

# WE WILL LEAVE THE LIGHTS ON! - HISTORICAL FRAGMENTS AS AUGMENTED REALITY MOBILE GAME AT RUINED SITES

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## **Abstract**

The paper analyses information on users' experiences about the Lights On! - mobile game and make conclusions about the factors which have to be taken into consideration when developing the game.

The mobile game was developed by Humak University of Applied Sciences together with Turku Game LAB and KSAO. It was part of the Lights On! -project which was a Finnish-Estonian project active in 2015-2018 and received its funding from the Central Baltic Interreg 2014–2020 programme of the European Union. The overall aim of the project was to improve visitors experience and turn eight fairly unknown historical sights into true tourist attractions. The development of the augmented reality mobile game to facilitate new kind of experience based learning was one of the major actions executed during the project. The final mobile game was awarded with the best Applied Game Award in 2018 [1].

The theoretical section of this paper explores augmented reality, gamification, experience based learning, storification and place attachment. All these dimensions have been part of the process during the development of the mobile game. The quantitative data was gathered by conducting a questionnaire among the players. The questionnaire has been available in the application and every player could answer it, if wanted. Most of the data was gathered during three organized excursions: two excursions for 4th and 5th grade schoolchildren to Rapola hill fort and Kuusisto castle ruins as part of their history lessons and one for students in Humak University of Applied Sciences to Kuusisto castle ruins. In addition, qualitative data consisted of learning diaries written by cultural management students in Humak. These results suggest that mobile game with augmented reality is a useful tool to improve visitors' experience at historical sites and it enhances the new kind of experience based learning and works as a tool to raise interest towards history even during those pupils who were originally that interested about the subject. This paper concludes the lessons learned during this development process: an augmented reality mobile game can be attractive when implementation is carefully prepared and there are resources enough for the production. It reminds is also the importance of focusing on the specific target group to achieve a successful outcome.

Keywords: Innovation, technology, research projects, mobile game, cultural heritage, augmented reality.

## **1 INTRODUCTION**

The paper analyses information on users' experiences about the Lights On! - mobile game and makes conclusions about the factors which should be taken into consideration when developing this kind of mobile application. This paper is based on the research work and thesis by Paula Kostia [2].

The development of this mobile game was one of the key activities of a development project called Lights on!. Project was funded by the Central Baltic Programme and it was active from 2015 to 2018. The project sought to create a joint network of historical tourist attractions in Finland and Estonia. Altogether, Lights On! project included eight sites rich with cultural history from the Central Baltic Sea region manifesting power on both sides of the Gulf of Finland. All of the sites had previously fallen into disrepair and had largely been ignored by the public. Their histories illustrate how domestic and foreign powers and political intrigues have shaped Estonia and Finland throughout centuries. All of them have also inspired an abundance of tales, legends and myths [3].

The goal of the sub-project of Humak University of Applied Sciences was to familiarize a larger audience with these sites by means of new inclusive approaches. Several creative and interactive techniques were piloted during the Lights On! project. One of the most demanding endeavors was the creation of a mobile game that would allow encounters with the characters from the past with the help of augmented reality. Augmented reality can offer people the feeling of the mixed world: computer simulated characters in the real world and the interactivity between those two worlds [4].

Theoretically, the development of the mobile game was based on theories of play and playfulness how play helps the players to create something new out of their experiences [5], [6], [7], [8]. Logic reminds the logic of surrealism, which shakes up our thinking and forces us to think in a new way [9]. There was also an aim of increasing place attachment by playing, by creating meaningful relationship between play and space by giving new memories [10], [11]. Lights On! mobile game can be played only onsite at these eight sites included in the project. The purpose of that project was that the game attracts people to get to know these historical destinations with a playful attitude. The ancient history combined with the latest technology is the combination which was meant to invite visitors to play and have fun with characters from the past. The experience of playing with historical characters can give a new experimental perspective to ancient stories and history. Storytelling is an ancient art that is still very much alive. Stories are said to be people's oldest addiction [12]. Due to the fact that the project sites have been significant places in the past, it is obvious, that the stories of places have various narrational layers. There are not only noble and legendary characters to be encountered in the game but there are also maids and swineherds with their narratives presented in the game. The aim was to make also common life in the past visible.

The development method of this AR mobile game was collaborative and it was based on student work and innovation capacity of young people. Pedagogically it was encouraged by 'piloting and experimenting' and 'learning by doing' mentality popular in Finland during the start up phase of development of this AR game. Student teams were formed in all three participating institutions (Humak University of Applied Sciences, Kouvola Region Vocational College and Turku University of Applied Sciences). All the teams were led by lecturers of different disciplines the institutions brought to this team.

The use of student work was not only inspirational and fulfilling the original aim of bringing fresh perspective for these omitted sites, but it brought several challenges along: the course structure and timetables varied a lot in different institutions and constant changes in both student force and lectures meant wiggly process from the game development perspective.



*Figure 1: The mobile game is using augmented reality and camera phone uses the cartoon boards on sites as trigger images in order to achieve the epiphany of the ancient character. Screenshot of a presentation video available at <https://www.youtube.com/watch?v=EaJgJpyHiGw>.*

The game development started in spring 2016 and the game was released in May 2018 at quite unfinished state. Despite of several technical and narrative challenges it was awarded the Best Applied Game of the Year 2018 by Finnish Game association with judges' argument. The game enlivens history, makes visitor to move around cultural heritage sites at participatory manner. At these locations manifesting power the resurrected characters of the past can be encountered and personal

experience of the site is thus created. The game adds value to the cultural heritage sites by making them more interesting and shows how history can be experienced with modern technology [13].

## 2 METHODOLOGY

The research of mobile game users' experiences was carried out in autumn 2018 by collecting mobile game users' experiences with the game [2]. Data was collected by using mixed methods to get more detailed information about players' thoughts and get better understanding of the whole subject [14].

The research data consisted of answers in structured questionnaire available in the mobile application and texts of learning diaries. Additionally, I was present to those excursions arranged to collect data and made observations about the playing. Observation is a good method to see if people are acting as they say they are [15]. However, my observation was not solely systematic because I was also in charge of excursion arrangements.

Three different groups visited Kuusisto castle ruins ja Rapola hill fort and they answered the questionnaire after playing the mobile game. Kuusisto and Rapola are historical sites that have very little construction left from their past glorious times and it was thought that AR mobile game could be especially useful in these kind of places. Among the public, Kuusisto and Rapola can be seen more like nature reservers than cultural heritage sights. So it was important to ask how people experience these sites with the help of mobile game. The research questions were: Which factors make players experience successful? Is it possible to increase people's interest to visit the historical site with the help of mobile game?

Testgroups consisted of 117 people: schoolchildren (age 9–11 years) with their teachers and students (young adults age 19–31 years) in Humak University of Applied Sciences. Schoolchildren answered only the questionnaire but Humak students wrote also learning diaries. The structured questionnaire contained 28 questions and the scale was from 0 (not at all) to 7 (yes, completely). It was possible for participants to proceed with the survey without answering every question so there were large variations in the amount of answers. There were also some technical problems (batteries running down, weak internet connections), some pupils didn't have mobile phones with them and due to cold and windy weather in one excursion, some pupils didn't answer at all. Because of all that there were big variation with the amount of answers per question.

Qualitative data consisted of 23 learning diaries written by the group of Humak students. First they answered the inquiry after playing the game and then they wrote a learning diaries about the experiences of playing. Student were allowed to write quite freely but some themes were asked to include to their writings:

Experiences about hiking in the nature with the phone; Did the playing the game influence their experience about the place; What kind of possibilities and obstacles they see about using augmented reality in historical sites. Learning diaries were analysed anonymously by content analysis searching and categorizing themes that featured in texts.

## 3 RESULTS

Reception of the game varied a lot depending on the age of the player so the results of the research were somewhat conflicting. Pupils from 9 to 11 years found playing as a positive experience and they were interested about it. Older students were also interested about the potential of the game but they were not pleased about the implementation of this Lights On -game. Nevertheless, they still thought that this kind of playful approach at historical sites will become more popular in the future.

The original idea of the game development was that the mobile game could attract players of all ages. In the light of research results it seems obvious that the mobile game was more suitable for children than young adults. However, it must be taken into account that the age range of this research does not cover all ages but only from 9 to 31 years. It would have been interesting to research also older people's experiences about the game but there were not enough data to make any conclusions about their opinions.

It seemed that children were ready to use imagination and experience the magic of stories. On the other hand, schoolchildren from 9 to 11 years have grown up with smart phones so all kind of mobile games are familiar to them. Nowadays games and gamification is also part of school work. It can be

thought, that gamification, which is familiar to the children, help them learn new things in well-known context [16].

According to students' texts, they would have wanted more facts about the site they visited and they felt that they didn't get any new information about the history. The more familiar approach than gamification at historical sites is usually the information about the battles, war heroes and great men. Lights On! project wanted to change attitudes toward history by bringing out microhistorical stories, myths and legends beside the great stories from the past with the help of little tales [17]. Students would have liked to have sounds and the narrator in the game instead of texts on the screen. They felt that stories would have been stronger with a storyteller.

Humak students felt that they were not the target group of the game and felt that it was too childish for them. Therefore the feelings after playing were quite disappointed. Reasons that led to these feelings among students was for example game graphics and tasks given in the game. During the project there were compromises that had to be done with characters due to technical matters (e.g. the size of the files) so the characters were not so lively and believable that was originally meant to be. Even if the characters were not so successful, the general graphics of the game was considered fine and suitable for historical surroundings.

Schoolchildren were quite satisfied with the game. That could be seen according to the results and what was seen during excursions through observation. When asked to give a response to the surveys prompts: "It was easy to imagine that the game characters were ghosts from the past." or "I got new information about the place with the help of the game." over 40 % of the children answered by giving a value of 7. Although stories were short and tasks were not real (you could continue playing without really solving problems) children experienced both the idea of the game and the implementation interesting. It could be thought that their ability to use imagination and enthusiasm to play filled gaps in the game (e.g. somewhat clumsy graphics). They really could imagine to meet people from the past in the middle of the forest.

Interesting difference between these two groups occurred when they responded surveys statement "The task given in the game was understandable". Schoolchildren answered by giving mostly values from 4 to 7, but students gave mostly values of 1 and 2. According to learning diaries students would have wanted tasks with different choices and the possibility to influence the storyline. They thought that more interactive elements including the game would make the playing more adventurous than it was.

There were seen a little correlation between the interest of the Lights on -game and interest of playing in generally. The people who are interested in playing the games (mobile/web/console) evaluated excitement and interest of this Lights on game with higher values (than those who are not interested in playing altogether. They might have seen the possibilities of the game even though the implementation of the game was slightly unfinished when it was released.

Certain cartoon boards were used as trigger images for the game and that determined the route of the players. The older students suggested that possibility to use GPS would make the game more interesting because then it would be possible to meet the characters wherever you go. On the other hand, children answered question "Moving from place to place and finding new objects to scan was fun" with high grade. After all it seemed that players achieved some kind of flow experience in game because they were going fast or even running from point to point. Especially school students kind of remodelled the gaming situation by competing with each other. Also students, who were not so interested in this game, went very quickly from starting point to the end. Interesting thing was that students felt it uncomfortable to rush forward but still did not slow down. They obviously felt this playfull approach to history meaningful.

## **4 CONCLUSIONS**

The lessons learned during this development process was that an augmented reality mobile game can be an attractive tool for gaining new friends for cultural heritage sites, enabling personal and interactive experiences of places and catchy way for teaching history for adolescents when implementation is carefully prepared and there are resources enough for the production. The game must work well, it have to be easy to use without special instructions and you have to be able to play it with all kind of smartphones.

From the hindsight perspective we can state that it is highly important to focus on the specific target group from the specing phase of the project in order to achieve a successful outcome. The other solution would have been different kind of levels (for children and adults) in the game, but that would have been even more demanding development project. Developing a functional mobile application is not as easy as it may seem in enthusiastic daydreaming stage, but requires a lot of concentration and patience in balancing in between different stakeholders. The collaborative method of developing the mobile game was challenging. The project turned out to be very difficult to manage with so many people in the development team and a high turnover of workers (both students and lecturers) during the project delayed the outcome.



*Image 2: Encounters with augmented reality characters from the past can be fun and educating at the same time. Screenshot from a video. Original available at: <https://www.youtube.com/watch?v=kQUbbCB1x0Y>.*

All in all, the idea of the game proved to be useful and interesting and that is also why it was awarded. Experience of playing a mobile game depends on many factors. When you are playing outside, even the weather plays significant part of the game experience, especially in counties with volatile and harsh weather conditions like Finland. The use of mobile technology in various kind of situations will certainly come more common in the future. We have already seen it advancing in huge leaps after development phase of this mobile application. The major challenge is to keep updated with technological evolution while preparing the game that it will be still valid when released.

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