Designing Mobile User Interfaces

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How do we make good mobile user interfaces?
What is usability?

Ease of learning
  – Faster the second time and so on...

Recall
  – Remember how from one session to the next

Productivity
  – Perform tasks quickly and efficiently

Minimal error rates
  – If they occur, good feedback so user can recover

High user satisfaction
  – Confident of success

Design Implement Evaluate
Building good user interfaces

- Task analysis & contextual inquiry
- Rapid prototyping
- Evaluation
- Repeat (iteration)

Task Analysis & Contextual Inquiry

- Observe existing work practices
- Create scenarios of actual use
- Try out new ideas before building software
Rapid Prototyping

Build an interface mock-up

Low-fidelity techniques
– Sketches
– Paper prototypes
– Video prototypes

Interactive prototypes
– HTML, JavaScript, Flash, etc.

UI Builders
– Visual Studio, etc.

Evaluation

Test with real people (intended users)

Build models

Low-cost techniques
– Expert evaluation
– Walkthroughs

Higher cost
– Controlled usability studies
Iteration

Design  Implement  Evaluate

Mobile Design

*Based in part on chapters from Designing the Mobile Experience by Barbara Ballard and Strategic Mobile Design by Cartman & Ting*
What’s the same?

- Rectangular bitmapped screens
- Text entry
- Pointer
- Audio I/O
- Network access
- Accelerated graphics hardware

What’s different?

- Smaller screen
- Touch-sensitive screen
- Slower Processor
- Motion Sensor
- Location Sensor
Other Differences...

Personal
– Belongs to only one person

Communicative
– Connects with the network in many ways

Handheld
– Portable and operable on-the-go

Wakable
– Can be turned on quickly, either by user or network

The Carry Principle

Users carry the device with them all the time
– The mobile user is more available than a desktop user
– The mobile device is used with the user’s other less mobile devices (desktop, laptop, etc.)
– The mobile user will be splitting their focus between the device and other external stimuli
– The mobile users social experiences may be modified both positively and negatively
People Use Multiple Devices

Device Collection

[5.96]

Work/School
[1.11]

Intermediate
[3.37]

Home
[1.48]

0.52

0.59

1.56

0.74

1.07

0.63

0.85


The Carry Principle

Users carry the device with them all the time

– The mobile user is more available than a desktop user

– The mobile user uses other devices (desktop, laptop, etc.)

– The mobile user will be splitting their focus between the device and other external stimuli

– The mobile users social experiences may be modified both positively and negatively
Final Important Difference

There is a great deal of variability across mobile platforms
– Many different kinds of devices
– Different screen sizes
– Different input devices
– Different web browsers
– Different UI conventions
– Different Carriers

Mobile User Interface Types

• Interactive Voice Response (IVR) Systems
• SMS/MMS
• Mobile Web
• Native Applications
• Hybrids
Interactive Voice Response (IVR)

E.g. Phone trees

Not the sexiest approach, but works on all phones

Works for illiterate users

Still plenty of opportunity for innovation
  – Better Voice Recognition
  – FonePal
  – Etc.

SMS or MMS

Text or Image based interfaces

Compatible with most phones

Some apps:
  – Google Search
  – Twitter
  – Voting apps (e.g. American Idol)
  – Donations (e.g. Haiti)
  – Text-based phone trees

Often used as an entry point:
  – Web to SMS Push
  – Text Keyword to Short Code

May be more viable in other markets where data and voice rates are high, but SMS is cheap (e.g. India)
Mobile Web

No modification needed for some devices/sites

No access to native hardware

JavaScript support reduced and slower

Can attempt to replicate native experience
  – Must design new sites for each device
  – Hard to do perfectly

Native Applications

Access to built-in hardware and software
  – Location
  – Accelerometer
  – Graphics Acceleration
  – Storage
  – Native Widgets

Better user experience, some restrictions
  – Little or No Portability
  – App Store Review Process
Hybrids

- Native Voice Applications
- Augmented Mobile Web Applications

Translating to Mobile

Mobilize, don’t Miniaturize
- Applications should not work the same way in different contexts
- Direct translation does not work

“Rethink what is desirable and possible in the mobile environment”
- How do tasks and user needs change?
- How can extra hardware help?
Mobile Design Focus Points

- One-Handed Operation
- Text Entry
- Small Screen
- Consistent User Interface Style
- Personal Data
- Always On, Always Connected
- Battery-Powered
- Inconsistent Connectivity
- Changing User Context

One-Handed Operation

Especially likely when the user is on-the-go

Also implies limited visual focus

Design guidelines:
- Use physical buttons or device features that can be felt
- Use larger controls that work with imprecise pointing
- Place interactive elements at bottom of screen
- Employ specialized thumb input techniques if needed (e.g. ThumbSpace)
Text Entry

“Trying to type on mobile is like trying to remove a contact lens with a cotton ball – it’s just not fun.”

–Aza Raskin

Solutions:

– Good defaults (e.g. current date, time)
– Auto-completion and predictive text entry (e.g. Fennec Awesome Bar)
– Use information from other sources (e.g. desktop computer, laptop)
– Alternate input methods, such as bar codes, camera images, speech
– Gesture-based text entry methods (e.g. ShapeWriter, Swype)

Small Screen

Limited support for multiple windows
Sharing data between apps is hard
Reading large amounts of text is difficult
Notifications cause context switch

Solutions:

– Provide customization options for large text displays (font size, number of page breaks)
– Do the work of sharing inside your application rather than force copy/paste (e.g. detect addresses and provide link to map application)
– Provide cues to re-orient user when returning from an interruption
Consistent User Interface Style

Each device has its own physical design and user interface style

Support for soft-keys may be important

General Solutions:
- If you must match style:
  Be Thorough
- If matching is unnecessary:
  Be Different

Personal Data

Most mobile devices are highly personal
Sensitive data and access credentials are likely to be stored on it
Loss will be noticed

Implications:
- Security is needed
- Text passwords are hard to enter
- Not all information and tasks require security
- Trade-offs are tricky
Always On, Always Connected

The user can be interrupted by a notification at any time

Users may want to use your application when it is socially unacceptable

Implications:
- Use “push" to inform users of *important* happenings (but know what important means)
- Provide cues to help a user reorient if they return to your application after an interruption
- Don’t require voice input, provide a fallback
- Avoid potentially disruptive feedback, such as audio cues or screen flashes

Battery-Powered, Inconsistent Connectivity

Wireless signal may drop at any time

Using the network eats battery power

Solutions:
- Avoid network usage on every interaction
- Store commonly-used data on the device
- Cache content as much as possible
- Pre-fetch content when power or network are readily available
- Don’t misrepresent age of data or completion of task when working around network problems
Changing User Context

Mobile applications will be used in different settings and contexts

Data and sensors are available to guess the current context (calendar, accelerometer, location, etc.)

Implications:

– If your application will be used differently in different contexts, design separate switchable interfaces for each context of use
– If you are trying to be intelligent:
  • Manage users’ expectations
  • Make the internal state of the application clear
  • Provide an easy override for when you’re wrong

Device Proliferation

How do we address the large variety of mobile devices?

– Targeted Design
– Least Common Denominator
– Class-Based Design
– Automatic Translation
– End-User Translation