Uncovering the richness of an authentic living museum through pervasive learning environment

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Abstract

The Pielinen Museum has a rich collection of untagged authentic houses, structures, and objects to exhibit. Problems emerge when visitors attempt to establish meaningful connections between the myriad of unmarked exhibits. Additionally, negative attitude towards museums especially among younger generation is a known problem. The LieksaMyst pervasive learning environment helps the visitor to discover temporal and thematic connections among exhibits. LieksaMyst's story-based role-playing game is aimed to attract and motivate particularly children and young adults.

1. Introduction

Museums are rich information repositories where adults and children alike come and spend their time exploring exhibitions and using their imagination to travel back in time. Ordinary static museum settings may cause children and youngsters to feel unmotivated and even bored. This was also the case in Pielinen Museum (Lieksa, Finland). As the second largest open air living museum in Finland, Pielinen Museum has much information and knowledge to share but most of this rich information is tacit, hidden within the interesting looking objects without descriptive tags. The only way to access to this information has so far been through guided tours. Problem with guided tours is that the information is mostly uni-directional: from the guide to the visitor. Another problem that has emerged in the Pielinen Museum is the sheer volume of unconnected objects from the visitors' perspective — forming a big picture of how life used to be like is very challenging without knowing the purpose of each object, how the objects are used, and how do they relate to each other.

To address these problems and to improve knowledge sharing and learning in public spaces, we have developed the Myst pervasive mobile learning platform. In this article, pervasive mobile learning refers to a type of learning in which the learner uses a mobile device to perform various context-aware learning activities in a physical environment that is responsive and interactive. Thus far pervasive mobile games built on the Myst platform have been successfully tested in Finland for example at science festivals (SciFest 2007—2008 in Joensuu) and Museum of Technology in Helsinki.

We used the Myst platform to develop an innovative pervasive learning environment, LieksaMyst, including an engaging, story-based role-playing game for Pielinen Museum in order to help the visitors to understand functions of old objects and to create meaningful thematic and temporal connections among the objects, themes and larger historical contexts. Thus, the aim of LieksaMyst is to uncover the potential of the rich information of the museum. Additionally, the purpose of our work is to change attitudes of the young visitors and increase their ability to navigate in a historical environment.

2. Learning in Museums

There are many reasons why people visit museums. For some it is a leisure activity while others may come together with a school group. Most visitors come to museums in order to learn something new or continue refining and refreshing the knowledge gained from previous visits. Children and young adults can be an exception as their extrinsic motivation for the visit can be the authority of school and not their own choice. Negative attitude towards museums only increases the unwillingness for free-choice visits[1].

In addition to why people visit museums, we should also consider how the visits should occur in order for them to be effective in terms of learning. There are two basic visit types: free and guided. It has been suggested that neither of the extremes is optimal for learning but we should choose something in between[2]. Visitors should also not be voiceless in the museums but they should be encouraged to interact with the environment[3] and with each other.

There is much evidence on positive outcomes related to museum visits. For example, [4] reported development of positive attitudes and cognitive learning; study in [5] suggested that the museum visit
was an interesting experience, it raised curiosity, affected psychomotor development, interest, appreciation, motivation, and generalisation; and [6] reported affective/emotional experience. These outcomes relate to all three types of learning in Bloom's domains: cognitive (knowledge), affective (attitude), and psychomotor (skills). Thus museums form a fertile context for wide range of learning activities from theory to practice.

3. Pielinen Museum

Pielinen Museum in Lieksa, Finland, is the second largest open air living museum in Finland, hosting over 70 old buildings and structures containing over 100000 items from different periods of time. Figure 1 shows the Virsuvaara house where our work has so far been concentrated.

![Figure 1. Virsuvaara house exterior](image)

Authenticity is one of the strengths of Pielinen Museum and in order to keep the atmosphere authentic, the buildings, structures and objects have not been tagged. Until now, the only way to know more about the objects and buildings has been through guided tours where information has been mostly unidirectional and schedules of tours have not always been convenient.

Another problem that has emerged in the Pielinen Museum is the sheer volume of temporally and thematically unconnected objects – forming a big picture of how life used to be like is very challenging without knowledge on what is the purpose of each object and how the objects relate to each other. This chaos of objects was verified in user centred design workshops which we ran for museum visitors during summer 2008 before implementing the LieksaMyst, a pervasive mobile game, which is described in the next section. Analysis of the workshop data is in progress.

4. LieksaMyst

LieksaMyst a pervasive learning environment (PLE) that we have developed in the Pielinen Museum together with a group of museum visitors and the curators of the museum. Rather than merely replacing the human guides, LieksaMyst offers possibilities for versatile interaction with the museum environment. LieksaMyst's core part is a story-based role-playing game which takes the learner back in time to meet people who lived in the old houses and used the authentic objects for various activities. Together with these authentic albeit fictional characters, the learner can follow the daily routines of the respective period of time. Interaction between the learner and the fictional character is done through the mobile device and the system supports text, images, sound and video (see Figure 2 for screenshots). One game session can last from 20 minutes to several hours, depending on how much content is available and how motivated the learner is.

In the first phase we created a story for one character living in one of the largest buildings in the museum, Virsuvaara. This character is Anna, the 40 year-old lady of the Virsuvaara house. She lives together with her husband, children, grandparents, servants, and lodgers, in total 18 persons in a single room. Among daily activities Anna tells and shows the learner for example how butter is churned, how carpets are made, and what kind of food was eaten in her house in 1895. The learner is also presented with various challenges ranging from challenging queries to finding a specific museum object needed to complete an activity. These challenges are part of the interaction with Anna – she requests the learner's help in order to complete her daily chores.

![Figure 2. Screenshots of LieksaMyst](image)
wishes farewell, she prompts the learner to sign her guest book. This entry, together with the learning experience (story path) of the learner is stored on the server so that it can be presented later for example on the homepage of the game for reflection purposes.

In addition to the role-playing game, LieksaMyst has also other learning tools available. Currently we have implemented a database discovery tool which allows ubiquitous access to pictures and text located in the museum database. We have also created a learning tool through which the learner can retrieve context-sensitive information of any object and its usage via RFID tags, but it has not yet been integrated to LieksaMyst. In addition to information retrieval, this tool will also allow recording of related evidence and posting comments in form of text, pictures, voice and video. In the near future, we will also release an editor for curators to create new content for LieksaMyst.

5. Discussion
How does LieksaMyst solve the problems mentioned earlier in this paper, namely the chaos of objects and the negative attitude of young visitors towards museums? Figure 3 depicts how LieksaMyst clears up the chaos of objects through temporal and thematic connections at various levels, hence uncovering the information embedded in the unmarked museum objects. Negative attitudes are tackled by innovative game play and compelling story which stems from authentic context and activities.

![Figure 3. Thematic and temporal connections](image)

Objects in each location (e.g. Virsuvaara) are assigned to themes (e.g. churning butter, weaving carpets, making dinner) and as Anna prompts the learner’s help, he/she learns the meaning of each object, its purpose and its place in a larger thematic and temporal context. Themes are temporally connected as well as are the activities within themes. Temporal connections can also be made between stories from different periods of time. The learner can repeat any activity or story by traversing backwards on the learning path. These properties ensure that each object that is part of the game is not in a “chaotic” state anymore, and purpose is conveyed to the learner. Engaging stories in the game support the concept association process which results to new or updated meanings. Current implementation of the game does not yet cover all the objects in Virsuvaara house but in the future the house will contain stories of the master, children, servants, etc, and thus the remaining objects will be included as well. The game content will be also expanded to other buildings and locations.

6. Conclusions
We presented LieksaMyst, a pervasive learning environment for Pielinen Museum, an open air museum. One of the motivations to develop LieksaMyst was to help the visitors to form thematic and temporal connections in the museum context, which by default does not offer deep information related to myriad of exhibits. Through these connections the visitors are able to access the unveiled richness of the exhibits and thus improve their visits both in terms of learning and enjoyment. Additionally, the story-based role-playing game is aimed to attract and motivate particularly young visitors.

For evaluating the effectiveness of LieksaMyst, we conducted tests with museum visitors at the end of 2008. Analysing the data gathered from these tests is still going on and results will be delivered in subsequent publications.

8. References