

Thesis usability test plan

Adaptive UCD based M-learning application development

BIT Thesis Group

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Table of contents

Versioning.....	1
Abbreviations.....	2
1 General	3
1.1 Location.....	3
1.2 Participants.....	3
1.3 Required training.....	3
2 Goal and objectives.....	4
3 Tools and methods	5
3.1 Tools	5
3.2 Preparation.....	5
3.3 Procedure	5
3.4 Evaluation metrics.....	6
4 Scenarios.....	7
4.1 Overview	7
4.2 Preconditions	7
4.3 Post condition.....	8
4.4 Completion.....	8
5 Results.....	9
Appendices.....	10
Appendix 1. Scenario 1: pausing a driving session GPS tracking.....	10
Appendix 2. Scenario 2: unauthorizing a driving session GPS tracking.....	11
Appendix 3. Scenario 3: interrupting a driving session GPS tracking, and interacting with map control	12
Appendix 4. Scenario 4: self-evaluating a previous day driving session, issues manual entry	13
Appendix 5. Scenario 5: self-evaluating a driving sessions.....	14
Appendix 6. Scenario 6: self-evaluating a driving session, date manual input and back browsing.....	15
Appendix 7. Scenario 7: taking a theory test, with errors	16
Appendix 8. Scenario 8: taking and suspend a theory test	17

Appendix 9. Scenario 9: taking a theory test, without answering some questions....	18
Appendix 10. Scenario 10: observing mobile menu adaptive content, and taking a theory test with no guidance.....	19
Appendix 11. Post scenario questionnaire.....	20
Appendix 12. Scenario evaluation form.....	22

Versioning

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Abbreviations

Table 1. A list of abbreviations and their meaning, used in this document.

Abbreviation	Meaning
UI	User Interface
UCD	User-Centered Design
UX	User Experience

1 General

This plan details the usability testing mobile targeted functionalities, provided by the *uxitdrive.com* web application prototype. It is centered on the execution of ten scenarios (e.g. usability test cases) by a group of selected users.

1.1 Location

The usability test will be executed at Altoo University's usability testing laboratory, in Otaniemi (Helsinki).

1.2 Participants

The participants will be selected by Test Supervisor Amir Dirin, in adequate number to execute all the ten designed test cases. Moreover, they will be able to represent the end-users consumer market target of the project business case. Hence, additional factors will be considered, such as age (e.g. eligible to get a driving license, especially the target age range between 18 and 25 years), computer literacy levels (e.g. adequate to use mobile devices, and tasks related to interaction with modern web applications), and proximity to the testing facilities.

1.3 Required training

All testers are expected to be able to use mobile devices to access and browse the Web, before entering the testing facility. Moreover, they will receive brief instructions concerning test execution (e.g. nature of the test, what is expected from them, equipment to be used, target application URL). Please, refer to the *Precondition* sub-paragraph for more information.

2 Goal and objectives

Usability testing goal in this project is to ensure that the application provides an effortless UX, thus encouraging trainees to use the application with no stress. Hence, maximizing learning efficiency and efficacy.

The objectives are the following:

- To ensure UI design consistency, and efficacy, e.g. labels readability and meaningfulness, efficient website navigation, reduced amount of actions required to use website functionalities, lack of redundancy, clear and meaningful feedback messages.
- To collect user feedback in relation to UX.
- To identify needed UI and UX improvement, if any.

3 Tools and methods

3.1 Tools

The testing will rely on the equipment available at Altoo University's usability testing laboratory, according to Test Supervisor Amir Dirin judgement. Moreover, each tester will have a mobile device available (e.g. smartphone or tablet) to access the web application prototype available online at the URL: <http://www.uxitdrive.com>. Mobile devices will be enabled to browse the World Wide Web (e.g. relying either on wireless or mobile data connection), and have a web browser installed. Mobile device, connection and browser types will not be predetermined, in order to represent a realistic selection of the technology available to the end-user consumer population.

3.2 Preparation

Project manager Maurizio Casarini will register ten *ad hoc* users in the online prototype, in order to grant authorization to testers (e.g. logon credentials). The list of the created user credentials is not included in this document for security reasons. Hence, it will be delivered separately to Test Supervisor Amir Dirin, together with this test plan. Finally, the application prototype will be available online at the URL: <http://www.uxitdrive.com>.

3.3 Procedure

Testers will execute the given test cases according to indications provided by Test Supervisor Amir Dirin. The test phases will be, in order:

- Test Supervisor will brief test subjects on the application, and testing purposes (e.g. testing application usability)
- Test Supervisor will ask them if they have any questions, in order to ensure they understood their duties, and how the test scenarios will be executed.

- Testers will be provided either a printed or digital copy of the test case(s) each and every one of them will have to execute. They will be invited to read them at least once, before beginning scenario(s) execution.
- Test Supervisor will monitor the interaction between testers and the web application itself. Testers will be encouraged to *think aloud*, in order to provide immediate feedback about application usability.
- Test Supervisor will collect feedback from test subjects, after scenario(s) completion, concerning prototype usability.

Please refer to the *Scenarios* chapter for scenarios *pre and post conditions*.

3.4 Evaluation metrics

Scenarios result will be evaluated according to the following metrics:

- Scenario completion rate is the amount of scenarios fulfilling the completion goal over the total amount of executed scenarios. Please, refer to the *Completion* paragraph in the *Scenarios* chapter for a description of scenario completion goal.
- Completion time per scenario, and number of pages displayed during execution. *Appendix 12 scenario evaluation form* provides a template for data collection.
- Usability feedback collected through a questionnaire, to be found in *Appendix 11 post scenario questionnaire*. It will be used to assess both web application specific elements (e.g. controls, content, feedback messages), and overall UX.

4 Scenarios

4.1 Overview

Scenarios were designed in order to provide adequate usability testing coverage, to all of the mobile targeted application functions, and they are:

- Driving session GPS tracking (scenarios from No. 1 to 3).
- Driving session self-evaluation (scenarios from No. 3 to 6).
- Theory test, taking of (scenarios from No. 7 to 9)
- Automatic user-targeted content feed and notification of suggested function. Displayed in the mobile menu, e.g. after successful logon, and at the completion of a task (one of the three functions above). It is tested in scenario No 10.

Scenarios can be found in Appendices from 1 to 10. Test Supervisor Amir Dirin will determine how many and which scenario(s) will be executed by each user.

4.2 Preconditions

The following preconditions apply to the scenarios execution:

- Test subjects are in an environment comfortable enough not to alter test execution (e.g. sitting, in adequate temperature and light condition).
- Test subjects have or received a mobile device, networking enabled and having web browsing capabilities (e.g. web browser installed).
- Test subjects have been briefed concerning testing procedure and objectives.
- Test subjects received a digital or printed copy of the assigned scenario(s).
- Test subjects know the web application URL (<http://www.uxitdrive.com>) and assigned access credentials.
- Test subjects are given the chance to enquire Test Supervisor for clarification concerning the testing session itself.

- Test subjects have confirmed to Test Supervisor they clearly understood their duties, and how the testing will be executed.
- Test subjects successfully accessed the application mobile menu, by logging on. Please, note that users' ability to use mobile devices, browse the Web, and log on the application are out of the test scope (e.g. mobile targeted functions). Instead, they are characteristics all eligible users must have.
- **Test subjects** involved in GPS tracking scenarios (scenarios from 1 to 3), **must enable high precision GPS tracking** in the used mobile device. Please, note that settings are OS specific, and unrelated to prototype functionality.
- **Mobile devices used for GPS tracking scenario(s)**, must reset browser GPS authorization settings, before starting each GPS using scenario. The reason for this prerequisite is to test all of the functional paths of interaction between browser GPS authorization management, and web application given feedbacks.
- Test Supervisor is ready to monitor scenarios execution, and the needed equipment is configured and ready to be used.

4.3 Post condition

Testers completed the given scenario(s), returned to the mobile menu, and logged out from the application. Hence, returning to the website login page.

4.4 Completion

The goal of each scenario is to reach full completion. Hence, test subjects should be able to execute all of the required actions successfully, as indicated in the scenario description (e.g. provide input, access and understand application feedbacks and content, easily navigate the website).

A scenario will be considered terminated when the test subject declares achievement of the scenario's goal.

5 Results

This document will be updated to include results, after usability testing will be completed and collected data analyzed.

Appendices

Appendix 1. Scenario 1: pausing a driving session GPS tracking

You recently began the process of acquiring a car driving license in Finland. The training activity you like the most is driving, and today you scheduled a session along with your instructor. The two of you just met at the agreed location and you entered the car, getting immediately ready to drive. Moreover, you are well aware that you will have to collect GPS tracking data, throughout the whole driving session. Hence, you logged on the driving school website, which in turn displayed the main menu. Accordingly, you activate the GPS tracking function, and authorize the browser to monitor your position. Finally, you start the engine and begin driving.

You follow the indications of the instructor, confident that your smartphone is fetching all of the required data automatically. After a while, a police officer stops road traffic to let a parade cross the road. Hence, you stop the car, then pause the GPS tracking function: there's no need to collect data while being still. Luckily it didn't take long for the parade to pass by. Therefore, you resume the tracking function, start the engine, and continue driving. At the end of the session, you stop the car. You drove perfectly, and made no mistakes. Very soon you will get your driving license.

The instructor reminds you to complete all of the remaining activities, required by the web application. Hence, you end GPS data collection and provide self-evaluation, step after step, reporting no issues at all. The last duty, is to check performance results and suggested content. The web application always provides useful training material at the end of every activity.

Finally, you end the self-evaluation returning to the main application menu.

Appendix 2. Scenario 2: unauthorizing a driving session GPS tracking

You recently began the process of acquiring a car driving license in Finland. The training activity you like the most is driving, and today you scheduled a session along with your instructor. The two of you just met at the agreed location and you entered the car, getting immediately ready to drive. Moreover, you are well aware that you will have to collect GPS tracking data, throughout the whole driving session. Hence, you logged on the driving school website, which in turn displayed the main menu.

Accordingly, you activate the GPS tracking function. The web browser requests GPS access authorization, but you deny it. Immediately, you look at the website: hopefully it will provide feedback, telling you how to fix the mistake. Therefore, you take action accordingly, reload the page, and start the GPS function once again.

The driving was almost perfectly smooth, and easily reach your destination. Hence, stop the car and end the GPS tracking function. Moreover, you submit the self-evaluation feedback with one issues reported: “**Koen kiertoristeykset vaikeaksi?**” with a rating equal to **2**. Finally, you briefly check the driving session overview information before returning to the application main menu.

Appendix 3. Scenario 3: interrupting a driving session GPS tracking, and interacting with map control

You just finished to shop for groceries with your parents. They suggest you to practice driving on the way back home. In fact, you are in the process to acquire a car driving license. Therefore, you enter the car and get ready to drive. Moreover, you are well aware that you will have to collect GPS tracking data for your instructor, throughout the whole driving session. Hence, you log on the driving school website, which in turn displays the main menu.

Immediately you start the GPS tracking function. An unexpected phone call, forces you to quit almost immediately. Accordingly, you return to the homepage. The phone call is very brief, and you restart the GPS website function.

Driving is pleasant in sunny days, to the point you almost forgot that the fuel tank will be empty soon. Luckily, you are just passing by a gas station. Hence you stop the car, pause the GPS function, and fill your car's tank.

You remember to resume GPS tracking just before starting the engine, then continue driving home. You have been a perfect driver today, no issues to report. Therefore, at the end of the session, you stop the GPS tracking and submit self-evaluation with no issues. You briefly check the map displaying your driving path, zooming in and out: you are curious to check the detail level it can support. Finally, you end the session and return to the main menu.

Appendix 4. Scenario 4: self-evaluating a previous day driving session, issues manual entry

You have been studying and practicing very hard to get your driving license. The result have been definitely positive, but sometimes minor distractions need to be addressed. Yesterday, you took a driving session with your instructor, but your smartphone battery was completely drained. Hence, you couldn't collect GPS data, neither submit any self-evaluation. Nonetheless, this is a problem easily fixed, and you know how to do it.

Therefore, you log on the driving school website, which in turns redirects you to the main menu. You start the driving session self-evaluation, and first thing enter yesterday's date. The enter information in relation to the encountered issues:

- **Onko peruuttamisessa ollut vaikeuksia?** rating of **3**
- **Koen moottoritie liittymät vaikeiksi?** Unluckily, you mistype and manually enter a value of **8**, then immediately fix the error providing a value of **2**.

Finally, you check the content from the suggested link before ending the session, and return to the application main menu.

Appendix 5. Scenario 5: self-evaluating a driving sessions

You have been well trained to use your driving school web application, to provide information to instructors. It is very useful to check your progress and performance. Today you are going for a driving session, but you forgot your smartphone home. Hence, you are well aware you will have to submit feedback after arriving back home.

Accordingly, go for a drive keeping in mind the issues you encounter. This is valuable data to forward through the driving school website. The issues to be reported in this session are:

- **Olen lähestynyt risteykseen liian suurella tilannenopeudella?** rating of 1
- **Koen moottoritie liittymät vaikeiksi?** rating of 2
- **Olen ohittanut edellä ajavan kielltyssä paikassa?** rating of 1

Accordingly, home you log on the driving school website, which in turn displays the main menu. You start the driving session self-evaluation, and report the three duly noted issues.

Moreover, after submitting you feedback, you carefully read the content from the suggested and the second optional link. The web application always provide learning material, in relation to the issues reported. Finally you end the self-evaluation, and return to the application main menu.

Appendix 6. Scenario 6: self-evaluating a driving session, date manual input and back browsing

Yesterday, you took a driving session with your instructor, but your smartphone battery was completely drained. Hence, you couldn't neither submit any self-evaluation. Nonetheless, this is a problem easily fixed, and you know how to do it.

Therefore, you log on the driving school website, which in turns redirects you to the main menu. You start the driving session self-evaluation, and first thing enter yesterday's date manually (e.g. typing the date). Then enter information in relation to the encountered issues:

- **Mikä käsitteylssä on vaikeinta?** rating of 1
- **Olen lähestynyt risteykseen liian suurella tilannenopeudella?** rating of 7
- **Vesisateella ei tarvitse vähentää nopeutta?** rating of 4.

Before submitting, you decide to check all of given values. Hence, you navigate back to the first self-evaluation page, and browse all of the evaluation pages. Check all of the provided ratings, and change the “**Vesisateella ei tarvitse vähentää nopeutta?**” rating to 3.

Moreover, after submitting the self-evaluation data, you display content of all the given links, in the session result webpage. Finally, you can end the session returning to the application main menu.

Appendix 7. Scenario 7: taking a theory test, with errors

You are on the bus to the university campus, a ten minutes trip from your apartment. You will have soon to take the exam to acquire a car driving license. Therefore, you decide to practice theory. Luckily, the driving school granted you access to a website enabling self-training using mobile devices (e.g. smartphone). It is a very good solution, because it allows trainees to practice in a very agile way (e.g. having only a few minutes time available, and in every location covered by mobile data access or Wi-Fi).

Accordingly, you browse the web, open the web application home page, and log on with the given credentials. The system immediately displays the main menu, and you start the theory test function. You know the application very well, and decide to check for each answered question:

- Whether your selection was right or wrong.
- Which answer is correct, in case yours is wrong?

Moreover, you well remember there's a ten seconds time limit to answer. Therefore, speed is essential to reach high performance.

You answer B to the first question, then proceed to the next one. You will answer the same way (e.g. B) to all questions, except the last one: you will choose A.

Finally, you display content from the suggested link, before ending the test and returning to the main menu.

Appendix 8. Scenario 8: taking and suspend a theory test

You are at school, and the hall is nearly empty: you were very early today. None of your schoolmates are here. Accordingly, you decide not to waste time and to practice theory, to get a driving license. Luckily, the driving school granted you access to a web-site enabling self-training through mobile devices.

Accordingly, you browse the web with your smartphone, open the driving school web-site home page, and log on with the given credentials. The system immediately displays the main menu, and you start the theory test function.

You read and answer the given questions, according to your knowledge of the driving regulations. **After the second answer**, you are approached by a friend and decide to chat a little bit. Hence, you navigate to the homepage, interrupting the test, but do not log out from the application. You will continue home, in the afternoon.

In fact, you re-start the theory test on the bus home, and check whether the system displays next question, or forces you to start from scratches. In any case, you reply all of the leftover questions.

The last task, is to check the test performance, and the content provided by the second and third optional links. The websites always provides targeted instructional content, at the end of each and every test taken.

Finally, you end the test and return to the application main menu.

Appendix 9. Scenario 9: taking a theory test, without answering some questions

You are waiting for a friend in a downtown café, but he is late. Therefore, you decide to practice some driving theory test, to ensure you will pass the exam next week. You like to make your time as productive as possible.

Accordingly, you browse the web with your smartphone, open the driving school website home page, and log on with the given credentials. The system immediately displays the main menu, and you start the theory test function.

You answer the given questions the following way:

- You do not reply the first question, because you don't know the answer. Wait a few seconds, and check the outcome.
- You answer C to the second question.
- You do not answer the third question, but wait for the application to highlight the correct answer.
- You answer B to fourth question.
- You answer as you please to the remaining questions, if any

You check all the content given in the test result webpage, after completing answering the questions. Finally, you end the test and access the application main menu.

Appendix 10. Scenario 10: observing mobile menu adaptive content, and taking a theory test with no guidance

You recently decided to take a car driving license. Hence, you subscribed to a driving school, and the instructor gave you access to a web application to support your learning. You are quite curious about how the website works. Accordingly you log on immediately, and browse the application. Being unaware of how the application works, you take the following steps according to a completely intuitive approach:

- You just logged on, and the application displays a webpage. You take your time, and carefully check the content provided, including any type of feedback.
- You decide to take what it looks like to be one of the suggested activities.
- You go through the selected function, in the way you deem most appropriate, until the application displays the main menu once again.
- Check again the content provided in the menu webpage, and note if there are any differences (e.g. content, feedback messages, anything else catches your attention).

You will discuss your findings with the instructor, in the afternoon.

Appendix 11. Post scenario questionnaire

Rating scale: 1 = very poor, 2 = poor, 3 = average, 4 = good, 5 = very good

Navigation related:

- How easy was it to understand how to start a scenario, e.g. main menu buttons?
- Were navigation controls easily visible, e.g. buttons and links?
- How easy it was to understand how to proceed to next task/webpage?
- How easy was it to understand if you could navigate back?
- How easy it was to go back to the main menu page?

Controls related:

- How easy it was to notice interaction elements in the webpages (e.g. buttons, links, calendar icon for date selection, sliders)?
- How easy it was to understand the clickable element function?
- How easy it was to use interaction elements (e.g. responsiveness, size)?
- How appropriate were the controls selected in relation to their function? (e.g. sliders to input values, calendar icon to select date, buttons/links to trigger website response)

Content related:

- Did you receive feedback messages when expected?
- How easy it was to understand feedback messages?
- How helpful were feedback messages?
- Were the webpages too full of information?
- How easy it was to understand webpages content?
- How easy it was to read titles and element labels (e.g. describing content)?

General:

- How easy it was to use the website?
- Do you have any remarks, concerning website usability?

Appendix 12. Scenario evaluation form

Test subject No. _____ Scenarios (to be marked) 1 2 3 4 5 6 7 8 9 10

Scenario	Successful	Completion Time	Total webpages	Notes