

## PROCEDURE FOR TESTING JELGAVA SCHOOL WEBSITES ON MOBILE DEVICES USING GOPRO HEAD CAMERA

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**Abstract.** Historically, most web designers and their clients have approached the desktop side of any project first, while leaving the mobile part as a secondary goal that gets accomplished later. Lately there is a growing trend in the industry to flip this workflow and to begin with mobile considerations and then work up to a larger desktop version. Testing mobile versions of the websites is becoming an important task for developers and clients. Therefore, industries that aim their businesses to youth must take into consideration the quality of mobile versions of their websites. One of such industries is education. School websites are already published, it is necessary to test the usability of mobile devices at schools. From the point of usability, navigation in mobile versions of websites is an important factor. If the navigation structure and information display are not usable, it can greatly impact the overall usability of websites. This paper focuses on application of navigation testing methods using a head camera and video analysis to evaluate the mobile versions of websites. As the research object six Jelgava city secondary school websites are used. GoPro camera was chosen to take videos from the user's view point and to follow up activities and record comments. As the testing device iPad 2 tablet computer with the Internet browser Safari was selected. Before testing was executed, the participants needed to complete a questionnaire. Participants' behavior observation was performed and it shows a similar action pattern. The users' comments were used to complete the testing results.

**Keywords:** usability, school websites, navigation testing, design.

### Introduction

Almost every organization now has its own website including educational institutions: schools, universities, colleges, etc. Typical functionality offered, for example, by school websites includes access to the lesson timetable, teacher reception hours, school events, student success stories, etc. With possibilities that are provided by mobile operators and telecommunication companies, such as cheaper mobile devices, the Internet traffic plans and the Internet speed, there is seen a tendency that also in Latvia the mobile approach should be considered. Both students and their parents often use the mobile devices; this means that the school web pages are viewed not only on computer, but also using mobile devices: smartphones, tablets [1; 2].

As the school websites are already published, it is necessary to test the usability of mobile devices at schools. Usability evaluations of mobile devices include new challenges, such as evaluation of navigation, evaluation of the layout tree, etc.

The aim of this paper is to test website navigation using mobile devices, a head camera and video analysis.

### Materials and methods

Usability testing allows not only to find the weak parts of application that could cause problems for the users, but also to find successful solutions, which can be used for the future projects. Usability testing is a way to find the users' opinion, view and analyze his action sequence, behavior and comments dealing with the tested application.

During usability testing on the desktop computer it is not an issue to record, both the users' behavior and action with application are standard methods. However, for mobile devices as with rapid development of devices, testing procedures are still developed. To record the users' actions on desktop computers, a fixed video camera, web camera, screen recording software and other devices and applications can be used. In comparison to desktop computers, mobile devices are portable and the screen can be moved, while the user is having interaction with the system. On mobile devices management of application typically is performed using a touch screen, so there is a need to save information about the user's interaction with the mobile device screen.

It also helps analyze the information about "outstanding activity": where the users wanted to click, but changed their minds. To test the mobile device navigation layout the following method and research object were selected.

As the research object 15 schools in Jelgava, 6 of which are secondary, were analyzed. It was decided to make usability testing for websites of secondary schools.

For website navigation and information layout analysis the following data need to be collected:

- users' comments during interaction;
- time that was necessary for each user to complete the task using website navigation;
- users' action sequence that is performed for reaching the desired information on website [3].

To collect such data, a video recorder can be used, which is also often applied in mobile device evaluation [4].

To take videos from the user view point and to follow up activities and record comments, there is a need to use the camera, which can be fixed to the head of the user [5]. For the purpose of this research commercially available cameras were analyzed. Such cameras need to be easily attachable to the front of the user's head, must provide sufficient quality of video and sound recording. Action cameras are suitable for this task. There are multiple producers of action cameras, such as Sony, Panasonic and others. But for this research only one camera producer was identified that provides cameras that can be attached to the front of the user's head and provide a changeable shooting angle. The producer is GoPro.

To organize the experiment ten respondents took part in the testing. Before testing was executed, the participants needed to complete a questionnaire, where the participants were asked to provide information about them:

- gender,
- age group,
- type of occupation,
- frequency of use of mobile devices,
- experience to visit Jelgava schools home pages.

In testing 5 women and 5 men were selected. As the research group parents were selected of the age range 18-50 years. 18-25 years old – 8 persons, one in the group from 26 to 35 years, one in the group from 36 to 50 years. Mobile devices are never used by one person, 1-2 times per month 2 persons use them, 1-2 times a week 1 person and mobile devices are daily used by 6 persons. 7 people at least once visited one of the Jelgava schools websites.

As the testing device iPad 2 tablet computer with the Internet browser Safari and GoPro Black Edition Hero4 head camera were selected.

During the testing the users' comments and each task execution time were recorded. GoPro Black Edition Hero4 camera was chosen because of the following reasons:

- high recording quality,
- sufficient sound recording quality,
- possibility to fix the camera on the front of the head,
- wide shooting angle shown in Fig. 1,
- adjustable camera angle positioning on the head in Fig. 2.

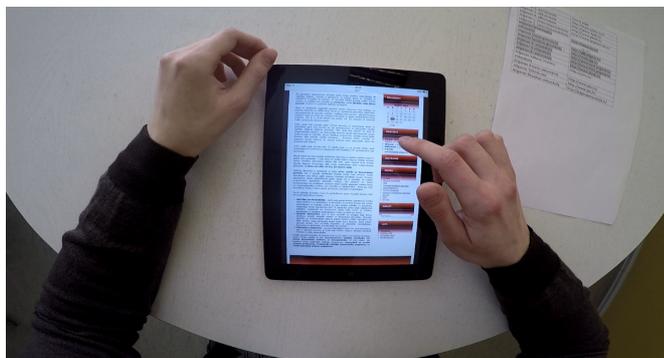


Fig. 1. View from the camera during the testing process



Fig. 2. Testing setup with iPad 2 and GoPro Black Edition Hero4 action camera

The testing setup with one of the participants is shown in Fig.2 and the testing process flowchart is illustrated in Fig. 3.

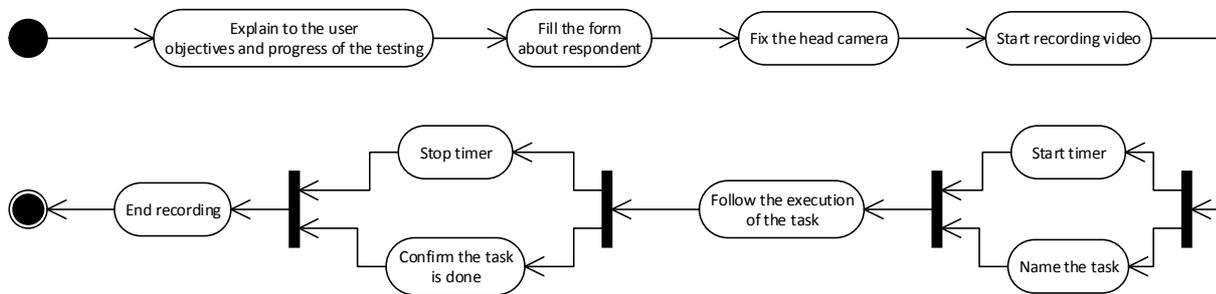


Fig. 3. Testing process activity diagram

Before the respondents were asked to find the necessary information on the school website it was confirmed that the information is available on the website.

After analysis of the selected home pages, it can be concluded that all school websites contain information about the 9 grade lesson timetable, teachers’ reception hours and information about contacts, including the school e-mail address. Information about the websites that were selected for testing is shown in Table 1.

Table 1

**School home pages used for the testing**

School	School’s home page address
Jelgava Secondary School of Technology	<a href="http://www.jtv.lv/">http://www.jtv.lv/</a>
Jelgava State Gymnasium	<a href="http://vgim.jelgava.lv/">http://vgim.jelgava.lv/</a>
Jelgava Spidola Gymnasium	<a href="http://www.jsg.lv/">http://www.jsg.lv/</a>
Jelgava Secondary School No.4	<a href="http://www.4vsk.jelgava.lv/">http://www.4vsk.jelgava.lv/</a>
Jelgava Secondary School No. 5	<a href="http://www.5vsk.jelgava.lv/">http://www.5vsk.jelgava.lv/</a>
Jelgava Secondary School No. 6	<a href="http://www.j6vsk.lv/">http://www.j6vsk.lv/</a>

**Results and discussion**

The task execution times are shown in Table 2. Most problems with navigation and information layout arise with Jelgava Secondary School No. 6 home page.

Participants’ behavior observation was performed and it shows a similar action pattern. While performing the task, during the first minute, the users sequentially are looking for information and commenting activities and navigation.

If the task cannot be completed within a minute, the users’ activities became more chaotic. They checked chapters consecutively or in random manner, and began to show dissatisfaction. At the end of the second minute the respondents concluded that the information cannot be found or that the

information does not exist on the website. Maximum time to perform the task was 3 minutes. It is also concluded by the researchers [6] that after certain time of searching information with no success on the website the users make an assumption that the information does not exist on the selected website.

Table 2

## Average time for task execution (seconds)

Task	School					
	Jelgava Secondary School of Technology	View teachers consulting hours	Jelgava Spidola Gymnasium	Jelgava Secondary School No. 4	Jelgava Secondary School No. 5	Jelgava Secondary School No. 6
View 9 class lesson timetable	66	36	26	16	22	118
Find school e-mail	34	11	18	16	16	7
View teachers consulting hours	69	7	14	23	12	95

During the testing it was concluded that some information is displayed in PDF format files that was not supported by Safari browser, therefore, omitted from the experiment.

It was found that the respondents have a similar behavior in searching for the school e-mail address. Most of the users started looking for this information at the bottom of the page. To apply this testing method another observation was made that some users have difficulty to browse the information and comment about their actions and feelings.

Overall, most difficulties were identified to browse Jelgava Secondary School No. 6 website. This school also has the largest number of the tasks that were not executed within 3 minutes and it was acknowledged that the information is not present on the website. Table 3 provides information on the number of failed tasks.

Table 3

## Tasks that were not executed within 3 minutes (count)

Task	School					
	Jelgava Secondary School of Technology	Jelgava State Gymnasium	Jelgava Spidola Gymnasium	Jelgava Secondary School No. 4	Jelgava Secondary School No. 5	Jelgava Secondary School No. 6
View 9 class timetable	0	0	0	0	0	4
Find school e-mail	1	0	0	0	0	0
View teachers consulting hours	1	0	0	0	0	4

This could be related to the fact that the school website is not adopted for mobile devices. Most of the menu section is not readable without zooming and scrolling and is not adjusted to work on devices with small screens. As well as it was found that at this school's website the search functionality was disabled. Difficulties with Jelgava Secondary School No. 6 website are also linked with the page navigation complexity and saturation of information on one page [7]. The users observed that it was

difficult to fulfill the tasks in Jelgava Secondary School of Technology website, which also is not adopted for mobile devices.

Jelgava State Gymnasium and Jelgava Secondary School No. 5 websites are adopted for mobile devices and small screens. Main Page of these websites was evaluated as simple and with understandable navigation. The menu is not saturated with many categories. Such saturation can negatively impact the website usability [8].

Analysis of the information about the tasks execution of which took less than 10 seconds was also performed (see Table 4) to show examples of well laid out structure and navigation.

Table 4

Tasks that were completed in less than 10 seconds

Task	School					
	Jelgava Secondary School of Technology	Jelgava State Gymnasium	Jelgava Spidola Gymnasium	Jelgava Secondary School No. 4	Jelgava Secondary School No. 5	Jelgava Secondary School No. 6
View 9 class timetable	2	4	1	3	1	0
Find school e-mail	3	4	4	7	4	8
View teachers consulting hours	0	8	2	3	6	1

The users explained that the easiest task is to find the school e-mail address. To record the users' action by analyzing the execution of tasks, it is possible to display a typical navigation scheme (see Fig. 4).

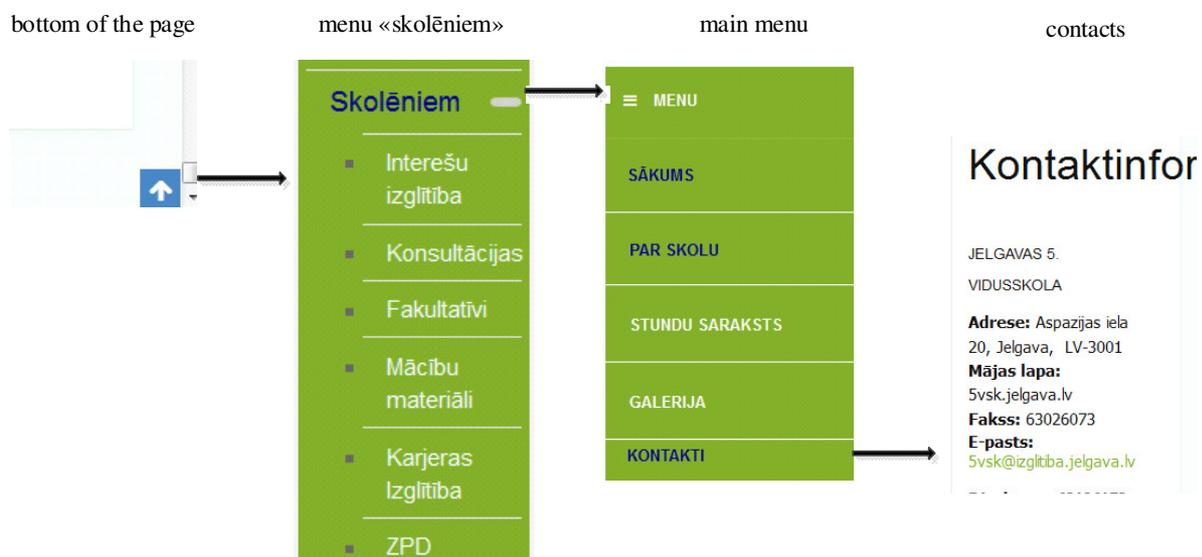


Fig. 4. E-mail address location task navigation scheme by participating user

To improve the testing results, the test data collection can be supplemented with recording of biometric parameters. Biometrical data, which could be informative for usability testing are: pulse, eye pupil augmentation and reduction, muscle changes, skin resistance, etc. [9]. To assess all biometric data it is necessary to use special devices. Pulse measurement is relatively a simple parameter, which gives additional information about the respondent's feeling. Pulse can be measured and recorded using smart watches. The smart watch advantage is the possibility to create special programs that help adapt

the device to usability testing. The problem that may arise in the analysis of the test data - data synchronization between the user's actions and measure indicators.

### Conclusions

1. The use of head cameras allows to record not only the task execution order from the user's view point, but also the comments that enable the development of the test analysis and do not need to synchronize video and sound. Commercially available action cameras can be used for mobile device browsing usability testing.
2. The test results are dependent on the tested user's personal characteristics, if the respondent does not comment activities on the website, particular attention is needed to perceive the analysis of the recorded sequence of activities.
3. Menu section reduction simplifies the website using a mobile device.
4. Usability testing can be developed using recording of the users' biometric data, such as pulse, during the test. This will help determine what tasks and in what time caused stress or change in the pulse.
5. From the analyzed websites Jelgava State Gymnasium and Jelgava Secondary School No. 5 had the best navigation and information layout for the tasks executed in the performed experiment.

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