort zone discussed above. From a non-player perspective, the activities of this game resulted into situations of surprise and amusement, that triggered curiosity. Stickers have been used on players and non-players as game mechanics, as well as means to spread knowledge in an unconventional, unexpected way.

Player to Space: distributed narrative and situated meanings

Using to advantage the fact of being narrative-based, these LBMGs use distributed and situated narratives shaped as small fragments of storyline related to the space wherein the game is taking place. To progress and complete the story (and the game), players are asked to explore the surroundings, interacting with the urban space that conveys specific meanings and serves as a source of in-game information, rather than being mere playground. From a player-to-space perspective, the mobile device is the game element that to different extents allows players to activate spaces and make them interactive.

Since the diffusion of mobile technology, several authors explored how games can extend, integrate and digitally-overlay the physical space. Particularly relevant to our reasoning are the rumination advanced by Montola, Waern and Stenros [19] and De Souza e Silva [9] who investigated the way games interact with people and the surroundings, and how players interact with the public spaces because of mobile gaming (play in public [19]). As a matter of fact, each place takes part to the game as a physical space wherein players move and act, and as a literally meaningful (being a repository of specific in-game meanings) setting for the fictional world, overlapped to the physical one thanks to the mobile device. In doing so, such LBMGs encourage players towards situated meaning-making, where having contextualized experiences is a source of further understanding.

The Fellowship of the Umbrella [5] is a LBMG about physical disabilities that echoes the cultural capital of play in public spaces [24]. Employing a fairy-tale fictional world, it uses some metaphors to transpose (and expose) some obstacles that disabled persons daily face, making players physically experience impairments. Wearing a specific role, every player is specifically equipped with costumes and game kits, and is required to move around following the features (actual limits) of their character. In this LBMG, the urban space and some of its architectural barriers are integrated into the game serving to nurture experience-based knowledge and awareness, in which players meaningfully step [18].

If on the one side, the space can serve to convey information, on the other, it can become servant to the activity of playing. In this case, play can be appropriative and take over the context in which it takes place [23]. *SOS-Rescue Squad* [20] works on the concept of *appropriation* [19,23], as several physical element, including the urban space itself, are appropriated in the game – often without letting non-players know. For instance, in a quest, players are asked to circumscribe spaces with tapes to keep passers-by far away. The game becomes a way to temporarily modify the way people interact with spaces. As a matter of fact, once players encircle a bench with tape, they cause a shift of meaning. From being a space with a social function, the bench assumes the role of a space of non-sociality.

Player to Device: smartphone as storyteller

The last typology of interaction here discussed is player to device, an exploration on how the smartphone entered the play activity. The discourse is not focused on issues pertaining the field of HCI or UI Design, but rather on the role of the smartphone as storyteller, a narrator accompanying players through the game. This typology of interaction takes place between players and digital characters, as manifestation of the game system.

As a matter of fact, the analyzed LBMGs are in great part designed relying on a distributed situated narrative [19], employing the device as provider of narrative contents, triggered where they are needed, and spread across the urban space as playground. The device acts as storyteller, a digital guide across the story and the urban space, that provides players with pieces of the narration, following the progression of the game and players' movement in the urban space. The situatedness of the narration implies a strict relation between the places and the story. In doing so, mobile technology nurtures the layer of the fictional world continuously hybridizing the real and the digital realm. In this sense, mobile technology functions as bridge between the two worlds.

The analysis of the LBMGs, object of the study, highlighted diverse strategies of use of the smartphone. Some set the device in the role of omniscient narrator, out of the story, an external, neutral entity that guides players, provides hints in the proper location of the clues and proposes dilemmas to be solved. It is the case of *The Lost Papyrus* [4], a LBMG about Alzheimer's disease aimed at inform players about the impact this illness has on the everyday activity of sick people and of those who live with them. Structured as a metaphor of the disease and its degeneration, the game involves four players in the role of an expert archaeologist and his brave assistants, exploring a still undiscovered tomb

to find a renowned papyrus and facing more and more difficult quests that symbolize the degeneration of the illness. The mobile device is interpreted in the game as a powerful tool, a quite magical machine that guide players from outside the story.

Other times the mobile device becomes a personified storyteller and enters the story as a character. In *The Treasures of Captain Torment* [6], the device actually embodies the spirit of the Captain that guides players to his treasure, across a story dealing with the very common, but often ignored, mental condition of depressed people. As active character of the story, the spirit of the Captain communicates with players through the mobile device, telling stories, providing hints and testing the bravery of his fellow pirates with questions and quests. The device is here both storyteller, narrative voice, and character of the story, with his personal aims to be reached with the help of players.

Other games interpret the mobile device as guidance, authoritative voice, that guides players not only across the game but also towards a specific behavior. *The 10 Commandments* [8] sets players in the role of a girl who must attend a casting, and the device provides her with ten commandments to be followed in order to have a "perfect slim body". Facing daily activities, players are continuously proposed a dilemma to be solved, making direct or indirect reference to the commandments. What players do not know is that the commandments are based on real online blogs which claim the so-called Pro-Ana behavior, presenting anorexia as a positive philosophy of life. By choosing to respect the commandments, players lose energy; by not obeying the sense of guiltiness is fomented. In both cases players are destined to fail. Designers exploited here the power of mobile device as authoritative voice, disconcerting players with a final plot twist that questions the role and credibility of the narrative voice.

CONCLUSIONS

The cases presented and discussed take advantage of the gamut of features and potentialities of LBMGs to design games that intensify and accent meaningful interactions, not only with the game itself as a system, but also with people (players and/or non-players), mobile device, and space. Furthermore, they are characterized by the inclusion of challenge-based, distributed narratives that enhance and facilitate immersion and sense of agency within the game: once again the game prompts players to challenge their comfort zone, pushing their own boundaries. Being LBMGs, this mainly regards social and spatial interactions.

The analysis we proposed stems from a player-centered standpoint and aims at portraying LBMG players as "interactive agents", engaged in meaningful social, spatial and technological interactions. A model of interactiveness made possible by the way these games have been designed, that is, as said, closer to urban games than to video games.

As a matter of fact, the image of the player that emerges is far from that of the most renowned commercial LBMGs (e.g. *Ingress*, *Pokémon GO*), as well as from common video games. The player here portrayed engages directly with other persons, through in-person, non-technologically mediated interactions. In commercial LBMGs the direct social engagement is a choice given to player – just think about *Pokémon GO* –, while the cases discussed above frequently require social interaction to proceed in the game. The progression is not only due to the mix of technology and space (geo-location) but also to the social interaction with persons, being them players or non-players.

Another remarkable difference is that the space wherein players move becomes something more than a mere background for the gameplay, acquiring meaningfulness in both the physical and in the fictional world provided. Places are involved in the story for what they really are (e.g. a bench, a tree) and for what they become in the story (e.g. a dangerous place to be evacuated, a space-time portal). Thus we could talk of *situated meaning*, since the physical characteristics of places, as well as their agency on players, are exploited by game designers to trigger a continuous negotiation of meaning between real and unreal, creating also a sort of narrative friction between what players see and the game fictional and digital overlay. LBMGs can indeed work on a twofold level: in terms of physicality, they challenge players as bodies moving, walking, running; in abstract terms, they require players to interpret the surroundings and its elements as part of a fictional layer that can be accessed via mobile device.

The mobile device is what makes this kind of LBMGs similar to the commercial ones, since they both exploit location-awareness as the main means of progression in the game, but, at the same time, its employment is rather different. Instead of being the "place where everything happens", the mobile device acquires the role of storyteller, trigger of actions that are only partially performed on the device itself. The smartphone becomes a means of urban exploration and social engagement. Expanding a concept by De Souza e Silva [9], digital and physical spaces can be designed to resonate, encouraging a more social-, digital-, and location-aware experience.

It is evident that the games here presented shift LBMGs towards urban games. Nevertheless, we claim that some differences can be traced back to the background in the design field of the students who crafted them, and of those who guided them. These games have been designed as artifacts able to maximize the interaction of their users (players) with other persons, with the space and with the device, that is what normally interaction designers do. Starting from a design standpoint, these games have been designed with an accent on the physicality of the interactions, thus characterizing players as interactive agents, physically engaged with what surrounds them, and not only with the device.

Designing LBMGs as artifacts closer to urban games and aimed at stimulating richer interaction of players at the three levels we highlighted – person, space, device – clearly implies a shift in how LBMGs are commonly played. Instead of being always-playable games, they become happenings, events to be organized considering the subsequent implications of such a way of staging a game. Nevertheless, the emerging image of interactive player here outlined opens up to opportunities for LBMGs designers to expand the level of interactivity of their players, marking the difference from video games and fully exploiting the potentiality of playing in a public space rich of possibilities to be caught.

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