Mobile usability evaluation: the case of the Art Encounters 2017 application

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ABSTRACT
Usability evaluation is a crucial step in ensuring the success and adoption of a mobile application. Several usability evaluation techniques have been developed over the time, each one with its own advantages. In this paper, we present a usability test that was done for the mobile application Art Encounters 2017, an app developed by Politehnica University of Timisoara, that promotes the Romanian biennial contemporary art exhibition with the same name. We applied the observation session and the focus group techniques, having as participants 20 students attending an Interactivity and Usability master course. The usability test indicates issues in the areas of navigation, menu, event searching and filtering, or getting to a venue, and received suggestions from the participants on how to further improve the application. Based on the result an improved version is to be developed for the next year event.

Author Keywords
Usability evaluation; observation session; focus group; mobile application.

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms
Human Factors; Design; Measurement; Performance.

INTRODUCTION

Usability, in the context of Human Computer Interaction, is a "quality attribute that assesses how easy user interfaces are to use" [2]. While mainly used to denote the quality of a system, usability also refers to the process itself of designing a usable system. Five quality components define usability: learnability, efficiency, memorability, errors and satisfaction [2].

As such, usability evaluation is a set of techniques which combine engineering, psychology and user research in order to determine the positive and negative usability aspects of a software, in order to improve it [1].

Several usability evaluation methods can be applied in measuring the usability of software systems and in particular mobile applications. Among them are heuristic evaluation, cognitive walk-throughs evaluation, conventional user test, laboratory testing and field testing [4].

In this paper, we report on the usability evaluation of a type of application that is very common nowadays, namely an art event app.

The mobile application Art Encounters 2017 is the official application of the Art Encounters 2017 event, a biennial contemporary art event in Timisoara and Arad, both big western cities in Romania. The first event took place in autumn 2015. For both events, the Multimedia Research Center of the Politehnica University of Timisoara designed and developed, through its staff and students, the official mobile application, both for Android and iOS smartphones.

Figure 1 shows some of the main sections of the application: the menu, the exhibitions list and a single view of an exhibition.

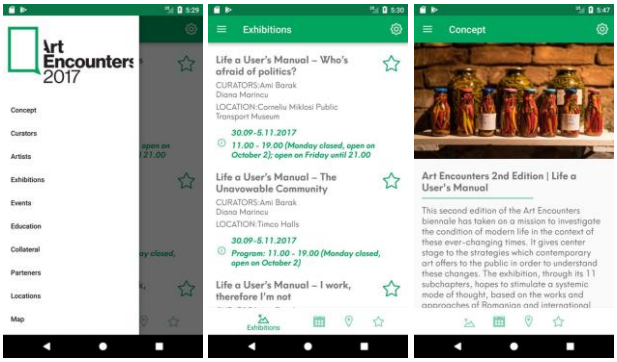

Figure 1 Screenshots from the Art Encounters 2017 mobile application

Following each iteration, the authors ran usability tests to assess the efficiency, efficacy and satisfaction of the users, in order to improve the application for future iterations of the biennale.

The usability evaluation tests took place as part of the Interactivity and Usability course, which the authors teach in the first year of the master in Multimedia Technologies at the Politehnica University of Timisoara.

The current paper describes the methodology, the results and the conclusions of the usability evaluation of the Art Encounters 2017 application.

METHODOLOGY

Overall, 20 students in the first year of the master in Multimedia Technologies participated in this study. They are considered expert users, since their bachelor and master studies are in an engineering field, and they are aged 22-24, 55% of them being male and 45% being female. They have never used the Art Encounters application before, with the exception of three students who installed and opened it only once or twice. However, almost half of the students have heard something before about the event itself.

The usability test consisted of two evaluation techniques: observation sessions and a focus group. In the observation sessions, 11 students were actually participants, while 1 was the facilitator and 5 were observers. The actual participants were selected considering the following criteria: a) they have never used the app before and b) they own in equilibrate proportions Android and iOS smartphones. The focus group took place with 17 students as actual participants, while 1 acted as facilitator and 2 were observers.

The usability evaluation took place in the faculty, in a room with 40 places, equipped with projector, video recording equipment, microphones, chairs and desks.

The User Observation Sessions

For the observation sessions, the authors prepared in advance the required materials for proper usability testing: video recording and confidentiality agreement, prequestionnaire, postquestionnaire, list of participant tasks, facilitator guideline, observer guideline, tables for registering participant comments, participant notes, times, steps and errors sheets.

The list of tasks consisted in 11 individual tasks that required the participant to:

1. Find the exhibition entitled “Avangarda istorică și arta ping-pong-ului” with information in Romanian and save it as an exhibition that you wish to visit later
2. Identify the location where the exhibition entitled “Avangarda istorică și arta ping-pong-ului” and how you can visit it
3. Search for other events that are happening in the same location with the exhibition entitled “Avangarda istorică și arta ping-pong-ului”
4. Find a cultural event that took place on Sunday, October 8, 2017
5. Find the closest Art Encounters space to the building that you are in right now
6. Post a message on Twitter or Facebook, from within the application, about the artist Dan Perjovschi that participates in the biennale.
7. Identify the year of birth for one of the curators of Art Encounters 2017.
8. Identify in the application an education event for kids
9. Find out how you can reach with the bike (VeloTM) the events that take place in the biennale.
10. Point out in the application the names and the details of the institution that organized Art Encounters 2017.
11. Change the language of the application so that you can read the content in English.

Each one of the participants was handed 2 or 3 tasks, in a balanced manner, in order not to keep the sessions too long, as the course had allocated 3 hours for performing the evaluation.

The participants activity on the smartphones was recorded with a mirrorless Panasonic Lumix GH4 video camera placed at an appropriate height above the desk, so that it would not hinder the participant. The recording was projected in real-time on a wall, behind the user, so the observers could follow the participants’ activity on the smartphone. Another video camera, this time a DSLR Canon 6D, paired with a Sennheiser microphone, recorded the mimics of the participant face and what they said during the process. The facilitator kept encouraging the participant to think out loud whenever possible. Both recordings were later correlated with the observers’ notes.

Figure 2 shows how an observation session looked like.

Figure 2 Setup of the observation session

The prequestionnaire consisted of 3 parts: demographic questions (age, gender, employment, field of activity, education), general IT knowledge (how often do they use the internet, what types of apps do they use most often) and particular questions (if and how frequently they used apps for cultural events, what apps and other comments).

The postquestionnaire consisted in general satisfaction questions about the activity in the app and questions about what the users liked most and what they would change in future versions of the app.

In short, an observation session developed like this:

1. User enters the usability lab and is greeted by the facilitator. The latter briefly explains to the user all about the session.
2. The participant signs a video recording consent and a non-disclosure agreement. They then fill in the prequestionnaire.
3. The facilitator hands them each task, one by one, and encourages the participant to think aloud.
4. During each task, the observers fill in the sheets with measurements and notes.
5. At the end of the task list, the participant fills in the postquestionnaire.
6. Finally, they have a short dialogue with the facilitator, communicating some last thoughts. Typically, the facilitator thanks them and walks them outside. In our case, the students that already completed the tasks remained inside, so they can watch from "behind the scenes" how the entire process develops.

The Focus Group Session

After the observation sessions, the whole group of students remained in the usability lab and formed a focus group. One student acted as the facilitator and two students acted as observers of the group, putting down on paper every piece of feedback that the participants gave. The focus group was recorded entirely, to be compared and correlated later with the observers' notes.

Figure 3 shows the setup of the focus group session.

Figure 3 Setup of the focus group session

The focus group questions were prepared in advance by the authors, and consisted of questions regarding what the participant thought about the design, the menus or the navigation, about what they liked and what they did not like and would change (and why), about how the menu items were distributed between the main menu at the bottom of the app and the expandable side navigation menu, about what other facilities the app should offer (like notifications, suggestions, marketing messages) and about the usage of the application versus the website. The focus group ended with a question requesting the participants to give the app a general mark from 1 to 10, the latter being the best.

RESULTS AND DISCUSSION

The results of the usability evaluation are both quantitative (such as times, steps, errors) and qualitative (postquestionnaire, participant comments, observer notes, focus group feedback). By correlating the time/steps/errors sheets with the observer notes, we noticed that 6 out of the 11 tasks have been completed successfully by all participants, while 3 tasks could not be completed by iPhone users, due to software errors. In general, the tasks that raised the most problems were related to getting to the location of a certain exhibition. One comment was characteristic of this issue: "I found the location but I don't think I am able to find out how to get there."

The postquestionnaire and the focus group comments revealed the most informative data. When asked to grade the application from various points of view, immediately after finishing the testing, the participants marked the intuitivity of the app with 3.2 points out of 5, the ease of working in the app with 3.6 points out of 5, the ease of navigation with the menus with 3.3 points out of 5 and the level of satisfaction at the end of the testing with 3.6 points out of 5.

Most positive remarks were related with the overall design of the application: content formatting, fonts and colors. Most negative remarks were related to the information architecture and the navigation.

Some participants found the existence of two menus, the main one, always visible at the bottom of the screen, and the expandable side navigation one, hidden on the left, to be confusing ("I'm baffled by the menu", said one participant), and would rather opt only for the latter one. In addition, because the app start page is now actually the exhibitions page, they mentioned the need for a start page that briefly informs the user what the app is about. The authors think that this might be a test-induced bias, since none of the participants knew about the app before, while real users would download the app on purpose.

One major issue reported by the participants was the lack of a search bar for the exhibitions, which forced them to scroll a lot up and down to find the required information. The feeling of overload was strengthened by the content being too overcrowded in some areas of the app.

Some situations were perceived as errors or were real errors and created confusion or frustration, such as the fact that, when selecting the artist of an exhibition, the app navigated the user to the entire list of artists, or that the events were not loading on the iPhones.

Other comments were related to the difficulty in finding out how to get to the venues by bike (more exactly with the public VeloTM bike sharing system), the absence of a feature of the map to show the current location of the user and the odd position of the button to change the language of the app.

When asked if they would rather use the website of the event than the app or vice versa, the participants said that they would use the website to read information about the exhibitions before the event starts and the app to access various other features during the event itself.

At the end of the focus group session, the participants agreed to grant the application around 3.4 points out of 5, which is in line with the grades that the application received immediately after the observation sessions.

From the analysis of the results and the comments from both usability testing techniques, 6 usability problems resulted. These problems, together with their severity ratings, calculated as an average between the values of scope, frequency and impact of the problem [3], are listed in Table 1.

No crt	Usability problem	Severity
1	The menu is confusing	Medium
2	User location not shown on map	Low
3	All artists show up even if only one is selected	High
4	Content is overcrowded	Low
5	A search bar is missing	Medium
6	It is not easy to find how to get to a venue	Medium

Table 1 Identified usability problems and their severity ratings

The postquestionnaire and the focus group feedback revealed what the participants would like to add to the application: a news section, where updates to the event would be posted frequently, notifications for upcoming marked-as-favourite events, recommendations on related events or the possibility to view the popularity of an event (based on the number of people that marked it as favourite).

Regarding the methodology used, the performed usability test combined two evaluation techniques, the observation session and the focus group, a fact that the authors think generated a good mix of quantitative and qualitative data. The experiment demonstrated that the focus session deepened the usability results that were obtained especially related to user satisfaction. The advantage of running the focus group immediately after the observation sessions is in exploiting twice the feedback of the same group of participants and in saving the time spent during the focus group to introduce the mobile application. The disadvantage of such a large group of participants in the focus group is that a minority of them was much more vocal than the rest of the group, which probably led to missed feedback from some participants.

CONCLUSIONS

This paper reported on a usability evaluation of the mobile application Art Encounters 2017, which was developed by the Politehnica University of Timisoara for the Romanian biennale with the same name. The usability testing consisted in several observation sessions and a focus group session. The participants were 20 students attending the Interactivity and Usability master course at the Politehnica University of Timisoara in Romania. The qualitative and quantitative results of the evaluation revealed a few usability problems, namely the confusing navigation within the menus, the crowded and hard to filter content, and the hard time in finding information about an artist or about how to get to the venue that an event takes place in. Some errors where discovered also on the iPhone version of the application. Despite these issues, most of the participants enjoyed the design and the content of the application, giving it 3.4 points out of 5. The participants also suggested some improvements to the application, such as adding a search bar and a filter for the events, adding a start page and a news section, improving the button for changing the language, receiving notifications for marked-as-favorite events and seeing the popularity of the events based on how many people marked them as favorites. As the usability testing was done in a controlled environment, with users who are all technically-savvy and with interests in usability testing, we can consider this as an expert testing and a deep analyze. The test was also a very good example of implementing real-cases in lab work with students.

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