

Designing and deploying mobile user studies in the wild

a practical guide



By Karen Church, Telefonica Research
MobileHCI 2012, San Francisco, 19th Sept

hello. my name is karen church.

i work as a research scientist in telefonica research in barcelona.

i love the mobile space

i try to understand how mobile users behave in their day-to-day lives

and to devise new services aimed at enriching their online experiences

aim of this
tutorial



the goal of today....

- Provide practical tips and guidelines
- Share learning outcomes
 - Some simple / obvious
 - Some not so simple / not so obvious
- “*what not to do*”



disclaimer!

tutorial schedule



tutorial overview

- Part 1
 - Case studies of projects I've been involved in
 - Overview of the various components of designing and deploying mobile studies
 - Important considerations during each phase
 - My top tips
- Part 2
 - Hands on group exercise!!
 - Put what you've learned into practice!

introductions....



show of
hands



mobile is
challenging





≠



Mobile phones are “personal”





Context impacts on mobile behaviors





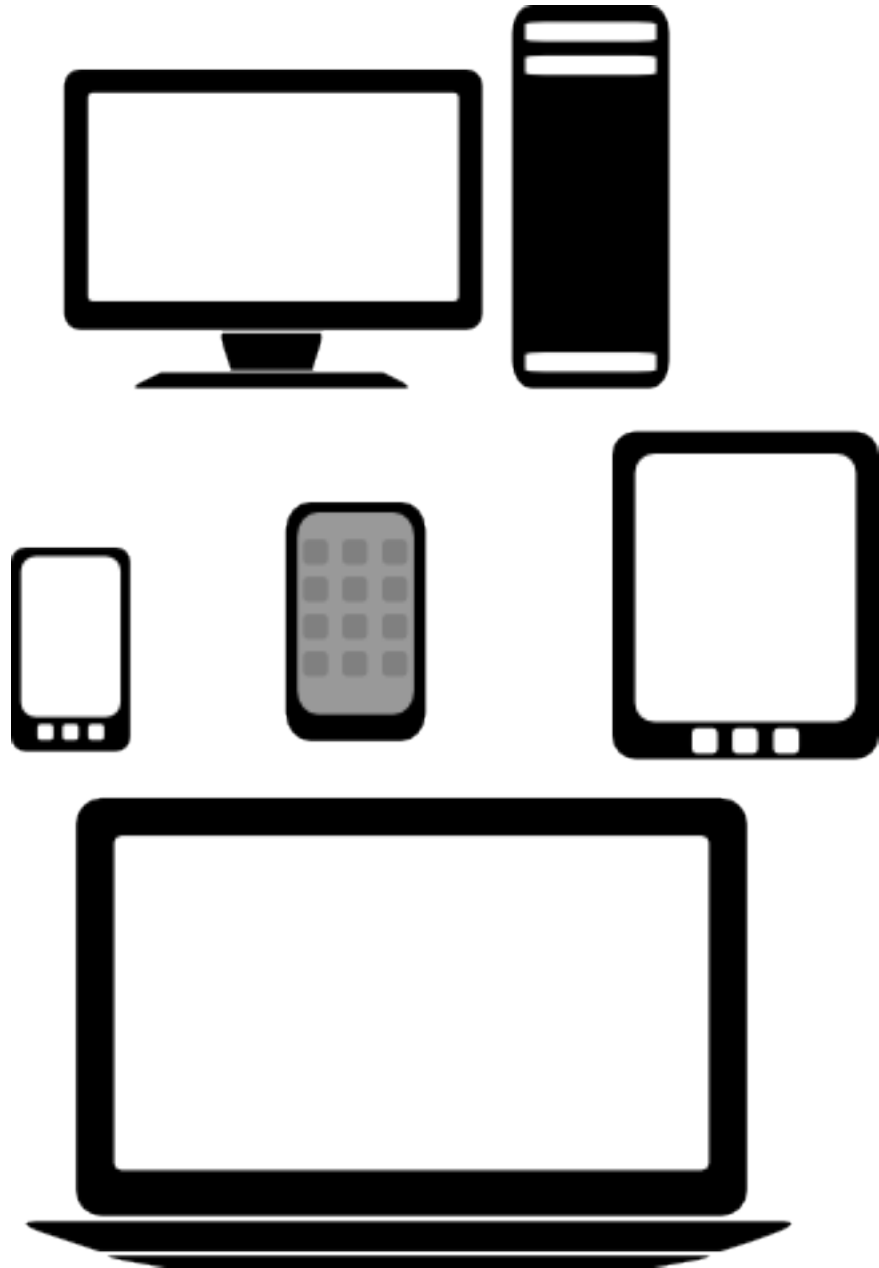
Mobile doesn't always mean mobile!

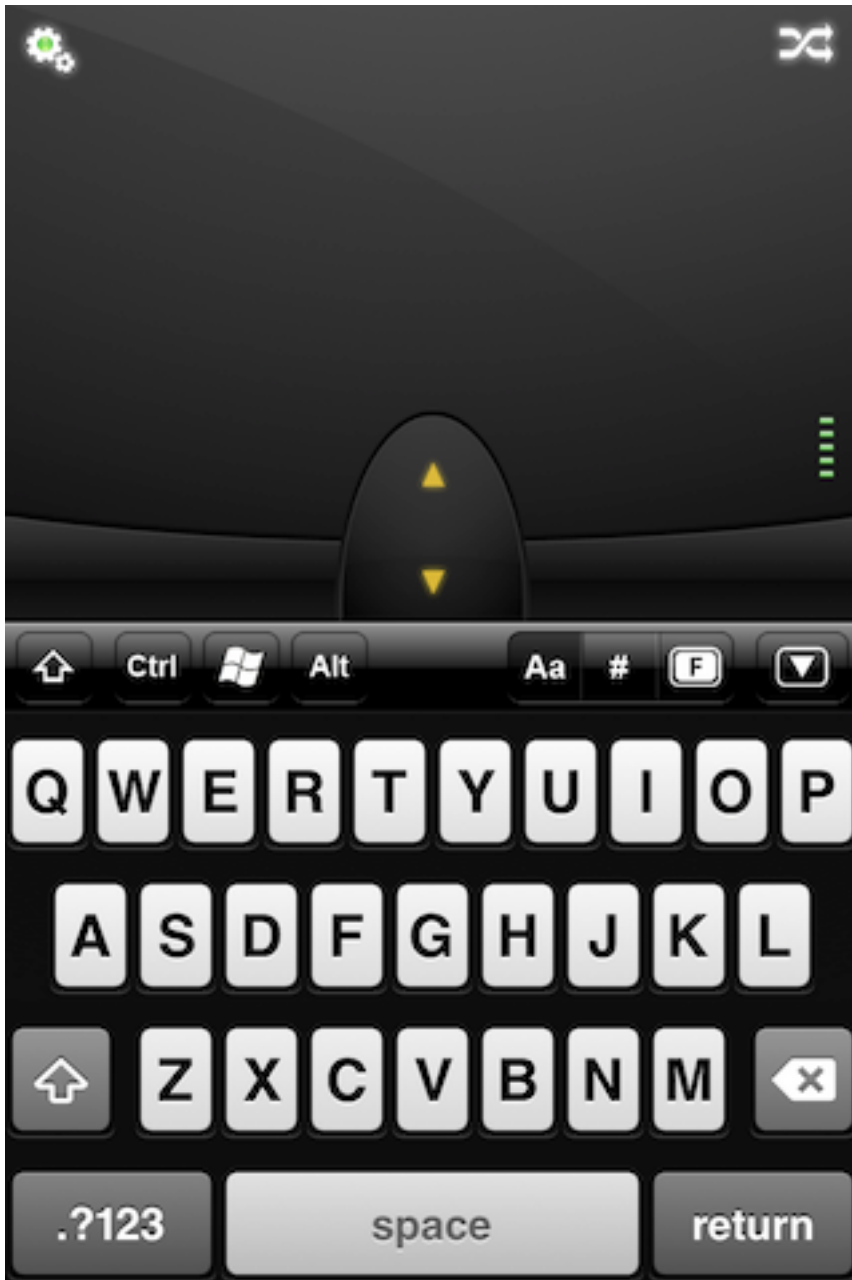


Lots and lots and lots of phone types



Tiny screens





Tedious input

mobile
also has
advantages





anytime, anywhere

Image source: <http://www.flickr.com/photos/moriza/126238642/>

“more users will connect to the Internet over mobile devices than desktop PCs by 2013”

Morgan Stanley | Mobile Internet Report | Dec 2009



mobile = first point of contact for some

case study
examples



Social Search Browser

ssb v1



facebook application

facebook

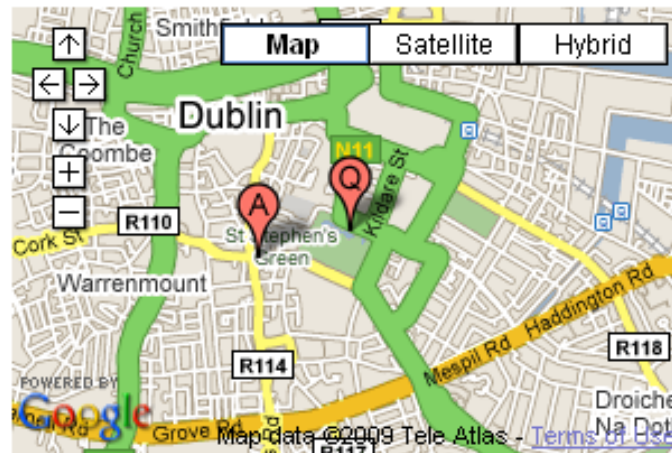
Home

Profile

Friends

Inbox 10

Query: "nice cafe for sunny monday afternoon"



Q Query

A Answer

Answer:

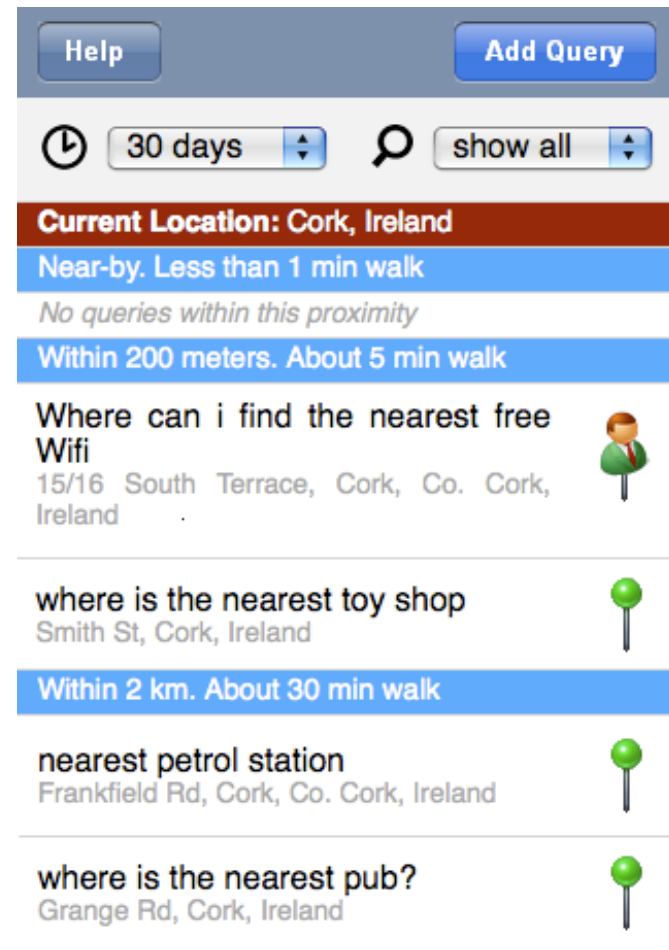
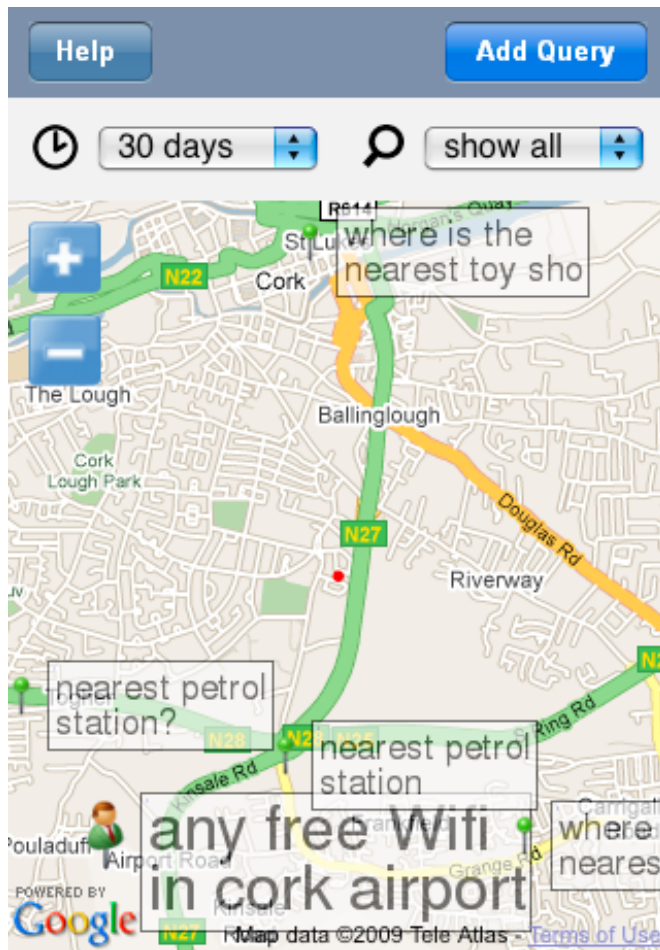
There's a lovely cafe with an outdoor terrace near St. Stephens green shopping center :)|

submit

first mobile field study of ssb

- 16 users, 1 week period, ireland, 2009
- Pre + post study questionnaire
- Hybrid-iPhone app on users own device
- Tracked queries, locations, answers and all interactions with the app
- Used SMS notifications

ssb v2: map vs. text



second field study of ssb

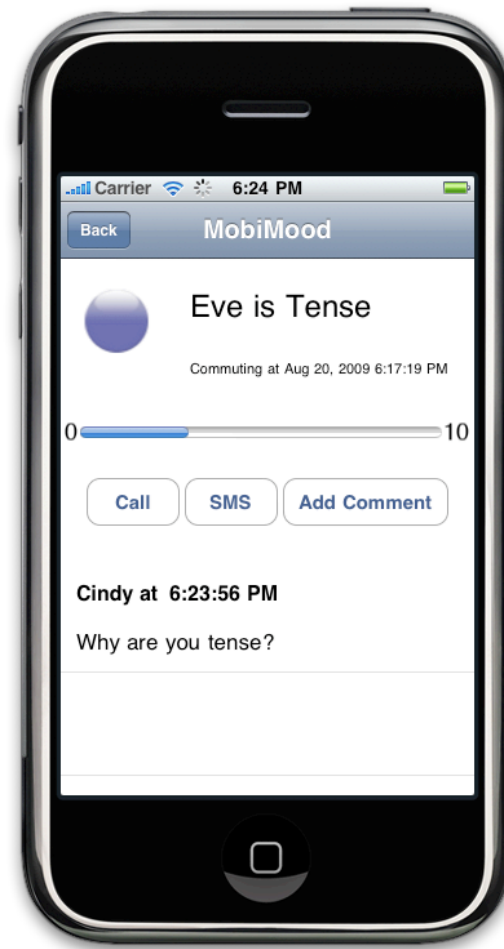
- Focus on the interface
- 4 week period, 34 users, ireland
- Pre + post study questionnaire
- Hybrid-iPhone app on users own device
- Tracked queries, locations and all interactions with the app
- No social component



tracking my moods + context



sharing my moods



field study of mobimood

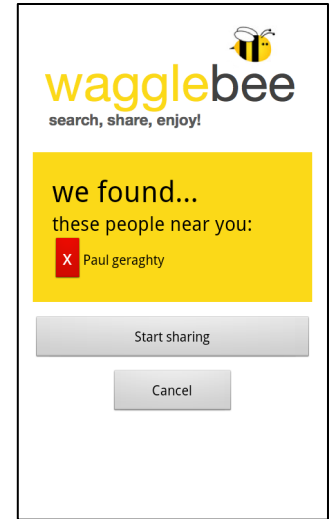
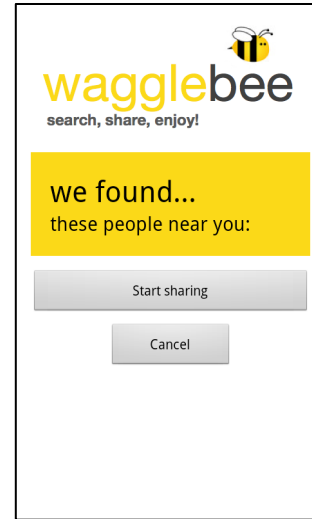
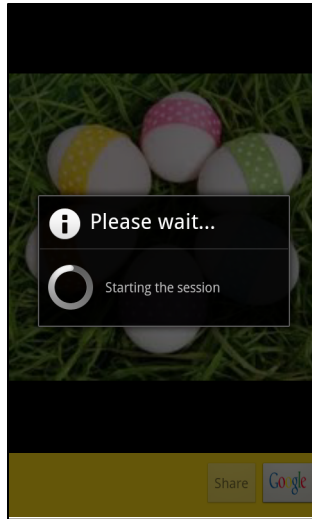
- 15 users, mostly male, 5 closely-knit groups
- 2 week period in August 2009
- Pre and post study survey
- Tracked moods, situational and social context, date/time and physical location.
- Used SMS and email notifications to keep users informed of interactions
- Sent users a visualization of their moods at the end of the study



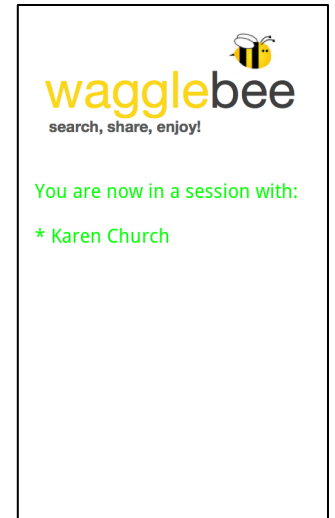
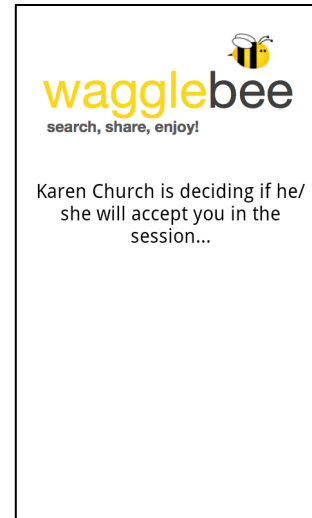
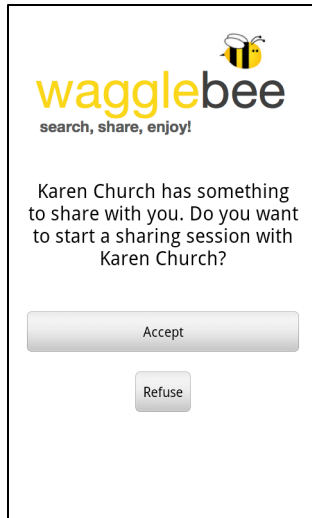
wagglebee

search, share, enjoy!

U1



U2



Web Imágenes Places Noticias más

Google

Restaurantes Cafés Bares Bancos

Ubicación desconocida

Google.es también en: català galego

euskara

Share Google



Page shared by Karen Church

Open page Back

« Volver a resultados Tamaño completo

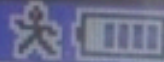
When is Easter 2012? The date of Easter Sunday 2012 will be Sunday April 8th ...

250 x 250 - 22KB squidoo.com

Share Google

field study of WaggleBee

- 17 users, 6 groups
- 2 week period, spring 2012
- Logged location, queries, shared pages, sessions, etc.
- Pre/post survey
- Semi-structured interviews



Mauro Cher

¿Cuales son tu
necesidades de
informacion?

10/01/2011

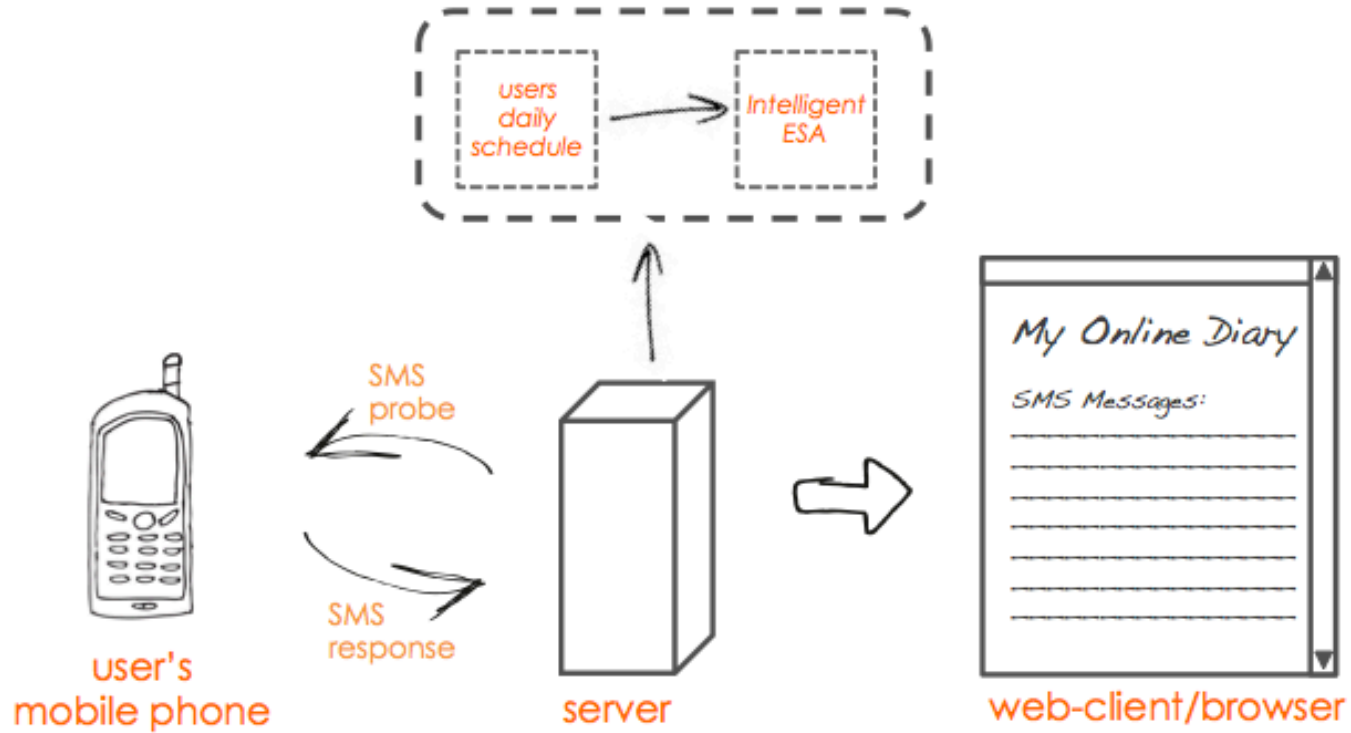
14:25:22

Opciones

Atrás

understanding mobile needs

mobile needs methodology



field study of mobile needs

- Pre-study screening questionnaire
- Online diary study + SMS as a means of Experience Sampling
- 3 months, > 100 users
- 12,000 SMS messages generated

Some references

Church, K., Neumann, J., Cherubin, M., and Oliver N. (2010) SocialSearchBrowser: A novel mobile search and information discovery tool. In Proceedings of the International Conference on Intelligent User Interfaces (IUI '10)

Church, K., Neumann, J., Cherubin, M., and Oliver N. (2010) The “Map Trap”? An evaluation of map versus text-based interfaces for location-based mobile search services . In Proceedings of the World Wide Web (WWW '10)

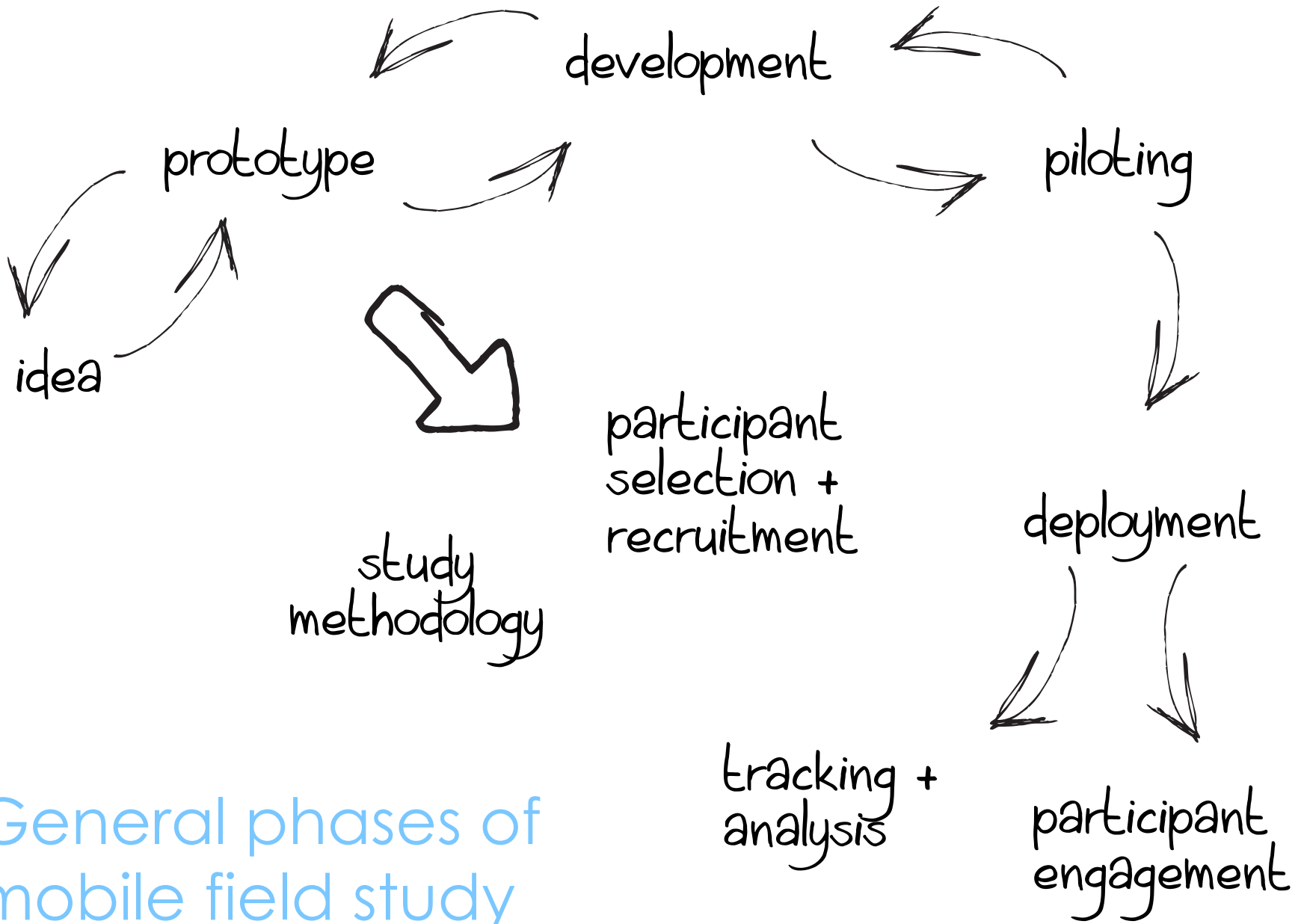
Church, K., Hoggan, E. and Oliver N. (2010) A Study of Mobile Mood Awareness and Communication through MobiMood . In Proceedings of the 6th Nordic Conference on Human-Computer Interaction (NordiCHI '10)

Church, K., Cherubini, M., Neumann, J. and Oliver N. (2011) Understanding Mobile Information Needs on a Large-Scale: Tools, Experiences and Challenges. In 2nd Research in the Large Workshop (held as part of UbiComp '11)

Reis, S., Church, K. and Oliver N. (2012) Rethinking mobile search: towards casual, shared, social mobile search experiences. In Searching 4 Fun Workshop (held as part of ECIR'12)



mobile
studies



General phases of mobile field study

the idea!



so you have an idea.....

- Reality filter – possible or fantasy?
- Do your homework!
- Research existing commercial applications and services
- Talk to friends, family members, colleagues to gather feedback

high-level concepts

- Who is going to be interested in this?
- What are their goals, intents, needs?
- How is this idea different than what exists at present?
 - Different app?
 - Or different way of doing something?

paper
prototyping





Image source: <http://www.flickr.com/photos/rosenfeldmedia/3978119393/lightbox/>

benefits of prototyping

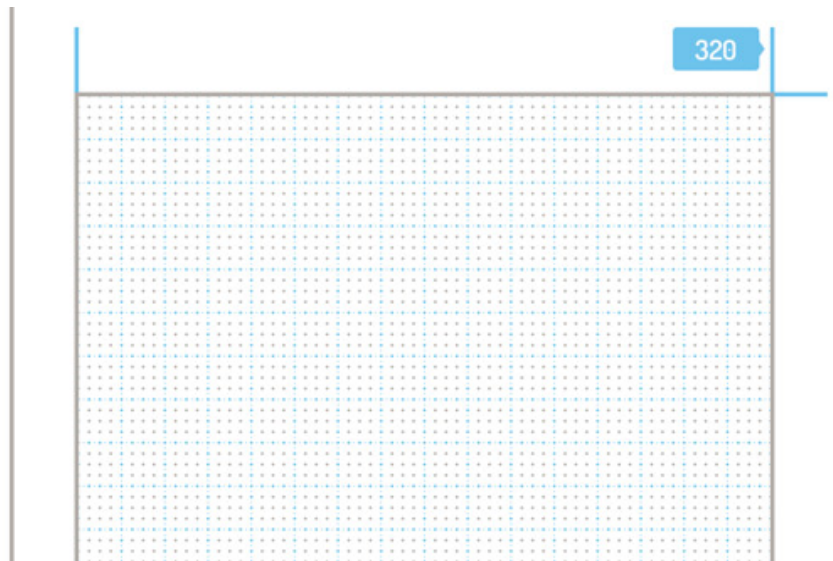
- Rapid + iterative
- Saves time + money
- Proves concepts early
- Helps in decision making
- Powerful way of collaborating
- Gather feedback from people quickly
- User-centric rather than technology-centric

various types/methods

- Wireframes + sketching tools
- Paper in-screen prototypes
- Powerpoint/keynote templates
- More interactive/online tools like Balsamiq, OmniGraffe, Axure, etc.
- But...I'm a big fan of simple pen + paper!



sneakpeekit



PROJECT:



PAGE:



DATE:



AUTHOR:

Tom Hume – Android Templates

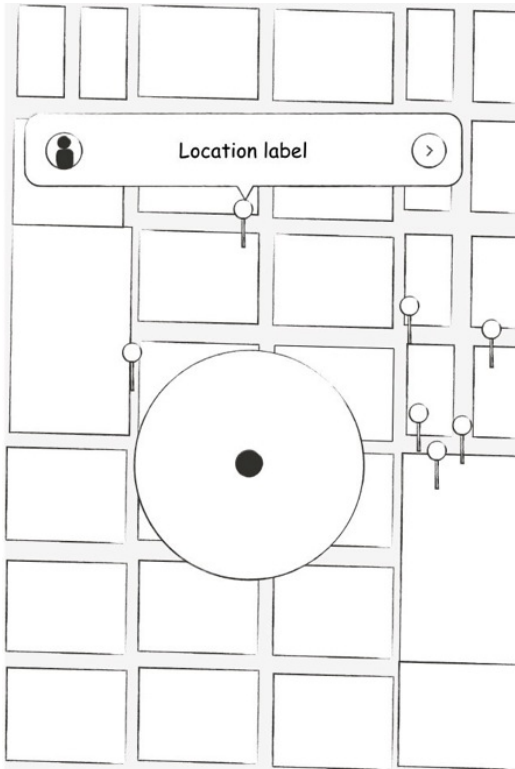




UXPin Paper Prototyping Kit



UI STENCILS



Previous Next Done

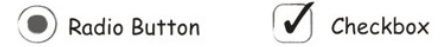
Option 1

Option 2

Option 3

Option 4

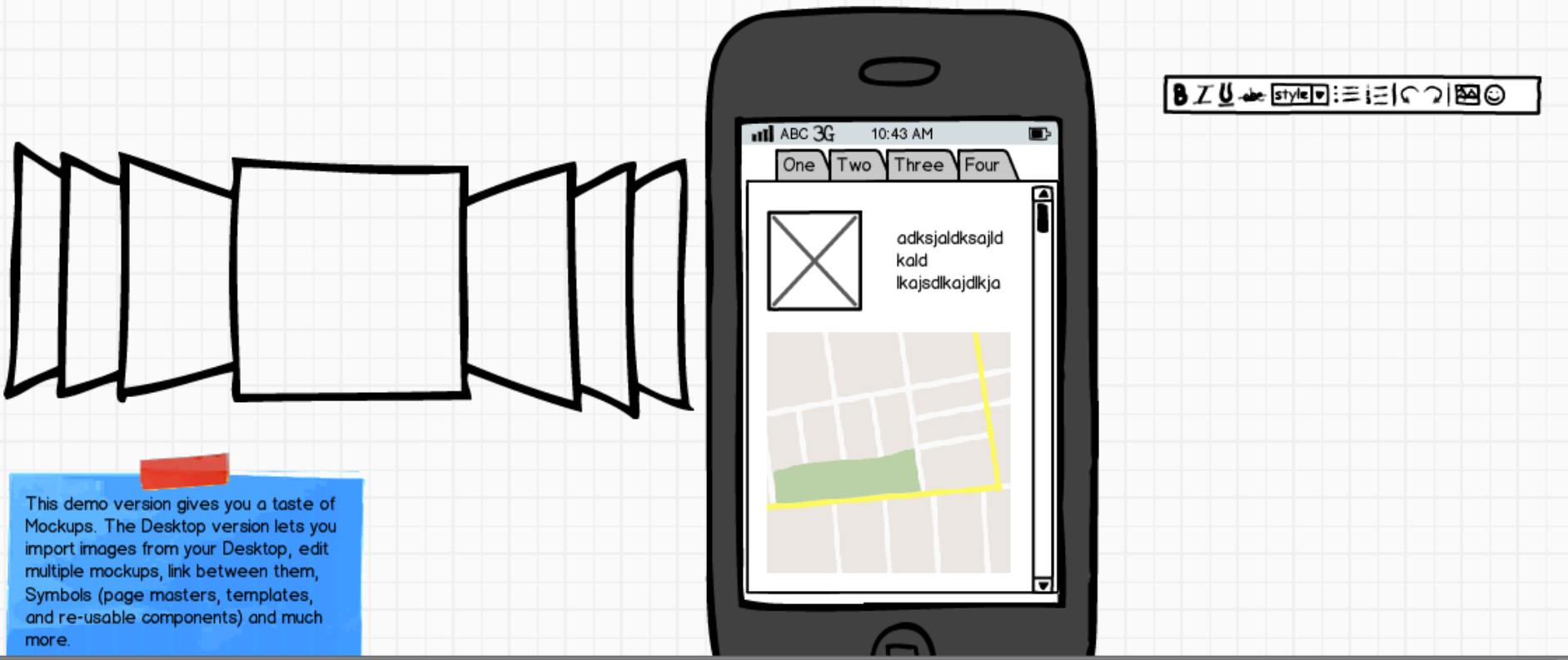
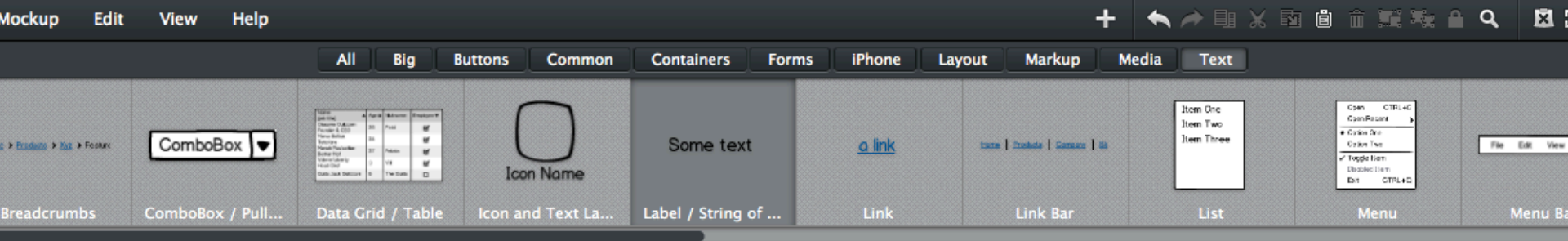
Thu Jul 29	11	55
Today	12	00
Sat July 31	01	05
Sun Aug 1	02	10
Mon Aug 2	03	15



Pop-up Dialog

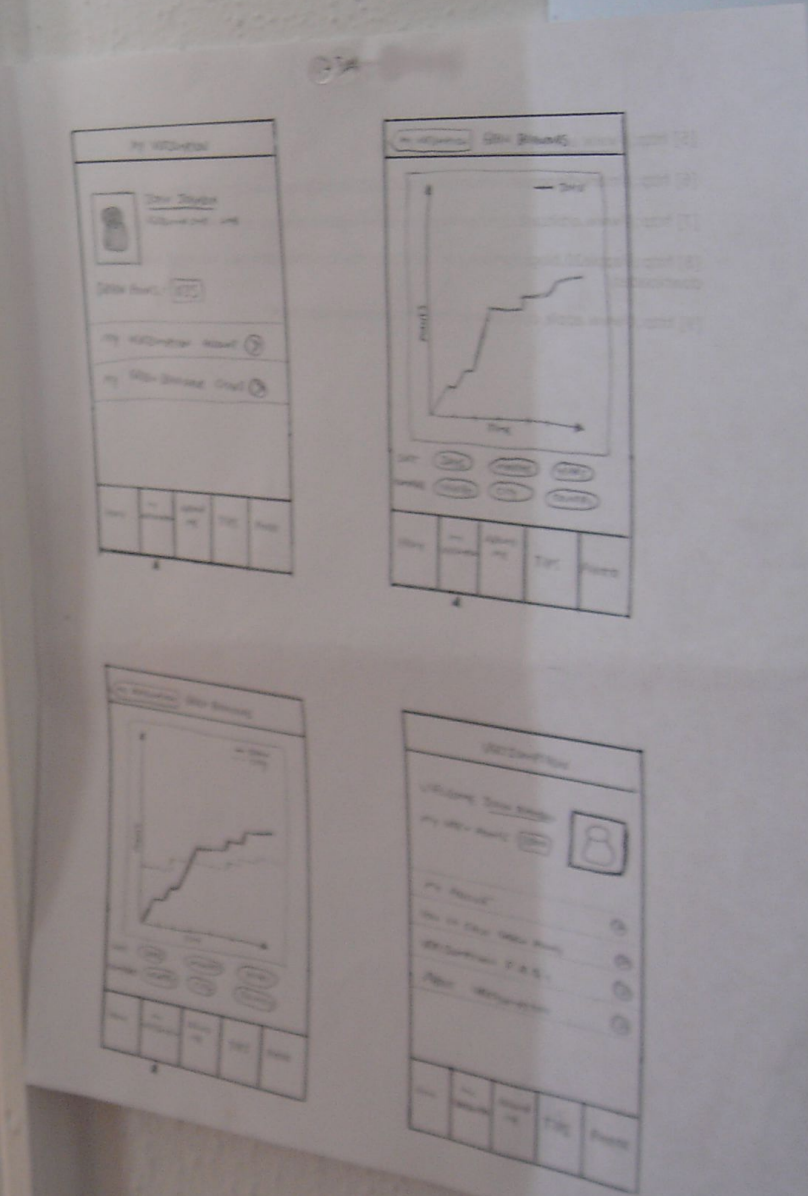
You need to hold your device upside down, shake it sideways then touch your nose to activate this feature

Cancel OK



This demo version gives you a taste of Mockups. The Desktop version lets you import images from your Desktop, edit multiple mockups, link between them, Symbols (page masters, templates, and re-usable components) and much more.

Balsamiq online mockups



In-screen prototyping

Image source: <http://uxmag.com/articles/paper-in-screen-prototyping>

how to start?

- Think about users needs, context and goals
- Start with the basics
- Think less is more - you are going to have to reduce /edit
- Think about the types of content you want to support
- Think about the structure
- Think about the interaction and how users navigate / experience your application
- Then sketch!!!

useful resources

Sneakpeak mobile sketch sheets (free)

<http://sneakpeekit.com/mobile-sketchsheets/>

Android wireframes (free)

http://gliderguns.files.wordpress.com/2010/01/android_wireframe_templates3.pdf

Paper In-screen prototyping tutorial

<http://uxmag.com/articles/paper-in-screen-prototyping>

Balsamiq online mockups demo

<http://builds.balsamiq.com/b/mockups-web-demo/>

Keynotetopia - Keynote/ppt resources (free for now!)

<http://keynotopia.com/keynote-mockups-templates/>

Rachel Hinman, Nokia Research - mobile paper prototyping essentials

http://www.slideshare.net/Rachel_Hinman

mobile
development



HTML



Web App

- Internet-enabled apps that have functionality for mobile devices.
- Accessed through the device's web browser
- No download / install



Native App

- An app for a certain mobile device
- Installed directly onto the device.
- Typically acquired via online store or marketplace

native apps

- Each platform requires it's own dev process, language and environment – no single codebase
- Multiple platforms = develop multiple apps
- Access the device's native features, information and hardware (camera, accelerometer, etc.)
- Updates downloaded/installed manually - users can be running on different / older versions
- App store approval process can be tedious
- Typically faster
- Typically “better” experience

web app

- Runs in the mobile device's web browser - each can have its own features
- Written in HTML5, CSS, JavaScript and server-side languages or web application frameworks e.g. php – therefore a single codebase
- Can access a limited amount of the device's native features and information (orientation, geolocation, etc.)
- Updates to app are server-driven - all users run the same version

how to choose?

- Does your mobile app require any special device features (i.e., location, camera, accelerometer, etc.)?
- Does your mobile app need to be Internet-enabled?
- Do you need to target all mobile devices or just certain devices?
- What programming languages do you already know?
- Is speed and performance important?

tools to make life easier

- Tools and frameworks to help develop apps for multiple mobile platforms and browsers, e.g.:
- Create mobile apps using web code!
- Examples:
 - PhoneGap
 - Appcelerator Titanium

keep in mind

- The type of application you choose to develop will have an impact on the study you can conduct and the participants you can recruit

piloting.....



piloting = crucial phase!

- Helps detect any failure points and spot silly mistakes BEFORE deploying with “real” participants
- Give yourself time to pilot and more time to make the required changes.
- In every study I've ran, this phase revealed LOTS of problems!



methodology

methodology

- **Exploratory vs. more focused?**
- Large / small scale?
- Not enough to simply log usage/ interactions – only reveals WHAT
- The WHY is also really interesting
 - **Mobile diary studies, Contextual ESM,** interviews, questionnaires/surveys

exploratory studies

- Unsure about how it will be adopted / used?
- Breaching experiments – give it to users in-the-wild and see what happens / how it's used (Crabtree 2004)
- May not have very concrete research questions

focused studies

- Concrete research questions
- Testing specific components / making specific comparisons, e.g. two different UIs, two different recommendation algorithms, etc.
- This does not mean lab-setting

diary studies

- Can gather large amounts of ecologically valid user data.
- Information can typically be entered in almost any situation.
- Requires little effort or cost to be deployed.
- Supports the generalization of the results
- But, can be difficult in mobile environments

snippet-based mobile diaries

- Mobile users submit “snippets” while on-the-move (Brandt et al 2007)
 - SMS messages
 - Pictures taken on their mobile
 - Voice recordings
- Lowers the burden of collecting diary entries in mobile environments
- These snippets are visible / available in their online diaries
 - Serve as a reminder to the participant
 - Users can provide more details at a later, more convenient time

contextual ESM

- Experience sampling method (ESM)
 - Participants make notes of their experience in real time at certain times
 - Subjects are normally sampled at random times or with little knowledge of their whereabouts.
 - Probing might be invasive or take place at inappropriate times
- Refinements to ESM have been suggested by modeling the participants' context
- In our work, “context” = users daily routines

keep in mind

- The study methodology you choose will have an impact on the participants you select
- Can also impact / influence your results/findings
- No study is perfect so just try to be aware of the trade-offs

useful resources

CHERUBINI, M. AND OLIVER, N. 2009. A refined experience sampling method to capture mobile user experience. In Presented at the International Workshop of Mobile User Experience Research part of CHI'2009

BRANDT, J., WEISS, N., AND KLEMMER, S. R. 2007. txt 4 l8r: lowering the burden for diary studies under mobile conditions. In Proceedings of CHI '07 extended abstracts.

CRABTREE, A. Design in the absence of practice: breaching experiments. In Proc. DIS '04

CONSOLVO, S., and WALKER, M. Using the experience sampling method to evaluate ubicomp applications. IEEE Pervasive Computing 2, 2 (2003), 24–31.

“Mobile diaries – discovering daily life” by Hagan & Rowland

<http://johnnyholland.org/2010/07/mobile-diaries-discovering-daily-life/>



participants

selecting participants

- Gender
 - Even distribution of males/females?
 - Does it matter?
- Age
 - Mixed or specific age group?
 - Representative of population?
- Culture
 - Can your app be deployed anywhere in the world and used in the same way?
 - Are you targeting specific countries or specific languages?

selecting participants

- Education level
- Socio-economic status
- Technical abilities:
 - Do you want / require tech-savvy users?
 - Do they need to be active users of social networks?
 - Do they need to be active Web users?
- Mobile platform/device:
 - specific type of device or any device
 - Smart versus feature phone

recruiting



recruiting

- Start as early as possible
- Spend some time on this task as it's important and can “make” or “break” a study!
- Does your university, institute or company have participant resources or a means of helping you recruit?

options for sourcing users

- Online services
 - Forums, craigslist, mailing lists, etc.
- Social networks
 - Twitter, facebook, linkedin groups
- Mobile App Markets
 - Using app markets as a “test” environment
- Referrals

know thy users!

- Who are your target users?
 - “actual” users will provide valid feedback
- Be selective / screen
 - Define who / what you need from testers and disregard users who don't meet that criteria
 - Put disqualifier questions in your initial recruitment questionnaire
- If you need very specialized or unusual user profiles, look in specialized places
 - E.g. school children, people with disabilities

keep in mind

- The source you use for recruiting participants will likely effect the sample you end up with
 - If you recruit via twitter, your sample will likely be skewed towards the standard twitter demographic
 - If you use an app store to deploy your app, you will likely end up with a large pool of young tech-savvy, males

how many participants?

- More than you think!
- Exploratory or more controlled study?
- High failure risk?
- High dropout rate?
 - Most studies see people drop-out so always recruit more than you need!
- It is a social system, requiring network of users? Or social groups?
- Remember to count pilot users too

clear instructions

- What do participants need to do?
- How long will the study take place?
- How can they contact you should they need anything?
- What incentives will they receive?
- Are these incentives “conditional”?

generate a pool

- Are users interested/willing to participate in future studies
- Generating a pool might allow you to reuse some participants for other studies
- Avoid reuse:
 - if your conducting iterative tests of same app
 - if the user in question has been involved in another study in the same year
 - If you have had problems with the participant in question in past studies

deployment



app markets

- Easy access to a potentially huge audience across the globe
- Can also be used as an apparatus for controlled experiments
- Generally no access to personal user data
- Difficult to get qualitative feedback
 - Comments / ratings
- Difficult to assess WHY

local experiments

- Complete control
 - Participants
 - Culture
 - Location
 - Device/platform
- Easier to gather qualitative feedback
- Easier to answer WHY certain behaviors emerge
- Smaller-scale

hybrid approaches

- Running both local and global experiments
- Data recorded for each group can feed into the other group and generate research questions
- Involves a lot more work
- “Use the small to explain the large and use the large to verify the small”,
Morrison et al. 2012

useful resources

- *Research in the Large Workshop Series*
 - MobileHCI 2012
 - UbiComp 2011
 - UbiComp 2010
- Niels Henze
 - Done lots of work in using app stores for mobile experiments
 - Hosting a tutorial this afternoon at MobileHCI on using app stores for experimentation
- Morrison et al. “*A Hybrid Mass Participation Approach to Mobile Software Trials*”, CHI 2012

user

engagement



engaging with participants

- Set the right expectations
- Be polite
- Be responsive
- Communicate in the way agreed
 - Phone (mobile/home), email, skype, etc
- **Case example** – personalized messages for mobile needs study

keeping track



participation over time

- Participation tends to decrease over time
- In the beginning everyone's excited
- But it doesn't take long for the novelty to wear off!
- You need to be able to spot decreases in usage
- And hopefully do something about it without introducing biases!

Example: visual admin tool

Mobile Needs Study: Basic Results

Below is some high-level summary results from the user study. And towards the bottom of the page is a list of links to more detailed statistics and results from the study:

High-level summary results

Study running for: 110 days

Users who sent SMS: 110

SMS: 11569

SMS open: 1959

SMS closed: 9610

Avg. SMS per user: 105.2

Avg. SMS per day: 105.2

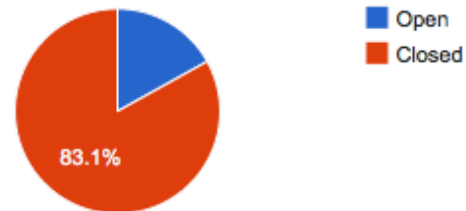
SMS probes: 30481

Bold Users: 10 [1-16.0]

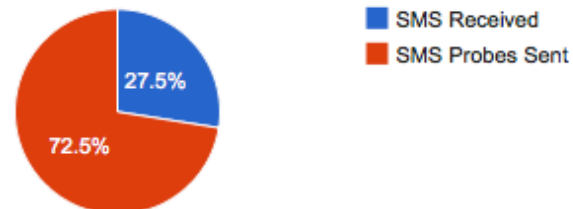
Average Users: 80 [17.0-194.0]

Super Users: 20 [195.0-365]

SMS Messages By Type



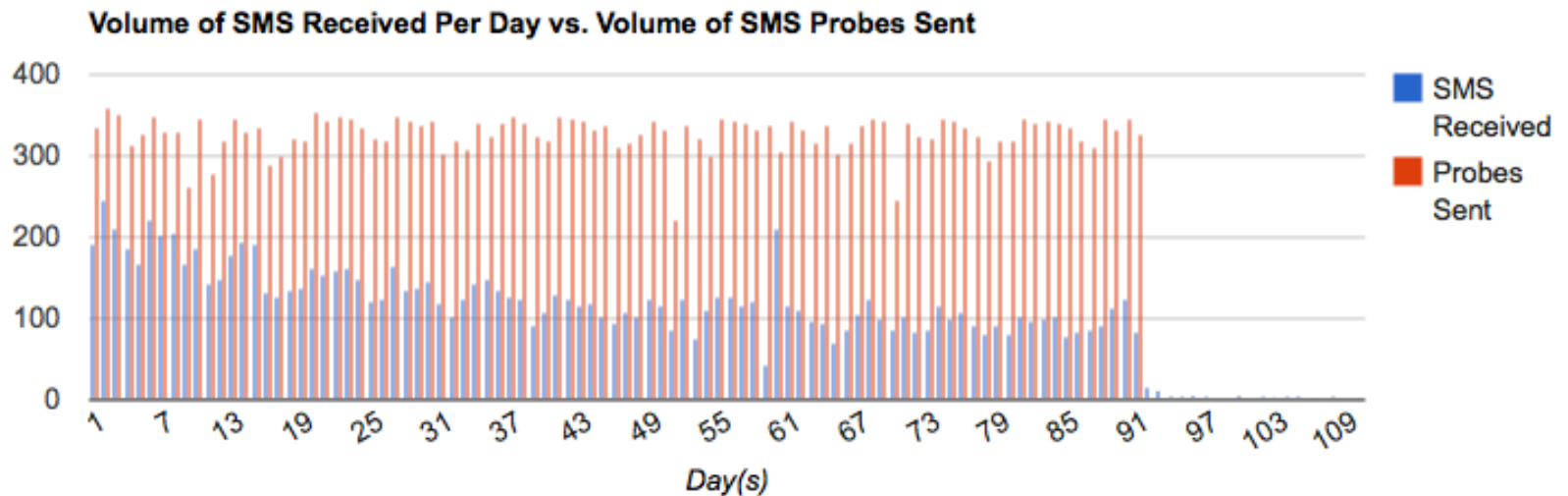
SMS Received vs. SMS Probes Sent



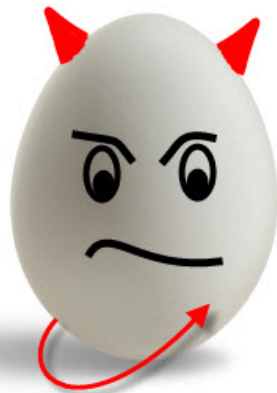
Mobile Needs Study: Daily Results

This page shows the volume of sms received per day (both open and closed) in a bar chart. This page helps to identify daily patterns.

Note that 'open' SMS are those with NO diary entry details, where as 'closed' SMS are those with a diary entry.



privacy + ethics!



legal and ethical concerns

- Is there a legal department in your company, organization, university?
- Is there an ethical committee who sets out guidelines when dealing with users?
- If you don't know the answer, find out!
- In most cases the legal / ethical department will have a set of guidelines for you to follow when conducting user studies.

legal and ethical concerns

- How are you going to handle the end-users data?
- What security / protection measures are in place for the users data?
- Are you abiding by the appropriate data protection policies?
- What are you logging from the user and more importantly WHY are you logging it?
- If the answer is “*because I can*” then it’s probably best to stop!

my top tips



be aware of design choices

- Remember
 - The users you choose and where they are chosen from
 - The platform you choose
 - The device you choose
 - The type of study you design and deploy
- All have an impact
- This is perfectly OK but you need to be aware that these choices can lead to some limitations / influences in observed behaviors

be selective

- Selecting “appropriate” participants is critical to the “success” of your study
- You need people who are interested and eager to take part
- You want people who follow-through
- Difficult to assess at the start
- Always recruit more users than you need!

get out of the lab

- If you're testing an idea for mobile users, mobile field studies are KEY
- Only when participants use our applications / services in the real world can we really assess how they behave

users own device

- Mobile phones are personal and intimate devices
- They tend not to be shared with others
- To gather naturalistic behaviors we need to study users in their natural environments
- This means their OWN mobile phone
- Avoid giving users an extra handset to carry

don't drain the battery!

- Very very very very very very important!!
- This issue has been a big problem in the studies we have conducted
- Even if your application is *AMAZING*, users get annoyed very quickly if your application causes battery drainage
- Testing will help you assess how battery friendly your application is

know thy network limits

- Does your app perform the same on 3G vs. WiFi? Test for this
- Remember, network problems or network constraints can impact on the experience of your app
- You need to be aware of these limits
- If you can't fix it, be honest about it

prototype, prototype, prototype.....

- Prototyping is a must
- Do it early
- Do it often
- Get feedback as often as you can
- Get feedback from as many people as you can
- Aim for unbiased feedback!

pilot testing is a must

- Allocate at least 1 or 2 weeks for this
- It will enable you
 - To iron out problems
 - To test all logging and data collection is working correctly
- I guarantee that you will find at least once issue during the pilot phase

social + mobile = OMG!!!

- If your app has a social component be prepared for more complications
- Recruiting will be more difficult so try to recruit via referrals / social networking sites
- It's also worth considering deployment on at least two mobile platforms
 - It's difficult to find groups of users who all own the same type of mobile phone, e.g. all iPhone users
- Be open to seeing usage that you never even dreamed of!
- Crumlish & Malone, Designing Social Interfaces:
 - www.designingsocialinterfaces.com

time x2

- Always allow more time for coding, testing and piloting
- Always start recruiting earlier
- Designing and deploying mobile user studies is hard and it takes time
- **Actual time needed = time you think x at least 2**

provide good information

- Instructional videos
- Help page
- FAQ page
- Website with study details, etc
- Your direct contact information
- Let users know you've prepared well for them and they have access to information and YOU when they need it

be nice!

- Be reachable, approachable, polite
- Participants are doing you a favor



useful

resources

interesting websites/blogs

Adaptive Path:

<http://www.adaptivepath.com/>

Smashing magazine

<http://www.smashingmagazine.com/>

UX matters

www.uxmatters.com/

Small surfaces:

<http://smallsurfaces.com/>

Practical Techniques for Creating Mobile Sites and Web Apps

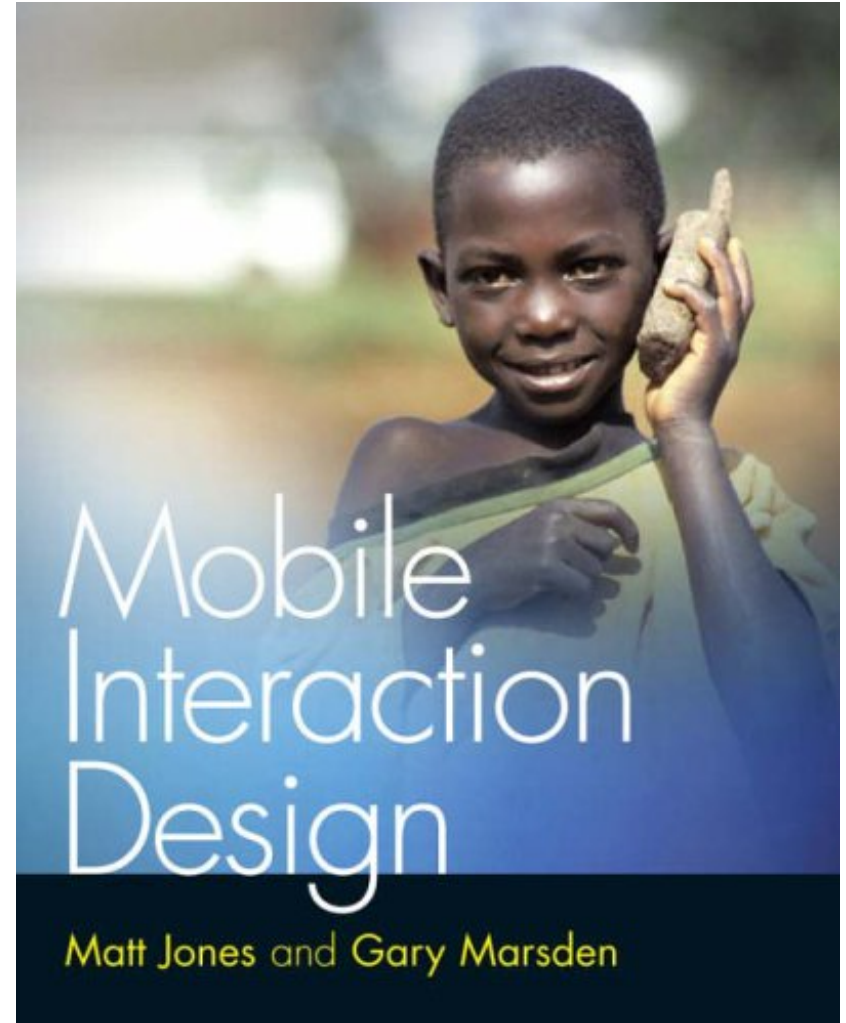


Mobile Design and Development

O'REILLY*

Brian Fling

<http://mobiledesign.org/toc>



Mobile Interaction Design

Matt Jones and Gary Marsden

Part 2

Hands on design exercise

- Group-based
- 45 minutes for the exercise
- 45 minutes for us to present and discuss our efforts

Foursquare Explore

- Design a mobile user study to assess the value of the recommendations provided to mobile users of Foursquare Explore
- Think about:
 - Participant recruitment (max 50)
 - Their background, experiences
 - Study methodology
 - How do you assess “value” in terms of the recommendation?



thank you!

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