

# REFLECTIONS ON USE OF LOCATION-BASED PLAYFUL NARRATIVES FOR LEARNING

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## ABSTRACT

In this paper we discuss current practices and trends in the use of narratives in location-based games for learning. This is a new area of research and practice termed playful narratives. The main aspects of these games are discussed. In particular, we focus on their narrative structure, the interaction modes that they afford, their use of space as prop for action and the possible learning impact they have. First, we introduce the theoretical and empirical considerations of playful narratives, then; an analytical framework of their main characteristics is introduced, discussed through typical examples of such games. Finally we conclude with an outline of future trends and possibilities that this kind of activities can have on learning in the future.

## KEYWORDS

Mobile games, location based games, narratives in games, educational games, playful narratives.

## 1. INTRODUCTION

Recent years have witnessed proliferation of mobile devices with advanced location sensing capabilities. This development has resulted in a number of location-based services, e.g. location-relevant information and content delivery, related to entertainment, tourism, weather etc. A particular kind of activity, that has resulted from these technological advances and their wide deployment, is related to *location-based games* or *pervasive games*, and *location based storytelling*. Many examples have been reported of these new kinds of activities that bear an intrinsic playful character, require active player participation, have strong spatial dimension and involve specific narrative structures.

Location-based games are designed to be played in public spaces like streets, conferences, museums and other non-traditional game venues and can be compelling for young players as well as adults (Montola et al. 2009). In these games, the place often immerses the players in a situated context where details of history, culture, and the available physical affordances provide opportunities and constraints that influence the choice of actions and interactions (Davenport 2005), generating new kinds of players' experiences.

One aspect to be examined in this new genre is the use of narratives and the effect they have on the user experience and in particular the learning value of the activity. Narrative, from the point of view of its learning impact and potential, can be considered as a tool for construction of meaning, and organization of experience (Sims 2003). The main characteristic of the narrative is the emplotment which is addressed as a synthesis of the heterogeneous (Ricoeur 1991). Thus narration seems to involve combining of different heterogeneous parts (actions, events etc) into a coherent whole and crafting the relationships between these different parts (ibid). These views indicate that the role of the person who is constructing the narrative is critical and demanding at the same time. However if we take into account that the process of the composition of the narrative is not completed in the text but in the reader who constructs a new interpretation of the world, based on the narrative, we might assume that participation in a narrative both as a "reader" or as "composer" can become a rich learning activity in the sense that the narration constructed, offers an explanation about the world.

In the case of playful narratives, one has to consider not only the characteristics of the game or of the narrative, but has to focus on the relationship between games and narratives (see Juul, 2005, Neitzel, 2005 and Jenkins, 2004). According to some researchers (e.g. Juul, 2005) most games have the activity embedded

in a larger story, called backstory, which acts as a background of the activity, without necessarily affecting, in large extent, the player experience. On the other hand, some game designers observe that interactivity of game playing is almost the opposite of narrative; since “narrative flows under the direction of the author, while interactivity depends on the player for motive power” (Adams, 1999). This discussion has been mostly referred to traditional computer games and interaction with the virtual world of the game. However in the new realm of location-based games, these arguments have to be re-considered. In this paper we focus mostly on games that are based on a strong narrative structure, since we observe that this kind of games -as opposed to games with less emphasis on narrative (e.g. action games)- can be implemented to support a rich learning activity. In addition, a special case of game-like activity is that of location-based storytelling. These are activities based on a novel or a text-based narrative (e.g. Riot! (Blythe et al. 2006) and Hopstory (Nisi et al. 2004)), that have been transformed to be played in a specific physical space with participation of readers/players. The playful character and the situated nature of the reader experience make this activity very similar to a location-based game and for this reason; these are discussed under the same perspective here.

In this paper, we study the role of narratives in this new genre and in particular we review specific examples of narrative structures used and their impact to the user experience and to learning potential. The term used to describe the studied activities is that of *playful narratives*, emphasizing the playful character of the activities together with their narrative dimension.

Under this perspective, it is argued that location-based activities with strong narrative structure and a playful character consist of a set of elements which can offer rich opportunities for learning. It is important to stress here that these elements do not document or guarantee learning but they are identified as having an important learning potential. Next we discuss the impact of these elements in learning and we attempt a synthesis in order to inform design of next generation playful narratives.

## 2. LEARNING ELEMENTS IN LOCATION-BASED PLAYFUL NARRATIVES: AN ANALYSIS FRAMEWORK

In this section a set of key concepts are proposed, considered central to the notion of location based playful narratives. These concepts, that form an analysis framework, have been deduced from study of a number of cases in the literature and have been studied through typical examples, outlined here. They help us a) identify those elements of playful narratives that can be exploited to support rich learning activities, b) to better understand the main characteristics of instances of location-aware stories and games and c) relate these characteristics to their learning potential.

The examples studied are drawn from two cases of playful narratives. We identified these cases as representatives of two main trends, i.e. focus on the narrative and focus on the playful character of the activity. The first example is a case of fiction in the city, presented by Paay et al. (2008). In this, users experience the mystery story ‘Who killed Hanne Holmgaard’ interactively, as they move through the city of Aalborg (see fig. 1).

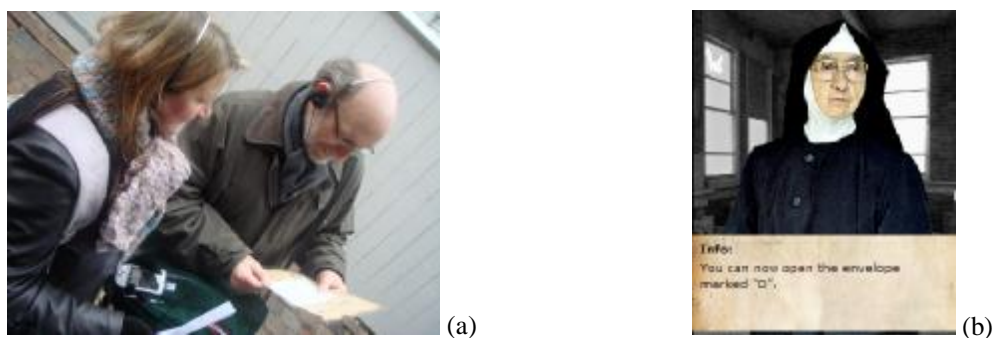


Figure 1 Activity snapshots from the “Who killed Hanne” example: (a) street activity and (b) screenshot of the mobile device where a fictional character gives a piece of evidence (images from Paay et al., 2008)

The second case is Frequency 1550 (Huizenga et al. 2009), a game about medieval Amsterdam, to be played in the historic centre of the city, during which various assignments are undertaken that earn the players points (see fig.2).



Figure 2. Activity from the “Frequency 1550” example: (a) location activity, (b) the Headquarter view during game playing time.(images from <http://freq1550.waag.org/>)

The objective of the analytical framework, defined through the study of the above examples, is eventually to inform design of next generation playful narratives as learning tools. The key concepts of the framework, depicted in figure 3, and discussed next are: (i) the role of the user and the structure of the narrative, (ii) the space and spatial motion, (iii) the dimensions of interaction, (iv) the degree of playfulness. These key concepts are used as filters, through which we analyse the two representative examples in the following sections.

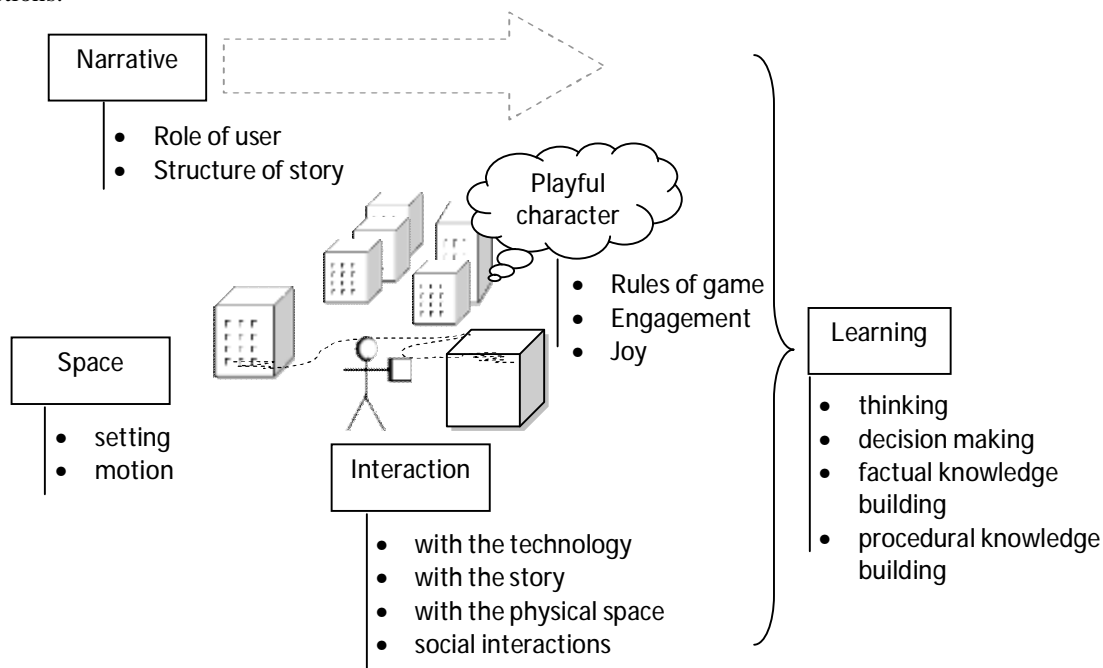


Figure 3. Key concepts of location-based playful narratives analysis framework

## 2.1 Narrative: role of user and structure

In the case of narratives embedded in location –based applications two things seem to change: one is the role of the user and the other is the structure of the narrative. The new media, like location aware applications, offer new ways of structuring the narratives and “reading” them, as opposed to linear structures. A term used by Aarseth (1997) is *ergodic literature*, indicating narratives, where the effort to traverse the text

is non trivial, as “extra-noematic responsibilities are placed on the reader”. So, new roles emerge for the reader who is transformed in active player.

It is observed that in location based stories, the users can undertake roles which vary or combine elements from a spectrum defined by the following two ends: the user as a listener/reader of the story to the user as a formulator of the story, or *implied creator* according to Neitzel (2005). Between these two ends there are other cases, such as the user as a participant of the story, for example where the user follows a predefined path and discovers eventually an existing story. With respect to the structure of the narrative, we focus on the characteristics of the structure (is it linear, is it spatially conditioned etc) and on the degrees of freedom offered to the user, whether it is a predefined structure that the user is expected to follow, a semi-predefined structure or a structure formulated by the user.

In the “Who killed Hanne” activity the users become part of the narrative as they play one of the characters described in the story. In this case there is a pre-constructed story line which is expected to be followed and “discovered” by the users. In this case the users do not establish the relationships between the different parts of the story but they use the offered information to discover them. As concerns the structure of the narrative, in this case it is linear and based on a temporal sequence, as the users can only go from location A to location B (and accordingly from episode or chapter 1 to chapter 2) in order to collect all the necessary clues and solve the case. In each location however, the two participants that form a team, can act in parallel interrogating different suspects and then combining the evidence they collected. It seems then that in the sequential structure of the narrative there are key points where things can happen in parallel but the result of these parallel actions feeds back to the sequence of the storyline.

In the “Frequency 1550” example the activity is denser. There is a backstory that acts as a canvas for the action. The story is that in order to gain citizenship in the city of Amsterdam, one needs to attain 366 points or ‘days of citizenship’ which represent the medieval year-and-a-day rule within the Amsterdam city walls to earn civil rights. In this case groups of four or five pupils are formed, and are assigned the identity of a beggar or a merchant who have different rights and a different status (i.e. order) in the game. Then they are asked to undertake various assignments. The players also may take the role of support team that resides in the headquarters. The headquarter teams digitally follow the route of the moving team, by means of GPS, and guide them through the tasks: a number of assignments, involving mostly collection of media, pictures etc. Completion of the assignments can gain points to the corresponding team. The structure of the game is loose and many activities can evolve in parallel or not completed at all, in a typical treasure hunt game situation. In the discussion of a quasi-experimental empirical study that involved over 200 secondary education students that played the game (Huizenga, et al., 2009) it was observed that the story played not significant role in the activity. The pupils “were told to gather points as much as possible, with no reference to earning civil rights” and were not always informed about their identities as beggar and merchant. So a finding of the study was that the narrative did not draw the attention of participants and did not contribute positively or negatively to the learning outcome.

## 2.2 Space and spatial motion

Location based activities take place in the “real world” which is a very rich field for learning, depending of course on how the notion of space is embedded in these activities in order to support learning. Space and spatial motion holds an important position in the every day activities taking place in the “real world”. Thus, spatial awareness and spatial intelligence (Gardner 1983) are not only an important subject of learning per se or a skill to be learned but also a tool for learning (see for example the notion of body syntonicity introduced by S. Papert as a means for understanding turtle graphics (Papert 1980) or the notion of embodied learning where meaning construction is grounded on bodily experience (for a brief review see Núñez et al 1999)).

From the examples presented and reviewed in the literature, we have identified two roles for space: in the first one, space functions as a background for the story or the game, while in the second, space plays a role in the evolution of the story. The later role is eloquently presented by Davenport (2005), as “the place to become a character in mobile and situated narratives”. A related issue, considered central to the use of mobile devices, is to identify the role of motion in space in these activities, i.e. to examine how important is for the story or for the game the fact that the players are not sitting at home interacting with a virtual space but they are moving in the actual space and to establish if this motion is seamlessly integrated in the activity.

In the case of “Who killed Hanne” space is important for structuring the narrative and is the context where the enactment of the story takes place. In specific, different episodes of the story were “attached” to the places of the city (e.g. the killing of Hanne took place in a park, interrogation of some of the suspects took place in a convent of the city as Hanne was a nun, etc). Users, in order to solve the case of the murder, had to visit each of the different places, where the story was taking place, in order to collect the necessary information. Even though the story evolves around space, the objectives of the user’s actions (e.g. go from one place to another, or to search for evidence in one place) are oriented towards the content of the story (i.e. who killed Hanne). Thus, in this case acquaintance with the city of Aalborg seems to come as a side effect of following the killer of Hanne.

In the case of the Frequency 1550 game, the space was a strong element of the action. Most assignments had to be performed in specific parts of the city and were related to specific buildings, points of interest etc., and were intended to trigger environmental awareness. In particular, the old city of Amsterdam was divided into six areas in each one of which six different themes of medieval times were addressed; labour, trade, religion, rules and government, knowledge and defense. So an interesting aspect of this game was a mapping between themes and space. The assignments were related to each theme and thus were undertaken in the corresponding area. In addition, part of each team, resides in a different space, the headquarters, where they are assigned different roles, that of receiving the information from the field and making further investigations on the specific matter.

### **2.3 Dimensions of Interaction**

Learning activities supported by the new media highly depend on the tools offered to the user in order to interact with the concepts under investigation. Furthermore, the type of learning that can take place is related to the ways the tools mediate the learning activity or to put in another way “what the user can do with the tools”. See for example the discussion on “Microworld” – a category of exploratory software – by Laurie Edwards who argues that “*the essence of the microworld centers on the creation of a rule governed environment made accessible for manipulation and exploration*” (Edwards 1998, pp. 64). Manipulation and exploration are structured around the interactivity supported by the tools built in the computer environment. In our discussion about the learning potential of playful narratives we consider essential to identify the dimensions of interaction involved. In our analysis we focus on four facets: (i) interaction with the technology, (ii) interaction with the story (iii) interaction with the physical space or the surroundings and (iii) social interactions in the case of group activities. In relation to these kinds of interaction, one should bear in mind the objections of theorists of the media, who claim that there is an interaction with a story, even in the case of text, that takes the form of mental processes involved. Manovich (2001) observes that interactions may occur not just in relation to computer-based media, where interaction is equated with physical interaction between a user and a media object (pressing a button, moving the body, etc.), but also “in relation to the required mental processes, like filling-in, hypothesis forming, recall and identification, which are required for us to comprehend any text or image”.

In the case of the “Who killed Hanne” activity, the technological interaction concerns solving of puzzles, discovering hotspots, interacting with virtual characters through selection of a predefined set of questions, and combining the parts of the signs using mobile devices. In the same example, interaction with the story concerns the users enacting part of the narrative by undertaking the role of characters of the story. The enactment is implemented through a set of predefined questions which are differentiated according to the character enacted and to the virtual character interrogated. Other than that, the user reads information related to the story delivered in different ways (in the form of newspapers, torn letters etc) and combines the different parts of information (or establishes relationships between the different parts of information) into a coherent whole in order to solve the case of the murder. User’s interaction with space involves navigation and way-finding based on a map. Social orchestration involves collaboration between two users who form a team of investigators aiming to solve the case of Hanne.

In the case of the “Frequency 1550” game the technology used by the field teams was smart phones, equipped with GPS and multimedia capturing capabilities. Through them the team members could capture snapshots of the urban setting and relate them to their tasks. The no-mobile members of the team at the headquarters interacted with desktop equipment that allowed them to search for further information in order to complete the task. An important instrument in the process was a map of medieval Amsterdam, see fig. 3(b)

that they could relate to the current map of the city. Interaction with the story was minimal, as the story was just a background for the action. A strong interaction was between the team members, and in particular between the city and the headquarter groups, since the former supplied the latter with information while navigation instructions were flowing the other direction. Finally at a final plenary meeting, all team members interacted and discussed the experience with other groups.

## 2.4 Playfulness

Many studies stress the importance of employing games in the learning process, focusing on the intrinsic motivation inherent in the nature of games (Malone, 1982, Prensky, 2005). Playing games is inherent in children and adults and, besides being a recreation, it promotes physical and intellectual activity. Interweaving the game idea with the content or the concepts to be learned is a way of infusing the advantages of games (i.e. the motivation derived from the feeling of fun) into the learning process (Malone and Lepper, 1987). Location-based games have the specific characteristic of interleaving the real world as a background of the activity, with digital characters, storyline and associated information, while the other players and physical artifacts provide relevant prompts for action and plot building. This context of the game activity, according to the theory of situated learning (Lave and Wenger, 1991), plays an important role in learning by providing tools, relevant background and learning objectives that give meaning to the learner (Lave and Wenger, 1991). Thus learning in a rich physical space evolves around interaction with items of interest (buildings etc.) thus learning trajectories may emerge consisting of the various elements: observing the physical space, in particular items with indexical value and links to associated information spaces, placing these items in context (narrative, spatial, historical, etc.), analyzing and handling the information about these items and the story. In this context and with the use of mobile technology during game playing, players will interact and may engage in decision making (e.g. which subplot to follow, how to combine items of information etc.) in order to formulate problem solving strategies.

In the case of the “Who killed Hanne” activity, the emphasis is on narration and storytelling rather than on playfulness. However the story, even though it is not stated by its creators, evolves around a variation of a treasure hunt game as the participants in each location collect clues that will lead them to the next place in the city. The idea of clue - following has been implemented as follows: the two participants need to complete the collection of evidence in a “key location” then the system awards the user with half a sign which when combined with the other half obtained by their partner indicates on the map which will be their next stop.

In the case of the “Frequency 1550” activity, the playful character is more evident, most aspects of a game activity (Dempsey et al. 1996) can be clearly identified, competing teams were involved, there were clearly defined goals, constraints, payoffs and consequences. The activity was rule-oriented and artificial in many respects. The findings of the empirical study also identified a strong engagement dimension, typical of game activities.

## 3. LEARNING CHALLENGES

In the previous sections we discussed learning through the point of view of the learning elements we identified in location based playful narratives, focusing on the potential of each element for learning and the way it was implemented in two exemplary cases. In this section we will attempt to outline the challenges for the combination of these elements when a learning agenda is underlying the design process.

Most current location-based games have not been designed and studied under the perspective of the learning they can support. In a recent review by Rashid et al. (2006) of 19 location-based games, played using location sensing mobile phones, it was reported that only one of them (Frequency 1550, discussed in section 2) was designed specifically with a learning objective, while in a recent volume on theoretical and empirical studies on design and evaluation of location-based games (Montola et al. 2009) none of the 14 examples of games discussed has been designed specifically with learning objective. In cases that learning is discussed- as it happens with both examples we analyzed earlier- it seems to be restricted in factual information only (information about places, historical facts etc). So despite the fact that learning may not be explicitly identified as a design objective or may not be the focus of the user activities, our analysis aimed to show that playful narratives consist of elements that can be combined to support a rich learning environment.

In the examples we analyzed in the previous section it has been indicated that these elements exist in one or another form in both examples. Yet the existence or not of these elements does not guarantee or result in “better or worse” learning. The questions that seem important in this case relate a) to the way these elements can be integrated into the activity so as to support learning and b) to the way location based technology can add a learning dimension by enriching the interaction with space, stories and games.

The emphasis on each element during the design cannot be predetermined and cannot be the same in all activities because it depends on the learning objectives (what we want the users to learn) on the characteristics of the space, of the story of the game and of the tools used. So, it becomes apparent that there is a dialectic relationship between the elements of playful narratives (see fig.3 and analysis of section 2) and this relationship needs to be taken into account in the design process, so as to achieve a seamless integration of these elements in the application.

## 4. CONCLUSION

In this paper we studied the emerging field of location-based playful narratives and their possible contribution towards learning. Key concepts of this new genre were identified and discussed, and through them we defined an analytical framework. This has been used for studying existing cases and ultimately, after completion of a review of the field, we expect to form some insight on designing the next generation of applications of this kind.

In the context of this research there are various issues that need to be addressed: Are all spaces adequate for playful narratives, and are all different kinds of narratives suitable for successful games with learning potential? How open playful narrative may be and what is the role of the players in defining the narrative and the game rules and what is the role of the narrative author in this new setting? (Wiesner, et al. 2009).

The possibility of participation of the user in defining the narrative has already been studied in the case of computer games, as Jenkins (2004) observes in relation to the popular computer game *The Sims*: “it is a sandbox that it should be understood as a kind of authoring environment within which players can define their own goals and write their own stories”. These are termed emergent narratives. Another example of user participation in defining the narrative of a certain space is the case of merging of media like blogging and location-aware experiences (the term mobile blogging has been used in this case) as discussed by Walker (2007).

The issue of kinds of narratives suitable for this kind of activity also needs to be studied extensively. Neitzel (2005) distinguishes among mythological, gnoseological and ideological narratives and relates them to action, adventure and strategy computer games. However we need to study further how these kinds of games and relating narratives map to location-based activities.

With regards to the spaces that are used as settings, and participate in the activities, these need to be carefully selected in terms of joyful user experience with learning potential. A site of an ancient temple or a museum may have more stories to tell us and enhance visiting experience, provided that a good storyteller has designed the narrative.

Finally the continuously shifting technological ground, e.g. presentation media, connectivity and mobile devices, need to be further studied and related to this genre and further investigate how they affect user experience and learning. For instance the new generation of ebook readers needs to be studied in terms of their role in location-based playful narratives, as new devices come out with high connectivity potential.

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