Learning in Community Through Mobile Storytelling and Location-Based Games

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Mobile Location-Based Gaming and in particular Mobile Storytelling are well suited to encourage and support community learning. We present the authoring system GeoQuest briefly and explain by means of some concrete pedagogical projects how such systems can meet the demands of modern community learning.

Keywords: Mobile Learning, Mobile Storytelling, Mobile Gaming, Authoring System, Mixed Reality

1 Introduction

We believe that mobile gaming and in particular mobile storytelling fits well with the demands in modern community learning. In this paper we present a digital storytelling system and describe how it can be used in learning scenarios involving both educational institutions and learner communities. We define three basic settings – which we call learning cases – and describe how they have been addressed in recent projects.

During the last decade we gained experience in mobile gaming in research and development. We carried out projects with industry partners as Deutsche Telekom and Ravensburger AG (as cited in Schmatz et al., 2009) as well as with several research partners in the fields of education, user interface design and gaming experience (cf. Knecht et al., 2011). We developed a fast sportive multiplayer game – Mister X Mobile – which we currently overhaul and extend towards a multiplayer engine. Furthermore we developed a system for mobile storytelling – GeoQuest – we focus on in this paper.

Why do we believe that mobile gaming and storytelling is particularly useful for community learning?

Locality: Mobile games can focus on the space their authors and consumers live in and provide a virtual layer to the real environment. Mobile stories can show particular views on the neighborhood with respect to history, events, individual context or future visions. As already shown by Klopfer (2008) such a focus on the real environment enhances the educational efficiency.

Low threshold: Smartphones and even tablets are widespread and offer a convenient way to consume and create media at any place, at any time, and share it easily with others. In particular younger people can be addressed well via smartphone apps connected with social media.

Participativeness: Open authoring systems enable everybody to take part in the role of consumer and creator. Anybody can create his or her own story and publish it to a mobile app that allows everybody to consume it on-site.

Although the notion of community learning is not sharply defined, the goals and achievements of non-institutional approaches toward education and social development within communities have been widely recognized and have received international attention as a research area. Due to the desired and necessary interconnection of community learning with local culture and initiative there is a great variety in educational community practices. Still many approaches share similar purposes and methodologies. For instance, typically the activities are developed using participatory methods such as dialogue techniques, and informal methods of creativity elicitation, knowledge acquisition and distribution play an important role. Also, quite typically we find inclusive learning in groups (as well as individually) and addressing all ages as common themes of community practices.

In this paper we present localized storytelling and learning practices through mainly outdoor mobile gaming where our research pattern basically follows the digital storytelling approach by Joe Lambert, co-founder of the Center for Digital Storytelling (CDS) at UC Berkeley, California (cf. Lambert, 2013). Over the past years we have gathered experience in the development and application of gaming-style spheres of learning in various social settings. While our focus here is to give a fair introduction and appraisal of GeoQuest (along EduQuest) as authoring system and serious game platform, we shall also mention practical examples and perspectives of future work.

2 Mobile Storytelling with GeoQuest

By the term mobile storytelling we mean a system that delivers stories to handheld devices and advances the stories according to the user's mobility. Examples are *city tours* that guide the user along a certain way and tell him the story whenever he reaches specific locations or *museum guides* that accompany their users through an exhibition and provide additional information about exhibits as the user approaches them. However, more playful settings are also imaginable in terms of location-based adventures where the player discovers his environment and uncovers the story through interaction with its surroundings.

In this paper we focus on GeoQuest but there are diverse system for mobile storytelling available currently, e.g. Actionbound or ARIS Games. GeoQuest is currently being developed as an interdisciplinary research project where other software engineers, pedagogues and social workers cooperate with us. In the context of GeoQuest we call stories and games *quests*.

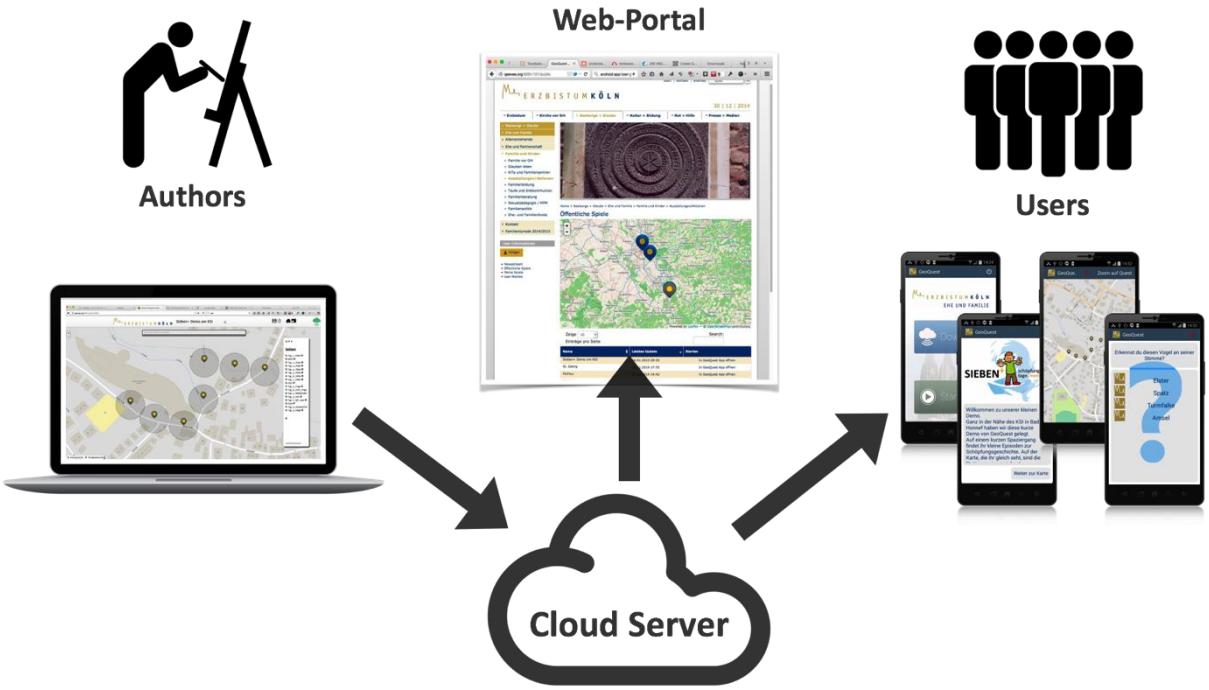

Figure 1: Overall architecture of the storytelling system GeoQuest.

The main parts GeoQuest consist of are a web-based editor for creating content and the mobile apps for consuming it. The editor allows authors to create their quests, upload media etc. and publish their work. All quests are stored on a cloud server. Players primarily use mobile apps to access the quests. Figure 1 gives an overview on the system architecture. It illustrates the additional option to publish quests on a Web-Portal.

Quests are made up of predefined pages (cf. Fig. 2a) presenting media such as text, images, video and audio files. Furthermore, there are interactive pages for asking questions, scanning QR codes, taking images or recording audio. Beside the pages a quest can contain locators which are defined by GPS coordinates.

The course of a story is driven by events and actions. Events are for example the start of the quest, entering a certain location, selecting a given answer or the result of a QR code scan. Possible actions (cf. Fig. 2b) are showing a page, showing a simple message, playing audio files, manipulating the set of locations, or even doing complex computations in the background. The quest authors define what actions will be triggered by which event.

For example a quest could emulate a multi-stage geocache by defining a chain of locators, each triggering the start of a page with the according media. Hence, the story is told while the player reaches or finds the subsequent locations. Pages can also be interactive and e.g. ask questions, take pictures or audio records and upload them to a quest-specific webpage. For indoor tours QR codes or other barcodes can be used as locators.

Whenever a page is started or ended, a location is reached or left, an interaction is performed (either successful or not) an event is issued which the game authors can use to perform different actions. This way more complex game logic can be realized, like using virtual items such as collecting a key before opening a treasure chest, or providing a whole network of storylines instead of just one linear narration.

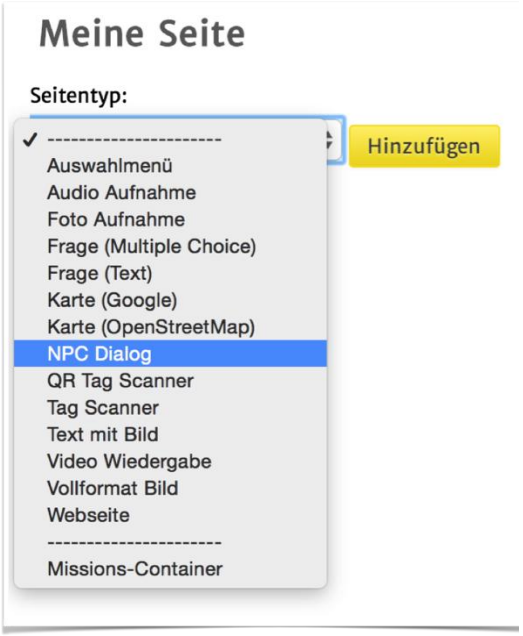

Figure 2a: Selecting a page type in the editor.

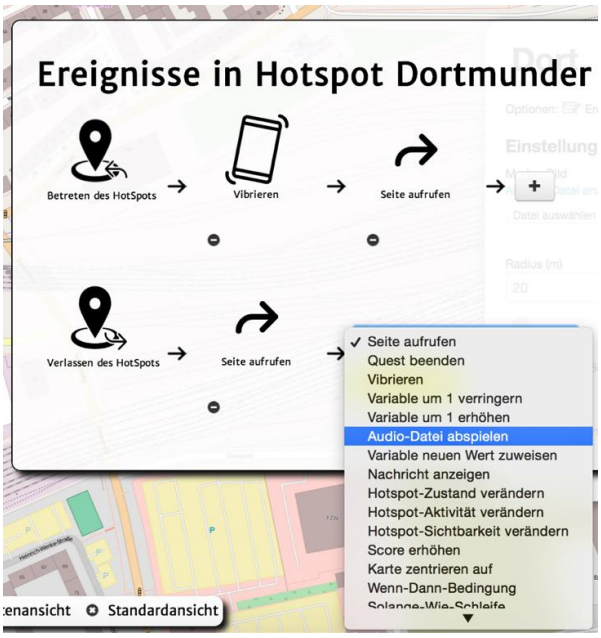

Figure 2b: Selecting an action in the editor.

3 Learning Cases: Consuming, Creating, Developing Together

We see three learning cases for mobile storytelling: *consume*, *create*, and *develop* a story. We illustrate these different cases based on recent projects we carry out together with partners.

Consuming a prefabricated story can teach certain topics, e.g. historic connections, physical facts, or practical know-how. Possible benefits are:

- learn in place
- use personal device, enabling to keep the information afterwards
- provide multimedia
- include interactive features

Creating one's own story provides a holistic learning situation addressing many different competences as for example:

- source finding and interpretation
- story design
- media competence
- technical realization

The resulting story might not be the focus but merely a motivation for and demonstrator of the work the group has achieved.

Developing a story involves both its creation and consumption in an iterative feedback process thus providing additional learning options like:

- reflection & analysis
- communication & feedback
- systematization of work flows
- democratic decision making

These learning cases are pretty different in practice and we see much more educational potential in the creation and development of a quest than in consuming it. But regardless what you focus on, these processes both are intrinsically connected by the tool-product relation. And the least the product can do for the creational process is motivating the participants to finish it and show it to others.

Furthermore, having a product, i.e. the quest, in mind and the consumers, i.e. the players, involved will probably increase the intensity of the learning experience. First, it steps up the pressure, since the quest will be published and perceived by external users; second, it reduces the space of options, since not everything that is possible, is likely appreciated by the audience. On the other hand, the feedback from external "customers" will be particularly motivating for many learners and a valuable and rewarding response.

4 Mobile Storytelling for Community Learning in Action

This section illustrates the learning cases by presenting some concrete projects that we carried out with our partners recently.

"Dr. Kim on the run" is a quest that we created together with StattReisen Bonn - an independent and politically active organizer of city tours. This quest enhances a guided tour about a financial scandal in the city of Bonn where a criminal project leader has peculated millions of Euros on a large construction project. But many different groups of people, like local politicians, bankers, craftsmen etc. were concerned. The scandal was well-known in the city and lots of rumors had been circulating about its backgrounds. Figure 3 shows some impressions of the tour.

Figure 3: "Dr. Kim on the Run" – A political mobile story.

The participants now used GeoQuest to gather virtual cues, documents, and recordings of fictitious phone calls when they strolled in small groups through the area. Each group of participants had previously chosen a certain role, e.g. a banker or a craftsperson and received appropriate clues during their tour. At the end of the tour the organizers had prepared a fake tribunal and played a trial with an actor giving the role of the district attorney. The participants now took part into that played trial and argued using the gathered evidences and clues about how to proceed.

This example shows how even consuming prefabricated quests can encourage discussions among citizens and thus support community learning.

"RadioRanzen" (German invented word meaning "radio satchel" which is related to the fictitious non-player character) is a completely different way to apply GeoQuest in an educational context which is done together with Q3 (Quartier für Medien und Bildung) – a media education institution (cf. Dietsch, 2015). This time, a group of adolescents who run a non-commercial radio station prepared a museum exhibition on the history and meaning of the radio for modern society. They used GeoQuest to create an interactive gamified museum guide specifically designed for children. In the quest the children should help a non-player character to find his lost radio frequencies. To do so, they had to solve some puzzles, interact with some exhibits and even perform some interviews with other visitors of the museum – taking the recordings directly with the quest app. During their tour through the exhibition they gathered scores which were posted to a website where they could later on see how they performed. Figure 4 shows some impression of the tour.

Figure 4: "RadioRanzen" – A museum guide from adolescents for kids.

In this scenario two separate learning effects have been exploited: first, the young people running the radio station learned a lot about creating a museum guide, telling a little story and generating suspense. Creating the tour also helped them to analyze their exhibition and enhance many details. Second, the children visiting the exhibition liked the electronic

interactive tour guide a lot and - we are quite confident about that – spend more attention to the exhibits, so that they might have learned more than they would have done without the quest.

"How grandpa played": Together with the German Red Cross we are currently creating a quest that shall encourage and foster communication between grandfathers and their grandchildren. The idea is, that the quest works like a frame story asking both the grandfathers and the grandchildren to fill out their respective parts in terms of interviewing each other. For example the app offers certain topics e.g. "My favorite toy" or ", "How I go to school" etc. Then each of the players chose or enter a short answer, take a photo and interview them mutually about their personal opinion. In the end they retrieve a little multimedia album as souvenir.

In the background there is a group of active grandpas who extend the app via the web-based editor and provide new topics over the time. This way the app can evolve and incorporate feedback from users.

Further applications: we are currently working together with diverse educational and social institutions on different projects which are related to community learning. *WikiCultureCity* aims to start a bottom-up ecosystem for sightseeing, cultural and touristic information. The Roman Catholic Archdiocese of Cologne is using GeoQuest for religious topics and tours in their diocese. Together with the University of Education in Karlsruhe we are starting EduQuest – a version of GeoQuest which will provide further education-specific functionality.

One important feature that allows us to support so many different projects with one tool is that GeoQuest can be used as a white labeling system and be visually completely integrated into existing websites (cf. Fig. 1 and Fig. 5). Hence each of our partners can have its own branded app accessing only the data his own authors have entered in his own editor. Furthermore, we can create specific editors for special game types, for example a simple editor for entering new frame stories in the example *"How grandpa played".*

5 Current State and Perspectives

We hope to see more communities consuming, creating, and developing quests in the future. Let us therefore finally summarize what makes us confident that mobile gaming and in particular mobile storytelling offers a high potential for community learning.

Organizational enablers:

- Public access: Diverse systems for mobile storytelling allow for open public access (e.g. ARIS Games (ARIS Games, 2015), ActionBound (ActionBound, 2015), GeoQuest has planned a public version for autumn 2015).
- Apparent role of educational institutions: GeoQuest is a white labeling system and supports separated web-portals and mobile apps for individual institutions. This is shown in figure 5 for the Karlsruhe University of Education.

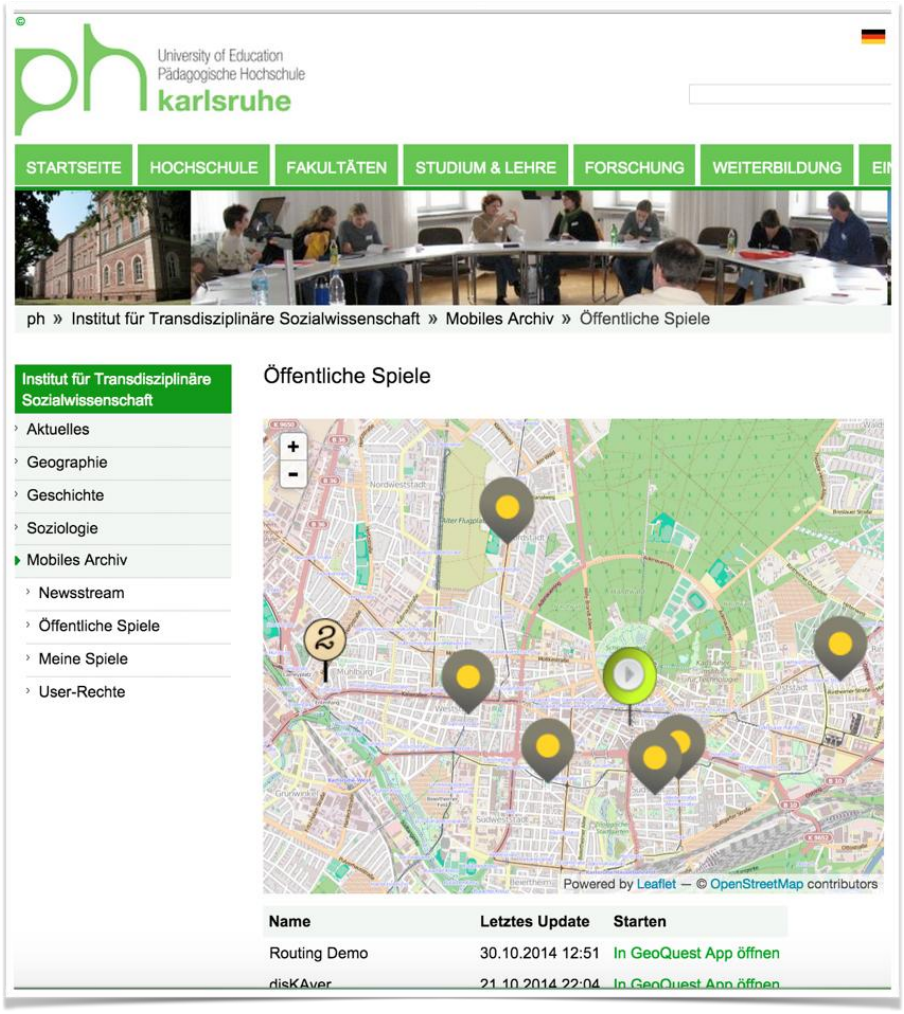

Figure 5: GeoQuest Web-Portal integrated in partner website.

Technical enablers:

- Low threshold to play: smartphones are already widespread; systems as GeoQuest and ActionBound support at least iOS and Android.
- Low threshold to create: most systems provide a web-based editor that is useable on any platform – even on tablet computers.
- Ease to use: some systems offer a very simple web-based editor (e.g. ActionBound) that makes it very easy to start with creating mobile stories.

Valuable and engaging contents:

- Location-based stories allow local topics to be told and discussed directly on the spot
- Elements of gamification can increase motivation and encourage participation.
- The genre of newsgames (cf. Bogost et al. 2010) seems a suitable model for creating education games: it brings together journalistic principles and game creation.
- Comprehensive options: some systems comprise a powerful feature set and enable to create a wide range of mobile stories and games (e.g. ARIS Games, GeoQuest).

Furthermore, we are currently developing EduQuest (on the base of GeoQuest) to address particular needs for authoring games and storytelling in the context of education. We cooperate with the Karlsruhe University of Education and the Remscheid Academy to enhance the system and offer trainings for multipliers.

References

Actionbound (2015). *Actionbound – Create your own smartphone rally – Scavenger hunt with friends app – GPS Treasure hunting app – iPad rally – Tablet tour*. Retrieved from https://en.actionbound.com/

ARIS Games (2015), *ARIS - Mobile Learning Experiences - Creating educational games on the iPhone*. Retrieved from http://arisgames.org/

Bogost, I., Ferrari, S., & Schweizer, B. (2010). *Newsgames – Journalism at Play.* Cambridge, MA: The MIT Press.

Dietsch, D. (2015). *Radioranzen - App | Q3 Quartier für Medien.Bildung.Abenteuer* Retrieved from *http://www.qdrei.info/category/radioranzen-app/*

Kerber, U., & Mügge, H. (2014). EduQuest. *L.A. Multimedia, 4*, 2014, 22-25 (in German).

Klopfer, E. (2008). *Augmented Learning – Research and Design of Mobile Educational Games*. Cambridge, MA: The MIT Press.

Knecht, G., Ertelt, J. & Mügge, H. (2011). *Mobile Spiele real und digital für Schule und Kinder- und Jugendarbeit*. Werkstattkurs an der Akademie Remscheid.

Lambert, J. (2013). *Digital Storytelling: Capturing Lives, Creating Community*. 4th Edition, Published by Routledge.

Schmatz, M., Bihler, P., Mügge, H., Veremeyenko, Y., Cremers, A. B., Fromm, R., Henke, K., & von Heynitz, D. (2009). *Mister X Mobile - An Innovative Location-Based Multiplayer Game.* 15th Annual International Conference on Mobile Computing and Networking - ACM MobiCom.