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Evaluation of Yasmine's Adventures: Exploring the Socio-Cultural Potential of Location Aware Multimedia Stories

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Abstract. This paper describes Yasmine's Adventures, a location aware multimedia story designed as a location based service for a museum. Yasmine's Adventures follows a young local girl (Yasmine) through a series of short animated adventures, tailored specifically to engage visitors in exploring the relatively neglected streets of the area in which the museum is situated. Yasmine's perceptions of the landmarks, identified by community members themselves, reflect the real concerns of the community. Results from the evaluation of the user's experience suggest location connection and perception changes when locative media narratives include learning, understanding and discovery elements.

Keywords: Location based services and experiences · Mobile socially driven storytelling · Interactive narrative · Digital storytelling · Location aware virtual reality · Urban computing

1 Introduction

This paper describes Yasmine's Adventures (YA), a location aware multimedia story (LAMS) that leverages on urban computing strategies to create an interactive trail across the landscape surrounding the Jewish Museum in Berlin. YA was created with the goal of challenging and engaging visitors of the museum to explore the adjacent and relatively neglected streets of the area in which it is situated. The motivation for this work is that the conscious layering of space and narrative provides a compelling, immersive experience with the power to reveal a community that is often overlooked.

Through the YA interactive story the audience follows the adventures of a free-spirited local girl named Yasmine as she sneaks away from her class field trip to the museum and attempts to walk home alone. The story is delivered through a mobile application that combines the finding and capturing of visual cues around the neighbourhood with the delivery of a sequence of short animations tailored specifically to the

Mehringplatz area. The YA project was developed to investigate how a location aware narrative can impact the audience perception of a neighbourhood.

2 Related Work

We position our project in the Locative Media panorama and in particular as a Location Aware Multimedia Story (LAMS). LAMS refers to cinematically rendered narrative content related to specific locations and embedded in those real spaces through the use of location aware mobile technologies [1]. By designing and producing virtual layers of information that combine with existing material layers we can have a direct impact on how a location is perceived and experienced by visitors and residents. A number of past projects have explored the association of digital media to urban locations with the intention of providing entertaining and educational experiences [2, 3], while struggling with technological shortcomings such as GPS inaccuracy. Issues these projects focused on included empowering communities, highlighting local histories [1, 4, 5], counteracting media reports that damaged neighbourhood reputations [6], and connecting communities with visitors [7]. Such projects reported success in impacting audiences but remained experimental in evaluations and feedback.

Moreover, there is a bias in building and evaluating location aware services in laboratory settings [8] since it limits the understanding of design and use and the development of cumulative knowledge regarding the design of such systems. Only more recently have researchers begun to look at methods and techniques for staging these systems in the wild [9]. Current research within the evaluation of LAMS suggests that evaluation techniques could be further explored. This work proposes applying in the wild evaluation techniques to push forward the understanding of audience interactions within real spaces mediated by mobile interactive technologies and content.

3 Yasmine's Adventures Interactive Experience

3.1 Concept and Story

YA was conceived with the goal of sharing neighbourhood concerns and perspectives with visitors to Mehringplatz by presenting a community view of the area. The process originated with the 'Pinpointing Mehringplatz' workshops, in which community members expressed their opinions about features of the neighbourhood as pleasing, displeasing, or potentially transformational (see Fig. 1). Based on the issues raised by community members themselves we selected five anchor points in the area and created the story of Yasmine, an adventurous 7-year-old girl. Yasmine starts her adventure by escaping from a field trip to the Jewish Museum and walking home alone. On her journey she stops in various places, including: the KMA, a community centre where hip hop classes are offered; and a street mural, where she talks to an artist while he paints. Every journey has its challenges, and Yasmine also encounters some trouble on her walk. YA includes both positive and negative feelings about neighbourhood locations, reflecting the content generated in the community workshop.



Fig. 1. Connection between community content and Yasmine’s story. Left to right: the first top and bottom pictures show the street mural and Yasmine talking to the artist. Second pair: the alley described by the community, where Yasmine meets a rat. Last pair: the construction site.

3.2 The Experience Design

The experience is designed as if it were a service provided by the Jewish Museum. If the participant wishes to experience YA they are given a YA enabled phone or instructed how to download and use the application on their own device. The participant then exits the museum to look for easily accessible visual markers located in strategic spots. The markers are A5 postcards depicting scenes from YA (see Fig. 2).

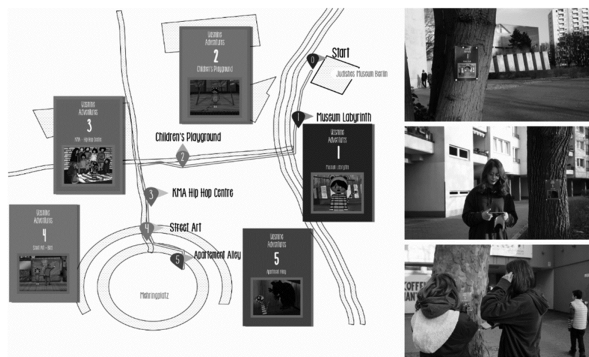


Fig. 2. Left: The experience points with content matched to the visual marker. Right: The visual markers placed in the real environment and participants interacting with them.

By pointing the phone’s camera at the marker and capturing it, a 3D reconstruction of the surrounding environment is displayed on the screen and the user is prompted to scan the virtual environment looking for story content by moving the mobile phone around the physical space. Once found, the video animation is loaded and the user can watch it. The animation depicts an adventure of Yasmine in that specific location. When the video clip ends, the user returns to the 3D environment screen by clicking a back

button, and can scan the virtual environment for more stories. If no other stories are available, the user can go back to the 2D map and follow the indications of where to go next to view more adventures. The story fragments are sequential so the locations must be visited in the correct order. Yasmine's story ends with a concluding video after all five locations highlighted on the map have been visited. The walk lasts approximately 20 min; duration was a design consideration since the cold Berlin winter could lead to an unpleasant or unfinished experience.

3.3 Technical Description

The implementation of the mobile application that delivers YA was programmed in C# using the Unity¹ game engine. The main interface is composed of scrollable map, 'close' button, and 'capture the marker' button. To recognize and capture markers we used Vuforia², and for 360-degree interaction we used the Durovis Dive plugin³.

For YA we recreated five three dimensional virtual locations in which to disseminate the animations. Once the target location in the virtual environment is found and users lock their scanning movement on it, the video loads and plays. When playback finishes Unity resumes, showing if there is more content to explore or not. All multimedia content is stored on the mobile device and no data connection is needed.

4 Methodology

4.1 Participants

A total of 20 users (55 % within the 25–34 age range) participated in the study (15 females). 50 % of the users had German as their native language and all users were pre-screened for their fluency in English. Participants were all currently living in Berlin. Participants were recruited using a snowball sampling methodology in order to gather both people familiar and unfamiliar with the area.

4.2 Evaluation Set Up

Participants were asked to experience the YA LAMS as described in Sect. 3.2 (see Fig. 3). The tour started at the entrance of the Jewish Museum where the researcher dispensed a mobile phone with the application and announced that they would be observed during the trials. On average each tour lasted approximately 20–25 min. Once the tour was complete, participants were asked to fill in a questionnaire consisting of demographic data and measures of narrative transportation, presence and flow.

¹ <http://unity3d.com/>.

² <https://www.qualcomm.com/products/vuforia>.

³ <http://www.durovis.com>.



Fig. 3. Participants of the user evaluations in the different stages. Capturing visual clue (Left); scanning the 3D environment (Centre); enjoying video narrative (Right).

Afterwards, we conducted semi-structured interviews to probe for participants' impressions of the overall experience, using the application, location and spatial presence and finally, connection gained to the neighbourhood. The interview guide included a set of core questions from the questionnaire to be addressed more thoroughly. Each interview also included individual questions based specifically on that participant's tour shadowing/observation notes. Interviews lasted about 15-20 min. The questionnaire and interview data were then analysed using a grounded theory affinity analysis [10, 11] with the support of the *Nvivo* software tool [12]. Researchers conducted a bottom-up data analysis reviewing and iterative process in three stages: *open coding* (quotes and high-level categories), *affinity diagrams* (relationships between categories) and *theme organization* (most frequent themes and description).

4.3 Measures

The Narrative Transportation Scale (NTS) [13] was applied to assess participants' ability to be transported into the application's narrative. It evaluates immersion aspects, namely: emotional involvement, cognitive attention, feelings of suspense, lack of awareness of surroundings, and mental imagery ($\alpha = 0.47$). A principal component analysis (varimax rotation) revealed a two-factor structure of 8 ($\alpha = 0.49$) and 3 items ($\alpha = 0.37$). When asked if the experience helped users learn and if it changed their neighbourhood perception, participants indicated ratings with an average of 4.5 (on a 1 to 7 scale). This perspective modification correlated to transportation, a strong and positive correlation between the two variables ($[r = 0.702, n = 20, p = 0.001]$), with high levels of transportation associated with high levels of neighbourhood perspective.

The Flow Short Scale [14] evaluated the individual's ability to be absorbed by the activity and fluency while conducting it. Internal reliability of the scale was high ($\alpha = 0.71$). Emotional involvement (measured by NTS) was correlated with flow where results indicated a strong and positive correlation ($[r = 0.533, n = 20, p = 0.023]$) in which high levels of flow were associated with high levels of emotional involvement.

To assess presence in the story a single item was included in the questionnaire: 'In the video narrative I had a *sense of being there*.' Presence is defined as 'a psychological state in which virtual objects are experienced as actual objects in either sensory or non-sensory ways' [15]. The results suggest a strong, positive relationship ($[r = 0.505, n = 20, p < 0.05]$) between transportation and presence with high transportation levels

associated with high levels of presence. Preliminary analyses were performed to ensure no violation of assumptions of normality, linearity and homoscedasticity.

4.4 Evaluation Findings

In this section we will discuss the results to address the following question: How did our audience perceive the neighbourhood through this narrative? Change of perspective was supported by four elements that emerged from the qualitative data analysis (Sect. 4.2): **(1) Awareness of space**, **(2) Connection**, **(3) Empathy**, and **(4) Content**.

Concerning the first element, **awareness of space**, participants mentioned physical objects of which they were not aware, although they had visited and walked around the area before as stated by one participant: ‘The fact that we actually stopped and looked around makes you notice other things’ (U17 ref. 2); or, ‘Through the application I saw something different – for example the playground’ (U6 ref. 1).

The second element, **connection**, emerged whenever users referred to feeling connected to the neighbourhood, or whenever they wanted to interact directly with people from the neighbourhood. Participants stated that the connection they felt with the area was enhanced by the YA experience: ‘I feel more connected. ... It is a geographically placed experience, I feel that they told me their perception of their home area’ (U15 ref. 3). However, some participants suggested this connection would be improved if the application brought them even closer to the community: ‘there could be teams from the neighbourhood developing the characters and the animations’ (U4 ref. 2).

Regarding the third element, that supported a change of perspective on the neighbourhood, participants mentioned that their perspective was changed through **empathy**, feeling some kind of affinity, either towards people who live there or even the physical location. For example, feeling compassionate about local community issues: ‘The construction is something I see more as an interference now and it was not something I really thought about before’ (U10 ref. 1); or even, ‘When we go to a place we do not know in this way, we can figure out the problems ... like the construction site and I would not reflect on why it has been there for so long’ (U7 ref. 1).

Concerning the fourth theme, **content**, users thought it could be further expanded to add more complexity: ‘I would make the story more complex and longer’ (U13, ref. 1). Users suggested that the content could have been shaped around locals’ anecdotes rather than a fictional story based on real events: ‘I would have rather had the little stories of what happened here or there, to make me more curious’ (U1, ref. 1).

Participants saw the application as an enjoyable gaming experience, comparing it to a **treasure hunt**: ‘The fun part was finding the markers and the scavenger hunt’ (U14 ref. 1). The markers in particular enhanced the sense of search and discovery: ‘I like searching for something you need to look around for and observe’ (U3 ref. 1).

5 Discussion

From the results and the analysis of the YA evaluation, similarly to [5, 16] we found YA to promote relatedness and exploration of the local neighbourhood. The results

indicate that participants did experience a sense of presence generated by the location aware multimedia story and this feeling allowed them to be immersed in the story. Participants revealed levels of immersion and transportation through the narrative, completed the task and felt absorbed by it, wishing to have extra visual markers and further information as they explored the space.

In addition, this sense of presence in the story enabled users to gain a greater awareness of the neighbourhood's physical space but also of the people living in it. This awareness expanded to feeling empathy and a shared understanding for community issues, since the story exposed issues identified by community members. Examples of participant engagement were the attention to and the awareness of the surrounding space throughout the experience, and the reported desire to add more complex content, visual clues and information, to learn more facts and expand the tour.

The level of connectedness and learning for users would have been greater if the application had included more facts, testimonials or even direct contact with locals. Learning and connecting for our participants meant talking to people who live in the area more than following a metaphorical story. Such a finding indicates that LAMS with a sociocultural intent should include more neighbourhood information to generate a stronger connection between the audience and the local neighbourhood. Nevertheless, participants did mention feeling concern for local issues. Such feelings might have been enhanced not only by the narrative, but also through the sense of presence in the story that was reported by several users.

In summary, the findings uncovered through the YA user study suggest that locative media associated with story content is a successful strategy for generating engagement and connection to local communities. However, these digitally mediated sociocultural efforts, such as YA, need to go beyond the individual engagement of a few people and perhaps even expand over longer periods of time. Beyond looking at individuals, users seem to suggest that having a community lens, looking at historical facts from a group perspective, and adding testimonials that allow others to understand the cultural and physical evolution of a particular location, would be welcome in LAMS with a socio-cultural emphasis. The connection of audience and neighbourhood seems to increase when a treasure hunt experience is added to location aware multimedia stories. Such a result can be achieved by mixing content with search and discovery activities. Learning by being in the place, discovering and connecting factual elements with the real location, and ideally having direct contact with community members, seem to be key elements for the successful engagement of visitors in the discovery of socially marginalized, overlooked, or underprivileged neighbourhoods.

6 Conclusions

This work presented the design process and evaluation of the interactive location based YA. The experience was designed to better integrate visitors to the Jewish Museum Berlin with the surrounding Mehringplatz neighbourhood. The application contributed to changing perception of the neighbourhood by supporting empathy, awareness, and connection, and by capturing participants' attention with an engaging story.

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