

Video prototyping in Concept Design for *MZig* - Situated and Collaborative Mobile Learning

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ABSTRACT

In this paper we describe the concept and design process of *MZig* - situated and collaborative mobile learning system that was developed using video prototyping method. The video prototype has played an essential role in the ideation process at two levels: by shifting the emphasis away from developing a functional and “testable” prototype, it enabled the design team to focus more on conceptual and experience design, it also functioned as a “boundary object” for getting feedback from peers and negotiating about possible future projects with potential partners. The important finding of this design exploration was different ways how video prototyping can foster design process, for example, through re-editing the initial video scenario and refining the details of the concept with minimal investment of time and effort. Video prototyping method also enabled the design team to discover unexpected potential uses of video in mobile devices shared within a group.

General Terms

Design

Keywords

Situated and collaborative learning, group work, mobile technology, socially and physically distributed cognition, design scenario, video prototyping

1. INTRODUCTION

For many researchers in the Participatory Design community video plays an important role in the design process: video is used for collecting data throughout observations of the users to final evaluation of the systems [6], on the other hand, some recent studies have indicated that video prototyping can be a valuable tool in ideation process and design explorations [7]. Video has been found very useful for design scenarios in different stages of design process, for example, for understanding the user requirements and the context of use better, or for effectively explaining design ideas for different stakeholders in a brief and obvious way. Video scenarios enable us to shift our attention from

functional and technical details more towards abstract and conceptual issues of the design. This paper describes the concept and theoretical background of *MZig* - situated and collaborative mobile learning system that was developed using video prototyping method. The script of the video scenario and the description of the *MZig* design process using video prototyping gives a better understanding of the *MZig* concept itself as well as a deeper insights how video prototyping could benefit the design process.

2. THEORETICAL BACKGROUND FOR THE *MZig* CONCEPT

MZig is a concept for using mobile technology in situated and collaborative knowledge building projects. The *MZig* application is designed for group-centered work where knowledge is constructed as a collaborative effort. Theoretically *MZig* concept is based on Computer Supported Collaborative Learning (CSCL) and social constructivist ideas. The main interest in CSCL research lies in how collaborative learning supported by advanced computer tools can improve knowledge production, interaction, distribution and sharing of expertise in peer learning communities [5]. With the *MZig* a group of learners can make a better use of knowledge that is physically and socially distributed in the group’s environment and social networks rather than relying on personal expertise. Small and portable new media tools can be very helpful in situating and employing physically and socially distributed cognition (for example, when going to a “knowledge rich” locations such as museums, libraries or visiting an expert, etc). As situated learning proponents claim, the knowledge should not be taught in abstract, it should be learned in context and actively doing something related to the subject [9]. Complete freedom to choose the context and location where *MZig* is used enables new kinds of situated learning processes to emerge where technological systems are “invisibly” and “artfully” integrated in people’s everyday practices [11].

MZig utilizes JigSaw, a collaborative learning technique developed by social psychologist Elliot Aronson in the early 1970’s [1]. *MZig* brings the potentials of ubiquitous and mobile computing to the Jigsaw method. According to the Jigsaw technique the course participants are first divided into “Mother groups” of 4 or 5 people. The groups are supposed to be diverse in terms of gender, expertise and skills. In each “Mother group” participants are assigned to be the experts in one sub-topic related to the overall theme of the study project. Experts of each sub-topic form an “Expert group”. After a certain time the experts are

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called back to their “Mother groups” to teach their study results to the others.

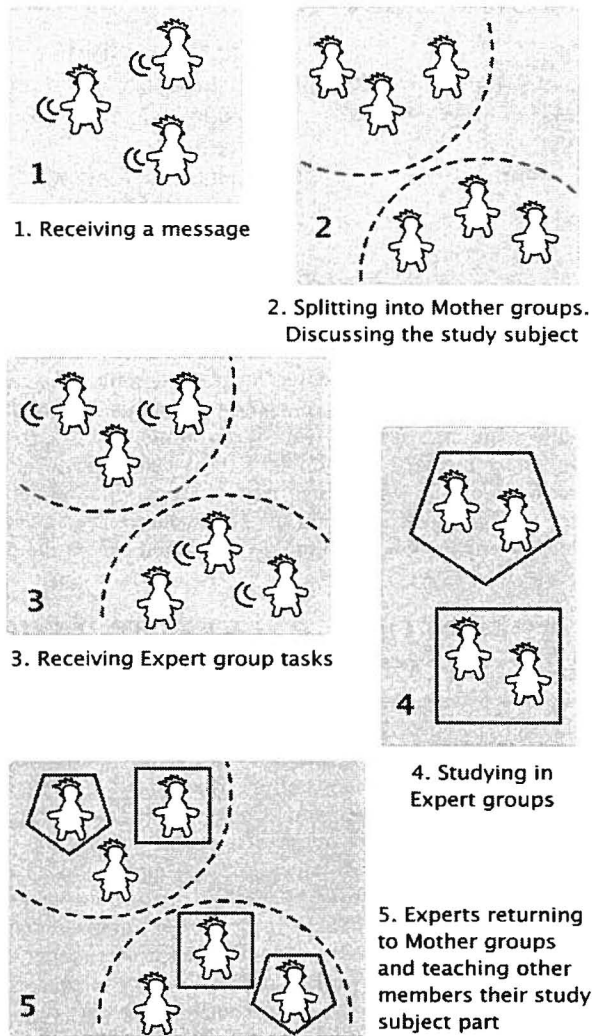


Figure 1. Jigsaw method.

First of all the *MZig* application takes care of the organizational tasks that must be carried out when implementing the Jigsaw technique. Secondly *MZig* offers more advanced tools for gathering and sharing information during the study project. Furthermore *MZig* guides the participants to carry out meaningful processes when working in the expert and mother groups. For example *MZig* automatically offers hints to the participants on whom to meet, where to go for a visit or how and when to carry out a group brainstorming.

3. *MZig* SESSION SCENARIO

3.1 Setting up the *MZig* Session

An important role in the group knowledge building plays the facilitator (tutor) who starts and mediates the *MZig* session. The facilitator introduces the idea about running a knowledge building session using the *MZig* to the participants and sets up the

application. The application is configured using the information on how many and who the participants are, what the study themes are and what the schedule of the knowledge building session will be.

3.2 “Ice Breaking” Game

After the facilitator starts the *MZig* session, the system automatically sends a message with a “Mother group’s” icon to all the knowledge building session participants. The participants’ task is to find the other members of their group. Looking for the “Mother group” is an ice breaking game where all the participants get to know each other. This kind of games may be important for group cohesion that could be described as “a dynamic process that is reflected in the tendency for a group to stick together and remain united in the pursuits of its instrumental objectives and/or for the satisfaction of member affective needs.” [4]

3.3 Orientation Presentation

The work in the “Mother group” starts with viewing a ready-made presentation of the overall theme of the study project together. The facilitator sends a simple presentation made by her and an invited expert on the study theme to all the knowledge building session participants through the *MZig* system. The presentation helps the participants to form a clear, shared vision of the objective and aims of the study project. The presentation is accessible throughout the *MZig* session for future reference.

3.4 First Study Task

The “Mother groups” receive a message from the *MZig* application with the introduction to the study theme sub-topics and the first study task. Each “mother group” must present questions that interest them related to the sub-topics and send them back to the *MZig* application. The study problems may be written on a post-it note, photographed using a camera mobile phone and the image sent to the *MZig* application. In the main *MZig* application the messages are placed in a matrix and categorized by “Mother group” and study theme.

3.5 Working in the Expert Groups

After the first task in the “Mother groups” the participants are divided into different “Expert groups”. The session participants receive messages from *MZig* application with the guidelines how to find the group in which they belong trying to identify people with the same kind of icons. When working on the sub-topics of the study theme in the “Expert groups” the participants receive new tasks from the *MZig* application.

3.5.1 Choosing Your Own Working Space

The “Expert groups” can choose the most suitable place to carry out their study work. It can be, for instance, their favorite meeting room, a museum or a library. The experts carry out their study work and prepare to present their findings to their mother groups. They may use databases and materials on the Internet accessible with their mobile devices. The content may also be video and audio clips.

3.5.2 Visiting Experts and Building Social Networks

One of the tasks that the knowledge building facilitator can give through the *MZig* system is to interview someone considered to be an expert on the sub-topic of the study theme. This brings outside expertise to the study work and builds the participants’ social

networks. Also the results of the expert interviews are sent back to the *MZig* application.

3.6 Creative Problem Solving

All tasks carried out in the expert groups require close interaction among the participants. Brainstorming and group work can be guided automatically by the *MZig* application. For example to help in innovation and creative problem solving the expert group can be asked to do word associations with key words sent by the *MZig* application. The association game currently used in *MZig* concept is originally developed by the world famous designer Viktor Papanek [10]. In the association game the group presents their ideas on a given topic and *MZig* sends them words to associate with, to create new solutions and ideas related to the topic. Words sent by *MZig* lead participants to approach and see the topic from new perspectives. The results of the brainstorming session are sent back to the *MZig* application.

3.7 Giving Presentations in the “Mother Groups”

According to schedule the participants are asked to return to their “Mother groups” and present their findings from the “Expert group” work for their peers. When giving the presentations the participants can use the materials gathered and automatically categorized in the *MZig* application. The presentations are discussed and the participants reflect on what they have learnt with the *MZig* application. The facilitator is also visiting the “Mother groups” and giving feedback on the presentations.

4. *MZig* DESIGN PROCESS

The *MZig* concept development and initial testing was carried out as a collaborative design effort during a weeklong workshop in Media Lab University of Art and Design Helsinki (UAIH). The design team started with analyzing the Jigsaw method and writing a script for shooting a video scenario of the *MZig* concept. Later on the group developed a half-functional *MZig* system prototype that enabled them to shoot a video scenario in almost real usage situation. The design team was equipped with camera mobile phones that allowed the group to receive messages via Bluetooth from the *MZig* system set up in a laptop, take pictures with a camera and send them back to the system. During the video shooting session the team moved freely in different locations and performed an improvised knowledge building session within the same group. The experiences from the video shooting session enabled the group to get the real feel of how mobile devices affect the group work and brought about some new insights about how the *MZig* system could work. The presentation video was edited and shown for the peer audience within the Media Lab UIAH, feedback collected and ideas discussed. After few weeks time another version of the *MZig* video was produced using the same video footage material. The new version reflected on the feedback that the group has received from their peers and focused more on the conceptual representation of *MZig* idea.

In the *MZig* design process the use of two kinds of prototypes can be distinguished: the semi-functional *MZig* application prototype that was sending the messages to the session participants’ phones during the video shooting; and the video scenario itself that was the main production focus and result during the workshop, that could be called a *video prototype*. Prototyping is widely accepted method in system design development process. A prototype is

usually considered as an approximation of a product along one or more dimensions such as functionality and appearance, which can be represented at low or high fidelity [3]. Prototypes are often used as “boundary objects” that enable designers and users to communicate around a situation in concrete terms [8].

Our claim is that the *MZig* video scenario that was produced during the workshop can be considered as a prototype that played an essential role in ideation and negotiation of meanings processes within the design team itself and also among external reviewers. The video prototyping worked at two levels: by shifting the emphasis away from developing a functional and “testable” prototype, it enabled the design team to focus more on conceptual and experience design, it also functioned as a “boundary object” for getting feedback from peers and negotiating about possible project outcomes with potential partners [2]. The video prototyping carried most of the essential traits of prototype testing, such as putting the *MZig* system prototype in real use situation, testing the hypothesis, collecting the feedback and generating ideas how the system could be improved.

An exceptionally powerful experience was the re-editing the initial video scenario after reviewing it within the design team and getting the feedback from colleagues. Through simple re-editing with minimal investments of time and effort, the scope of *MZig* concept changed from technological tool towards more general group collaboration and knowledge building concept that improved the design team chances in negotiations about the future projects with different partner companies. The *MZig* video prototype also had some unexpected results: the video viewed from a mobile phone shared within the group that was sitting around the table generated several new ideas about how video content viewed together from a mobile device could be used for knowledge building.

5. CONCLUSIONS

In the nearest future the *MZig* concept will be tested using qualitative and participatory design methods in real usage situations. The tests will be done using similar prototypes as the design team was using while producing the video: in the first rounds of prototyping no elaborated functional prototypes will be employed, but the “wizard of Oz” technique will be used to collect observational data and feedback from the users. The users will be also involved in the ideation process of developing further and creating new concepts of mobile devices usage in group work situations.

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