

Mobile HCI Evaluations

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Introduction

In the last couple of decades, mobile phones have become an integral part of our lives
With fast evolution in technology the usability of mobile phones is also increasing rapidly
A glimpse of evolutions of mobile phones...

Going Mobile | The evolution of the cellphone



1982 Mobira Senator
Finnish company Mobira Oy, a precursor to Nokia, introduced its first car phone, the Mobira Senator NMT-450. It weighed about 22 pounds.

1984 Motorola DynaTac 8000x
The first cellphone to be offered commercially hit the market priced at \$3,995 (\$9,237 in 2012 dollars) and weighed just under 2 pounds.

1987 Mobira Cityman
One of the world's first handheld phones, the Cityman weighed 28 ounces with the battery.

1989 Motorola MicroTac
Initially manufactured as an analog cellphone, the MicroTac was an early example of a flip phone, in which the mouthpiece folded over the keypad.

1992 Nokia 1011
The first digital handheld phone, the Nokia 1011 would become the company's best-selling phone ever.

1993 BellSouth/IBM Simon Personal Communicator
First phone with a touch screen and smartphone features (pager, calculator, address book, send/receive faxes, games and email). Cost about \$900.

2000 Ericsson R380
The first device marketed as a smartphone.

2002 BlackBerry 5810
Made by Research in Motion, the 5810 was a cellphone with organizer functions and a keyboard for thumbs; a wired headset was mandatory.

2004 Motorola Razzr
Was part phone, part fashion accessory. In the Razzr's first four years, Motorola sold more than 110 million units.

2007 Apple iPhone
Hundreds of people lined up outside Apple stores to buy the first iPhone, priced at \$499 (4GB) and \$599 (8GB).

Source: WSJ research; Photos: Nokia (3), Motorola (3), Blackberry, Ericsson, Associated Press
The Wall Street Journal

HCI and Modern Devices

Portability and ease of communication were dominant attributes for making mobile phones indispensable parts of modern lifestyle

According to recent study an average individual spends 1 hour 52 minutes per day on their smartphones

The increased involvement of the masses in these devices was the precondition for standardization of development techniques

According to Shackel the core aspect of computer use has shifted “from system supremacy to personal empowerment”

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Following are the 4 categories mobile phones are majorly classified into:

- Unintelligent gadgets
- Cellular phones
- Smart phones
- Devices with operating systems

Following are the 4 categories usability evaluations for mobile phones is conducted:

- Task
- Physical
- Social
- Temporal

Usability Evaluation Methods

Due to fast changing technology the lifespan of the modern highly evolved mobile phone is short

According to Kano, usability evaluations for mobile phones is divided into the following categories:

- Must-have
- More-is-better
- Attractive usability

The standardized evaluation checks make sure that all devices and related services at least meet the “must-have” needs

UEM Approaches

Following are the 3 categories in which UEMs are divided into:

- Test
- Inspection
- Inquiry

Following are the 6 major concerns for UEMs:

- Skills and/or technological competence of the user
- Costs associated with data collection
- The presence of researcher changing the phenomenon of interest
- Time and/or personnel required
- Inability to completely control experimental variables
- Observations that do not generalize

Laboratory Based UEMs

Advantages:

Testing of the device or any related application takes place in a closed environment

The test users are provided with pre-defined tasks

Specific scenario based users responses are captured by experts through this technique

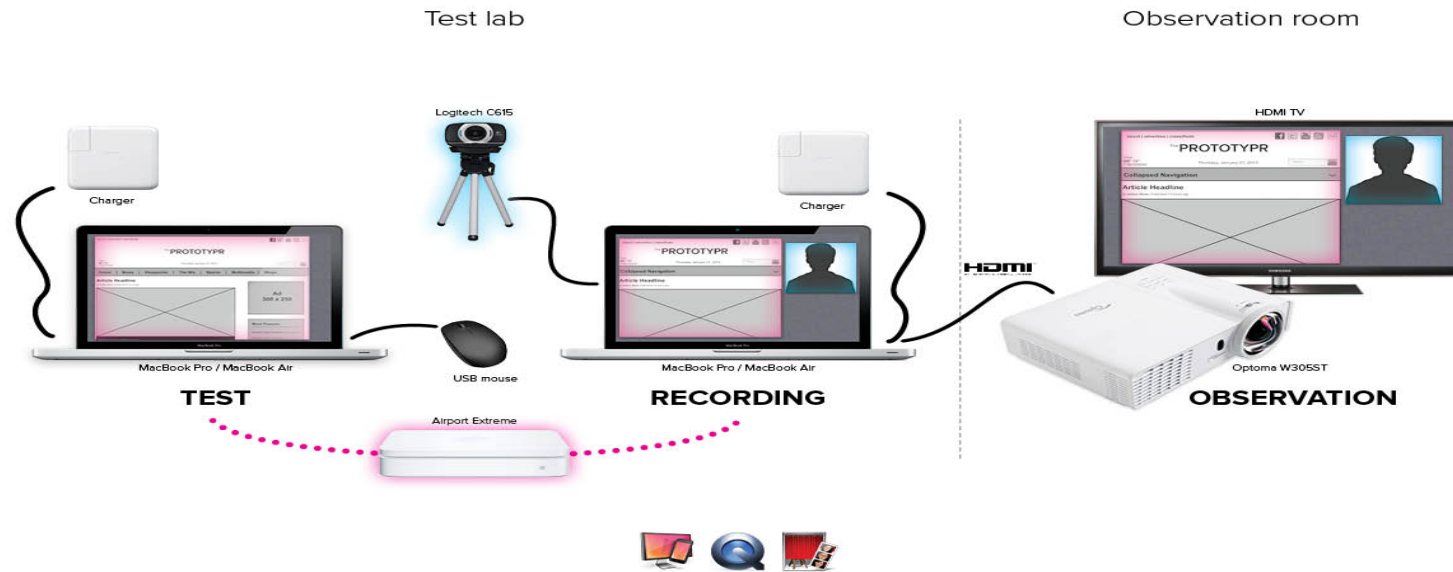
Disadvantages:

It becomes difficult for the evaluators to replicate environmental factors that can affect usability

Limited user exposure to features of the application limits the possibility of detecting possible flaws of the system

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A sample setup...



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A sample laboratory based evaluation test scenario...

Task Number	Scenario of action	Task description
1.	You need to inform your friend about your personal particulars as he needs to fill up a form for you. You decide to call out.	<ol style="list-style-type: none">1. Dial out to contact Gerald from mobile phone contacts list.2. Start a conversation upon pick up as you normally would.3. Verbally inform the contact your full name, NRIC, address and date of birth
2.	You receive a call from a friend on your mobile phone. You answer the phone call.	<ol style="list-style-type: none">1. Answer phone call as you normally would.2. Start a conversation with the friend.
3.	You need to inform your friend about your personal particulars information as he needs to fill up a form for you. You decided to SMS out.	<ol style="list-style-type: none">1. Compose a SMS including the following information: your full name, NRIC, address and date of birth.2. Send SMS to Gerald from mobile phone

Field Based UEMs

Advantages:

Collection of data about users, user needs, and product requirements is done in a generic setting

Relies heavily on user feedback, which is captured through interviews and observations

Aspects covered through field based evaluation methods are:

- Locations and setting
- Movement and posture
- Workloads
- Distractions and activities
- Devices and usages

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Disadvantages:

Data collection is done by investigators in the field in comparison to the experts in the laboratory setup

Due to this there is are chances of missing critical information while surveying the user space

Surveys have to be designed in a manner that information can be collected in the most efficient style

Poorly designed surveys can result in wasteful time consumption and vague information collection

Decision Making Attributes

Following are few of the questions, researchers seek answers to before selecting any evaluation style:

- What was the hypothesis for both lab-based and field-based evaluations?
- Which out the two performed better than the hypothesis?
- What is the effect of the environment on the participant?
- What were the differences in usability problems found in the laboratory and the field environment when testing with a participant?
- What were the similar problems that were observed in both the environments?
- What was the degree of severity of the problems between laboratory and the field?
- What was the differences in task execution times for scenarios in both environments?
- What can be concluded for test design point of view?

Identified Errors

Following are the types of errors that are detected by UEMs:

Critical problems; these problems would:

- Prevented participants from completing tasks
- Recur across all test scenarios

Serious problems; these problems would:

- Increased test completion time severely
- Recur frequently across test subjects and
- Let participants still complete the task eventually

Cosmetic problems, these problems would:

- Increase participants time to complete task slightly
- Recur infrequently across test scenarios
- Let participants complete task easily

Laboratory versus Field-Based Evaluation

To draw a contrast between laboratory and field evaluations I have considered the app developed by team “Team Dead Birds”



Team Members: Caleb Chapman, Rebecca Driver, Jonathan Faron, Ryan Fenton-Garcia, Bradley Ross, Eric Vasey

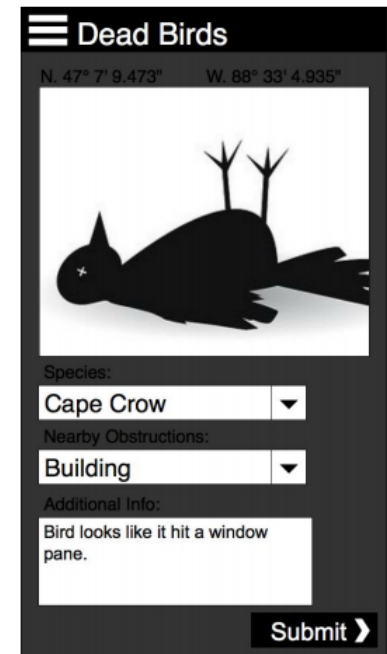
Important Features

Goal: This application aims to deliver a simple, convenient solution for documenting and identifying dead birds found, as well as analyzing causes for bird mortality

The app collects data using interactive forms

The app uses mobile phone features like camera, gps location

Most users of this app would be commuting while reporting the incident



The screenshot shows a mobile application interface titled "Dead Birds". At the top, there is a hamburger menu icon and the title. Below the title, the GPS coordinates "N. 47° 7' 9.473" and "W. 68° 33' 4.935" are displayed. The main content area features a white square with a black silhouette of a dead bird lying on its back, with its legs sticking up. Below this image, there are three form fields: "Species:" with a dropdown menu showing "Cape Crow", "Nearby Obstructions:" with a dropdown menu showing "Building", and "Additional Info:" with a text input field containing the text "Bird looks like it hit a window pane." At the bottom right, there is a "Submit" button with a right-pointing arrow.

Disadvantages of Laboratory Evaluation

Following the current industry trend of testing nearly 70% applications in a laboratory setup, if we test this app in a contained environment:

We will have to design a detailed scenario sheet using which the user will provide their input

The user space that will be testing the app will be static

Most features of the app that are designed for keeping in mind the mobility of the user will remain untested

Possible flaws that can show up in real time use will remain undetected

Advantages of Field Evaluations

Due to the specific nature of the application it is advisable to test it in field based setting

The key features to tested for this app are:

- Camera
- GPS location capturing
- Quality of text entered to describe the incident

Since the user would be commuting while reporting the incident, a field based evaluation would help in exploring all the features and related errors that can occur in real time