"Exploratory Testing of Mobile Applications"

Presented by:

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Exploratory Testing of Mobile Applications

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How We Started

- Re-used our approach to testing web apps
- However, there are differences that are easily overlooked
How We Adapted

Explored differences:

• Less powerful device
• Different network combinations
• Unique operating system, preferences
• Easy to move to different locations
• We got physical!
  – Wandered around
  – Rotated the devices, tapped fingers on inputs, etc.

Difference: Less Power Than a PC

• Interactions with the operating system or other programs can have a big impact
  – This is a common source of problems: one app leaves the device in a state, and your app launches in that state
• Memory –intensive activities can freeze up the device
• Kinetic inputs can behave strangely
**Difference: Network & Connectivity**

- Network connections can have a huge impact on the way a web-based mobile application works
  - Wifi vs. 3G vs. others
- Moving between wifi devices, or providers can cause interesting error conditions
  - Eg. Walk through a large building with multiple wifi devices
- Walking or driving into dead spots can cause an application to fail in strange ways

**Difference: Application Store Distribution**

- Apps are distributed through online stores set up by providers
  - Eg. AppStore, Android Market, others
- Apps are distributed through online stores set up by providers
  - Eg. AppSTore Android Market, others
- They have submission guidelines; read them!
- Failing to follow store submission specs can result in denial
I SLICED UP FUN!

A model for testing mobile applications

• Adapted from Bach’s SFDPOT model
  – structure, function, data, platforms, operations, time
• Each letter stands for an approach or consideration when testing mobile apps
• Combine it with your own favorite approaches and mnemonics

* thanks to Jared Quinert for the mnemonic creation help

I: Inputs into Device

• Keyboard(s)
• Touch screen
• Voice control
• Synching with other devices
• Peripherals that you can plug in to the device

Test Tip:
• Hold, move, and rotate the device and input with different combinations – be creative!
S: Store Submission

• submission specifications and development guides

• user guides for
  – error handling,
  – location services,
  – permissions for user privacy items,
  – accessibility, etc.

Test Tip:

• Find guidelines and compare with application

L: Location

• Geo-location capabilities
• Dead spots
• Connection issues
• Moving from one network to another (eg. Wifi to wifi, wifi to 3G, 3G to wifi, others)

Test Tip: Get Physical!

• Move around and use different location-based functions. See how the device transitions from connection types
Interactions/Interruptions*

- Running multiple applications, utilizing multitasking
- Using other applications, then using the application you are testing (email, calendar, texting, note taking, others)
- Notifications (new emails, phone calls, text messages, other notifications)
- Error messages (losing connections, notifications, operating system and others)

* Testlabs Top 10 Tips For Testing iPhone Applications
http://blog.testlabs.com/search/label/iPhone

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Interactions/Interruptions

Test Tip: Make it Real

- Create scenarios using other apps or functionality on the device while using the app
- These can be a treasure trove of bug discovery.
**C: Communication**

- Phone
- Texting
- Emails
- Instant messaging
- Voicemail messages

**Test Tip:**
- Integrate various communication types to see how your app handles disruption.

**E: Ergonomics**

- Small devices have little ergonomic help. 
  Watch for:
  - Sore eyes, fingers, backs
  - Much faster fatigue than using a computer

**Test Tip:**
- Watch for usability bugs in workflows or app functionality that makes strain worse:
  - Too much typing/tapping
  - Items are too small
  - Long workflows
**D: Data**

- Types of input: special characters, different languages, etc
- Media: outside sources of data
- Updates to firmware, carrier settings, app settings, frequency of updates

**Test Tip:**

- Explore options to generate and input different sizes and types of data. Add time and timing of inputs to add variability.

* Bach, 2003. Heuristic Test Strategy Model

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**U: Usability**

- Smaller size, slower network speeds and awkward interaction with devices causes people to get frustrated easily
- People will stop using an app and move on if they find it difficult to use
- Usability is one of the most important factors for the success of a mobile app
Usability

Testing Tip:

• Watch for awkward workflows to install, configure or update an app
• Identify repetitive, confusing or long workflows that are physically tiring
• Watch your emotions: if you feel tired, angry or frustrated, find out why and log it.

P: Platforms*

• The proliferation of devices types, firmware updates, types of carriers, and even web browsers is enormous
• Configuration testing can get out of hand quickly
  – brands and types of devices
  – hardware versions
  – OS versions
  – network (3G, wifi, others)
  – SSL vs non-secure

*Bach, 2003. Heuristic Test Strategy Model
Platforms

• Emulators often have little value beyond unit/smoke testing
• Require physical devices to wander around, input into, rotate, interact with, change networks to find important bugs

Testing Tips:

• Test on as many device types as you can
• Testing in different places with different carrier connections will yield timing-related and other bugs
• Use classification trees to find optimization paths to deal with the combinatorial explosion
• Look for services that help you expand configuration platform testing to save money
F: Functional Properties*

• Analyzing what an app does, what problems it solves, and all of the features and functionality it has is important

• How does this interact with the device and its physical limitations?

Testing Tips:
• Tour your device settings and try out different combinations
• Tour the application and explore it thoroughly

*Bach, 2003. Heuristic Test Strategy Model

U: User Scenarios

• People use mobile devices differently than computers

• Identify how your app would integrate with other functionality on the device:
  – Communication: phone, texting
  – Calendar, appointment management
  – Note taking, voice commands
User Scenarios

Testing Tips:

• Create scenarios that integrate your application with typical device use

• Create personae of three users:
  – Someone with your skills
  – Someone who is a techno-phobe
  – Someone in-between

N: Network

• Network latency is more pronounced on mobile devices

• Back end infrastructure is varied, and crosses companies, borders, and can be complicated

• Less reliable connectivity due to moving around

Testing Tips:

• Explore combinations of network types, signal strength, locations and try to force network errors
I SLICED UP FUN!
**Project Management Discovery**

**Schedule Impact:** it’s difficult to get as much testing time in a day

- Smaller devices cause physical strain
- Back strain, eye strain
- Sore fingertips from touch screens
- No ergonomic support like we have with PCs

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**Logistics Challenges**

**More Work than Test**  
**Computer Management**

- Policies for procurement, updates and safe storage (small devices and cables disappear)
- Build updates can be challenging due to special tool requirements, dev licenses, updates locked to single machines, require technical knowledge
- Configuration tools and policies (installing SSL certs, updating firmware, etc.)
Logistics Challenges

- Having enough devices that are charged and available for your test team can be difficult
- Practice for collecting, charging and storing devices each night
- Practices for dealing with health issues:
  - Hand sanitizer
  - Cleaning devices after use
- Policy for updating dev and other licenses

Automation Challenges

- Automation on mobile isn’t as mature
- Difficult to streamline automation when you have multiple devices to support – different languages, tools, runtimes
- Testing on emulators that run on your PC has some value
- I was able to get basic automation working, but gestures, inputs, physical inputs support, etc. are lagging
Regulatory Challenges

• Some regulatory bodies are suspicious of the devices themselves:
  – Size is too small
  – Security risks of mobile data access

• Be prepared for filing, re-filing and changing requirements

Getting Started

• Use testing approaches you are familiar with
• Highlight and explore differences in mobile devices
• Exploit weaknesses and challenges of mobile devices in your test approach
Questions?