Bridging the Gap between Game Designers and Cultural Institutions: a Typology to Analyse and Classify Cultural Pervasive Games

Diane Dufort, Federico Tajariol, Ioan Roxin
Université de Franche-Comté

Abstract
In the last fifteen years, pervasive games, i.e. games that blend a gameworld and reality were created most notably to promote movies, series or videogames. Chosen for their combination of assets, they prompted a deeper engagement in players especially in the institutional cultural sector. We aim to create conceptual and methodological tools to bridge the gap between designers and cultural institutions and help them reach mutual understanding. In this paper, we will describe our adaptation of an open-ended typology of games to the specific case of CPGs.

Keywords: pervasive games, cultural heritage, alternate reality games, typology of pervasive games, design of pervasive games

Résumé en français à la fin du texte
Introduction

Since 2008, each visitor of the Tower of London can play and help three characters and a polar bear in peculiar missions: evading the dreadful tower! To do so, (s)he needs to visit the tower with (her)his mobile phone and listen to old famous prisoners. Some of them, such as Anne Boleyn, could only give information about themselves, whereas others could ask the player to help them evade by repeating the events that led to their evasion.

These players experienced *Prisoner Escape From the Tower*, a pervasive game offering a cultural message, which actively engages participants, and enable them to discover and learn about English cultural heritage. Pervasive Games are sociotechnical apparatus that cultural institutions (e.g. museums, theatres, etc.) created following a *multimediatization* process, which means that multimedia technologies are employed to prompt new leisure and informal learning activities, in order to reach new audiences. In fact, due to the development of information technologies and to the *media convergence* process, cultural institutions have to take into account audience’s expectations. Designing Cultural Pervasive Games expects to align visitors’ expectations and cultural institutions’ goals. This process raises several methodological questions, at the intersection of both Information and Communication Sciences and Sciences of Design fields.

This paper presents a methodological thinking to formally describe Cultural Pervasive Games. In the first part, we discuss the usage of multimedia technologies in cultural heritage sites and its objectives. Subsequently, we discuss the pervasiveness and other main features of pervasive game, in order to define the concept of Cultural Pervasive Games (CPG). In the third part, we put forward the typology of CPG we built over a large corpus. Finally, we discuss how our typology could be an intermediary and necessary step towards an ontology, which would help multimedia designers and cultural institutions to create CPG in heritage sites.
**Culture & IT in heritage sites**

Cultural institutions have a most relevant mission for the education of citizens in the post-industrial society, in particular for the education of youth population (Pronovost, 2005). In fact, culture is not an individual creation but a system of representations, which are specific to a human community and shared among its members (Cuche, 1996; Moles, 1967). For this reason, several countries, especially in Europe, are used to deploy important financial and human means to prompt young people to learn and discover different forms of culture, especially those they are unfamiliar with (Hindmarsh *et al.*, 2001). For instance, in France the mission of national cultural institutions is to enable citizens to nurture their talent and creativity, to be trained in any kind of artistic discipline and to preserve cultural heritage.

To accomplish its mission, cultural institutions often commit artists and curators to create exhibits that stimulate any social interaction about, around and sometimes with artworks (Bannon & Bowers, 2001; Ciolfi & Bannon, 2002; Filippini-Fantoni, 2004; Heath, Luff, Lehn, Hindmarsh, & Cleverly, 2002; Hindmarsh *et al.*, 2001). In fact, social interaction is a key component of an audience’s learning experience (Falk & Dierking, 2000; Heath, Lehn, Hindmarsh, Luff, & Cleverly, 2001; Laurillau & Paternò, 2004).

In this context, information and communication technologies have been employed to actively engage the members of the audience cooperating with each other, towards the media convergence process (Jenkins, 2006; Lambert, 2003). New forms of cultural learning experiences emerged (Kiefer, Matyas, & Schlieder, 2006; Michael *et al.*, 2010) aiming to present cultural heritage in a more appealing way while taking into account the social side of visiting.

Games have long been used in the cultural institutional sector. Indeed, many cultural institutions seek to exploit the commonly claimed potentialities of games such as flow or immersion (Brockmyer *et al.* 2009; Csikszentmihalyi & Csikszentmihalyi, 1992). Games with a purpose are broadly referred to as serious games. Clark Abt (1970) defined serious games as games mixing educational learning and informal learning and used as a complement to other pedagogical methods without limiting them to a specific medium/material. However, the expression “serious game” is commonly and broadly used to refer to video/computer-
enhanced games which include a serious dimension: informational, persuasion, educational, advertisement, etc. At the same time, this modern definition “limits” these games to video games and extends the types of “serious” purposes (Alvarez & Djaouti, 2010; Alvarez et al., 2007; Anderson et al., 2010; Bellotti et al., 2013; Mortara et al., 2014; Zyda, 2005).

The serious purpose is conveyed in the content of the games. However, considering all serious games efficient only based on the content they include would be making an overly generalizing claim. An efficient serious game has not only to be a good pedagogical tool but also a good game (Mortara et al., 2014; Suttie et al., 2012; Zyda, 2005). Additionally, Bogost highlights that the potentiality of games to achieve a “serious” purpose not only relies on their content but also on their expressive persuasive power. In that context, persuasive games are games that exploit procedural rhetoric, persuasion through interactions and representations, in order to make a claim (Bogost, 2007, 2011). These approaches are not incompatible but complementary.

Nonetheless, if the serious/persuasive games expressions cover games created for a wide variety of media and platforms, including mixed-reality games or mobile games, they still set the focus on computers along their related technologies and functioning (Bogost, 2007; Anderson et al, 2010).

This paper addresses games with educational/informational purposes played in a cultural institutional context. Though computer-enhanced, these games focus on reality to the point that some seek to make these technologies transparent to the player. These games are also referred to as “pervasive cultural heritage serious games” (Coenen et al., 2013). They are a part of what we call Cultural Pervasive Games.

**Pervasive games: definition**

To describe the pervasiveness of games instead of drawing a clear separation between pervasive and non-pervasive, Montola (2005, 2007) suggests that a game is pervasive if it corresponds with at least one of the following criteria: a) it is not played in a dedicated space (e.g. game board, field) but rather in the physical spaces of the player's ordinary life, such as
streets or museums; b) its game sessions are blended in ordinary life; c) there is ambiguity between the identity of participants, both players and actors of the game, and non-participants.

According this position, pervasive games blend a gameworld into the ordinary life of the player, blurring the magic circle of a game (Montola 2005, 2007, 2011; Montola, Stenros, and Waern 2009). The expression magic circle refers to the playground, the social, spatial and temporal boundaries in which the game takes place (Huizinga, 1980; Salen and Zimmerman, 2003). In other words, a pervasive game represents the rupture or dissolution of the traditional boundaries of games, when its gameplay exploits pervasive computing technologies and blends virtual and reality (Hinske, Lampe, Magerkurth, & Röcker, 2007; Lankoski et al., 2004; Montola, 2011; Nieuwdorp, 2007). McGonigal (2006) posits that "pervasive" implies breaking, blurring and moving the boundaries. In other words, a pervasive game would provide a more mobile and intermittent experience. In our view, we adopted Montola's perspective and we consider pervasive games can exploit various technologies including localization technologies such as GPS (Benford et al, 2006) and Infrared (Reid et al., 2008); client/server infrastructure and services counting networking technologies such as WIFI (Chalmers et al, 2004; Ballagas, Kuntze & Walz, 2007; Björk, Falk, Hansson & Ljungstrand, 2001); web technologies (Benford et al., 2006); mobile or augmented reality technologies (Schneider & Kortuem, 2001; Stenros, Montola, Waern, Jonsson, 2007), etc.

**Pervasive games: main features**

Pervasive Games have a main relevant feature: the ambiguity between reality and the gameworld due to the absence of firm delimitation between the “two” worlds. Ambiguity can be thrill-inducing and thus a source of interest, curiosity and amusement (Benford et al., 2006; Dansey, 2008; Gaver, Beaver & Benford, 2003; McGonigal, 2003; Montola, 2007), and it can be exploited as a resource to generate social interaction, thoughts, questions and confusing the player involved in the game.

According to Gaver, Beaver and Benford (2003), there are three main types of ambiguity:

i) ambiguity of information: it occurs when imprecise information is received, provoking speculations and requiring interpretations. For example, in *Uncle Roy*
All Around You, players were asked to follow a person qualified only with vague information (e.g. color of a shirt or hair)

ii) ambiguity of context: it occurs when an object or an element of the game is presented in a way that breaks its usage conventions. A non-game example of ambiguity of context are the Modified Social Benches of Danish artist Jeppe Hein. These benches generate confusion between the expected usage of a bench and the fact that they were designed specifically to be unusable this way. It stimulates interaction.

iii) ambiguity of relationship: it exploits the player's relationship with an object or an element of the game. Gaver, Beaver and Benford mentioned the Telegotchi, "an electronic pet with no buttons" (Gaver, Beaver, and Benford 2003) supposed to be controlled with the user's psychic powers.

The interaction between these three types could impact significantly the efficiency of pervasive games in activities related to cultural heritage, and it could make some emergent features, such as apophenia and coincidence.

A. Apophenia and pareidolia
Ambiguity of information stimulates a natural optical phenomenon: pareidolia (McGonigal 2004). Pareidolia is a sort of perceptive illusion, a tendency to perceive as significant a meaningless stimulus. A typical example of pareidolia would be seeing the shape of a T-Rex playing saxophone in a cloud.

Dansey (2008) describes pareidolia as a visual form of apophenia without attributing to the latter term its common clinic connotation (as a development stage of schizophrenia). Apophenia therefore covers a wider area than the simple pareidolia. Indeed, it would qualify any tendency, in an individual, to attribute an incorrect meaning to a coincidental event. In other words, apophenia is the phenomenon in which “a sense is given to nonsense” (Dansey 2008). In pervasive games, apophenia would inspire a player to interpret a coincidental event as a game event (McGonigal, 2004; Dansey, 2008).

McGonigal (2006) describes a case of apophenia in a Go Game session. One of the team found, during their game, a pile of materials (e.g. pieces of metal or old furniture) next to a
sign stating “Assembly required”. Thinking that this was part of the game, the team members spent 20 minutes to build a chair with these materials. A few minutes after, one the game plants approached the group (McGonigal, 2006).

Not only these players interpreted as a game event something that was totally unrelated (apophenia) but the coincidental approach of the game plant at this very moment (he was actually patrolling in the area) highlights another phenomenon: coincidence.

**B. Coincidence**

The "happy coincidence" (Reid, 2008) is a 'magic' moment when the overall context is favourable and fills the gap between the real world and the game world. According to Reid (2008), three types of coincidence can occur:

i) natural coincidence, when natural events and game events are linked in some way, as when, for example, a thunder resonates in the real world while a player is getting described a tragic event happening during a thunderstorm;

ii) social coincidence, which occurs when a player shares a game event with another while considering it is fortuitous;

iii) feigned coincidence, when actors or game elements are exploited to bring events that are interpreted as coincidences.

Coincidences make the place where the game is orchestrated more meaningful to the players, thus generating a sensation of connection to the place or historical site (Reid 2008). Coincidences could be also interpreted as a message to the players, inviting them to look beyond appearances and to search for potential game hints in the real world (McGonigal 2003; McGonigal 2006), in particular in games created to make heritage sites more appealing, engaging and thrilling (Bellotti, Ferretti, and De Gloria 2005; Reid 2008), like the Cultural Pervasive Games.

**Cultural Pervasive Games (CPGs): definition and features**

In our view, CPGs are created in a specific purpose: forming an educational interface between the public and the artworks most notably to support a cultural event, provide some alternative tours and enhanced visits, promote the historical cultural heritage or change the image of a cultural institution. Cultural pervasive games, in the same way than videogames or
traditional games, require a precise vocabulary to describe their structure and mechanisms, such as time, space and social interactions between players.

Gentes et al. (2010) point out that, for a CPG located in an urban setting, it is insufficient to consider the space as the geometrical organization (Gentes, Guyot-Mbodji, and Demeure 2010). They expand this concept to four anthropological dimensions: the real-world physical organization, the narrative world as well as the service and the events within the city.

Zagal and Mateas (2007) studied the temporality in video games and identified four temporal frames: the fictive time, the coordination time, the real-world time and the gameworld time. Several temporal frames could interact with each other in a particular game (Zagal and Mateas 2007).

We analyzed 12 CPGs orchestrated or launched between 2007 and 2012 in Europe or North America. We only retained CPGs that met 2 criteria: a) created by cultural institutions or to valorize a heritage site b) with enough information accessible to feed the analysis. These CPGs were created for various purposes we could group in 3 categories (table 1).

The first category concerns CPGs aimed at promoting a cultural event (e.g. festival, conference). The game is commonly played before or during the related event. Their narrative is also related to the theme of the event. For example, in 2011, the game [In]visible Belfast was created to prompt publics to participate to the Belfast Book Festival. The story was revolved around a famous Irish writer: Ciaran Carson.

The second category concerns CPGs aiming to offer new ways to visit cultural heritage sites for example to reach new publics. The narrative aspect of these games is not always History compliant but seek to stimulate a longer, more attentive or participative visit.

In the third category, we grouped CPGs aimed at giving publics, especially the youth, a more modern, friendly image of cultural institutions and their related practices.
The analysis of the games suggests that players cooperate and sometimes form teams instead of competing against each other. This is also the case in games that were not requiring collaboration or cooperation to be finished such as Cherche Tom dans la Nuit in which players helped beginners to solve puzzles. In other games, such as Eduque le troll, a form of competition or emulation was present due to the limited amount of prizes given to the first players to finish the game. Social interaction patterns set by the game designers stimulated these behaviors (Dena, 2008).

When games support these activities, players most gladly engage themselves in activities of active discovery with strong motivation (Bellotti et al., 2005; Reid, 2008). For example in Vanished, children explored topics with scientific method and experiences. It lead players to be active and satisfied in relation to their underlying longing of activity (Davallon, Gottesdiener, & Le Marec, 1999; Fourmentraux, 2006, Lambert, 2003), most notably concerning creation and co-creation of cultural objects such as in Ghosts of a Chance or Pheon.

### Table 1 - Corpus of CPGs

<table>
<thead>
<tr>
<th>Category</th>
<th>Cultural Pervasive Game</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Promote an event</td>
<td>Eduque le Troll, Centre Georges Pompidou, (France)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Cherche Tom dans la Nuit, European Night of Museums, (France)</td>
</tr>
<tr>
<td>3</td>
<td>Offer new ways to visit a cultural site or museum</td>
<td>(In)visible Belfast, Belfast Book Festival, (Ireland)</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Prisoner Escape From the Tower, Tower of London, (UK)</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>The Giskin Anomaly, Balboa Park, (USA)</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>« RExplorer », Regensburg (Germany)</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>PLUG, Musée des Arts et des Métiers, (France)</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>The Miracle Mile Paradox, Miracle Mile area, (USA)</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Ghosts of a Chance, Smithsonian American Art Museum, (USA)</td>
</tr>
<tr>
<td>10</td>
<td>Change the image of a cultural institution before public’s eyes</td>
<td>The Mystery Guest, Bibliothèque Finksburg du comté Carroll, (USA)</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Find Chesia, Finksburg Library of Carroll County, (USA)</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Blood on the stacks, Bibliothèque Coates, (USA)</td>
</tr>
</tbody>
</table>
Relevance of a typology of games

Starting from earlier works (Aarseth, Smedstad Solveig & Sunnanå, 2003), Elverdam and Aarseth (2007) make their proposal about an open-ended multi-dimensional game classification model, which contains 17 dimensions grouped in 8 meta-categories: Virtual Space, Physical Space, External Time, Internal Time, Player Composition, Player Relation, Struggle and Game State. By open-ended, the authors meant that “individual dimensions can be modified, added, or rejected without compromising the integrity of the model as a whole” (Elverdam and Aarseth 2007). This typology is not limited to videogames but describes games as varied as Chess, Volleyball or World of Warcraft.

Zagal et al. proposed the “Game Ontology Project” (GOP) to describe, analyze and study games. Their purpose was to create a hierarchically structured evolutive framework adapted to a wide range of games (Zagal et al., 2005). All the entities of the ontology ensue from one of the five main elements: interface, rules, goals, entities, and entity manipulation. Zagal and Bruckmann (2008) used this ontology as a learning tool for game design students. On one hand, their purpose was to invite students to engage themselves in activities linked to the research in their field thus “allowing students to meaningfully participate in authentic practices that contribute to a larger body of knowledge” (Zagal & Bruckmann, 2008). Students were then asked to enrich the existing ontology with examples of games. On the other hand, the authors wanted to “help students learn and develop a critical vocabulary for talking about games” (Zagal and Bruckman 2008) thus using the ontology as a learning tool.

In the field of game studies, many authors reflected upon the lack of unified, critical and precise vocabulary to describe games and their structure (Church, 1999; Elverdam & Aarseth, 2007; Zagal & Bruckman, 2008; Zagal, Mateas, Fernández-vara, Hochhalter, & Lichti, 2005). They also mention the need to develop design tools such as typologies or taxonomies (Bailey, 1994) in order to help cultural actors and designers to create CPGs (Elverdam & Aarseth, 2007; Zagal et al., 2005).

This lack of tools doesn't only have theoretical effects but also professional effects. For example Zagal and Bruckman (2008) asked college students taking game classes to participate in an exercise of formal description of video games to complete an ontology of
games. Future professionals of the field, familiar with games, yet faced difficulties to describe games and lack vocabulary to do so. Participating in the ontology development and thus working with a tool composed of strict semantic categories had positive learning outcomes in terms of vocabulary (Zagal & Bruckman, 2008). In a transdisciplinary professional context, it is highly likely that the same difficulties will be met or be heightened between groups of different specialties.

**Our typology of cultural pervasive games**

We adapted Elverdam and Aarseth’s work (2007) to the particular case of the CPGs and we created our typology (fig.1). Its open-ended nature, completeness and precision were undeniable assets. Due to the pervasive nature of CPGs and their blending with reality, we have rejected some categories in Elverdam and Aarseth’s work (2007), such as the “Game State” meta-category, we added some other categories (green colour in Fig.1) and we modified some existing dimensions (orange colour in Fig. 1). In this section, we describe our proposal.
**Added meta-category: Immaterial/Material Contents**

Two new meta-categories have been created to describe the narrative content of the game. As pervasive games occur both in reality and in a gameworld, we called the new meta-categories “Immaterial Content” and “Material Content”. They both contain three dimensions, each dimension of a meta-category mirroring a dimension in the “twin” category.

The dimension “Game Content” describes the kind of material/physical or immaterial/virtual content included in the game. It contains 4 values:

i) existing (when the game exploits pre-existing content),

ii) specific (when the content of the game was created specifically for the game),

iii) both (when the game exploits both pre-existing and specifically made content) and

iv) none (when the game exploits no content of this type).
For instance, the immaterial content of *Prisoner Escape from the Tower* or *RExplorer* were created specifically for the game (Reid *et al.*, 2008) while *Cherche Tom dans la Nuit* exploited both pre-existing and specific immaterial content.

The dimension “User Content” describes the type of immaterial or physical content that was allowed/encouraged from the players. It contains 4 values:

i) game requirements (players are required to send/create content as part of the game such as a photo or a sculpture),

ii) player's initiative (players generate content on their own volition such as a game wiki created to help other players to follow the plot of the game),

iii) both and

iv) none (the players are not allowed/encouraged to create content either physical or virtual).

**Added meta-category: Social Frame**

We added the “Social Frame” meta-category to represent the social extension of the magic circle of play. It includes two dimensions: “Perception of the Performance Frame” and “Role”. The “role” describes the kind of role the player performs, according to Van Ments’ works (1999). Its values can be:

i) none (the player acts as himself/herself),

ii) existing/historical role (the player acts as a real person),

iii) player-created role (the player acts as an imaginary person and creates this imaginary person).

The “Perception of the Performance Frame” dimension describes how the magic circle of play is socially extended. Benford *et al.* (2006) describe two different strategies. The first strategy makes the apparent frame of the performance, the gameworld appear wider than it actually is. The aim is to give players the illusion of a game in which bystanders are involved (Benford *et al.*, 2006). Thus, individuals who stand totally outside the social frame are perceived as implied performers. The second strategy makes the social frame perceived as narrower than it actually is. Dissimilar to the first case, it makes performers be perceived as implied bystanders. These two strategies also include objects or spaces (Benford *et al.*, 2006).
We added a third value for this dimension: “Identical”. This value describes a game in which the perceived social limits and the actual limits are the same. In this kind of games, there is no social ambiguity about players, performers and bystanders. Games like PLUG fall in this category. PLUG was staged at the "Musée des Arts et des Métiers" and was a card-collecting game in which each card represented an artwork.

**Added dimensions: Environment Dynamics in the Physical Space**

In pervasive games, both the physical space and virtual space are exploited and the player has the ability to do things “for real” (Montola, 2007) meaning that she can actually produces changes in her environment. To describe this ability, we chose to add a new dimension in the “Physical Space” meta-category named “Environment Dynamics”. It mirrors the “Environment Dynamics” dimension within the “Virtual Space” meta-category.

Given that the potential changes made in the player’s environment can’t be totally free, this dimension can only take two values: None and Fixed. Games such as *R* Explorer and *Prisoner Escape from the Tower* have no environment dynamics. Indeed, the game designers did not allow the players to make any change to the town of Regensburg or the Tower of London. In *Ghosts of a Chance*, players collectively created the artworks displayed in a temporary exhibition of the Smithsonian Museum of American Art.

**Added dimensions: Player Agency in Struggle**

In the “Struggle” meta-category, we added two dimensions in the “Player Agency”: “Global Player Agency” and “Local Player Agency”. Both contain two values: Absent and Present. We consider that Local Player Agency is present when players' actions have immediate results on the sequence of events of the game. Global Player Agency is present when players' actions have consequences in the long-term period (Mateas & Stern, 2005).

**Discussion**

Our extended typology enables designers to describe three possible extensions of the boundaries of the game: social expansion, spatial expansion and temporal expansion. It contains 27 dimensions (for a total of 84 values) grouped in 9 meta-categories.
Zagal and Mateas (2007) distinguish the gameworld time (i.e. time spent in the gameworld) and the fictive time (i.e. players’ expectations about the representation of time in the game). This distinction is particularly relevant in the case of historical CPGs. However, their “Gameworld time” roughly corresponds to Elverdam & Aarseth’s “Internal Time”. Moreover, the time representation of “Fictive Time” is actually addressed in the “Representation Dimension” in “External Time”. Though, we preferred keeping Elversam and Aarseth's terminology because it would seem more appropriate to describe the “real-world History” in the “External Time” meta-category.

Elverdam and Aarseth (2007) observed that one perspective of their typology model was to enable researchers to determine the game design patterns responsible of the success of those games played by a specific group of players. In the same way, it could be used for the reverse approach to ask the question: which patterns could a designer implement in order to reach a particular objective among the aforementioned group of players? The answer to this question requires that both a wide-ranging list of patterns as well as a list of classified games exist and are maintained. Björk and Holopainen (2005) worked on the first aforementioned list.

Elverdam and Aarseth also made an analogy between their work and language. They compared their typology to a grammar of the language of games while game design patterns are the language itself. Following this analogy, an ontology could serve as a grammar in this language. We therefore aim to develop, in further works, an ontology of pervasive games, especially CPGs. Gruber (1993) defines the concept as a “specification of a conceptualization” (Gruber, 1993). Borst (1997) highlights several key characteristics of such a project. For this author, an ontology is a “formal, explicit specification of a shared conceptualization” (Borst, 1997). An ontology is a vocabulary about a specific domain, hierarchically structured and including a set of relationships, constraints and rules defining this vocabulary (Breslin, Passant, and Decker 2009; Szilagyi 2014). An ontology must fulfil three different commitments: “a semantic commitment which sets the linguistic meaning of the concepts described in the ontology, an ontological commitment which sets their formal meaning and a computational commitment which determines their actual exploitation” (Bachimont, 2000). Various technologies and standards exist to represent information and knowledge such as
KL-ONE, DOGMA or OWL (Web Ontology Language). Our ontology of Cultural Pervasive Games will exploit the latter.

The next step will be to integrate works conducted on ontologies and culture (Blanchard, Mizoguchi, & Lajoie, 2010) to include knowledge about the cultural context of these games. Finally, this will enable us to build a knowledge base we will exploit in a web-based application for the conception of Cultural Pervasive Games.

**Conclusion**

Information and Communication technologies offer a constant challenge to cultural institutions and designers who work with these. Technology literate publics have important expectations related to contents or interactivity offered while institutions have mostly educational and informational objectives. In that context, the concept of Cultural Pervasive Game, influenced by the pervasive computing paradigm and by the media convergence process, would seem to be a suitable answer to both of them.

Our contribution aimed to define Cultural Pervasive Games both on the intentional and extensional plans. To support our work, we analysed a selection of Cultural Pervasive Games. It enabled us to adapt a typology to the specific case of CPGs. The typology has both a descriptive and taxonomic value. As such, it represents a necessary step to identify and classify characteristics of Cultural Pervasive Games. The next step will be to create a methodological tool to support the conception of CPGs which requires cooperation between game designers and cultural institutions in order to balance efficiently the gaming and pedagogical aspects of these games. In the game studies domain, many authors noticed the lack of such tools (Bailey, 1994; Church, 1999; Elverdam & Aarseth, 2007; Zagal, Mateas, Fernández-vara, Hochhalter, & Lichti, 2005), and highlighted the necessity to develop methodological tools for the conception of games (Elverdam et al., 2007; Zagal et al., 2005). Others showed the repercussions of this lack, including on future professionals of the field (Zagal & Bruckman, 2008).

Our next step will concern the validation of the predictive level of our typology. It will enable us to create an ontology and a knowledge base of Cultural Pervasive Games exploited in an...
application aimed to help both designers and cultural institutions in the process of conception of these games.

**Works cited**


Introduction%20au%20Serious%20Game


Bridging the Gap between Game Designers and Cultural Institutions


McGONIGAL, J. (2004, April). *Play or Else: A performance studies approach to ubiquitous gaming*. Ph.D. Qualifying Lecture, Department of Performance Studies / Center for New Media University of California at Berkeley, USA.


http://doi.org/10.1016/j.culher.2013.04.004


http://doi.org/10.1145/1279540.1279553
Bridging the Gap between Game Designers and Cultural Institutions


Diane DUFORT is a PhD Student in Information and Communication Sciences at ELLIADD laboratory, OUN team. Her main research interests include cultural heritage, pervasive games, learning activities in cultural heritage sites, Alternate Reality Games and transmedia storytelling.

Federico TAJARIOL is an associate professor in Information and Communication Sciences and a senior researcher (ELLIADD laboratory, OUN team) (University of Franche-Comté). His research concerns the design and the evaluation of ICT supporting human activity in augmented environments, learning activities and cultural heritage.

Ioan ROXIN, is a Full Professor in Information and Communication Sciences and director of the ELLIADD laboratory (University of Franche-Comté). His main research interests concern multimedia learning systems, semantic web, and context modeling for interactive environments.

Résumé
De nombreux jeux pervasifs ont été créés dans le domaine culturel, par exemple pour accompagner la sortie de films, de jeux-vidéos ou pour combler l'attente entre deux saisons d'une même série. Cependant, notre contribution se focalise sur les Jeux Pervasifs Culturels qui sont orchestrés dans les lieux culturels et touristiques. Nous avons pour but de proposer aux institutions culturelles et aux designers, des outils méthodologiques et conceptuels qui pourraient les assister à établir une compréhension réciproque.

Mot-clés : jeux Pervasifs, médiation Culturelle, jeux en réalité alternée, typologie des jeux pervasifs, conception de jeux pervasifs