

## Location Based Mobile Games as educational means.

### The case of The Fellowship of the Umbrella

Sciannamè, Martina<sup>a</sup>; Mariani, Ilaria<sup>a</sup> and Spallazzo, Davide<sup>a</sup>

<sup>a</sup>Department of Design, Politecnico di Milano, Italy.

---

#### **Abstract**

*The paper discusses how Location-Based Mobile Games can successfully support informal educational activities. Looking at them as meaning-making tools, the paper frames the field of action and then explains the peculiarities that make such games powerful means for informal learning: the different levels of learning conveyed by the activity of designing and playing LBMGs; their communicative nature; the implication of being situated and of including physical/spatial activities in the process of interiorizing the experience and realising its sense in a personal way; the meaningful relationship among the game magic circle, the fictional world, and the situated space; the open and free state of mind of the learners-players coming from wearing a mask and hence play a role during the game; and the effectiveness of stealth approaches to foster engagement and, therefore, deeper understanding. The value and opportunities coming from such features in terms of both design and learning are presented and discussed through a case study: The Fellowship of the Umbrella, a LBMG developed during the academic course of Augmented Reality and Mobile Experience at Politecnico di Milano.*

**Keywords:** *Game-based learning; LBMGs; active pedagogy; informal learning; situated experiences; meaningful play.*

---

## **1. Introduction**

The paper discusses Location-Based Mobile Games (LBMGs henceforth) as informal educational means moving from a case study born in a formal educational context. LBMGs are games that rely on geo-localization to provide contextual play activities. Frequently mentioned with other names, such as mixed-reality games (Montola, 2011) or hybrid-reality games (de Souza e Silva & Delacruz, 2006), LBMGs have the ability to modify the gameplay according to players' current location, mixing a digital experience, provided through a mobile device, with a physical one, performed in the real world. Born in the early years of the new millennium with experimental games such as *Botfighters* and *Mogi*, LBMGs are coming of age and recently reached the wide public with titles like *Pokémon Go*, by Niantic and Nintendo, with billions in revenues. Since their early beginnings, LBMGs have been employed for informal educational purposes, capitalizing on their ability of enhancing the physical play experience with digital layers of information, therefore conveying knowledge while entertaining. Games such as *Environmental Detectives* (Klopper, Squire, & Jenkins, 2002) paved the way to several experiences aimed at fostering learning through located play. *The Fellowship of the Umbrella* (Sciannamè & al., 2014) sets in this context as a LBMG aimed at sensitizing players on the issue of disabilities. It stemmed from the didactic course *Augmented Reality and Mobile Experience* at Politecnico di Milano. The first author of the paper was involved in the design of the game, while the other authors were teachers of the course, therefore the paper essentially brings two perspectives: that of the designer who crafted the game, and that of the researchers who firstly mentored and then analysed the experience it generated.

In particular, the results here discussed are drawn following a mixed methods approach that allowed to collect data applying a triangulation on the qualitative data culled, facilitating their validation through cross-verifying different sources. During the iterative cycles of design that ran over three consecutive months, we conducted interpretive ethnography and participant observation, while shadowing and informal interviews with students were carried out during and after the playtests.

## **2. Meaning-making by designing and playing LBMGs**

From literature to first-hand experience, it can be stated that games are powerful triggers to stimulate a learning process. As a matter of fact, they are able to foster engagement and implicitly elicit serious learning through fun and participatory activities (Prensky, 2001). Moreover, due to their location-based nature, those games embed learning in an actual and situated context, nurturing informal education as well as supporting the formal one (Huizenga et al., 2009). In this regard, different levels of learning emerge around the development of a LBMG, as it has been proved in the course *Augmented Reality and*

*Mobile Experience*, held in Politecnico di Milano by Spallazzo and Mariani. Specifically, three ways of learning can be pointed out: (1) *learning to design* for mobile experiences, as a result of formal education; (2) *learning by designing games*, where education is both formal (attaining the aim of the course) and informal (through the research about related topics that students had to understand and transpose into game elements (Mariani & Spallazzo, 2016)); (3) *learning by playing games* that provides informal education (Prensky, 2001; Gee, 2007; Salen et al., 2011) about the developed topics through a “hands-on, first-perspective and moving experience” (Mariani & Spallazzo, 2016). Moreover, as stated by Avouris and Yiannoutsou (2012), games can be classified as (i) ludic, (ii) pedagogic or (iii) hybrid, according to their purpose to make players enjoy, learn or both. Still, the learning process can be activated by all of these typologies.

Games are *communicative tools*. As many other products of human intellect, they can be ascribed to the field of design and, starting from here, multiple authors state the fact that *design communicates* (among others Dourish, 2001; Antonelli, 2011; Kolko, 2011). It is an activator of dialogue (Redström, 2006), wherein the designer represents the sender of a message that may be comprehended, accepted, refused or modified by the receivers in relation to their context and personal background. In Jakobson’s Theory of Communication (1966), it is important to underline the function of the physical channel and/or psychological connection in allowing the sender and the receiver to establish and maintain communication as *contact*. Consequently, oral speech, books or films are not exclusive means for education. A conversation – considered as the main resource involved in a learning activity (Sharples et al., 2005) – may arise from spaces, objects, and even games.

Since when they were first investigated, games have been depicted as conveyors of meaning, deeply entwined with the human process of interpretation of the world (Huizinga, 1938), and as contexts of representation (Frasca, 2003; Salen & Zimmerman, 2004) wherein meanings are embedded. Games are complex, dynamic systems of communication (Mariani, 2016) able to produce knowledge, understanding, comprehension and awareness (Spallazzo & Mariani, 2017). Also referring to important topics, they can result in questioning, affecting, challenging or even disrupting one’s attitudes and behaviours.

Another important feature, stressing LBMGs peculiarity of stimulating learning, is the *active involvement* of the player’s situated body, as frequently discussed for cultural learning (Hooper-Greenhill, 2007). Either from the educational and the design field, it can be inferred the importance of actions and active participation. From the beginning of the 20th century, theories about *active pedagogy* spread out in opposition to traditional and superimposing methods, sustaining a more intimate system of education based on personal experiences (Dewey, 1938). This attitude also affected creative fields. Bruno Munari, for instance, used to quote an old Chinese proverb which states: “If I hear I forget, if I see I remember, if I do I understand”. Embracing this philosophy, he organized laboratories in

which experimentation and discovery brought to self-learning. Further systematization leads to the scientific field of Activity Theory. It is sufficient to mention that at first even calculation, one of the most abstract human activities, passes through one's fingers or the interaction of the body with small objects (Kaptelinin & Nardi, 2009).

Therefore, designers need to encourage activity in their users (Kolko, 2011): empowering players to have active roles means to give them the opportunity to question their own ideas on the ground of the experience made (Mariani & Spallazzo, 2016), enabling a process of actual learning, awareness and, possibly, change. Hence, the *specificity* of LBMGs turns out to be fundamental in a model of learning that distances itself from reported testimonies (as in textbooks or vertical lessons) in favour of contextual experiences. Learners (players) are transported into a fictional world superimposed on the actual, surrounding reality, which they can even obliterate. Yet, it is in the physical space that the learning-by-experiencing process takes place. In fact, while experiencing LBMGs, players are *immersed* in a *magic circle*, a safe place that can be described as a membrane in between the physical world and the game itself (Montola et al., 2009), but they do interact with concrete boundary objects (Star & Griesemer, 1989). At the same, time these objects may nurture players' awareness of being involved in the game world (McMahan, 2003) and maintain a contact with reality (Spallazzo & Ceconello, 2015), fostering the interiorizing of the first-hand experience. Thus, they stand as activators and influencers of behaviours and, in addition, triggers of meaning-making: in *transferring and translating* practice, they can convey metaphorical significance that requires interpretation to be understood (Spallazzo & Mariani, 2017).

In this regard, Kaufman and Flanagan (2015) suggest a 'design embedded approach' which consists in stealthily or covertly delivering the game real aim (educating in our case) by directing the player's attention to other fictional worlds and issues, in favour of a more engaging and enjoyable playing experience. Indeed, openly declaring the educational purpose of the game induces players to raise psychological defenses, while being in an elseworld and wearing a mask is an act of freedom and openness (Mariani, 2016) that generates the conditions for players to set their own mental frames (Bertolo & Mariani, 2013; Bogost, 2007; Gandolfi & Mariani, 2014), modify their usual way of thinking and acting, making them interpret the world with fresh eyes, without worrying about protecting their ego (Csikszentmihalyi, 1990). In this sense, the playing experience can truly be meaningful and effective as a tool to foster learning.

### **3. The Fellowship of the Umbrella: a case study**

*The Fellowship of the Umbrella* (Sciannamè & al., 2014) introduces four players into an ironic fantasy world, asking them to bring back to light the forgotten Source of the Truth, once protected by the Naiads. To complete the mission they have to solve different quests

playing the roles of a *powerful magician*, a *manufacturer dwarf* and a *wise elf* (respectively the magician's trusted alchemist and advisor), and an *atavistic beech* (a primordial creature immune to magic). The magician is the guide of the fellowship, s/he knows the path as s/he found the way to connect with the Naiads. However, to do that, the magician has to enter in a parallel aquatic dimension that implies difficulties in communicating and interacting with the surrounding world. That is the reason why the magician has to gather the group and the player has to wear a diver's mask and a snorkel. The magician is also the bearer of a geolocalized smartphone showing the map of the game. Then, the dwarf is the artifacts keeper, carrying all the useful objects for the mission. Being used to live in the underworld, s/he needs to wear a fold to protect his/her eyes from the sun. The elf, instead, is the narrator. S/he possesses the knowledge to read the useful words of wisdom contained in the ancient papers of his/her people, to whom s/he is still heavily connected – actually, the elf continuously hears their voices (physically through loud headphones). Finally, the beech: resilient to any curse, it is the one who can recover fundamental *leaves* of information spread along the path. Yet, it is a very old tree, and its trunk is not always the best mean for ambulation. The game is composed of four quests. Each of them is designed to be completed by the cooperation of all the players, exploiting their *different abilities*. Thanks to their peculiarities, every player will succeed in one quest, while having difficulties in all the others. Finally, when the fellowship reaches the Source, the companions are once again tested, being asked to perform a votive act, described in the keys that each of them collected after completing their quests. If faced as it is, each task seems unreachable for the poor players; the only way to get through them is figuring out that they can be swapped with each other. Just by doing that they can successfully complete the mission.

With the finale of the game, it comes the moment of the closing revelation, when the Source unveils the great truth. Players, aware of experiencing the mission in someone else's shoes, find out the real metaphorical meaning of their roles: the magician is a dumb, the dwarf is visually impaired, the elf is deaf while the beech has a motor disability. Thus, they also get to grasp that the structure of the entire game is designed to convey multiple levels of meaning, that players can elaborate only once the game has ended. Among them, more evidently, the players are led to experience the daily struggles caused by visual, motoric, auditive and expressive impairments. In consequence, they are also led to experience situations that foster to empathiseing with people affected by such impairmentsthem. Then, two different interpretations are suggested: on the one hand they can positively look at the experience in the light of Einstein's quote «If you judge a fish by its ability to climb a tree, it will live its whole life believing that it is stupid» and deeply understand the sense of being *differently-able*. On the other hand, they are provocatively asked to question their sincere morality reflecting about their usual attitude towards people with handicaps, by reflecting on the feelings they felt during the quests, especially referring to their mates who were unable to attain their tasks and about whose *disability* they were not aware.

#### **4. Discussion**

*The Fellowship of the Umbrella* is a LBMG designed for sensitising people on the topic of disabilities. Particularly, it aims to induce reflection about the way able-bodied individuals usually behave towards differently abled. On the one hand, it underlines the concept of different ability, showing that impaired people are not completely unable, but have the potential of being successful. On the other hand, it stresses the fact that they do not need to be continuously judged as ‘different’.

In order to facilitate the learning-by-experiencing process to be activated with open mind and no psychological barriers, a stealth approach (Kaufman & Flanagan, 2015 – even if the case predates their formulation) has been adopted. Players are immersed into a fictional world by means of an ancient book narrating the background story and the characters, who are presented providing even the most thorough detail to nurture empathy. Further identification is conveyed on the one side by asking players to wear actual props that put them into their character’s skin, on the other by the game mechanics through limits and behaviour rules. This introductory phase is crucial for the success of the educative purpose of the game as it is the means to let the players dive into the magic circle. It is key to construct a coherent metaphor that allows players not to doubt the fictional world but just feel to be part of it. In this case, during post-game informal interviews, players affirmed that, while playing, they did not suspect the covered meaning of the experience, even though they were conscious of the social content of the academic course.

Furthermore the game kit and clothing demonstrated their efficacy as they allowed to attest players’ inclusion into the fictional world: the objects helped them perceive the abilities and the role of their character – e.g., the mobile device represented the whimsical guidance of the magician. And, after the plot twist, the props enhanced the meaning of the whole experience. Specifically, the relevance of these objects is connected to the hindrances they actually imply within a situated space. As a matter of fact, in LBMGs the physical context can play a leading role in the learning process. The heroes’ path is tough and tricky, several architectural obstacles interfere with the game, and even if it is possible to recognise the ludic and ironic sense in the diverse meaningful situations, it is essential for players to endure the physical fatigue of accomplishing the quests in order to trigger the final first-hand awareness. Indeed, it is just after the revelation concluding the game that the process of re-examination and re-attribution of sense, on the ground of the learning activity, begins. As confirmed by informal interviews, through their actions, feelings and thoughts players ultimately make their own sense of the experience and transpose what they directly assimilated to the stock of knowledge that affects their daily lives and behaviours.

To conclude, the field observations as well as the interviews conducted reinforced the communicative purpose and narrative role that spatial architectural elements served. The

gamespace resulted to be a further obstacle to overcome, being perceived as an additional element with a significant role in transferring the overall meaning of the game, by moving the player's attention on what it takes to accomplish specific activities under certain conditions. The various constraints, forced by the gameplay itself, in combination with an engaging and fascinating narrative, contributed to producing a relevant emotional climax. Explicative was the way in which players supported themselves while moving in space – forming a compact group with strong mutual dependencies –, as well as the awareness of not being able to rely just on themselves. This feeling was one of the most frequently reported by the players, underlining the strong communicative value.

## References

- Antonelli, P. (2011). *Talk to Me: Design and Communication between people and objects*. New York: MoMa.
- Avouris, N., & Yiannoutsou, N. (2012). A Review of Mobile Location-Based Games for Learning across Physical and Virtual Spaces. *Journal of Universal Computer Science*, 15, 2120–2142.
- Bertolo, M., & Mariani, I. (2013). Meaningful Play: Learning, Best Practices, Reflections Through Games. In K. Mitgutsch, S. Huber, H. Rosenstingl, M. G. Wagner, & J. Wimmer, *Context Matters! Proceedings of the 7th Wien Games Conference 2013: Future and Reality of Gaming*. Vienna: New Academic Press.
- Bogost, I. (2007). *Persuasive Games: The Expressive Power of Videogames*. Cambridge: MIT Press.
- Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience*. New York: Harper Collins.
- de Souza e Silva, A., & Delacruz, G. C. (2006). Hybrid Reality Games Reframed: Potential Uses in Educational Contexts. *Games and Culture*, 1(3), 231–251.
- Dewey, J. (1938). *Experience and Education* (1997th ed.). New York: Touchstone.
- Dourish, P. (2001). *Where the Action Is. The Foundations of Embodied Interaction*. Cambridge, Massachusetts: MIT Press.
- Frasca, G. (2003). Simulation Versus Narrative. In M. J. Wolf & B. Perron, *The Video Game Theory Reader*. New York/London: Routledge.
- Gee, J. P. (2007). *What Video Games Have to Teach Us About Learning and Literacy*. New York: Palgrave Macmillan.
- Gandolfi, E., & Mariani, I. (2014). The Game as Social Activator, Between Design and Sociology. A Shared Framework to Analyse and Improve the Ludic Experiences and Their Social Impact. In *STS Proceedings*. Milano: STS Italia Publishing.
- Hooper-Greenhill, E. (2007). *Museum and Education*. Abingdon: Routledge.
- Huizenga, J., Admiraal, W., Akkerman, S., & Dam, G. T. (2009). Mobile game-based learning in secondary education: engagement, motivation and learning in a mobile city game. *Journal of Computer Assisted Learning*, 332–344.

- Huizinga, J. (1938). *Homo Ludens*. London: Routledge & Kegan Paul.
- Jakobson, R. (1966). *Linguistica e poetica*. In *Saggi di linguistica generale* (pp. 181–218). Milano: Feltrinelli.
- Kaptelinin, V., & Nardi, B. A. (2009). *Acting with Technology*. Activity Theory and Interaction Design. Cambridge, London: MIT Press.
- Kaufman, G., & Flanagan, M. (2015). A psychologically ‘embedded’ approach to designing games for prosocial causes. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 9(3).
- Klopper, E., Squire, K., & Jenkins, H. (2002). Environmental Detectives: PDAs as a window into a virtual simulated world. In *IEEE International Workshop on Wireless and Mobile Technologies in Education Proceedings* (pp. 95–98).
- Kolko, J. (2011). *Thoughts on Interaction Design (Seconda Edizione)*. Burlington, Massachusetts: MK Publications.
- Mariani, I. (2016). Meaningful Negative Experiences within Games for Social Change.
- Mariani, I., & Spallazzo, D. (2016). Empowering Games. Meaning Making by Designing and Playing Location Based Mobile Games (Vol. 28).
- McMahan, A. (2003). Immersion, engagement and presence. In M. J. Wolf & B. Perron, *The Video Game Theory Reader* (pp. 67–86). New York/London: Routledge.
- Montola, M., Stenros, J., & Waern, A. (2009). *Pervasive Games. Experiences on the Boundary Between Life and Play*. Burlington,: Morgan Kaufmann Publishers.
- Montola, M. (2011). A Ludological View on the Pervasive Mixed-reality Game Research Paradigm. *Personal Ubiquitous Comput.*, 15(1), 3–12.
- Prensky, M. (2001). *Digital Game-Based Learning*. New York: McGraw-Hill.
- Redström, J. (2006). Persuasive Design: Fringes and Foundations. In *Lecture Notes in Computer Science* (Vol. 3962, pp. 112–122).
- Salen, K., Torres, S., Wolozin, L., Rufo-Teppe, R., & Shapiro, A. (2011). *Quest to Learn: Developing the School for Digital Kids*. Cambridge: MIT Press.
- Salen, K., & Zimmerman, E. (2004). *Rules of Play: Game Design Fundamentals*. Cambridge: MIT Press.
- Sharples, M., Taylor, J., & Vavoula, J. (2005). Towards a Theory of Mobile Learning. In *Proceedings of mLearn* (Vol. 1, pp. 1–9).
- Spallazzo, D., & Ceconello, M. (2015). Design Tales. Mobile Technologies Supporting Informal Learning in the Urban Space. In *Didamatica 2015*.
- Spallazzo, D., & Mariani, I. (2017). LBMGs and Boundary Objects. Negotiation of Meaning between Real and Unreal.
- Star, S. L., & Griesemer, J. R. (1989). Institutional Ecology, ‘Translations’ and Boundary Objects: Amateurs and Professionals in Berkeley’s Museum of Vertebrate Zoology, 1907-39. *Social Studies of Science*, 19(3), 387–420.