

# TAGGLING GAME: LEARNING ABOUT CONTEMPORARY ART THROUGH GAME PLAY

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## Abstract

Engaging museum visitors through game playing is an approach that has been used extensively by many museums and cultural institutions. Location-based games, facilitated by mobile technologies, have been already implemented in various museums, archaeological, historical, cultural, science, art galleries, etc. However a particularly hard case to implement playful activities with learning potential is that of museums of contemporary art. In this paper we describe "Taggling", a game designed for a Contemporary Art Museum, focusing in particular in the learning patterns observed in groups of visitors of the museum playing the game. Taggling is a kind of card sorting game where players are engaged in untangling a set of tags that describe different artworks so as each tag to be placed in the corresponding artwork. Based on two evaluation sessions, it was discovered that Taggling has the potential to successfully engage the players with the artworks. We consider this an important achievement, given the difficulty of engaging with contemporary art compared to traditional art.

Keywords: Location-based, mobile, games, gamification, learning, museums, contemporary art, Taggling.

## 1 INTRODUCTION

Modern mobile devices and the accompanying technological infrastructure have reshaped our everyday interaction with the physical world and with each other. The question of how to use this technological potential in a way to support formal or informal learning in various settings has been the concern of researchers and practitioners for some time now. Location-based multi-player mobile games have been proposed as ways for achieving learning objectives while engaged in playful activities. Museums, as sites of informal learning are particularly suitable cases for testing this proposal [1], [2], [3]. The location-based mobile game discussed here, Taggling, aims at engaging the visitors of a museum of contemporary art with the exhibits in a playful way, providing thus opportunities for informal learning.

Location-based mobile games are playful activities that are situated in real-world contexts, where the game-play is facilitated by mobile devices. It is believed that these games are conducive to learning, and that they may lead to the acquisition of skills like critical thinking, curiosity, creativity, collaboration, consideration of multiple perspectives, social awareness, responsibility and media fluency [4]. Mobility, in the context of location based mobile games, means that the game-play impels the players to move in the real world and interact with it, as opposed to simply 'mobile games' where the players carry the game with them. The presupposition is that the players, by performing physical activities in places rich in value, relate knowledge with the places. This is the case with museums or other places that are rich in content like archaeological sites, historic city centers, etc. These games are conceived as tools that can employ the fun of a game, while at the same time, the players can be engaged with the specific location [3].

In the constructivist learning paradigm [5], the visitor of a museum is self-dependent and has an active role in the construction of meaning by interacting with the exhibits, as opposed to the passive consumption of information. In the past, the constructivist approach to learning has been supported by non-digital games in an effort to provide interaction with the exhibits. Mobile technologies have reshaped this approach, as outlined for example in [6] in more detail. Mobile games that are designed for interaction in museums follow various patterns (for a more detailed overview see [3]). Two early examples of such games are the "CoCicero" system [7], in which visitors are asked to collect data in order to solve an enigma, and "Mystery in the Museum" [8], where the participants must additionally share the data they collect and have a discussion on them. Another group consists of games that are

set up as treasure hunts and which are usually played in public spaces. In the treasure hunt genre the players look for exhibits following clues or trying to answer questions correctly or quizzes in order for the game to advance. A criticism of these games is that they treat museum artefacts as a bunch of disconnected and de-contextualized things, which stands in stark contrast to gains regarding player engagement, motivation and knowledge about the exhibits [9], [10].

A third group of games incorporates the scavenger hunt motif in role-playing mobile games or in playful narratives, as discussed in [11]. Typically these games have the theme of a mystery story through which the museum exhibits are presented and integrated in the narrative. An example is another game named "Mystery at the Museum" [12], which combines the mystery story theme with role playing and which connects the exhibits with scientific fields such as mathematics, models or communication. Upon closer examination, in these games the players are often engaged primarily with the plot instead of the exhibits [10]. The players go through the exhibits in a cursory fashion, scanning for, locating and picking up only the bits of information that are useful in the context of the story.

Tagging follows a slightly different approach. Its design lacks a background narrative and a role-play motif and instead the game-play revolves around contact with specific characteristics of the exhibits. In that sense, it follows a similar approach with the game "MuseumScrabble" [13]. MuseumScrabble was designed for cultural-historical museum and teams of players had to associate exhibits in the museum with specific traits, called 'keys'. The keys were about concepts, ideas or traits related to specific exhibits and were not obvious, e.g. they required the players to engage themselves with the exhibits. The players had to observe and think about the exhibits in order to associate them with the keys that that make most sense.

Tagging provides a further challenge, since it is designed for a museum of contemporary art. Contemporary art may be very diverse, to the point that it may lack a physical presence or it may be a complicated interaction of space, place and viewer [14]. The name of the game is a synthesis of the act of 'tagging' and 'tangling'. Next, the game is described and its rationale explained, followed by a description of an evaluation study.

## 2 GAME DESCRIPTION

Tagging of an artwork can be part of a non-formal description of the artwork, as discussed in [15]. In Tagging this idea is used to create tags (e.g. labels that say something about an exhibit) for each participating exhibit, then scatter these tags randomly and finally ask the player to use his/her cognitive skills to assemble the right set of tags of each exhibit.

### 2.1 Game play

Tagging is a multi-player mobile game designed to support visitor engagement with contemporary art. The game – content and mechanics – is the result of an interdisciplinary collaboration between the Human-Computer Interaction Group of the University of Patras<sup>1</sup> and the Macedonian Museum of Contemporary Art in Thessaloniki<sup>2</sup>. Several players (or teams of two or three sharing one device) can play against each other using a single device per player or team.

The game-play of Tagging resembles that of card sorting. Players are engaged in untangling a set of tags. Each *tag* describes an aspect of an artwork. The aim is that in the end each tag is placed in the corresponding artwork. Teams play against each other to gain as many points as possible until the game is over, e.g. when there are no more misplaced tags left. Each artwork has *tag-slots*, which are the place-holders for the artwork's tags (Fig. 1-b). Similarly, each team's device has a *bag* or repository, which is a place-holder for tags as well (Fig. 1-c). A player can store in the bag the tags that he/she picks up from an artwork. A player can carry a maximum of seven tags in the bag.

At the start of a game session, the tags are randomly placed in the artworks' tag-slots. Some tags are placed in the bags in each player's device. In this state the tags are considered tangled. The aim for the players is to untangle all tags by placing them in the corresponding exhibits using their mobile device as a means of interaction. The devices allow the players to perform two basic operations. Pick-

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1 <http://hci.ece.upatras.gr>

2 <http://www.mmca.org.gr>

ing up a tag, where a tag is transferred from an exhibit's tag-slot to the device's bag and, secondly, placing a tag, where a tag is transferred from the device's bag to the exhibit's tag-slot.

The main screen, which serves as a central and returning point of the game, consists of a list of the available exhibits split into screens, one for each floor hosting exhibits (Fig. 1-a). This categorization is purely spatial — although it depicts traditional curatorial decisions — and helps the players navigate through the collection. Additional navigation or spatial information such as a map were not considered necessary for the current implementation for this museum as the area that the collection is expanding is not very large but it is considered as an improvement in a later version of the game. Each list item displays the name of the exhibit, the name of the artist connected with the exhibit and a thumb-sized picture of it, as is on the museum archives. This remark is made to highlight the loose and sometimes vague boundaries and form of contemporary artworks, thus making the capturing of such a piece of art on an image a research area of its own. Apart from the basic information provided, a more strategic feature is present on the main screen. For each exhibit there is an indicator of how many available tag-slots there are and how many of them are correctly or incorrectly filled (Fig. 1-a, right side). It is not disclosed which exactly of the tags in the exhibit's tag-slot are the correct ones. The indicators for correct, incorrect and empty tag-slots are illustrated as green, orange and gray bars respectively. This feature drives the players' strategic decisions, as shown in data analysis later on, as well as their cognitive process. For example, knowing beforehand that one of the tags that you see currently associated with the specific exhibit is correct and two others are not, but there are still two empty slots to fill, helps form a strategy and attempt to recognize which would be correct.



Fig. 1: (a) The main screen of the game. The artwork on the ground floor are shown. For each artwork there is a thumb-sized image, the title and the name of the artist. On the right number of correct, incorrect and empty tag-slots is shown. (b) The artwork 'Dance Macabre' is shown with 3 correct tags attached to it. There are still two empty tag-slots. (c) The player's bag with the tags that it currently contains. The icon 'i' on (b) and (c) displays a hint for the corresponding tag.

One key mechanic implemented in the game after an early evaluation session is the presence of extra information on some of the tags. This verbal information is a hinting mechanism and is presented in the form of short phrases (hints) that are meant to be explanatory or imply a new perspective to a tag, helping the player to make the connection with the correct exhibit. The player can request them by tapping on the 'i' icon next to a tag (Fig. 1-b/c).

The game has been implemented as an Android application. Network connectivity is essential, since it is a multi-player real-time game which additionally requires a game-server to maintain the global game

state. Contact between the art-works and the game is established by scanning QR codes to identify the artworks. The QR codes are scanned by the players' device. Then the player can perform the actions of picking up tags from the artwork to the bag and placing them on another artwork as described above.

## 2.2 Design rationale

Tagging mechanics are described by the metaphor of carrying around tags in order to place them in the right places using a mobile device as a carrying bag and special places in the museum as place-holders for the items. This way the cognitive connection between the real world and the game world is made possible using mobile devices as a bridge.

This concept was inspired by the museum game 'Plug: Secrets of the Museum' (PSM) [16] and by our own earlier game 'MuseumScrabble' [13]. In 'PSM', the players use handheld devices to collect virtual image cards representing objects, exhibits or people. Their object is to assemble collections of the same colour – theme. Collecting cards is a task performed in two different modes, either by picking them up from special points near exhibits or by exchanging them with other players. The technology used to interact with the real world is NFC tags. Collections or colour – themes are designed to facilitate the cognitive connection of exhibits, people and visual notions together.

In Tagging this idea is taken further and twisted towards a learning perspective. Artworks are viewed as objects that bind concepts together. For each object-artwork, 'items of contact' were identified and then expressed as keywords or short phrases that represent an aspect of it, named 'tags'. These tags are designed to guide the players' attention on specific characteristics associated with the artwork. The major objective is to familiarize the visitor-player with contemporary artworks on multiple levels, starting from the obvious, visually perceivable and concrete components (such as size, material, constructive properties, kinetic parts etc.) to the more abstract and conceptual qualities, such as aesthetic values or notions regarding the artworks' content.

Matching the tags to the artworks, visitor engage in a process of interpreting the art that range from visible to non-visible properties. They also construct a model of approaching and interpreting contemporary art through recognizing key elements and aspects of viewing an artworks. It is, thus, targeted at the casual unaided visitor of the museum to establish a preliminary contact with the museum, the collection and some aspects of interpreting the exhibits before a guided tour and more in depth visit takes place.

## 3 EVALUATION AND ANALYSIS

Next, we draw from evaluation tests conducted in the premises of the Museum of Contemporary Art in June (test A) and November (test B) 2014. In test A, 10 adults (25-50 years of age) participated who volunteered after they were contacted for that reason. Test B was organized as a side event of conference on mobile technologies and learning and more than 40 adults participated. Due to its nature, the second test was less structured. Although we planned for and invited 15 participants, over 40 people arrived and played the game. Preceding each session a short presentation of the game took place where the rules and the game-play were explained. Data was collected using audio transcripts of the players during the play and during a debriefing session (test A), observation notes kept by the researchers (test A+B), and a structured questionnaire (test B). The insights gained provided valuable feedback about Tagging's potential for learning and it informs our decisions for future design improvements. In the following, an overview of major points is provided.

### 3.1 Engaging with the artworks

Regarding player engagement with the artworks, observation allows for some insights. The players, while examining the artworks and trying to identify the incorrect tags, are engaged for some time with the actual artwork. During this engagement, differing opinions may arise among team members, which provoke a discussion and the players attempt to analyse what would constitute a correct connection between the tag and the artwork. This behaviour displays that the players' engagement with the artworks was not superficial. This kind of engagement does not happen in all cases, but the learning potential is visible, since the connection between a tag and an artwork is not trivial. At the same time, it was observed that some tags which are definitely not trivial and which presuppose a certain contextual knowledge, do not lead to a discussion. This counters the expectation of the designers and would require further investigation to identify the reasons and make improvements.

Possible solutions are the inclusion of tags that are easier to connect, the inclusion of a mechanism that adapts to the player's skill level (i.e. a mechanic that would automatically adjust the difficulty of a tag to the overall skill), or the inclusion of a debriefing period where the curators could guide the players through a reflective discussion.

### 3.2 Understanding the artworks

A second observation shows that the players synthesize their own understanding of an artwork by combining and interpreting the so far correctly identified tags. Consider that the artworks, at the start of the game, contain incorrect and randomly placed tags. As the game progresses, the artwork (the physical exhibit) is gradually supplemented by additional bits of information that are contained by the correct tags (and by the tags that are so far known to not match). So, mid-way through the game, the player's idea about any exhibit is changing. These 'changing' interpretations are important because they shed new interpretive light on an artwork and are the result of a pro-active effort by the players to identify and correctly place the tags.

### 3.3 Revisiting the artworks

Another insight is that players revisit artworks constantly. The game does not progress in a linear fashion, hopping from artwork to artwork, but it entails multiple revisits. From discussion analysis after the players were debriefed it was evident that the repeated visits of artworks did improve the players' understanding of them, to the point of complaining that they would like to have complementary information about the artworks e.g. the names of the artists. The game was thus updated to include the artists names (as shown in Fig. 1-a). Another possibility is, as an artwork's tags are correctly placed, to gradually 'disclose' more information about it.

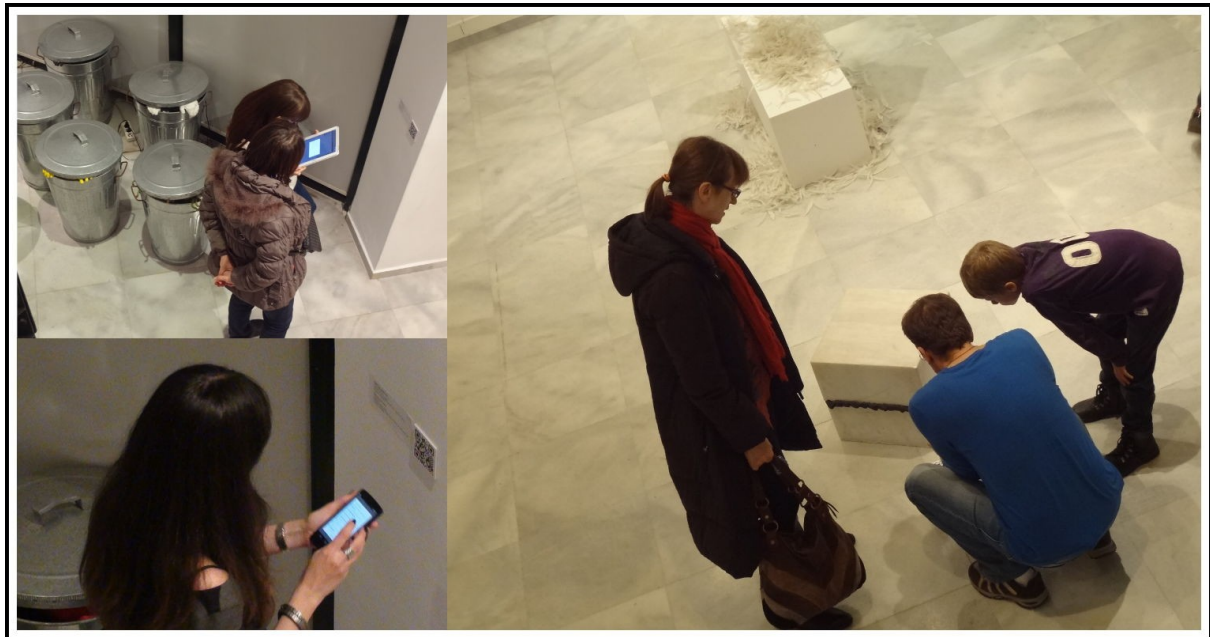


Fig. 2: *Players of Tagging in action.*

### 3.4 Updating wrong hypotheses

The cost of wrong decisions is readily felt. Besides thinking about an artwork, making a choice involves also investment in physical exertion, in other words, the penalty is also physical. The motivation is thus big to make correct decisions. When confronted with wrong choices, e.g. when placing a tag on an exhibit about which they feel certain the players displayed disappointment which reveals that an important learning process takes place, namely the rejection/verification of hypotheses.

On the other hand, players did place tags on the correct exhibit either by sheer luck or by following a hunch. When this happens, the opportunities for reflection and hypothesizing are missed.

A possible improvement considered is to include penalty points for wrong answers in order to force second thoughts before placing a tag to an exhibit and eliminating a trial-and-error strategy which is less thought provoking.

### **3.5 Player movement in the museum space**

A key aspect of the game is its spatial character. Players are required to move through the 'play-ground' area. The size of the bag (Fig. 1-a) also has an impact on how often the players revisit an exhibit. In the implementation tested, the bag could carry a maximum of 7 tags. Both can lead to increased player fatigue. Indeed, the initial test (test A) included artworks in three distinct areas/floors of the museum, but the constant movements lead us to down-scale to two adjacent floors for the second test.

A different design approach that was considered was to structure the game as a succession of 'levels', akin to levels in a platformer game, where each floor or area would be unlocked only after the previous floor is completed.

### **3.6 Understanding the rules and defining strategies**

The limited size of the carrying bag had another impact. The players had to temporarily 'store' tags on random exhibits, even if they knew where they would correctly belong. This means the players prioritized some tags/artworks with the risk that a rival team would visit said artwork and take the stored tags.

Also, the last correct tag that would be placed on an artwork would give to the team that performed this action bonus points. Players were observed to take advantage of this and adjusting their strategy accordingly, i.e. they identified correct tags and waited until an exhibit had only one tag to go. Taggling shows thus that it has the potential of another level of strategic thinking, that is countered by the size of the carrying bag and the risks that temporal 'storage' of tags on random exhibits entails.

It is evident from these two points that the players did understand the game and its mechanics sufficiently enough in order to develop winning strategies.

## **4 CONCLUSIONS**

In this paper we described Taggling, a location-based mobile game that was designed and implemented for a museum of contemporary art. The game was designed with the purpose to be used as a vehicle for promoting visitor engagement with the exhibits. One of the major objectives of Taggling is to engage the visitor with contemporary art on as many levels as possible, starting from the obvious, perceivable and concrete components (such as size, material, constructive properties, kinetic parts etc.) to the more abstract and conceptual qualities, such as aesthetic values or notions regarding the artworks' content, as observed in various cases of visitor interaction during game play, discussed in the paper. Based on two limited evaluation sessions, Taggling shows the potential to successfully engaging the players with the artworks. We consider this an important achievement, since contemporary art is more challenging than traditional art. Furthermore, the rules of Taggling are simple enough and understandable.

More importantly, the game shows promising potential to fulfil its role as a game for informal learning. Visitors were engaged with the exhibits in multiple ways and provided a lens through which players can construct meaning by themselves through multiple trajectories. Taggling is of course not limited to museums of contemporary. Content is completely separated from mechanics and implementation and can be played in a multitude of venues of cultural significance. Finally, it's simple rule-set allows for a great range of adjustments that may correspond to differing requirements.

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