Chapter 7
MuseumScrabble: Design of a Mobile Game for Children’s Interaction with a Digitally Augmented Cultural Space

Christos Sintoris
University of Patras, Greece

Adrian Stoica
University of Patras, Greece

Ioanna Papadimitriou
University of Patras, Greece

Nikoleta Yiannoutsou
University of Patras, Greece

Vassilis Komis
University of Patras, Greece

Nikolaos Avouris
University of Patras, Greece

ABSTRACT

Mobile technology has created new possibilities for location-based playful learning experiences. This article describes the MuseumScrabble mobile game, aimed at children visiting a historical museum. The game requires that the players explore the museum and link abstract concepts with physical artefacts using a mobile device. The focus of this article is on the interaction design process and the subsequent observations made during field evaluation of the game. Design principles that guide the development of such a game are presented and concern playfulness, learning, social interaction, physical aspects of the game and flow between physical and digital space. This article explores how these design principles are reflected in the study and how problem-solving strategies and collaboration and competition patterns are developed by children in this multi-player educational game.

INTRODUCTION

Mobile technologies play an increasingly important role in children’s lives today. So it is reasonable to seek new ways in which this technology, now familiar to children, may be used for playful learning. An interesting example is location-sensitive mobile games that provide opportunities to embed learning in authentic environments while children have an engaging and joyful experience. Design and evaluation of such location sensitive games...
MuseumScrabble

is a challenging process. The complexity of the settings for which the activity is designed and of the technology used, the special characteristics of the users, who are usually children, and the dual objective of designing a joyful and at the same time rewarding experience, mean that some basic principles need to be defined in order to drive the process. These tenets then inform major design decisions. Evaluation of the effectiveness of the technological and organizational decisions needs to be done in a systematic way and lessons learned need to be abstracted so that they may be useful for designers of other similar activities.

In this article we discuss the design and evaluation of MuseumScrabble, a new location sensitive mixed reality game designed for children visiting a museum. The game is deployed in the historical and cultural Museum of Solomos and Eminent Zakynthians in Zakynthos, Greece. The museum hosts paintings, personal belongings and other artefacts mainly related to prominent people of the region, from the last three centuries. These non-interactive exhibits have been augmented with RFID tags and the museum equipped with a wireless network. The visitors of the museum may use handheld devices (PDAs) with RFID scanners to scan the tags and receive information as audio, text and images over the wireless network.

In this context the MuseumScrabble game has been implemented. The game has been named after the popular Scrabble word game, on which it is loosely inspired. The idea of associating the letters placed on the board to any word under the precondition that these letters are contained in the new word is transferred in the MuseumScrabble where the exhibits of the museum can be associated to an abstract concept, under the precondition that there is something common between the exhibit and the concept.

The MuseumScrabble game is played by teams who compete against each other. Each team is given a single handheld device with an RFID scanner through which they link exhibits to topics. The players select a topic and then move around the museum halls to identify the most relevant exhibits using the hints provided. The teams are free to select the topics they wish to play with. Examples of topics include: Ladies of Zakynthos, Religious art, Theatre etc. The teams that identify relevant exhibits are awarded points. The team that has achieved the highest score when the game finishes wins the game.

The objective of this article is to describe the principles on which the design of MuseumScrabble was based and then provide an outline of key design decisions and discuss the effect these decisions had on children’s behaviour when they played the game. The rest of this article is organized as follows: Next, related work is presented, followed by the principles that informed our design and the discussion of how they influenced the design process. Finally the findings of an ecologically valid study of playing the game are discussed.

Related Work

Location based activities can take place in museums and in general, in sites of historical, cultural or natural interest, where learning is combined with fun beyond the frames set by formal education (Hall & Bannon, 2005; Leinhardt, Crowley, & Knutson, 2002). Museums and other places of culture are already acquainted with mobile technologies, as handheld guide assistants have already been used for creating visitor experiences, beyond the typical visit (Schauble et al., 2002). In recent years there has been a visible evolution in the way mobile guide systems are integrated in museums, with social interaction and collaboration increasingly gaining in importance (Schoyen et al., 2008). For instance, mobile guides designed for group interaction such as “Sotto Voce” show a shift from simple information delivery to collaboration. Collaborative games provide a gameplay approach to the museum visit (Woodruff, Aoki, Hurst, & Szymanski, 2001). For example, the “CoCicero” project (Dini, Paternò, & Santoro, 2007) requires that visitors gather clues to solve a puzzle, while