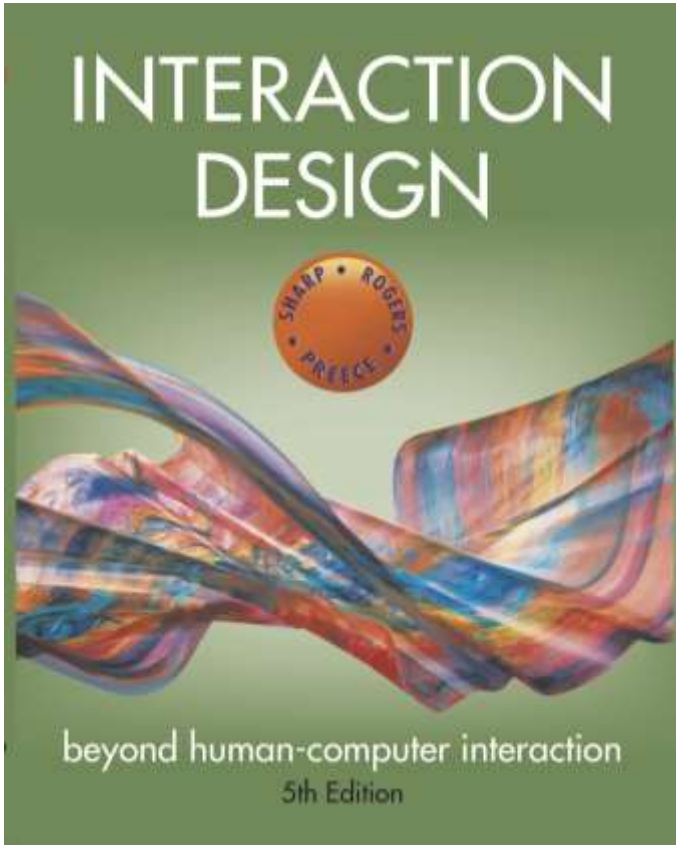
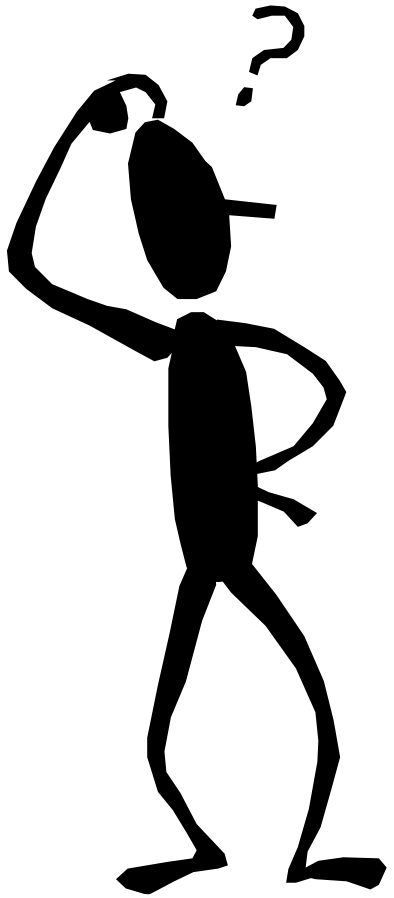


Chapter 12

DESIGN, PROTOTYPING and CONSTRUCTION

Overview

- Prototyping
- Conceptual design
- Concrete design
- Using scenarios
- Generating prototypes
- Construction



Prototyping

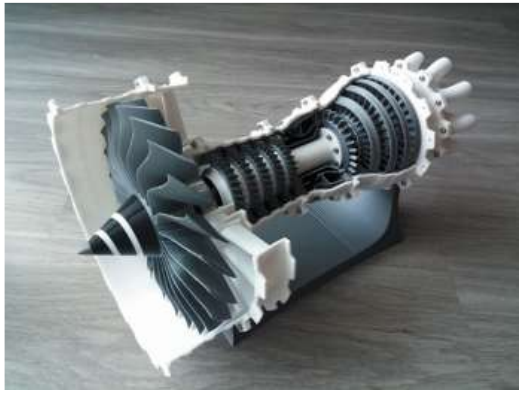
- What is a prototype?
- Why prototype?
- Different kinds of prototyping
  - Low fidelity
  - High fidelity
- Compromises in prototyping
  - Vertical
  - Horizontal
- Final product needs to be engineered

What is a prototype?

- One manifestation of a design that allows stakeholders to interact with it
- In other design fields, a prototype is a small-scale model:
  - A miniature car
  - A miniature building or town

Source: PalmPilot wooden model
© Mark Richards

3D Printing Examples



(a)

(b)

(c)

Examples of 3D printing: (a) model jet engine, (b) Spider Dress 2.0 by Anouk Wipprecht, and (c) teddy bear "printed" form a wireframe design

Sources: (a) Build Your Own Jet Engine. Licensed under CC-BY-3.0, (b) arch20, and (c) used courtesy of Scott Hudson

What is a prototype in interaction design?

In interaction design, a prototype can be (among other things):

- A series of screen sketches
- A storyboard, for example, a cartoon-like series of scenes
- A PowerPoint slide show
- A video simulating the use of a system
- A lump of wood (for instance, the PalmPilot)
- A cardboard mock-up
- A piece of software with limited functionality written in the target language or in another language

Why prototype?

- Evaluation and feedback are central to interaction design
- Stakeholders can see, hold, and interact with a prototype more easily than a document or a drawing
- Team members can communicate effectively
- Ideas can be tested out
- Prototyping encourages reflection: an important aspect of design
- Prototypes answer questions and support designers in choosing between alternatives

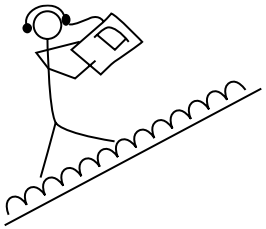
Low-fidelity Prototyping

- Uses a medium which is unlike the final medium, for example, paper or cardboard
- Is quick, cheap, and easily changed
- Examples:
  - Sketches of screens, task sequences, and so on
  - ‘Post-it’ notes
  - Storyboards
  - ‘Wizard-of-Oz’

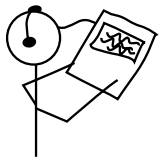
Storyboards

- It is a series of sketches showing how a user might progress through a task using the product
- Often used with scenarios, bringing in more detail and a chance to role play

Example storyboard

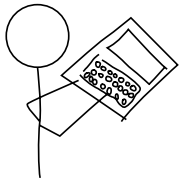


Christina walks up hill; the product gives her information about the site

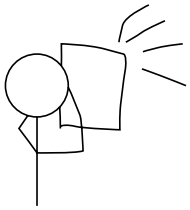


Christina adjusts the preferences to find information about the pottery trade in Ancient Greece

Christina scrambles to the highest point



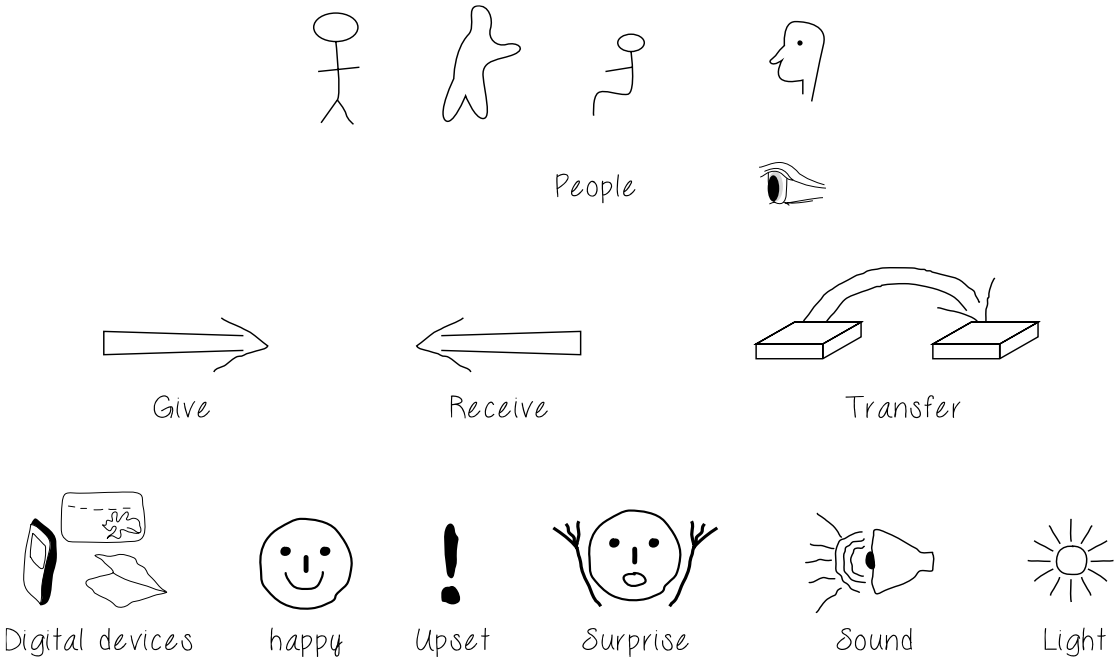
Christina stores information about the pottery trader's way of life in Ancient Greece



Christina takes a photograph of the location of the pottery market

Sketching

- Low-fidelity prototyping often relies on sketching
- Don't be inhibited about drawing ability – Practice simple symbols

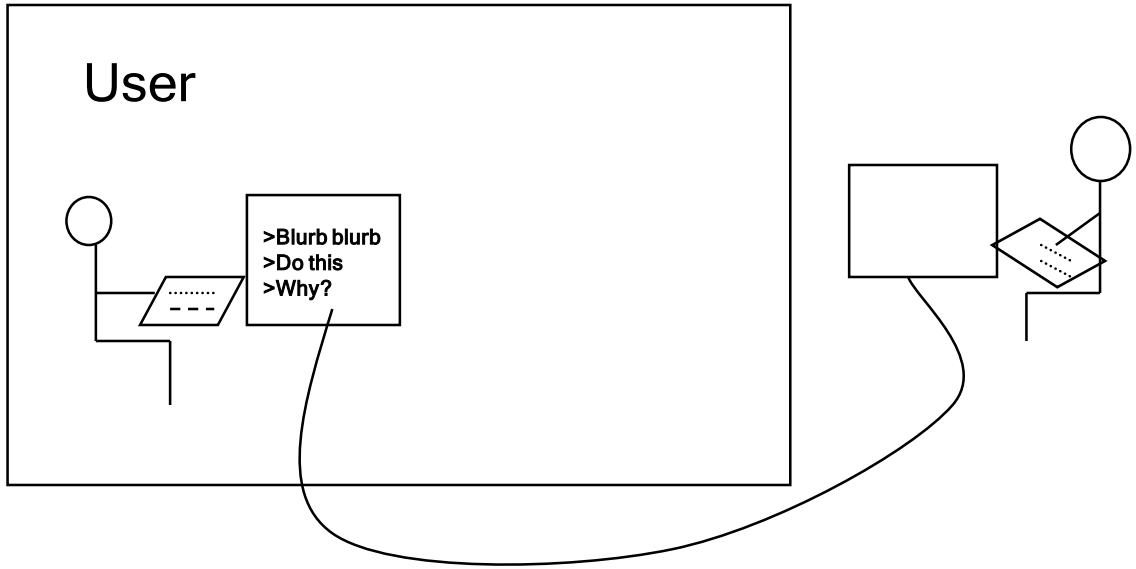


Prototyping with index cards

- Index cards (3 x 5 inches)
- Each card represents one element of interaction
- In evaluation, can step through the cards

‘Wizard-of-Oz’ prototyping

- The user thinks they are interacting with a computer, but a human is responding to output rather than the system
- Usually done early in design to understand users’ expectations
- What is ‘wrong’ with this approach?



High-fidelity prototyping

- Uses materials that you would expect to be in the final product
- Prototype looks more like the final system than a low-fidelity version
- High-fidelity prototypes can be developed by integrating existing hardware and software components
- Danger that users think they have a complete system…see compromises

Compromises in prototyping

- Prototyping involve compromises
- For software-based prototyping, maybe there is a slow response? sketchy icons? limited functionality?
- “In the wild” prototypes operational but not necessarily robust
- Two common types of compromise:

  Horizontal: Provides a wide range of functions, but with little detail

  Vertical: Provides a lot of detail for only a few functions
- Compromises in prototypes must not be ignored. Product needs engineering

Conceptual design

- A conceptual model is an outline of what people can do with a product and what concepts are needed to understand and interact with it
- Understand problem space and current requirements; empathize with users
- Creativity and brainstorming techniques
- Mood board may capture desired feel
- Consider alternatives: scenarios and prototyping helps

Building scenarios

Empathizing with users

The Third Age Suit

Source: Ford Motor Company

Choosing an interface metaphor

- Interface metaphors combine familiar knowledge with new knowledge in a way that will help the user understand the product.
- Three steps: understand functionality, identify potential problem areas, and generate metaphors
- Evaluate metaphors:
  - How much structure does it provide?
  - How much is relevant to the problem?
  - Is it easy to represent?
  - Will the audience understand it?
  - How extensible is it?

Considering interaction and interface types

- Which interaction type?
  - How the user invokes actions
  - Instructing, conversing, manipulating, exploring, or responding
- Do different interface types provide insight?
  - Shareable, tangible, augmented reality, and so forth

Expanding the initial conceptual model

- What functions will the product perform?
  - What will the product do and what will the human do?
- How are the functions related to each other?
  - Sequential or parallel?
  - Categorizations, for example, all actions related to privacy on a smartphone
- What information is needed?
  - What data is needed to perform the task?
  - How is this data to be transformed by the system?

Concrete design

- Difference between conceptual and concrete is emphasis
- Many aspects to concrete design
  - Color, icons, buttons, interaction devices, and so on
- User characteristics and context
  - Inclusiveness, input, and output modes
- Accessibility
  - Web Content Accessibility Guidelines
- Cross-cultural design
  - Language, colors, icons, and information architecture
  - Indigenous knowledge and perspectives

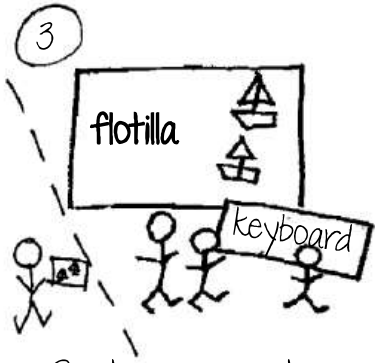
Generating prototypes

- Generate a storyboard from a scenario
  - Break down scenario into steps
  - Create a scene for each step
- Sketching out a storyboard prompts designers to think about design issues
- Generate a card-based prototype from a storyboard or from a use case
  - Consider each step in use case – what interaction element is needed
  - Draw a card that captures it

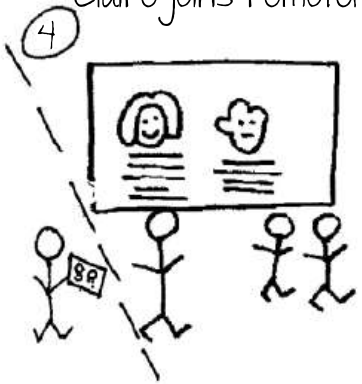
Generating storyboard

Thomson family gather around Claire joins remotely

Will tells their initial idea

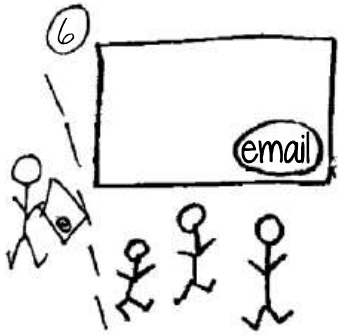


System suggests flotilla



System shows descriptions

Will asks for details



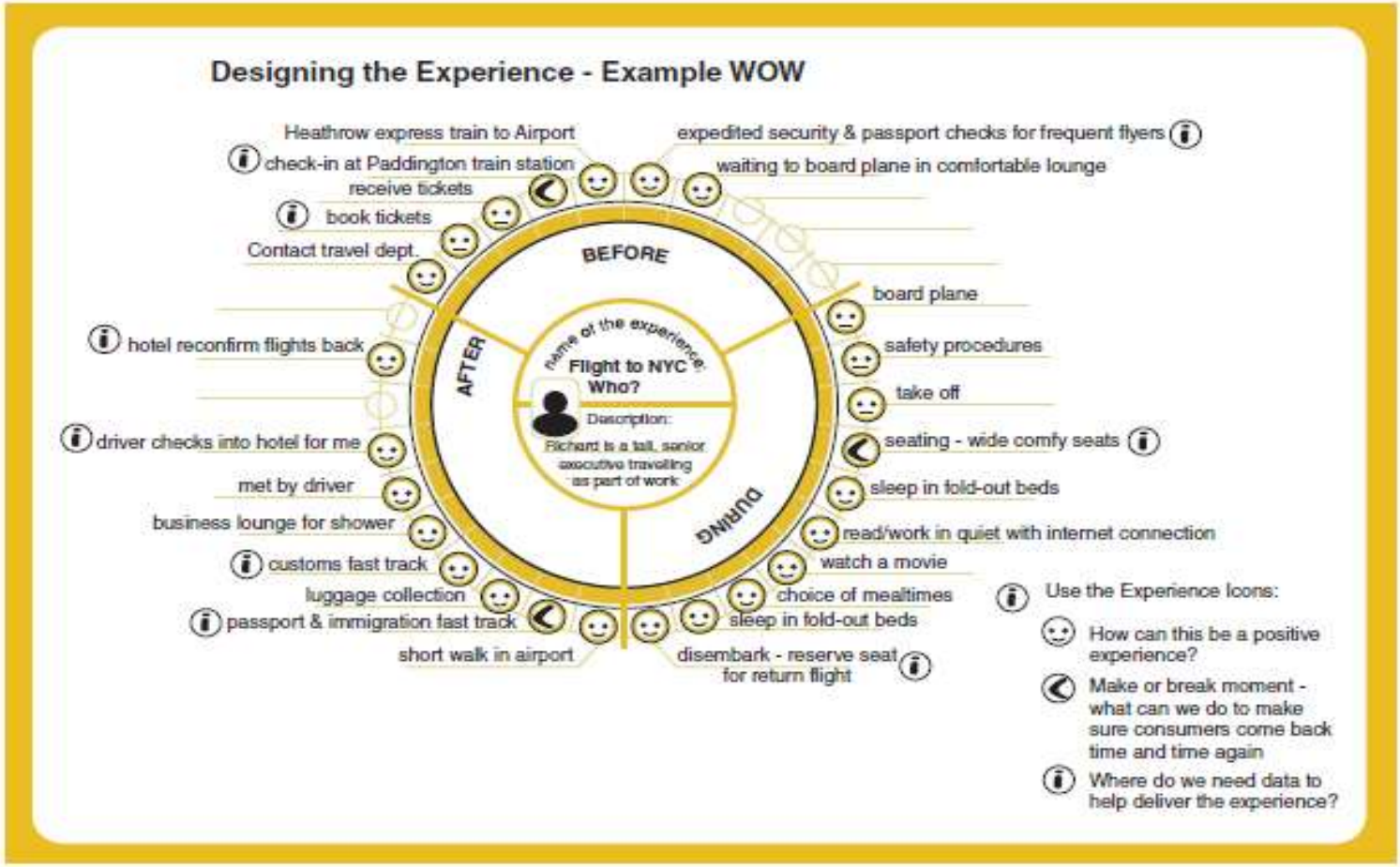
Details emailed

Generating card-based prototype

Explore the user's experience

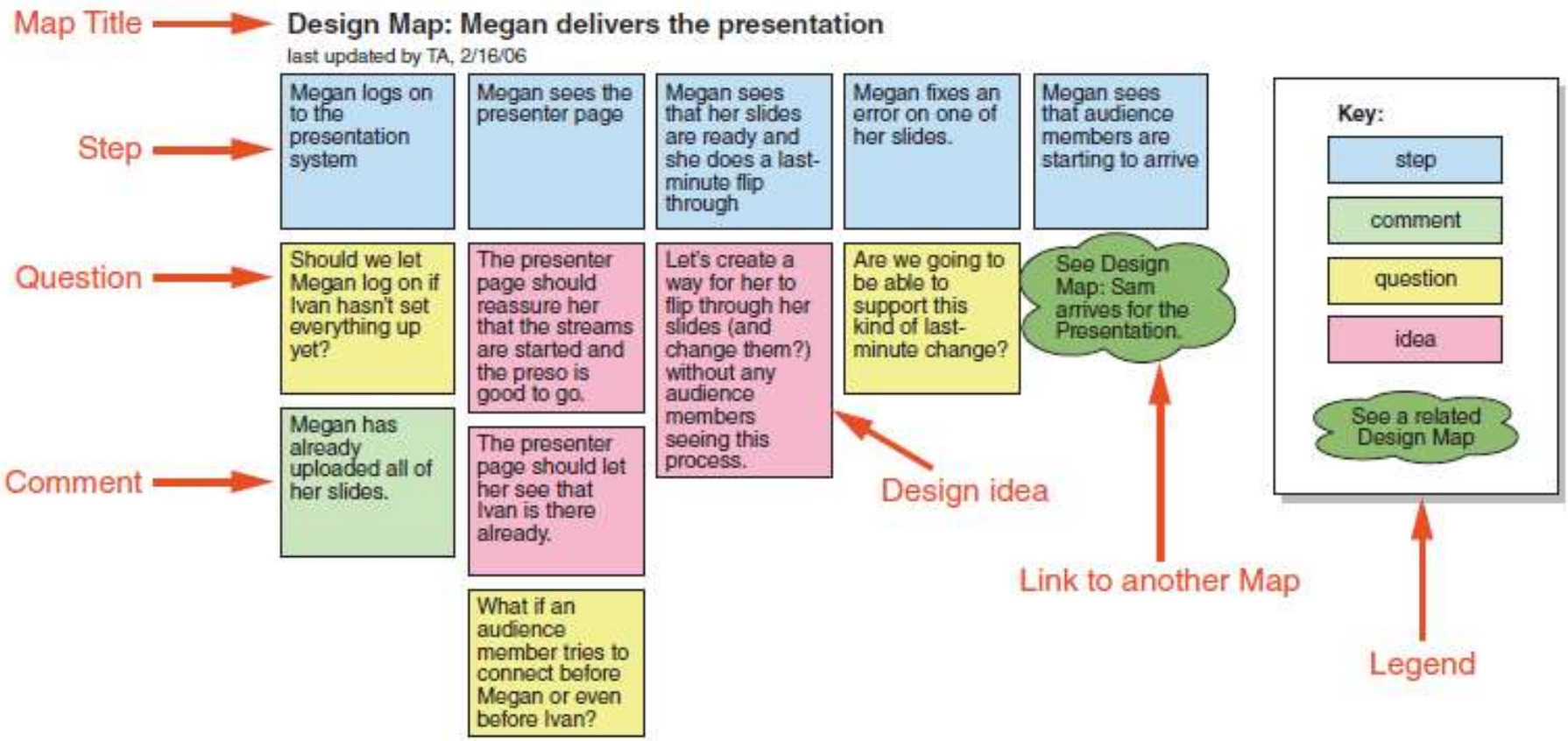
- Use personas, card-based prototypes, or stickies to model the user experience
- Visual representation called:
  - Design map
  - Customer or user journey map
  - Experience map
- Two common representations
  - Wheel
  - Timeline

An experience map drawn as a wheel



Source: LEGO

An experience map drawn as a timeline

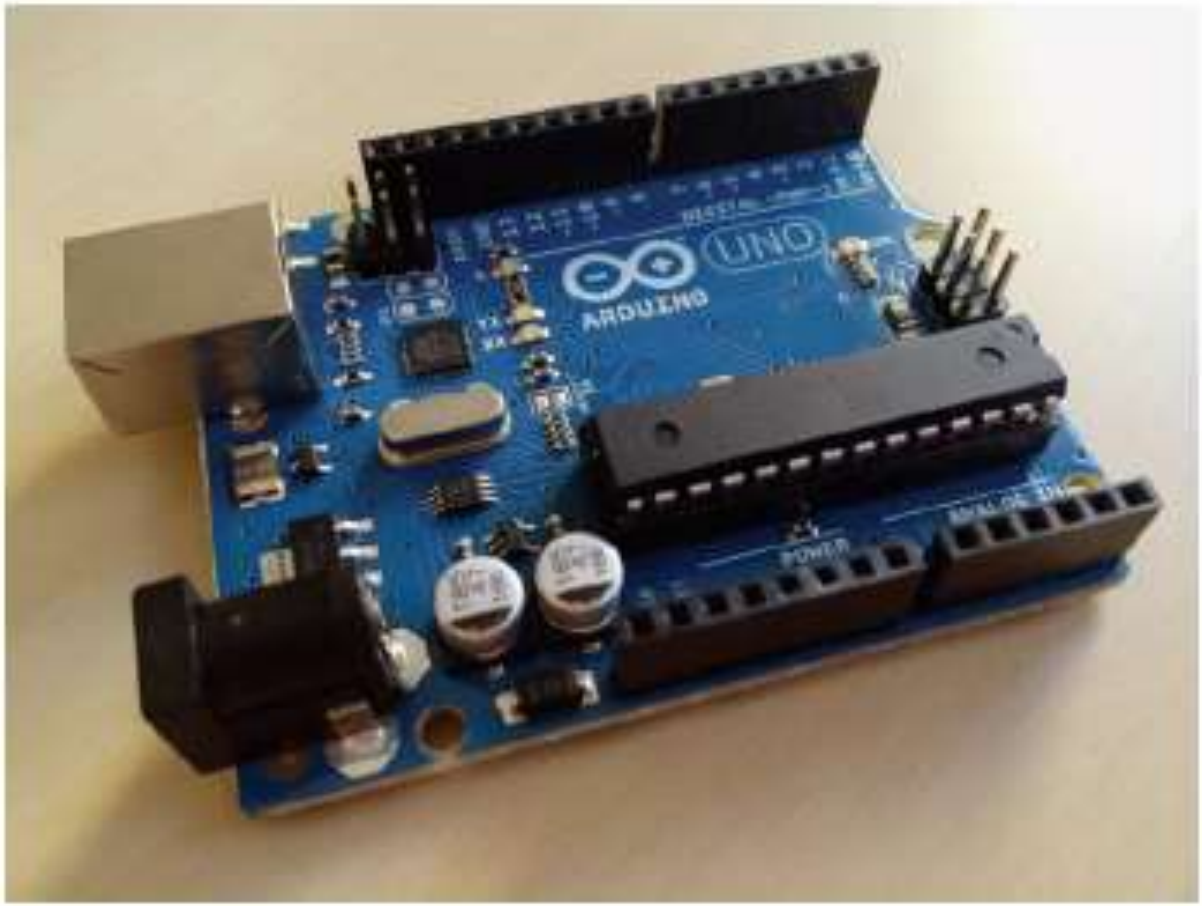


Source: Adlin and Pruitt (2010), p134. Used courtesy of Morgan Kaufmann.

Construction: Physical computing

- Build and code prototypes using electronics
- Toolkits available include
  - Arduino
  - LilyPad (for fabrics)
  - Senseboard
  - BBC micro:bit
  - MaKey MaKey
- Designed for use by wide range of people

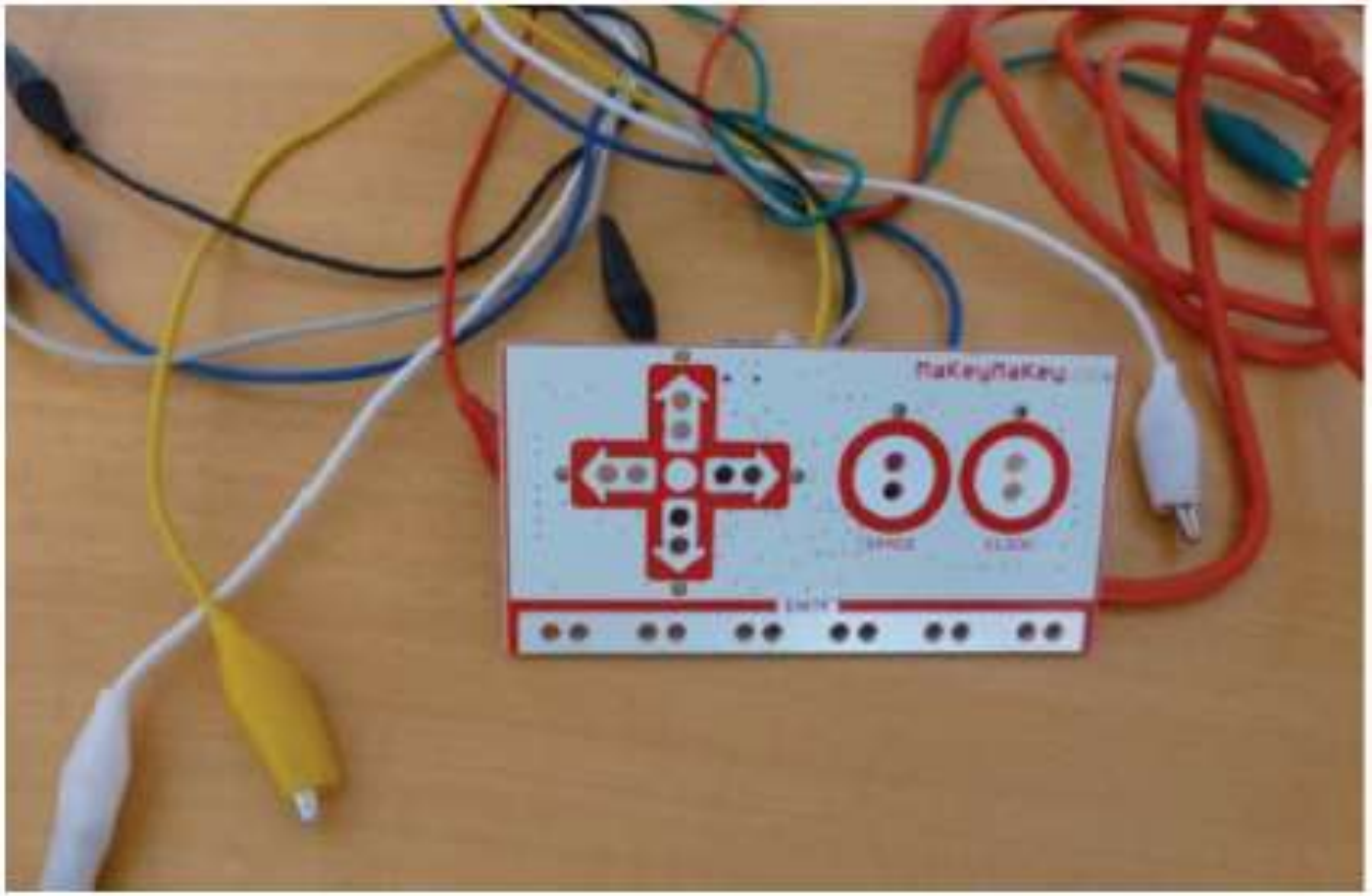
Physical computing kits



The Arduino board

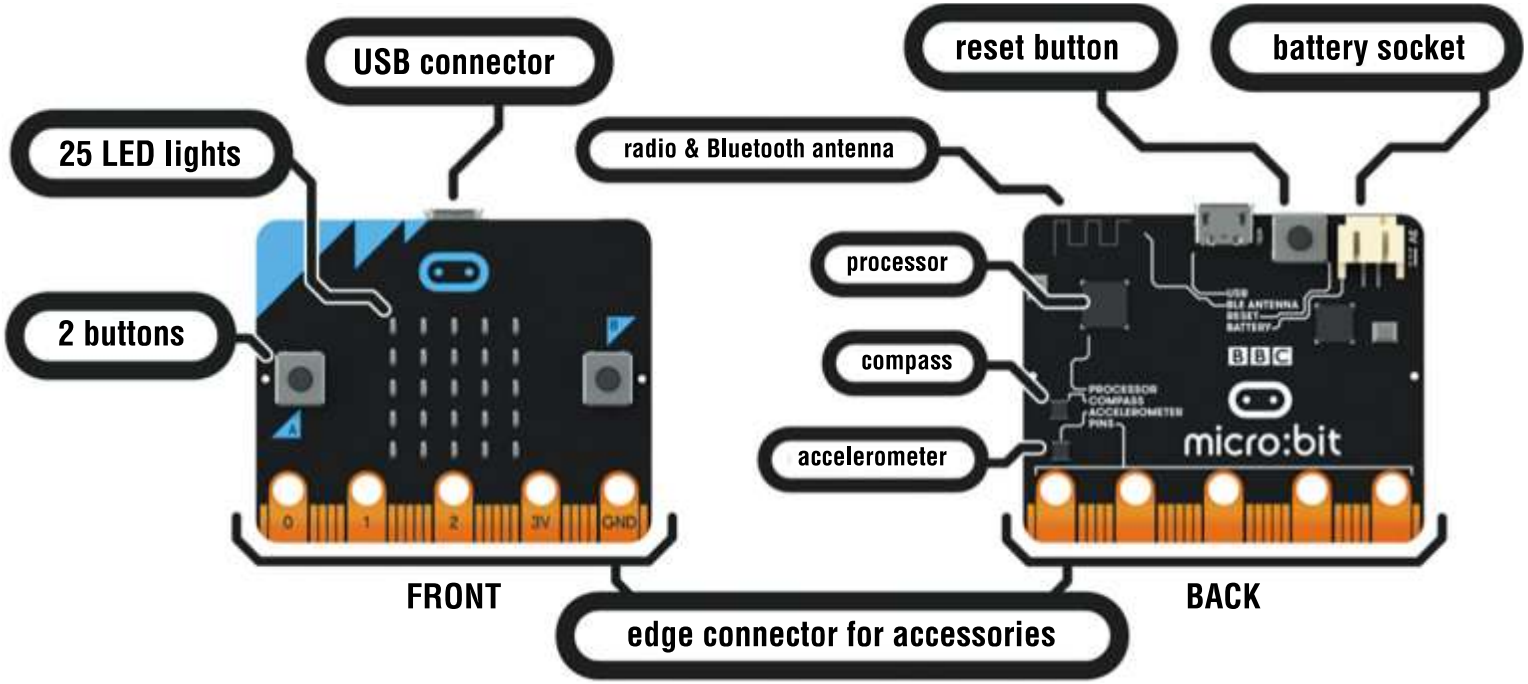
Source: Used courtesy of Dr. Nicolai Marquardt

Physical computing kits



The Makey Makey toolkit *Source*: Makey Makey

Physical computing kits



The BBC micro:bit

Source: micro:bit. Used courtesy of Micro:bit Foundation

Construction: SDKs

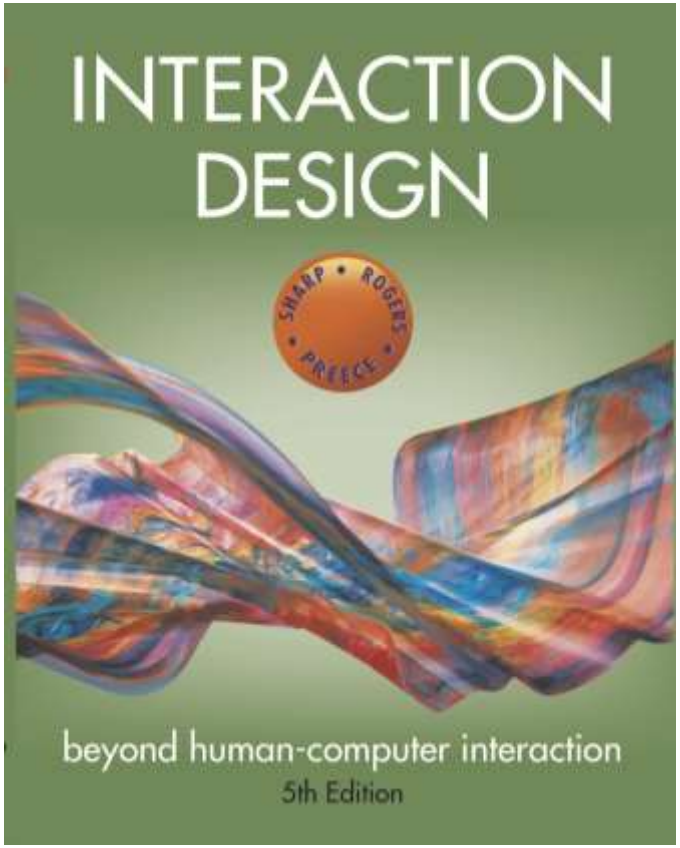
- Software Development Kits
  - Programming tools and components to develop for a specific platform, for example, iOS
- Includes: IDE, documentation, drivers, sample code, and application programming interfaces (APIs)
- Makes development much easier
- Examples:
  - Amazon's Alexa Skills Kit for voice-based services
  - Apple's ARKit for augmented reality
  - Microsoft's Kinect SDK for motion tracking

Summary

- Prototyping may be low fidelity (such as paper-based) or high fidelity (such as software-based)
- Existing software and hardware helps create prototypes
- Two aspects to design: conceptual and concrete
- Conceptual design develops an outline of what users can do and what concepts are needed to understand the product.
- Concrete design specifies design details, for example, layout or navigation

Summary (*continued*)

- Three approaches to develop an initial conceptual model: interface metaphors, interaction styles, and interface styles.
- Expand an initial conceptual model by considering whether product or user performs each function, how those functions are related, and what information is required to support them
- Generate prototypes from scenarios and use cases
- Physical computing kits and software development kits facilitate the transition from design to construction



Chapter 14
INTRODUCING EVALUATION

Goals

- Explain the key concepts and terms used in evaluation
- Introduce range of different types of evaluation methods
- Show how different evaluation methods are used for different purposes at different stages of the design process and in different contexts of use
- Show how evaluators mixed and modified to meet the demands of evaluating novel systems

Goals *(continued)*

- Discuss some of the practical challenges of doing evaluation
- Through case studies, illustrate how methods discussed in Chapters 8, 9, and 10 are used in evaluation, and describe some methods that are specific to evaluation
- Provide an overview of methods that are discussed in detail in the next two chapters

Why, what, where, and when to evaluate

Iterative design and evaluation is a continuous process that examines:

Why: To check users' requirements and confirm that users can utilize the product and that they like it

What: A conceptual model, early and subsequent prototypes of a new system, more complete prototypes, and a prototype to compare with competitors' products

Where: In natural, in-the-wild, and laboratory settings

When: Throughout design; finished products can be evaluated to collect information to inform new products

Bruce Tognazzini tells you why you need to evaluate

"Iterative design, with its repeating cycle of design and testing, is the only validated methodology in existence that will consistently produce successful results. If you don't have user-testing as an integral part of your design process you are going to throw buckets of money down the drain."

See AskTog.com for topical discussions about design and evaluation

Types of evaluation

Controlled settings that directly involve users (for example, usability and research labs)

- Natural settings involving users (for instance, online communities and products that are used in public places)
  - Often there is little or no control over what users do, especially in in-the-wild settings
- Any setting that doesn't directly involve users (for example, consultants and researchers critique the prototypes, and may predict and model how successful they will be when used by users

Living labs

- People's use of technology in their everyday lives can be evaluated in living labs
- Such evaluations are too difficult to do in a usability lab
- An early example was the Aware Home that was embedded with a complex network of sensors and audio/video recording devices (Abowd et al., 2000)

Living labs *(continued)*

- More recent examples include whole blocks and cities that house hundreds of people, for example, Verma et al., research in Switzerland (2017)
- Many citizen science projects can also be thought of as living labs, for instance, iNaturalist.org
- These examples illustrate how the concept of a lab is changing to include other spaces where people's use of technology can be studied in realistic environments

Evaluation case studies

- A classic experimental investigation into the physiological responses of players of a computer game
- An ethnographic study of visitors at the the Royal Highland show in which participants are directed and tracked using a mobile phone app
- Crowdsourcing in which the opinions and reactions of volunteers (for example, from the crowd) inform technology evaluation

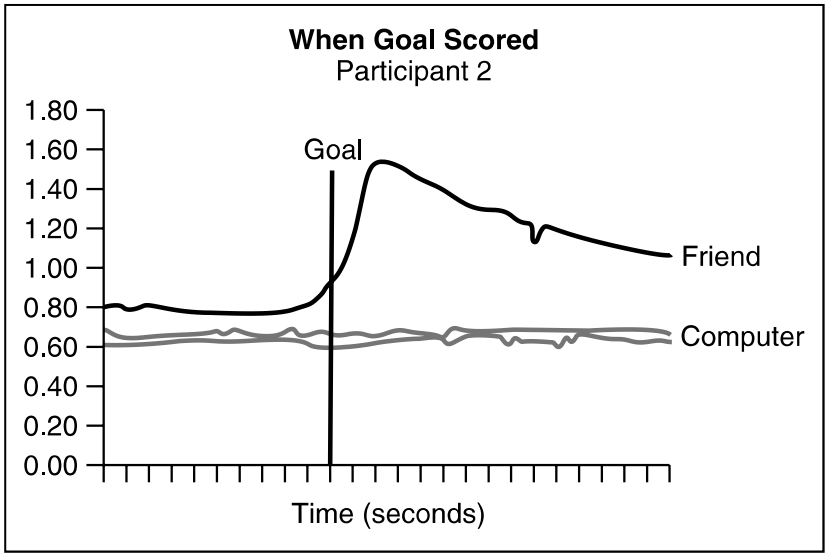
Challenge and engagement in a collaborative immersive game

- Physiological measures were used
- Players were more engaged when playing against another person than when playing against a computer
- Why was the physiological data collected normalized?

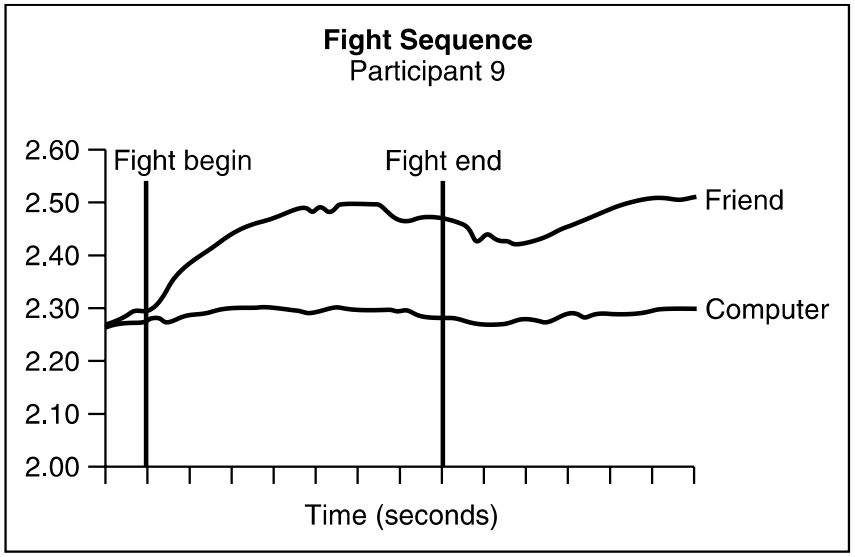
Physiological data of participants in a videogame

Source: Mandryk and Inkpen (2004), "*The Physiological Indicators for the Evaluation of Co-located Collaborative Play,"* CSCW'2004, pp 102-111. Reproduced with permission of ACM Publications.

Example of physiological data



(a)



(b)

A participants' skin response when scoring a goal against a friend (a), and another participants' response when when engaging in a hockey fight against a friend versus against the computer (b).

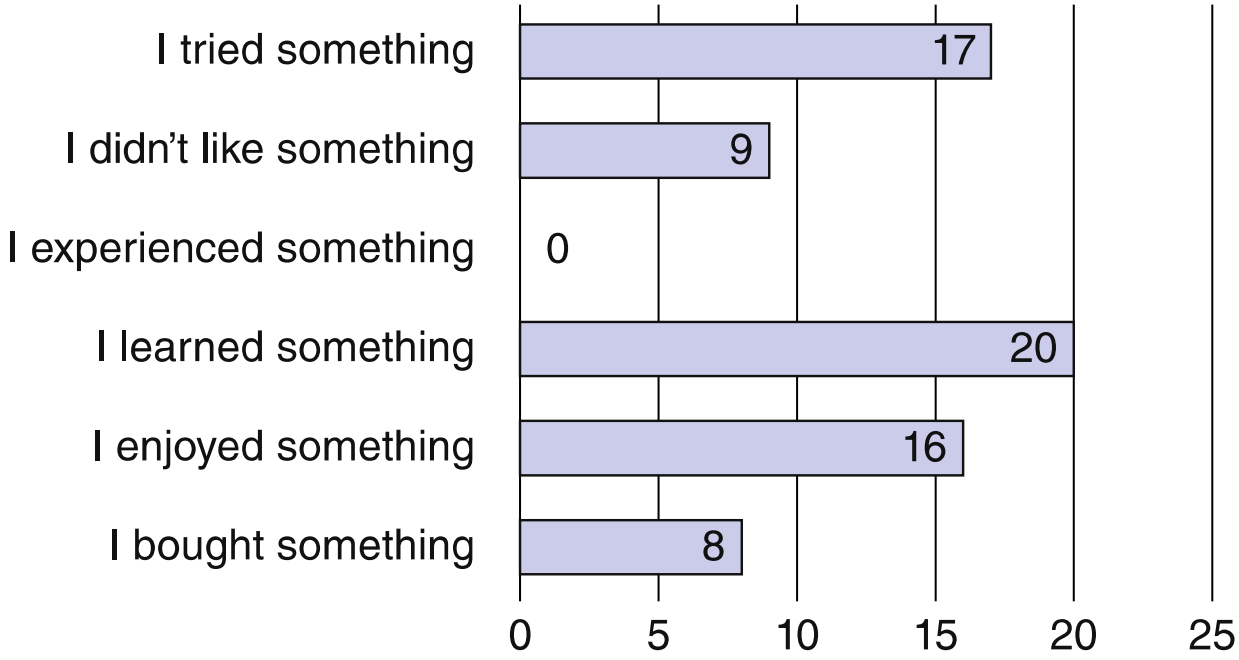
Source: Mandryk and Inkpen (2004), "*The Physiological Indicators for the Evaluation of Co-located Collaborative Play,"* CSCW'2004, pp 102-111. Reproduced with permission of ACM Publications.

Ethnobot app used at the Royal Highland Show

- The Ethnobat directed Billy to a particular place (Aberdeenshire Village)
- Next, Ethnobot asks "…what's going on?"
- The screen shows five of the experience buttons from which Billy needs to select a response

Source: Tallyn et al. (2018) Reproduced with permission of ACM Publications.

Experience responses submitted in Ethnobot



Number of prewritten experience responses submitted by participants to the pre-established questions that Ethnobot asked them about their experiences

Source: Tallyn et al. (2018) Reproduced with permission of ACM Publications.

What did we learn from the case studies?

- How to observe users in the lab and in natural settings
- How evaluators excerpt different levels of control in the lab and in natural settings and in crowdsourcing evaluation studies
- Use of different evaluation methods

What did we learn from the case studies? *(continued)*

- How to develop different data collection and analysis techniques to evaluate user experience goals such as challenge and engagement
- The ability to run experiments on the Internet that are quick and inexpensive using crowdsourcing
- How a large number of participants can be recruited using Mechanical Turk

Evaluation methods

Method	Controlled settings	Natural settings	Without users
Observing	x	x	
Asking users	x	x	
Asking experts		x	x
Testing	x		
Modeling			x

The language of evaluation

- Analytics
- Analytical evaluation
- Biases
- Controlled experiment
- Crowdsourcing
- Ecological validity
- Expert review or criticism
- Field study
- Formative evaluation
- Heuristic evaluation
- Informed consent form
- In the wild evaluation
- Living laboratory
- Predictive evaluation
- Reliability
- Scope
- Summative evaluation
- Usability laboratory
- User studies
- Usability testing
- Users or participants
- Validity

Participants' rights and getting their consent

- Participants need to be told why the evaluation is being done, what they will be asked to do and informed about their rights
- Informed consent forms provide this information and act as a contract between participants and researchers
- The design of the informed consent form, the evaluation process, data analysis, and data storage methods are typically approved by a high authority, such as the Institutional Review Board

Things to consider when interpreting data

Reliability: Does the method produce the same results on separate occasions?

Validity: Does the method measure what it is intended to measure?

Ecological validity: Does the environment of the evaluation distort the results?

Biases: Are there biases that distort the results?

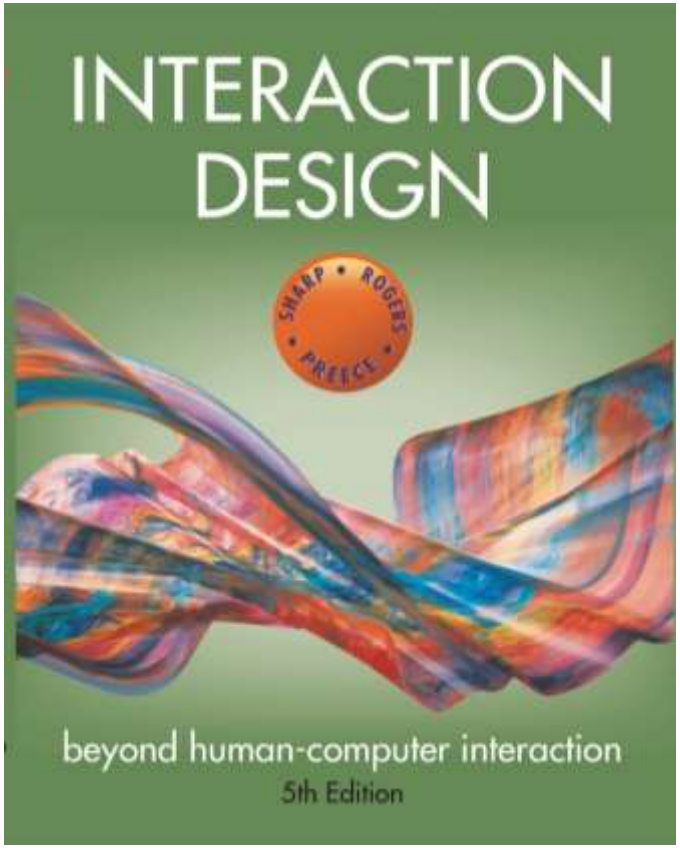
Scope: How generalizable are the results?

Summary

- Evaluation and design are very closely integrated
- Some of the same data gathering methods are used in evaluation as for establishing requirements and identifying users' needs, for example, observation, interviews, and questionnaires
- Evaluations can be done in controlled settings such as laboratories, less controlled field settings, or where users are not present

Summary *(continued)*

- Usability testing and experiments enable the evaluator to have a high level of control over what gets tested, whereas evaluators typically impose little or no control on participants in field studies
- Different methods can be combined to get different perspectives
- Participants need to be made aware of their rights
- It is important not to over-generalize findings from an evaluation



Chapter 15
Evaluation Studies:
From Controlled to Natural Settings

Goals

- Explain how to do usability testing (UT)
- Outline the basics of experimental design
- Describe how to do field studies

Margaret Mead

“WHAT PEOPLE SAY, WHAT PEOPLE DO, AND WHAT THEY SAY THEY DO ARE ENTIRELY DIFFERENT THINGS.”

Usability testing

- Involves recording performance of typical users doing typical tasks
- Controlled settings
- Users are observed and timed
- Data is recorded on video, and key presses are logged
- The data is used to calculate performance times and to identify and explain errors
- User satisfaction is evaluated using questionnaires and interviews
- Field observations may be used to provide contextual understanding

Usability testing conditions

- Usability lab or other controlled space
- Emphasis on:
  - Selecting representative users
  - Developing representative tasks
- 5-10 users typically selected
- Tasks usually around 30 minutes
- Test conditions are the same for every participant
- Informed consent form explains procedures and deals with ethical issues

How many participants is enough for user testing?

- The number is a practical issue
- Depends on:
  - Schedule for testing
  - Availability of participants
  - Cost of running tests
- Typically 5-10 participants
- Some experts argue that testing should continue until no new insights are gained

Usability Testing

How many users to test??

- 85% system problems can be identified *(Lewis, Determining Usability Test Sample Size, 2006)*
- Proven in more than 83 case studies *(Nielsen, How Many Test Users in a Usability Study, 2012)*

“Iterasi proses usability testing di setiap hasil redesign sebelum implementasi akan memberikan hasil terbaik dan lebih murah” sehingga melakukan UT berulang dengan jumlah user terbatas lebih baik daripada melakukan sekaligus dengan jumlah yang banyak.

UT Plan

PRODUCT UNDER TEST

Being tested :
-

Fitur saat test :
-

BUSINESS CASE

Why:
-

Benefits:
-

TEST OBJECTIVES

Goals:

PARTICIPANTS

Lokasi: Jumlah partisipan

Key Character/Persona :

EQUIPMENT

TEST TASKS

Task yang diujikan

Post Task & Test Questionnaire :

RESPONSIBILITIES

Facilitator, Observer:

Tech Support/observer:

LOCATION & DATES

Tanggal:
Lokasi :

Procedure

The main step of procedure UT

Contoh : UT Plan

PRODUCT UNDER TEST

Being tested :
Aplikasi GOJEK mobile Android

Fitur saat test :
Go-Food

BUSINESS CASE
Why:
Kebutuhan validasi experience User menggunakan aplikasi mobile khususnya informasi merchant & pembayaran merchant offline (QR Code).

Benefits:
- Meningkatkan traffic pengguna.
- Meningkatkan transaksi.

TEST OBJECTIVES

Goals:
Apakah user dapat dengan mudah mengetahui cara Mencari jenis makanan kesukaan user, Mencari jenis makanan yang ditentukan, Mencari penunjuk arah ke merchant terdekat , Mencari merchant sepatu olahraga dari kategori, Melihat informasi merchant yang direkomendasikan, Pembayaran melalui QR statis, Pembayaran melalui aplikasi, Mengetahui status pembayaran yang sudah dilakukan.

• Apakah flow yang diimplementasikan pada aplikasi sudah sesuai dengan mental model dari user?.

PARTICIPANTS

Bandar Lampung: 5 orang

Key Character/Persona :
• 5 orang mahasiswa (usia 18 – 23 tahun)

EQUIPMENT

• Smartphone
• Desktop
• Aplikasi lookback

TEST TASKS

1. Mencari jenis makanan kesukaan user
2. Mencari jenis merchant yang sudah ditentukan
3. Mencari penunjuk arah ke merchant terdekat
4. Mencari merchant sepatu olahraga dari kategori
5. Melihat informasi merchant yang direkomendasikan
6. Pembayaran melalui QR statis
7. Pembayaran melalui aplikasi
8. Mengetahui status pembayaran yang sudah dilakukan

Post Task & Test Questionnaire :
- Post task
- Post test (SUS & NPS)

RESPONSIBILITIES

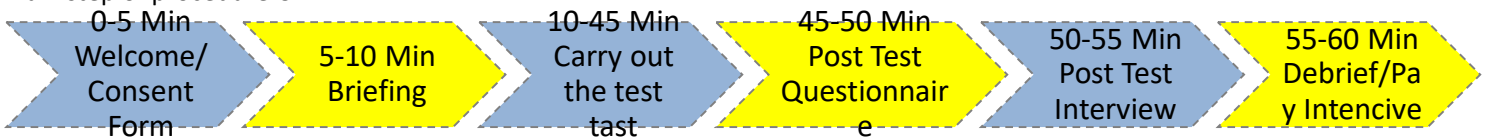
Facilitator, Observer
Hafiz, Iqbal

Tech Support/Observer
Ginar

LOCATION & DATES

Lokasi : MBK Food Court
Waktu : Sabtu 8 Des 2018

Procedure
The main step of procedure UT



TASK SCENARIO

TASK 1

Goal Task :

Scenario :

Task :

Pre-conditions :

TASK 2

Goal Task :

Scenario :

Task :

Pre-conditions :

Contoh
Task 1 : Proses Mencari jenis makanan kesukaan user

Goal Task : Menilai tingkat kemudahan untuk **mencari jenis makanan kesukaan user.**

Scenario : Anda adalah seorang user yang baru saja menginstall aplikasi x di smartphone dan ingin mencari jenis makanan kesukaan Anda.

Task : Silahkan Anda mencari jenis makanan yang Anda sukai.

Pre Conditions :

- User **sudah login ke** aplikasi.
- Pastikan **aplikasi Lookback sudah terinstall** dan sudah dapat merekam.
- Agar saat akan memulai sesi, partisipan diingatkan untuk **memposisikan handphone dengan benar** sehingga wajah partisipan terekam dengan benar oleh Lookback.

Penyusunan task tidak boleh terlalu detail memandu dan tidak boleh terlalu menyebutkan label menu yang ada pada aplikasi.

Tahapan Usability Testing

1. Sampaikan pengantar UT kepada user **(terlampir "*script* fasilitator")**
2. Minta user membaca **(terlampir "*think out loud instruction")***
3. Pelaksanaan *usability testing* dengan melakukan task:
   Contoh: "Silahkan melakukan pembelian tiket pesawat dari Surabaya ke Bali menggunakan Traveloka"

Think Aloud Instruction

- Mohon sampaikan apa yang Anda pikirkan selama aktivitas ini. Jika Anda sedang membaca sesuatu dalam aplikasi tolong baca dengan suara keras.
- Katakan sesuatu yang terlintas dalam pikiran Anda yang membuat Anda tidak mengerti atau sesuatu yang membuat Anda mudah mengerti.
- Komentar-komentar Anda membuat kami mudah dalam evaluasi aplikasi ini.

Usability lab with observers watching a user and assistant

Tobii Glasses Mobile Eye-Tracking System

Source: Dalton et al., 2015, p.3891. Reproduced with permission of ACM Publications.

Portable equipment for use in the field

Setup used in the Chicago usability testing sessions

Source: iPad App and Website Usability Study. Used courtesy of the Neilsen Norman Group.

Testing the iPad usability

- First study was conducted quickly in two cities: Fremont, CA and Chicago, IL
- Tests had to be done quickly, as information was needed by third-party app developers
- Also needed to be done secretly so that the competition was not aware of the study before the iPad was launched
- Seven participants with over three months experience with iPhones

Testing the iPad usability *(continued)*

- Signed an **informed consent** form explaining:
  - What the participant would be asked to do
  - The length of time needed for the study
  - The compensation that would be offered for participating
  - Participants' right to withdraw from the study at any time
  - A promise that the person's identity would not be disclosed
  - An agreement that the data collected would be confidential and available to only the evaluators
- Participants were asked to explore the iPad
- Next, they were asked to perform randomly-assigned specified tasks

Examples of the tasks used in the iPad evaluation

App or website	Task
iBook	Download a free copy of *Alice's Adventures in Wonderland* and read through the first few pages.
Craigslist	Find some free mulch for your garden.
eBay	You want to buy a new iPad on eBay. Find one that you could buy from a reputable seller.
Time Magazine	Browse through the magazine and find the best pictures of the week.
Epicurious	You want to make an apple pie for tonight. Find a recipe and see what you need to buy in order to prepare it.
Kayak	You are planning a trip to Death Valley in May this year. Find a hotel located in the park or close to the park.

Adapted from Budiu and Nielsen, 2010

Source: iPad App and Website Usability Study. Used courtesy of the Neilsen Norman Group.

Problems and actions

- Examples of problems detected:
  - Accessing the Web was difficult
  - Lack of affordance and feedback
  - Getting lost in an application
  - Knowing where to tap
- Actions by evaluators:
  - Reported to developers
  - Made available to public on Neilsen Norman Group.

Problems and actions *(continued)*

- Accessibility for all users is important
- Study did not address how iPad would be used in people's everyday lives
- Another study was done a year later to examine this and other issues that there was insufficient time to address in the first study

QUANTITATIVE PERFORMANCE MEASURES

Quantitative performance measures

- Number of users successfully completing the task
- Time to complete task
- Time to complete task after time away from task
- Number and type of errors per task
- Number of errors per unit of time
- Number of navigations to online help or manuals
- Number of users making a particular type of error

Source: Wixon and Wilson, 1997

Single Easy Question (SEQ)

for each task

Kuesioner Task 1 :

Apakah Anda berhasil menyelesaikan task? YA TIDAK

Bagaimana kesan Anda terhadap tingkat kemudahan atau kesulitan dalam menyelesaikan tugas ini:

Sangat Sulit						Sangat Mudah
1	2	3	4	5	6	7

Komentar:

.....

.....

.....

.....

.....

UXBootcamp - Usability Testing Aplikasi JOOX

kuesioner task 1

5. Task 1 : Apakah Anda berhasil menyelesaikan task?

- ○ Ya
- ○ Tidak

6. Task 1 : Seberapa mudah/sulitkah untuk menyelesaikan task?

1 (sangat sulit) 4 7 (sangat Mudah)

Prev Next

Data yang diperoleh dari survey monkey

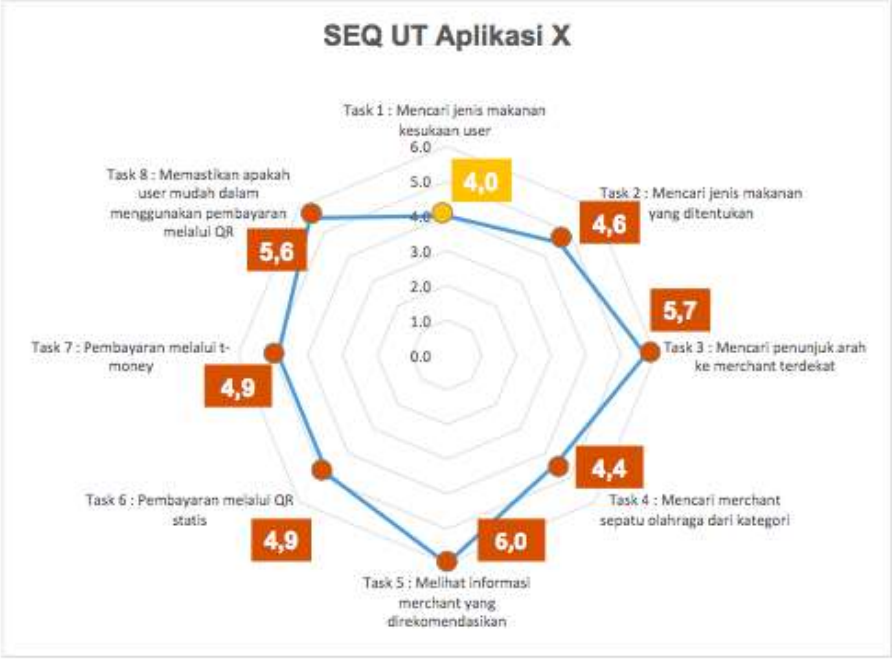
Data terkait :
Biodata responden, Jawaban kuesioner, Post task question (SUS), (NPS), Komentar user terkait aplikasi

Nama	Task 1 : Apakah Anda berhasil menyelesaikan task	Seberapa mudah? (1-7)	Komentar
Bagas	Tidak	1	Saya coba scroll berkali-kali dari atas ke bawah, dan tidak menemukan merchantnya.
Putra	Ya	3	Merchant tidak tersusun secara alphabet

SEQ (Simple Easy Question) :

Rata-rata : 2

Diagram SEQ (Single Easy Question)



Tingkat kemudahan penggunaan aplikasi X melihat informasi merchant yang direkomendasikan oleh user mudah. Walaupun satu task yang masuk dalam tingkat yang kurang baik yaitu task 1 mencari jenis makanan kesukaan user

Selama pengamatan saat UT, user merasa bahwa informasi produk merchant kurang lengkap, dan proses pembayaran melalui QRen kurang familiar, sehingga ada yang gagal bayar. Lebih detail dapat dilihat pada negative finding selanjutnya.

Skala Tingkat Kemudahan:

Sangat Sulit						Sangat Mudah
1	2	3	4	5	6	7

System Usability Scale

No	PERNYATAAN	SANGAT TIDAK SETUJU (1)	TIDAK SETUJU (2)	NETRAL (3)	SETUJU (4)	SANGAT SETUJU (5)
1	I think that I would like to use this system frequently (Saya rasa saya akan sering menggunakan aplikasi ini)					
2	I found the system unnecessarily complex (Saya rasa aplikasi ini terlalu rumit, padahal bisa lebih disederhanakan)					
3	I thought the system was easy to use (Saya rasa aplikasi mudah untuk digunakan)					
4	I think that I would need the support of a technical person to be able to use this system (Saya rasa saya membutuhkan bantuan dari orang teknis untuk dapat menggunakan aplikasi ini)					
5	I found the various functions in this system were well integrated (Saya menemukan bahwa terdapat berbagai macam fungsi yang terintegrasi dengan baik dalam aplikasi ini)					
6	I thought there was too much inconsistency in this system (Saya rasa terdapat banyak hal yang tidak konsisten pada aplikasi ini)					
7	I would imagine that most people would learn to use this system very quickly (Saya rasa mayoritas pengguna akan belajar menggunakan aplikasi ini dengan cepat)					
8	I found the system very cumbersome to use (Saya menemukan bahwa aplikasi ini sangat tidak praktis)					
9	I felt very confident using the system (Saya sangat percaya diri dalam menggunakan aplikasi ini)					
10	I needed to learn a lot of things before I could get going with this system (Saya harus belajar banyak hal terlebih dahulu sebelum saya dapat menggunakan aplikasi ini)					

SUS (System Usability Of Scale)

Nama	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	SUS
Bagas	4	3	4	2	3	3	3	3	4	2	55
Putra	3	4	3	2	3	4	4	2	3	2	62,5

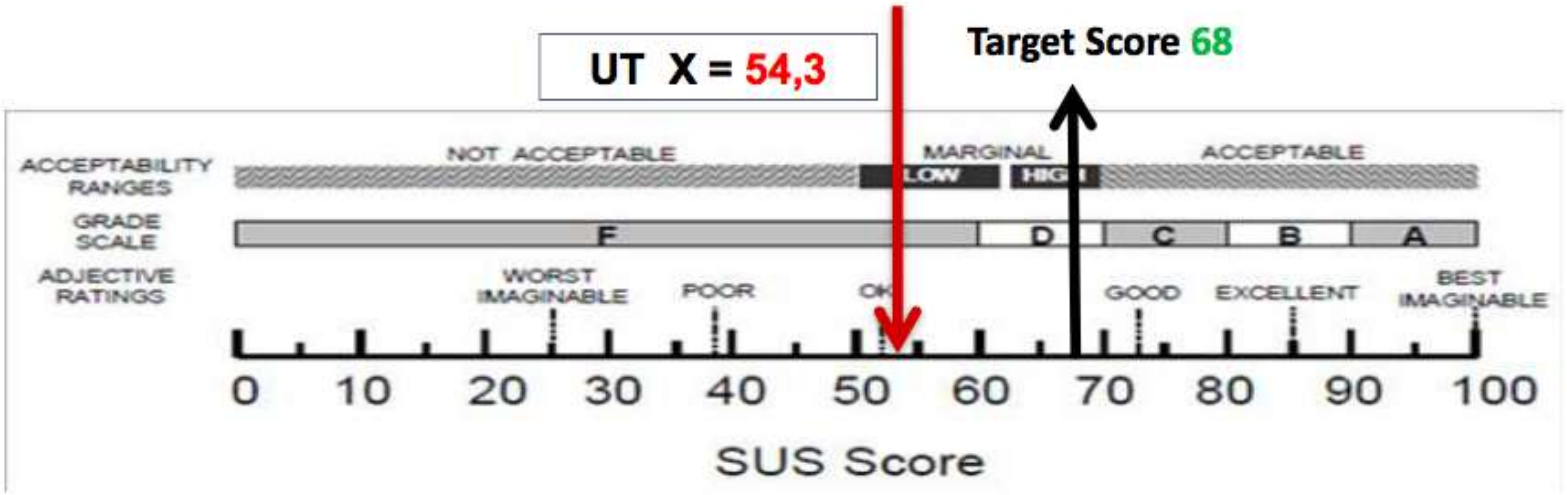
Rata-rata : 54,3

Batas : 68

Scoring Method :

- **Pertanyaan Ganjil :** Jawaban - 1
- **Pertanyaan Genap :** 5 – Score Jawaban
- SUS Score : {(Jumlah Subtotal Pertanyaan 1-10) x 2.5} : jumlah responden

Parameter SUS (System Usability Of Scale)



Berdasarkan **research nilai score rata2 adalah 68.**
Nilai SUS produk X berada dibawah kategori rata-rata dengan **Marginal Low OK dengan rata-rata 54,3**

Scoring Method :

- **Pertanyaan Ganjil** : Jawaban - 1
- **Pertanyaan Genap :** 5 – Score Jawaban
- SUS Score : {(Jumlah Subtotal Pertanyaan 1-10) x 2.5} : jumlah responden

http://uxpajournal.org
http://www.measuringu.com/sus.php

Net Promote Score

1.Apakah Anda akan merekomendasikan Aplikasi Blanja ini ke orang lain?

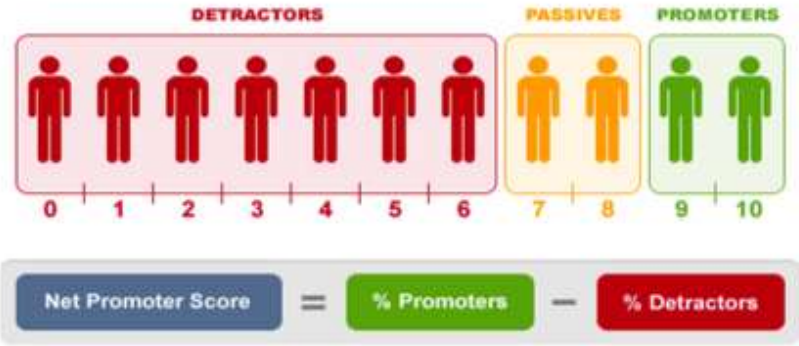
1	2	3	4	5	6	7	8	9	10
Sangat Tidak Ingin									Sangat Ingin

1.Apa yang Anda sukai dari Aplikasi ini? .....
2.Apa yang Anda tidak sukai dari Aplikasi ini? .....
3.Apa masukan Anda untuk Aplikasi ini (sebagai improvement)? .....

NPS (Net Promoter Score)

Nama	Apakah Anda akan merekomendasikan aplikasi ke orang lain?
Bagas	5
Putra	7

	2 orang	%
Promoters	0	0 %
Passives	1	50 %
Detractors	1	50 %



= 0 %. - 50 %

= - 50 %

Batas : 31

Usability testing and Experiments

- Usability testing is applied experimentation
- Developers check that the system is usable by the intended user population by collecting data about participants' performance on prescribed tasks
- Experiments test hypotheses to discover new knowledge by investigating the relationship between two or more variables

Usability testing and research

Usability Testing

- Improve products
- Few participants
- Results inform design
- Usually not completely replicable
- Conditions controlled as much as possible
- Procedure planned
- Results reported to developers

Experiments for Research

- Discover knowledge
- Many participants
- Results validated statistically
- Must be replicable
- Strongly controlled conditions
- Experimental design
- Scientific report to scientific community

Experiments

- Test hypothesis
- Predict the relationship between two or more variables
- Independent variable is manipulated by the researcher
- Dependent variable influenced by the independent variable
- Typical experimental designs have one or two independent variables
- Validated statistically and replicable

Experimental designs

Different participants (between subjects):

Single group of participants is allocated randomly to the experimental conditions

Same participants (within subjects):

All participants appear in both conditions

Matched participants (pairwise):

Participants are matched in pairs, for example, based on expertise, gender, and so on

Different, same, matched participant design

Design	Advantages	Disadvantages
Different	No order effects	Many subjects and individual differences a problem
Same	Few individuals, no individual differences	Counter-balancing needed because of ordering effects
Matched	Same as different participants, but individual differences reduced	Cannot be sure of perfect matching on all differences

Field studies

- Field studies are done in natural settings
- “In the wild” is a term for prototypes being used freely in natural settings
- Seek to understand what users do naturally and how technology impacts them
- Field studies are used in product design to:
  - Identify opportunities for new technology
  - Determine design requirements
  - Decide how best to introduce new technology
  - Evaluate technology in use

A field study of a pain-monitoring device

- Monitoring patients' pain is a known challenge for physicians
- Goal of the study was to evaluate the use of a pain-monitoring device for use after ambulatory surgery
- Painpad is a keypad device
- It was usability tested extensively in the lab before brought into two hospitals
- Goal was to understand how Painpad was used in the natural environment and as part of routines in two UK hospitals.
- How pain-monitoring differed with Painpad

Painpad

A tangible device for inpatient self-logging of pain

Source: Price et al., 2018. Reproduced with permission of ACM Publications.

Data collection and participants

- Two studies in two hospitals involving 54 people
- 13 males, 41 females
- Privacy was a important concern
- Hospital stay ranged from 1-7 days, mean and median age 64.6, 64.5
- Patients given Painpad after surgery and prompted to report pain levels every two hours
- Nurses also collected scores
- All data entered into charts
- Patients in one hospital were given a user-satisfaction survey when they left
- Also rated Painpad on a 1-5 Likert scale

Data analysis and presentation

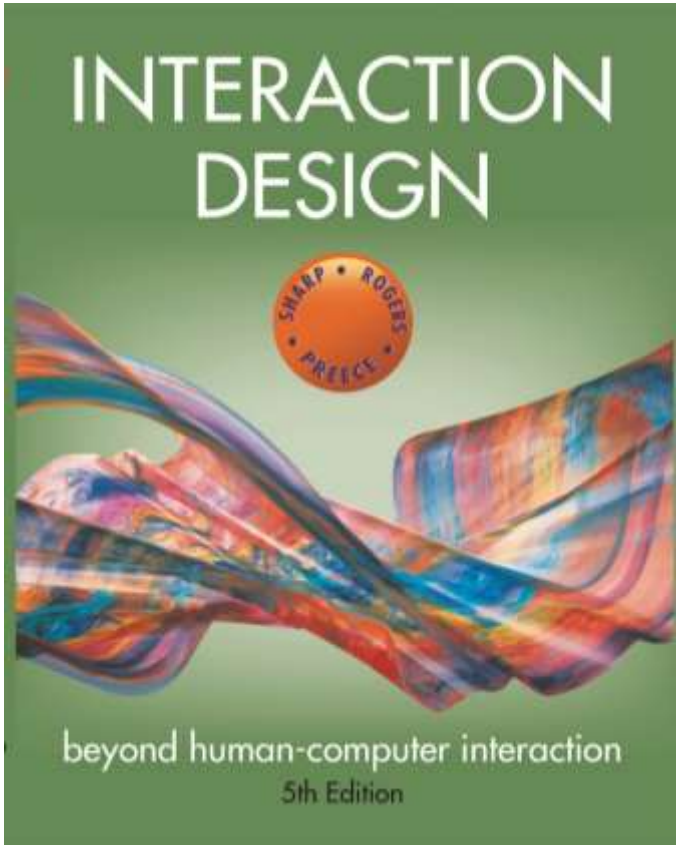
- Three types of data were collected:
  - Satisfaction with Painpad was based on questionnaire responses
  - Patients' compliance with the two-hour routine
  - How data collected from Painpad compared with data collected by nurses
- Data showed:
  - Satisfaction with Painpad 4.63 on Likert scale
  - Patience compliance was mixed: some liked it while others disliked or didn't notice the prompts
  - Patients recorded more scores with Painpad than through the nurses

Summary

- Usability testing takes place in controlled usability labs or temporary labs
- Usability testing focuses on performance measures, for example, how long and how many errors are made when completing a set of predefined tasks
- Indirect observation (video and keystroke logging), user satisfaction questionnaires, and interviews are also collected
- Affordable, remote testing systems are more portable than usability labs
- Many also contain mobile eye-tracking and other devices

Summary *(continued)*

- Experiments test a hypothesis by manipulating certain variables while keeping others constant
- The experimenter controls independent variable(s) in order to measure dependent variable(s)
- Field studies are evaluation studies that are carried out in natural settings to discover how people interact with technology in the real world
- Field studies that involve the deployment of prototypes or technologies in natural settings may also be referred to as ‘in-the-wild’ studies
- Sometimes the findings of a field study are unexpected, especially for in-the-wild studies that explore how novel technologies are used by participants in their own homes, places of work, or outside



Chapter 16
Evaluation: Inspections, Analytics, and Models

Goals

- Describe the key concepts associated with inspection methods
- Explain how to do heuristic evaluation and walkthroughs
- Explain the role of analytics in evaluation
- Describe how A/B testing is used in evaluation
- Describe how to use Fitts' Law – a predictive model

Inspections

- Several kinds
- Experts use their knowledge of users and technology to review software usability
- Expert critiques can be formal or informal
- Heuristic evaluation is a review guided by a set of heuristics
- Walkthroughs involve stepping through a pre-planned scenario noting potential problems

Heuristic evaluation

- Developed by Jacob Nielsen in the early 1990s
- Based on heuristics distilled from an empirical analysis of 249 usability problems
- These heuristics have been revised for current technology by Nielsen and others for:
  - Mobile devices
  - Wearables
  - Virtual worlds
  - Social media
  - …
- Design guidelines form a basis for developing heuristics

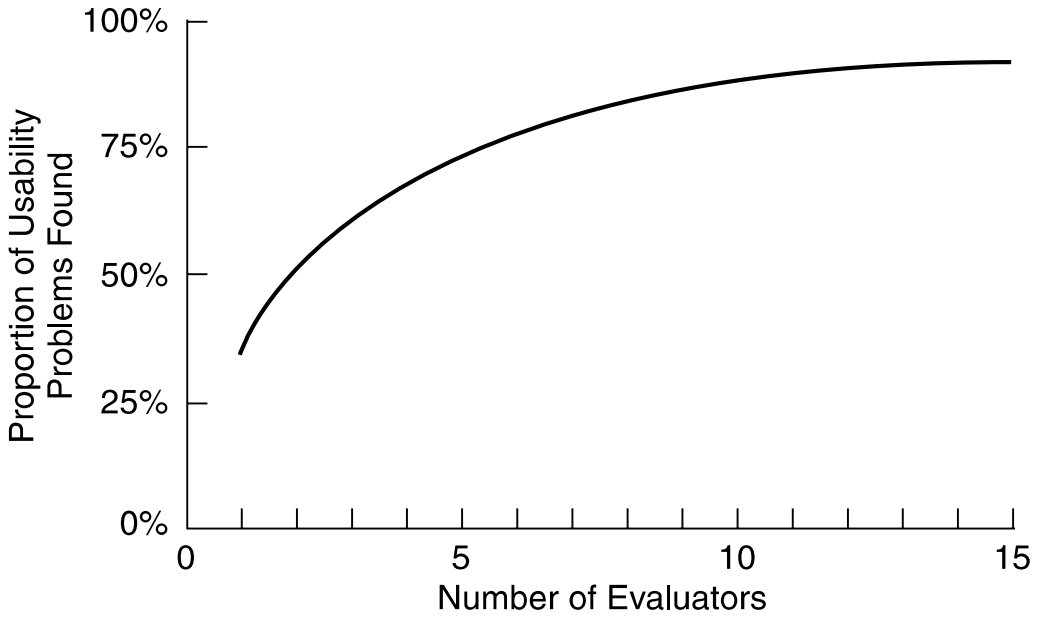
Revised version (2014) of Nielsen's original heuristics

- Visibility of system status
- Match between system and real world
- User control and freedom
- Consistency and standards
- Error prevention

Revised version (2014) of Nielsen's original heuristics *(continued)*

- Recognition rather than recall
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Help users recognize, diagnose, recover from errors
- Help and documentation

Number of evaluators and problems



Curve showing the proportion of usability problems in an interface found by heuristic evaluation using different numbers of evaluators

Source: Nielsen and Mack, 1994. Courtesy of Wiley.

Number of evaluators

- Nielsen suggests that on average five evaluators identify 75-80 percent of usability problems
- Cockton and Woolrych (2001) point out that the number of users needed to find 75-80 percent of usability problems depends on the context and nature of the task problems

Heuristics for websites focus on key criteria

- Clarity
- Minimize unnecessary complexity and cognitive load
- Provide users with context
- Promote positive and pleasurable user experience

Source: Budd, 2007

Doing heuristic evaluation

- Briefing session to tell experts what to do
- Evaluation period of 1-2 hours in which:
  - Each expert works separately
  - Take one pass to get a feel for the product
  - Take a second pass to focus on specific features
- Debriefing session in which experts work together to prioritize problems

Advantages and problems

- Few ethical and practical issues to consider because users not involved
- Can be difficult and expensive to find experts
- Best experts have knowledge of application domain and users
- Biggest problems:
  - Important problems may get missed
  - Many trivial problems are often identified, such as false alarms
  - Experts have biases

Turning design guidelines and golden rules into heuristics

Ask questions like the following:

"Does the application include a visible title page, section or site? Does the user always know where they are located? Does the user always know what the system or application is doing? Are the links clearly defined? Can all actions be visualized directly (i.e., no other actions are required)?"

Granollers, 2018, p. 62

Evaluating for accessibility using Guidelines

- Web Content Accessibility Guidelines (WCAG) (see Lazar et al., 2015)
- Guidelines can be used as heuristics for evaluating websites
- Governments and large corporations have to make their websites accessible by law
- Four key concepts:
  - Perceivable
  - Operable
  - Understandable
  - Robust

Source: WCAG 2.1 at a Glance.

Cognitive walkthroughs

- Focus on ease of learning
- Designer presents an aspect of the design and usage scenarios
- Expert is told the assumptions about user population, context of use, task details
- One or more experts walk through the design prototype with the scenario
- Experts are guided by three questions

The three questions

- Will the correct action be sufficiently evident to the user?
- Will the user notice that the correct action is available?
- Will the user associate and interpret the response from the action correctly?

As the experts work through the scenario, they note problems

Pluralistic walkthrough

- Variation on the cognitive walkthrough theme
- Performed by a carefully managed team
- The panel of experts begins by working separately
- This is followed by a managed discussion that leads to agreed decisions
- The approach lends itself well to participatory design
- Also other adaptations of basic cognitive walkthroughs

Web Analytics

- A form of interaction logging that analyzes users' activities on website
- Designers use the analysis to improve their designs
- When designs don't meet users' needs, they will not return to the site
- They become one-time users

Web Analytics *(continued)*

- Web analytics enable designers to track the activities of users on their site
- They can see how many people come to the site, how long they stay, and where they go
- Web analytics offer designers the “big picture” about how their site performs based on user activity
- One of the most well-known analytics

Segment of Google Analytics for Interaction Design 5e website, December 2018

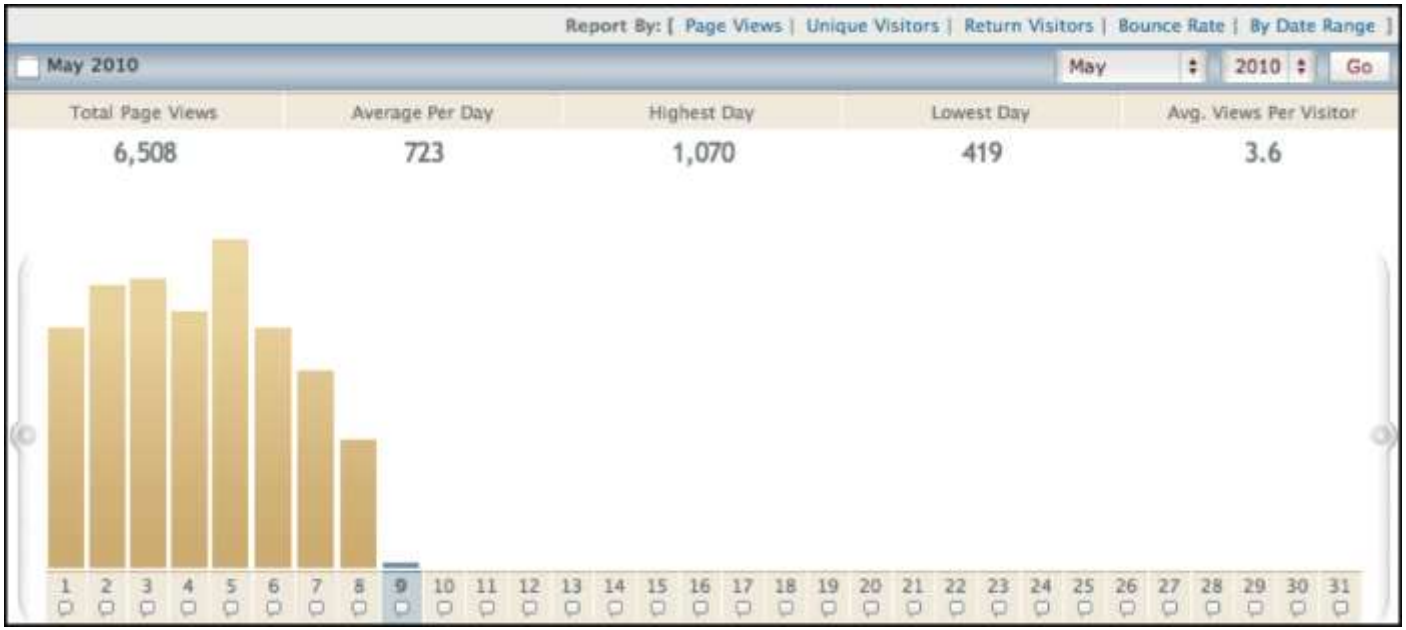
(a)

(b)

Segment of Google Analytics for Interaction Design 5e website, December 2018 *(continued)*

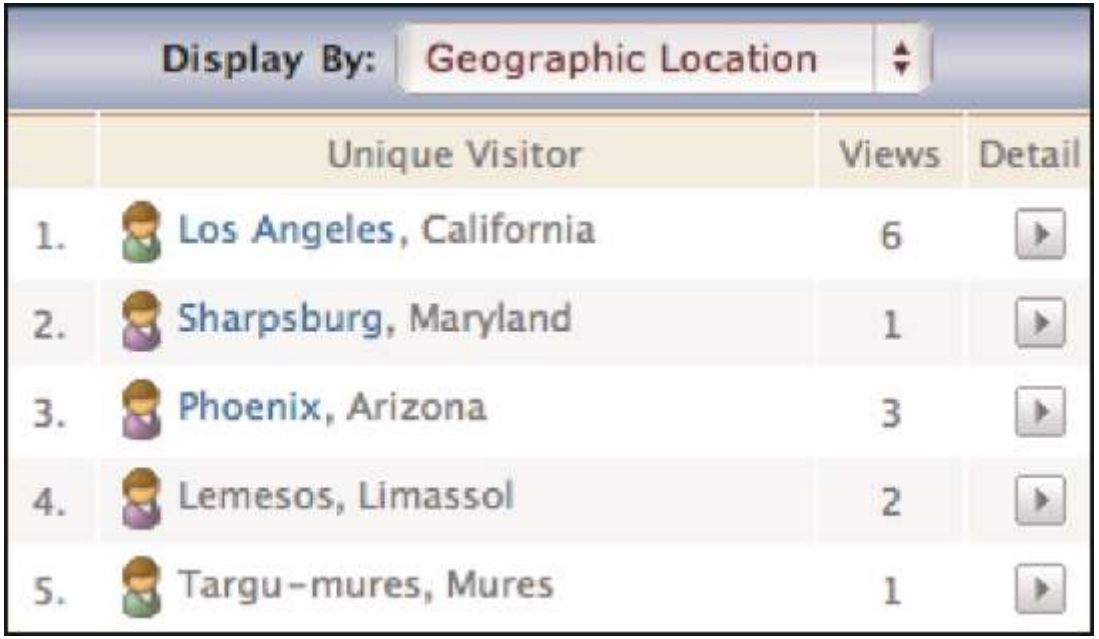
Language	Acquisition			Behavior		
	Users ↓	New Users	Sessions	Bounce Rate	Pages / Session	Avg. Session Duration
	529 % of Total: 100.00% (529)	462 % of Total: 100.22% (461)	642 % of Total: 100.00% (642)	60.28% Avg for View: 60.28% (0.00%)	3.26 Avg for View: 3.26 (0.00%)	00:02:31 Avg for View: 00:02:31 (0.00%)
1. en-us	317 (59.81%)	279 (60.39%)	391 (60.90%)	55.50%	3.80	00:03:02
2. en-gb	44 (8.30%)	34 (7.36%)	52 (8.10%)	63.46%	2.44	00:01:21
3. zh-cn	27 (5.09%)	21 (4.55%)	35 (5.45%)	82.86%	2.40	00:01:31
4. es-es	12 (2.26%)	11 (2.38%)	13 (2.02%)	61.54%	2.08	00:00:32
5. sv-se	11 (2.08%)	9 (1.95%)	13 (2.02%)	69.23%	1.46	00:01:36
6. ko-kr	9 (1.70%)	9 (1.95%)	14 (2.18%)	35.71%	6.29	00:04:10
7. de-de	6 (1.13%)	6 (1.30%)	6 (0.93%)	66.67%	3.33	00:00:25
8. en	6 (1.13%)	6 (1.30%)	6 (0.93%)	83.33%	1.17	00:00:06
9. ar	5 (0.94%)	3 (0.65%)	6 (0.93%)	66.67%	4.17	00:01:00
10. nl-nl	5 (0.94%)	5 (1.08%)	5 (0.78%)	40.00%	2.80	00:01:02

Segment of early VisiStat Analytics from 2010



Source: VisiStat Analytics, 2010

Segment of early VisiStat Analytics from 2010 *(continued)*



Where visitors to Mountain Wineries in California come from

Source: VisiStat Analytics, 2010

A/B Testing

- A large-scale experiment
- Offers another way to evaluate a website, application of app running on a mobile device
- Often used for evaluating changes in design on social media applications
- Compares how two groups of users perform on two versions of a design

A/B Testing *(continued)*

- Can involve thousands of users
- May create ethical dilemmas if users don't know they are part of the test
- Care is needed to ensure that other issues are not affecting users' behavior

Predictive models

- Provide a way of evaluating products or designs without directly involving users
- Less expensive than user testing
- Usefulness limited to systems with predictable tasks, for example, voicemail systems, smartphones, and dedicated mobile devices
- Based on expert error-free behavior

Fitts' Law (1954)

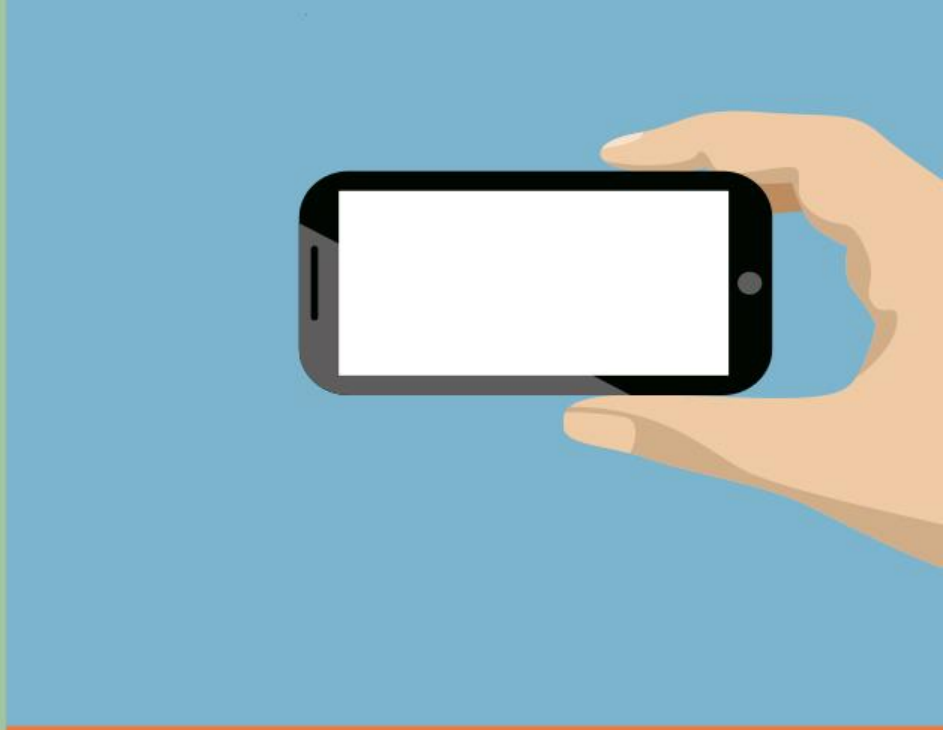
- Fitts' Law predicts that the time to point at an object using a device is a function of the distance from the target object and the object's size
- The further away and the smaller the object, the longer the time to locate it and point to it
- It is particularly useful for determining where on a screen to position an object
- Fitts' Law is useful for evaluating systems for which the time to locate an object is important, for example, smartphones, handhelds, and mobile devices

Summary

- Inspections can be used to evaluate requirements, mockups, functional prototypes, or systems
- User testing and heuristic evaluation may reveal different usability problems
- Design guidelines can be used to develop heuristics
- Walkthroughs are a fine-grained focused method for evaluating small parts of a product

Summary *(continued)*

- Analytics involves collecting data about users activity on a website or product to see which parts are used
- A/B testing is a form of large-scale experiment
- Fitts' Law can be used to predict expert, error-free performance for clearly defined tasks with limited key presses, for example, to evaluate keypress sequences for handheld devices and the position of objects on a screen



Mobile App Design Practical Guidelines

IF3151 Human Computer Interaction
STEI ITB 2020

Smartphone User

- By 2022, the number of smartphone users is expected to increase by two-thirds compared to 2013.
  - The average user spends 3-4 hours per day on mobile.
  - The vast majority of that time is spent in **apps and on websites.**

Good UX is Important

fast loading time + ease of use + delight during interaction = Good UX

A good UX is what **separates successful apps from unsuccessful ones**.

Practical Recommendations to Mobile App Design: Minimize Cognitive Load

A Comprehensive Guide To Mobile App Design

Nick Babich

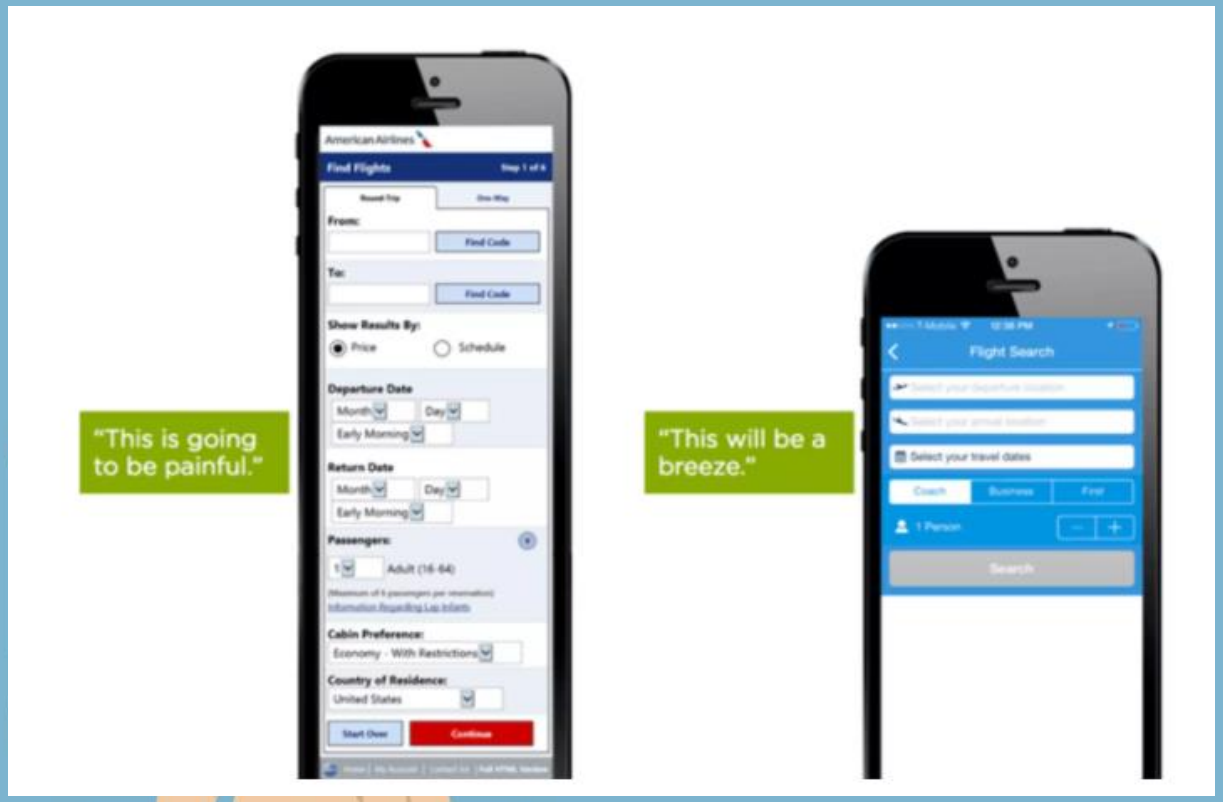
https://bit.ly/2HZmMHS

1. Minimize Cognitive Load

- Minimize the amount of brain power required to use the app.

- Minimize Information
- Minimize User Input
- Avoid Jargon
- Break Task
- Offload Task
- Anticipate User Needs

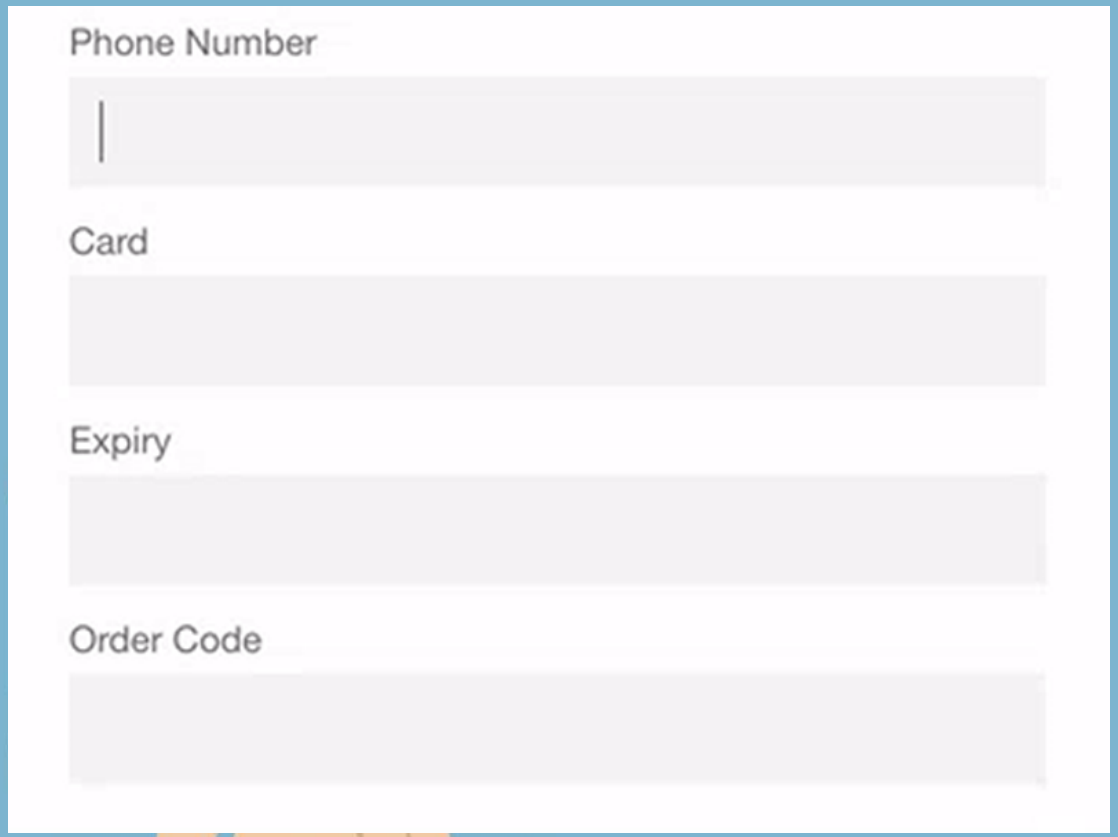
Minimize User Input



(Image source: Luke W.)

- Keep forms as short as possible by removing any unnecessary fields.
- Combine multiple fields into one easy-to-fill field.

Minimize User Input

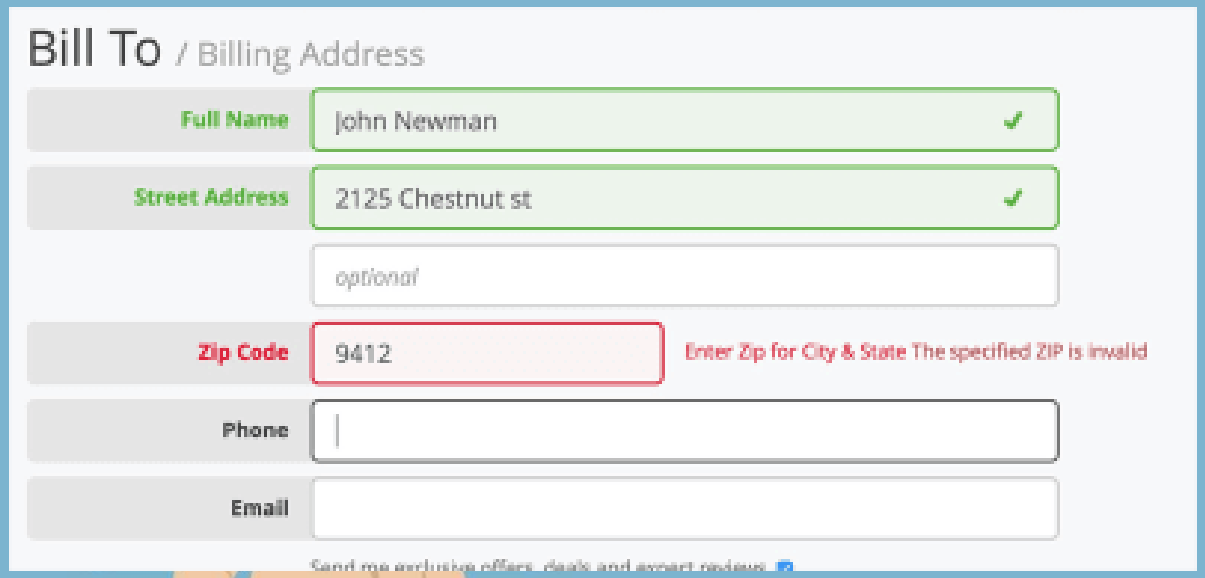


(Image credit: Josh Morony)

- Provide input masks.
- Field masking is a technique that helps users format inputted text.

Minimize User Input

Dynamically validate field values.

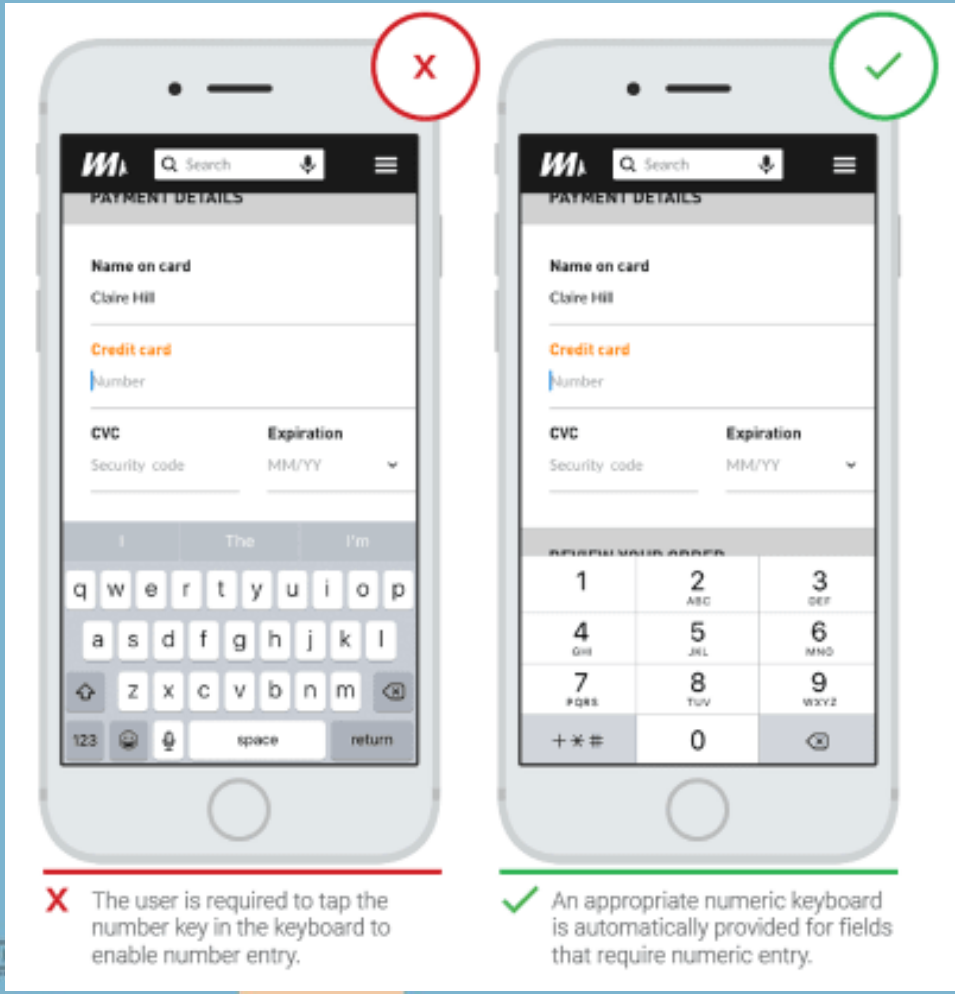


Inline validation (Image source: Baymard)

- It's frustrating when, after submitting data, user have to go back and correct mistakes.

Minimize User Input

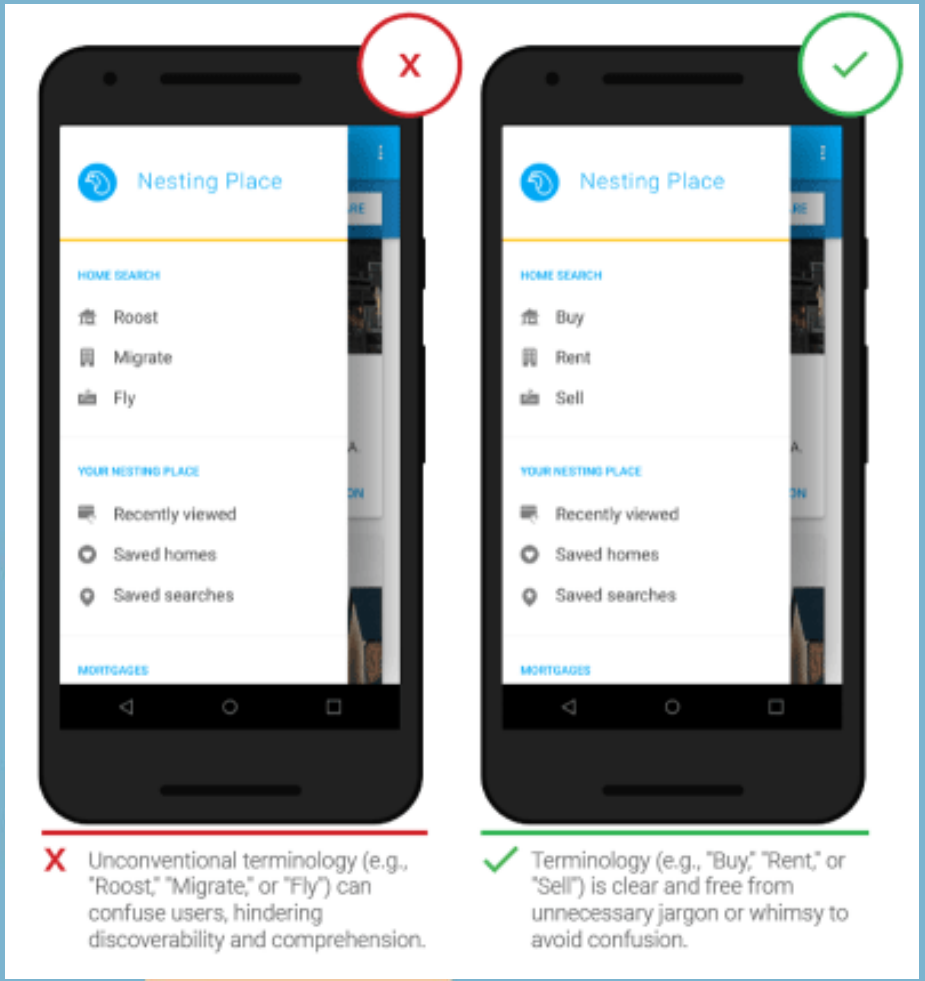
Customize the keyboard for the type of query.



- Display a numeric keyboard when asking for phone number
- include the @ button when asking for an email address
- Ensure that this feature is implemented consistently throughout the app

Match the keyboard to the required text input. (Image: ThinkWithGoogle)

Avoid Jargon



- Use what you know about your target audience to determine whether certain words or phrases are appropriate.
- “Beli Sekarang” vs “checkout”

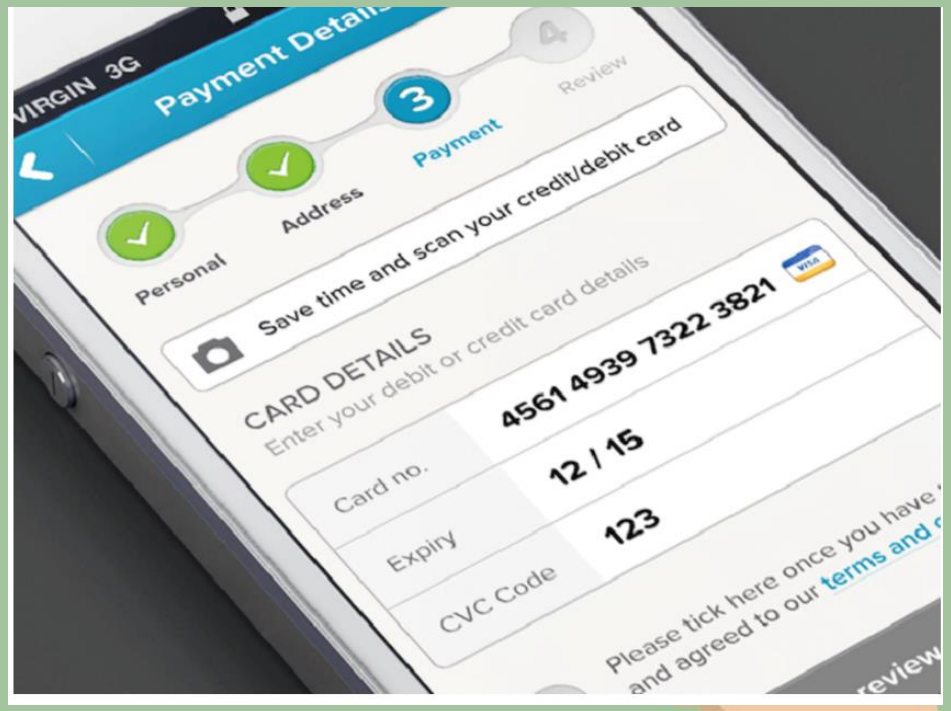
Unknown terms or phrases will increase cognitive load for the user.
(Image source: ThinkWithGoogle)

Break Tasks

- If a task contains a lot of steps and actions required from the user, it's better to divide such tasks into a number of subtasks.

Chunking makes a form look less loaded, especially when you're requesting a lot of information from the user.

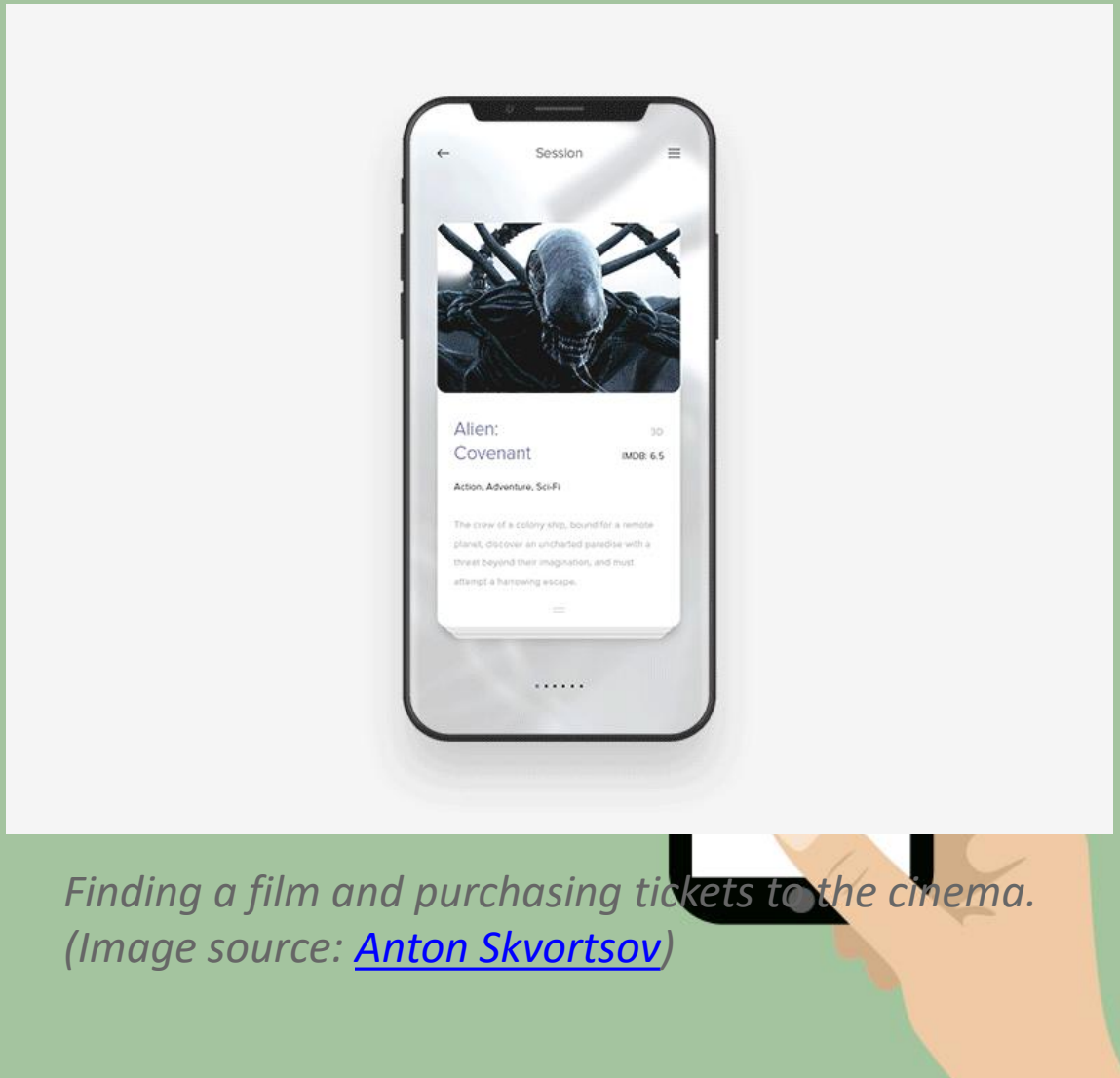
(Image source: Murat Mutlu)



Break Tasks (2)

Chunking help to connect two different activities

- such as browsing and purchasing



Finding a film and purchasing tickets to the cinema. (Image source: [Anton Skvortsov](#))

Offload Tasks

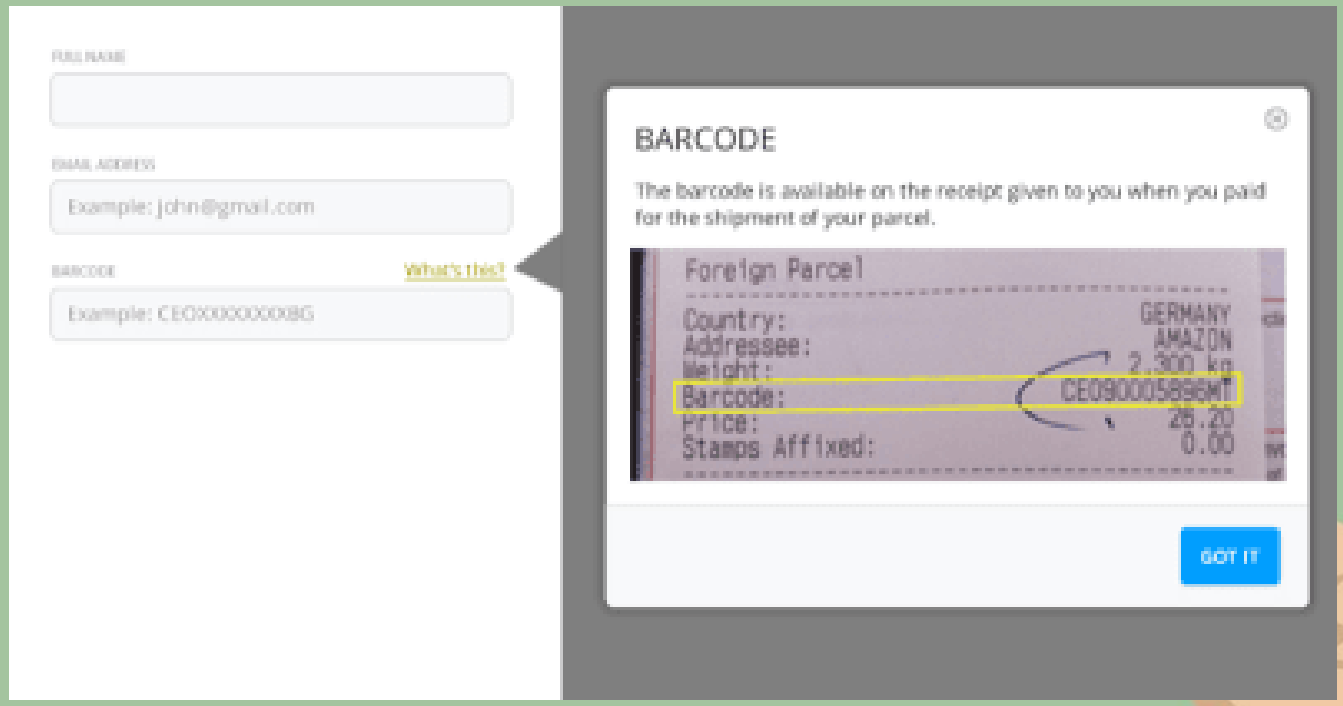
- Look for anything in the design that requires user effort (such as entering data, making a decision) and look for alternatives.

Example:

Reuse previously entered data instead of asking the user to type more or use already available information to set a smart default.

Anticipate User Needs

Proactively look for steps in the user journey where users might need help



A specific part where users need to provide specific information.

(Image source: Hotjar)

Practical Recommendations to Mobile App Design: Decluttering, Visual Weighting, and Consistency

A Comprehensive Guide To Mobile App Design

Nick Babich

https://bit.ly/2HZmMHS

2. Decluttering

- It’s essential to get rid of anything that isn’t absolutely necessary

- Reducing clutter will improve comprehension

- Use ***Functional Minimalism***

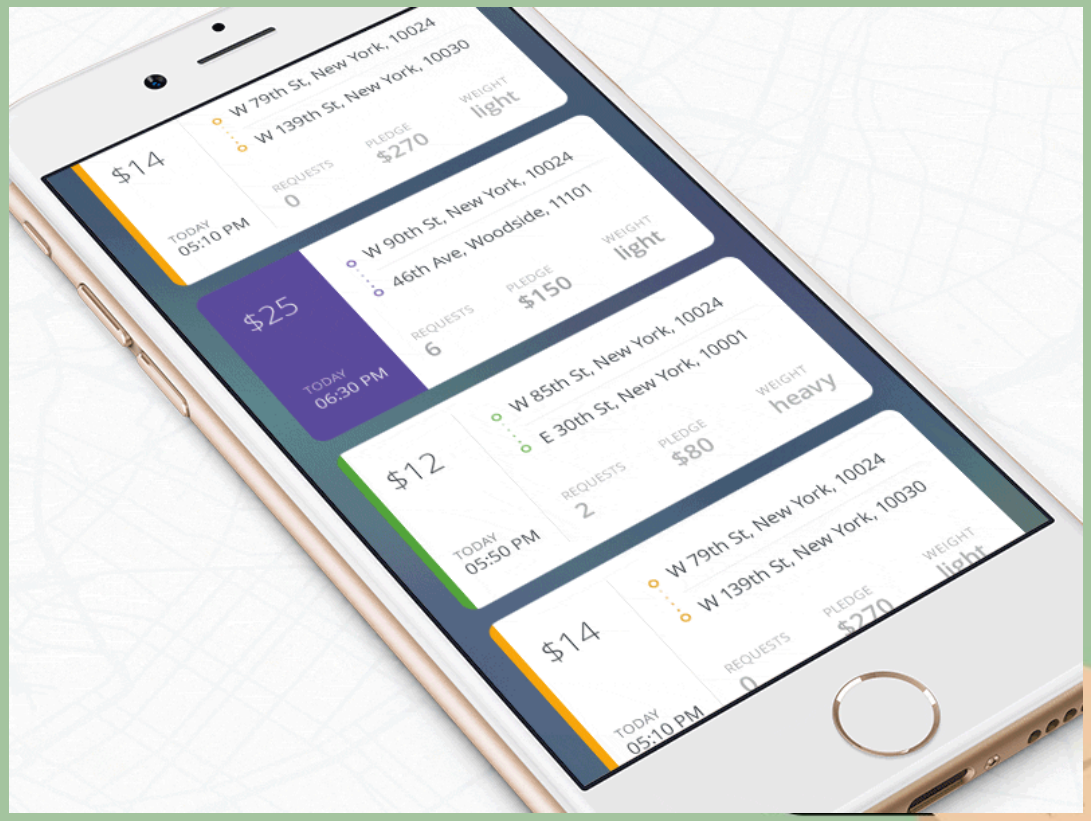
Functional Minimalism (1)

- Keep content to a minimum (present the user with only what they need to know).
- Keep interface elements to a minimum.

The clear tab bar (right) is much better than the cluttered one (left). (Image: Apple)

Functional Minimalism (2)

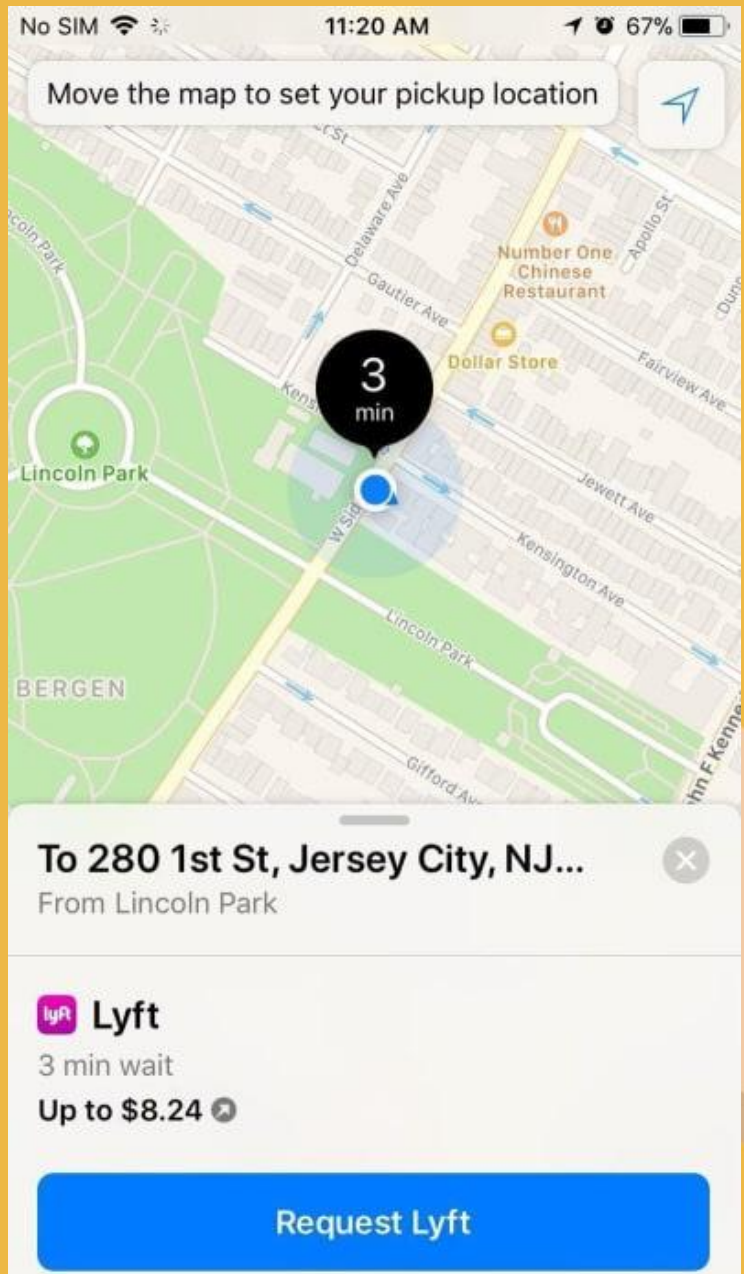
- Use progressive disclosure to show more options.



The interface reveals more options after interaction. (Image source: Ramotion)

3. Use Visual Weight to Convey Importance

- The most important element on the screen should have the most visual weight.
- Adding more weight to an element is possible with font weight, size and color.



4. Make the Design Consistent

Consistency eliminates confusion

Visual consistency
Typefaces, buttons and labels need to be consistent across the app.

Functional consistency
Interactive elements should work similarly in all parts of your app.

External consistency
Design should be consistent across multiple products. This way, the user can apply prior knowledge when using another product.

Practical Recommendations to Mobile App Design:
Optimize Content for Mobile

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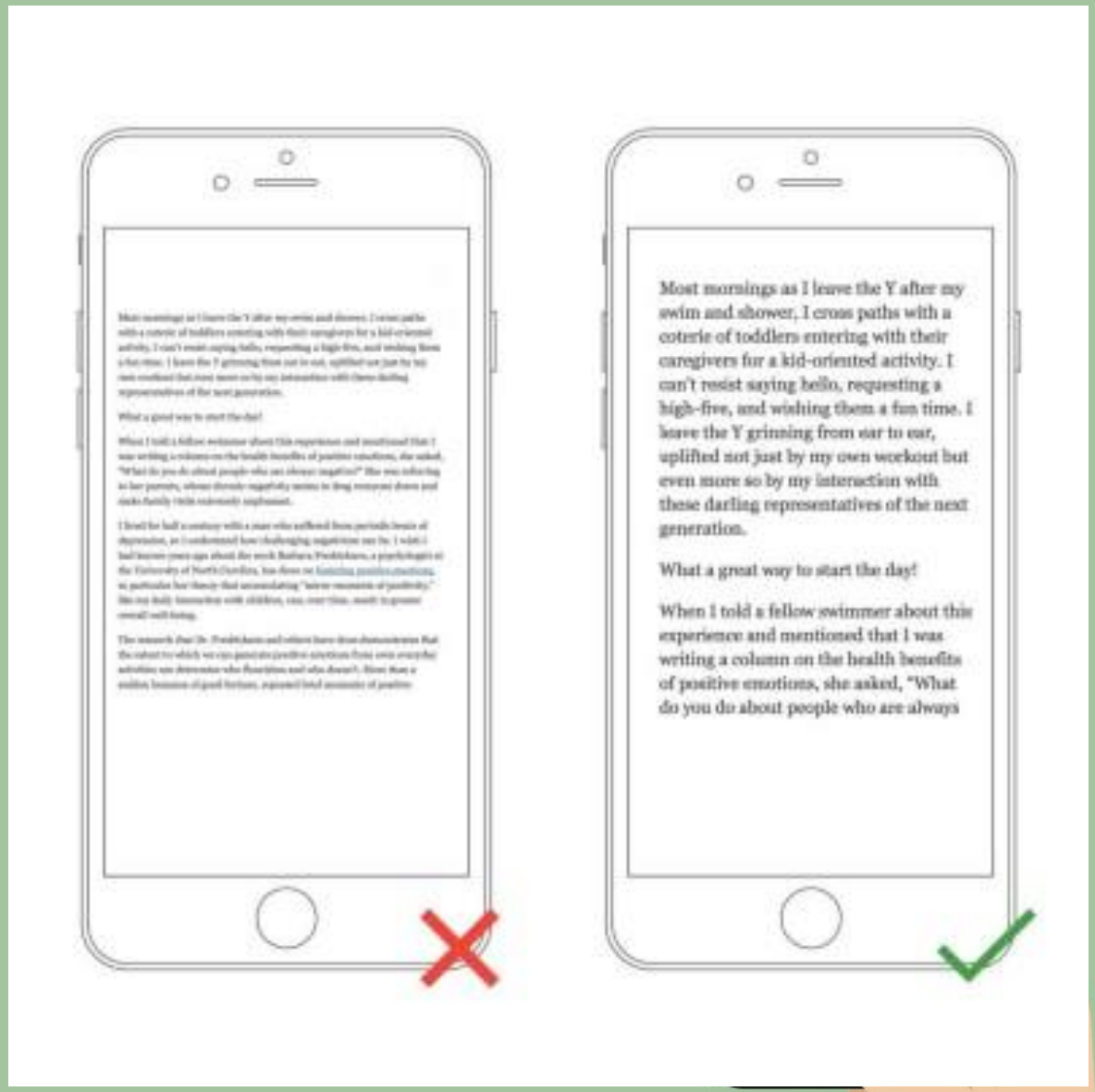
5. Optimize Content For Mobile

- Content plays a significant role in design.
- In most cases, the primary reason why people use an app is the content it provides.
- But it’s not enough just to have clear, well-crafted content.
- The content has to be easy to digest.

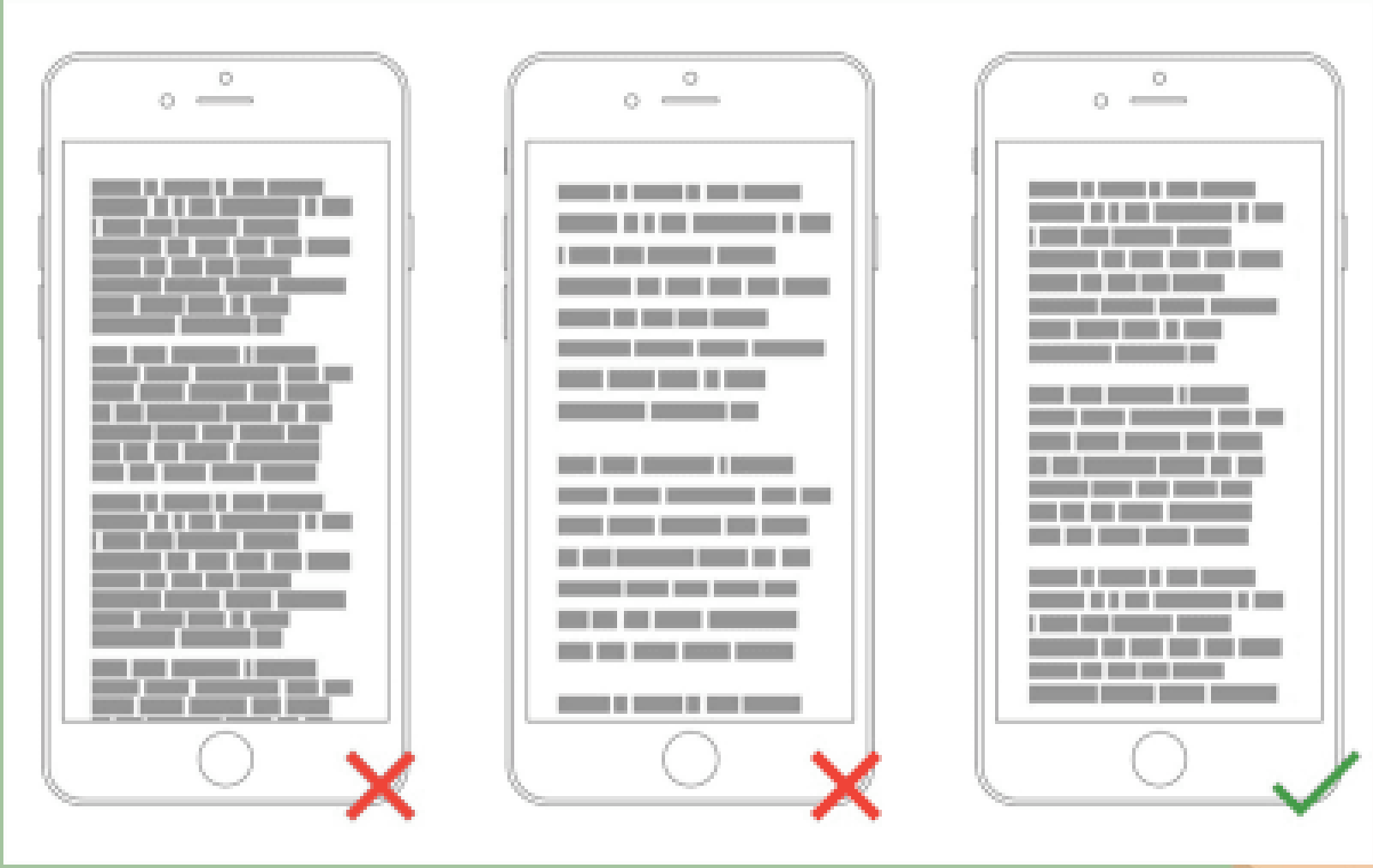
Make Text Readable and Legible

- **Font size** Generally, anything smaller than 16 pixels (or 11 points) is challenging to read on any screen.
- **Font family** Most users prefer a clear, easy-to-read font.
- **Contrast** Make sure there is plenty of contrast between the font and the background for easy readability.
- **Avoid all caps.**
- **Limit the length of text lines.** A good rule of thumb is to use 30 to 40 characters per line for mobile.
- **Don’t squeeze lines.** Adding space between text aids the user in reading and creates a feeling that there isn’t so much information to take in.

Limit the length of text lines

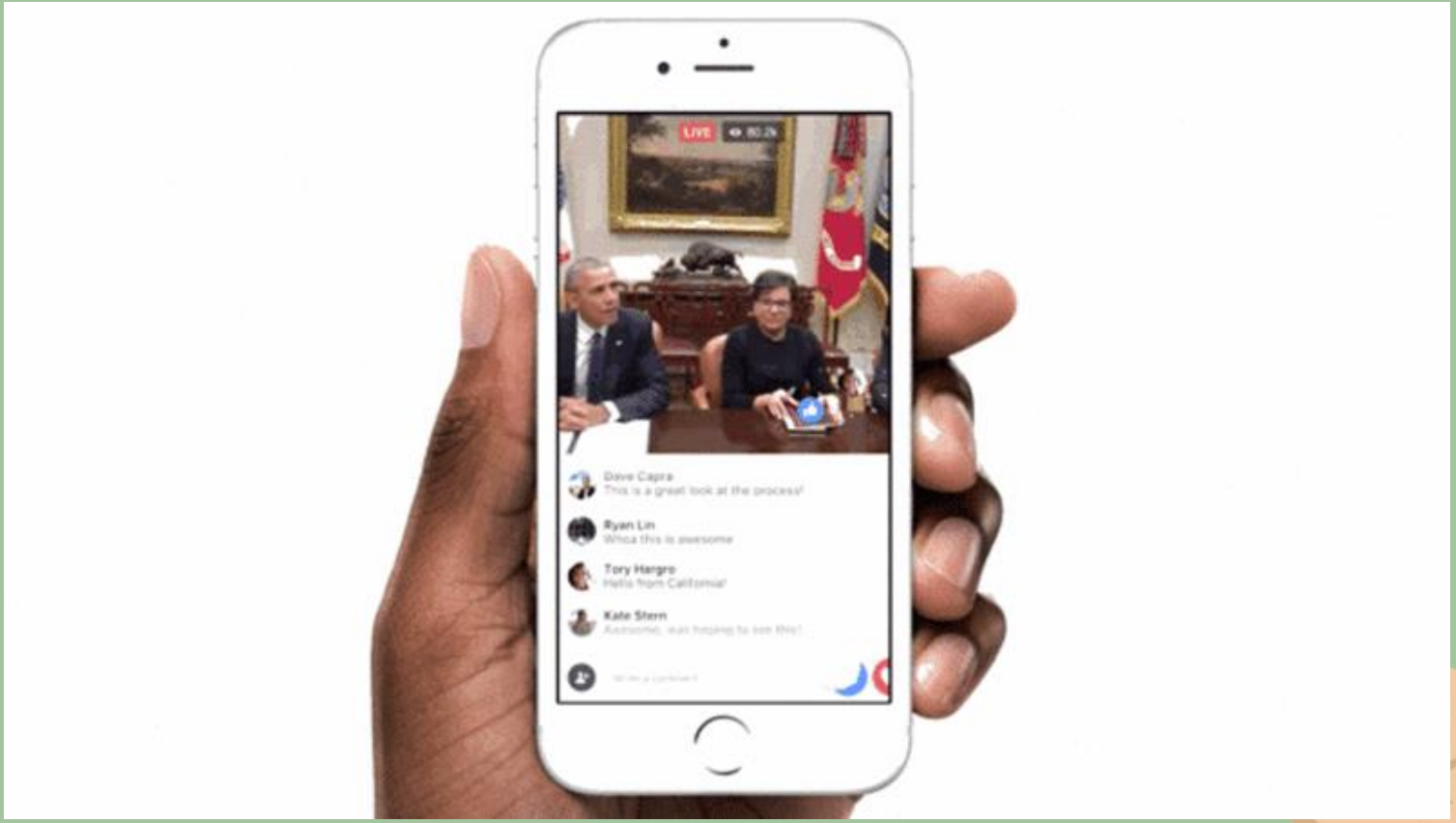


Don’t squeeze lines



Video Content is Optimized for Portrait Mode

According to ScientiaMobile, 94% of users use their mobile device in portrait mode.



Facebook Live allows you to watch video in Facebook's timeline. (Image source: Giphy)

Practical Recommendations to Mobile App Design:
Design for Touch

A Comprehensive Guide To Mobile App Design

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6. Design for Touch

Designing for touch has a goal of reducing the number of incorrect inputs and making interaction with an app more comfortable.

- Designing for fingers not cursors
- Consider thumb zone
- Feedback on Interaction

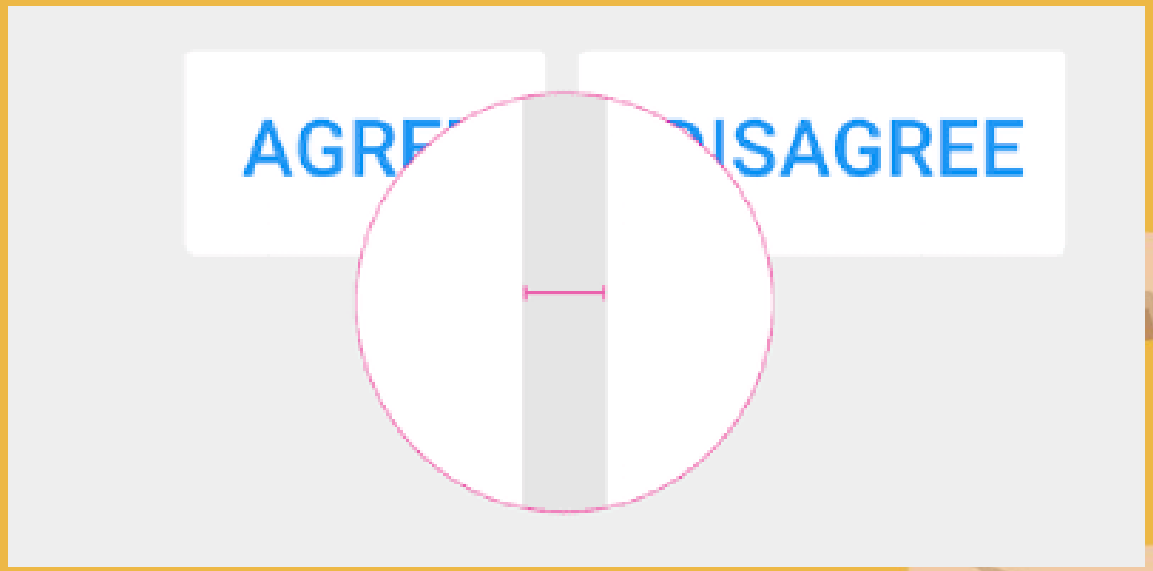
Designing for Fingers not Cursors: Size

A small touch target increases the chance of false selection.

(Image source: Apple)

Designing for Fingers not Cursors: Space

If multiple touch targets are near each other ensure that there is good amount of space between them

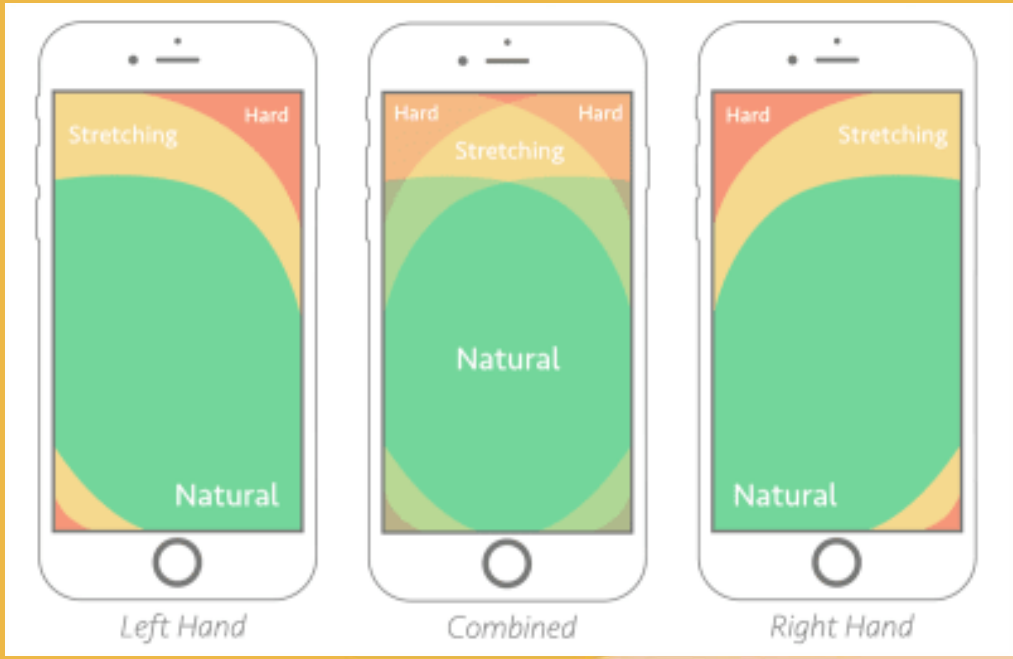


An example of space between buttons.

(Image source: Material Design)

Consider Thumb Zone

- A lot of users hold their phone with one hand.
- Only a part of the screen would be a genuinely effortless territory for their thumbs -> called **the natural thumb zone**.
- Other zones require finger stretching or even changing the grip to reach them.



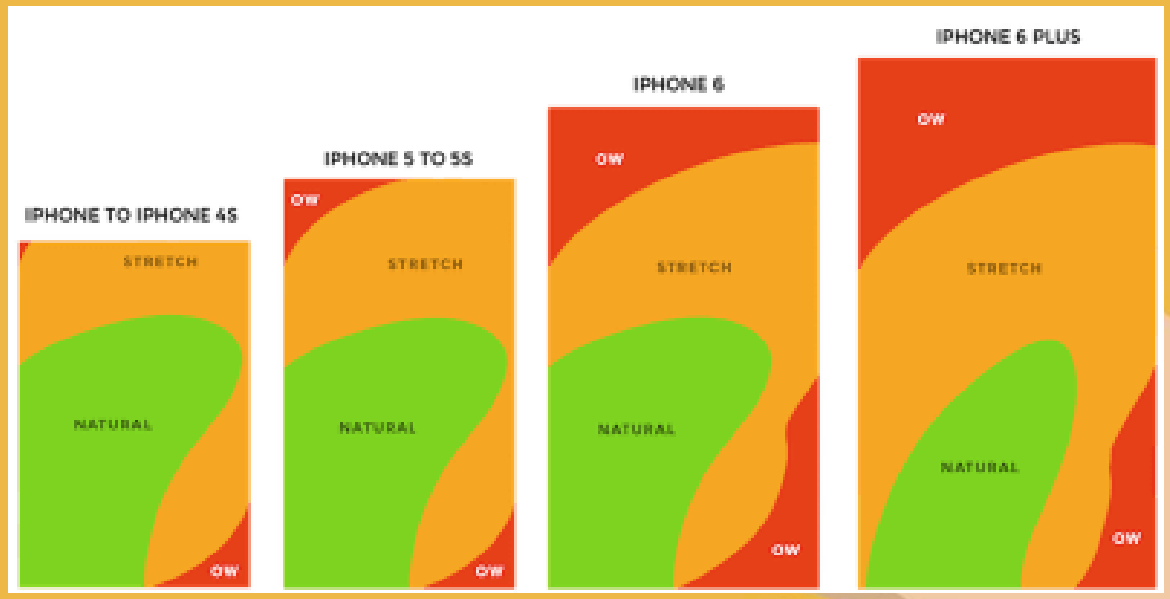
Thumb zones, according to research by Scott Hurff. (Image source: Smashing Magazine)

Consider Thumb Zone

The bigger the display, the more of the screen is less easily accessible.

- Green zone: the best place for navigation frequent interactive actions

- The red zone: the best place for potential danger options (such as “Delete” or “Erase”). Users are less likely to trigger this option accidentally.



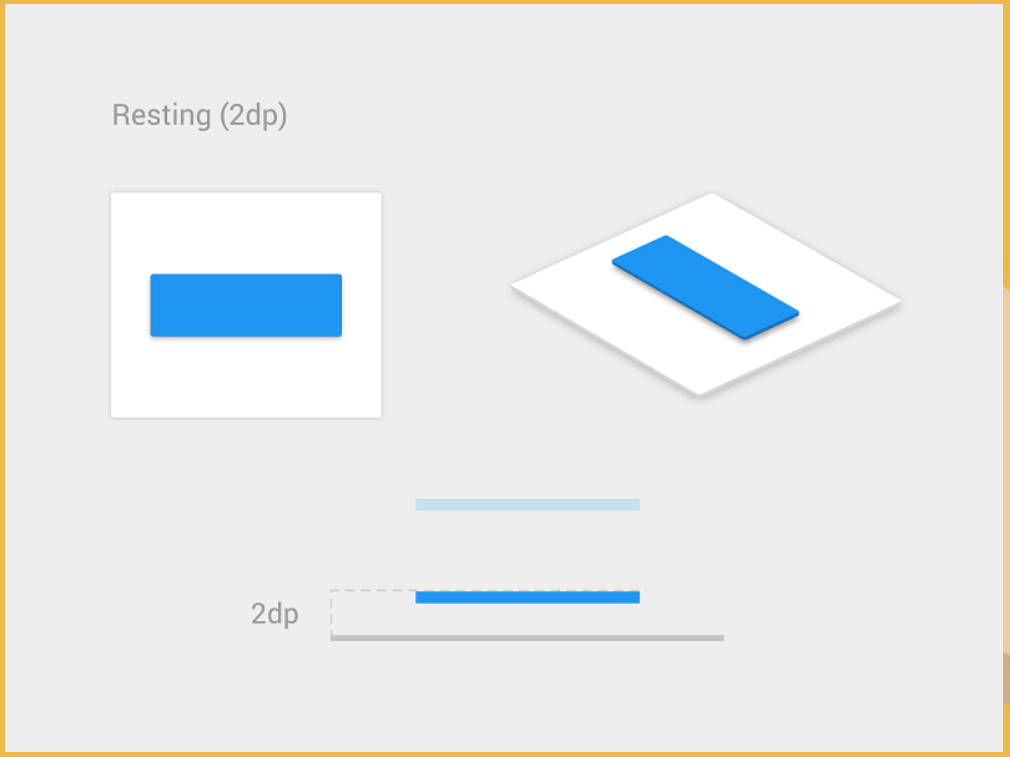
Thumb zones for a right-handed person, according to research by Scott Hurff.

Feedback on Interaction

- Provide instant feedback on every user interaction.
- If your app doesn't provide feedback, the user will wonder if it has frozen or if they missed the target.

The feedback could be:

- visual (highlighting a tapped button)
- tactile (a device vibration on input).



(Image credit: Vadim Gromov)

Practical Recommendations to Mobile App Design: Optimize for Mobile

A Comprehensive Guide To Mobile App Design

Nick Babich

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7. Optimize for Mobile

- Design for Interruption
- Take advantage of device capabilities
- Multi-channel experience
- Poor internet connectivity
- Limited data
- Limited device capabilities
- Local aesthetic
- Specific of region

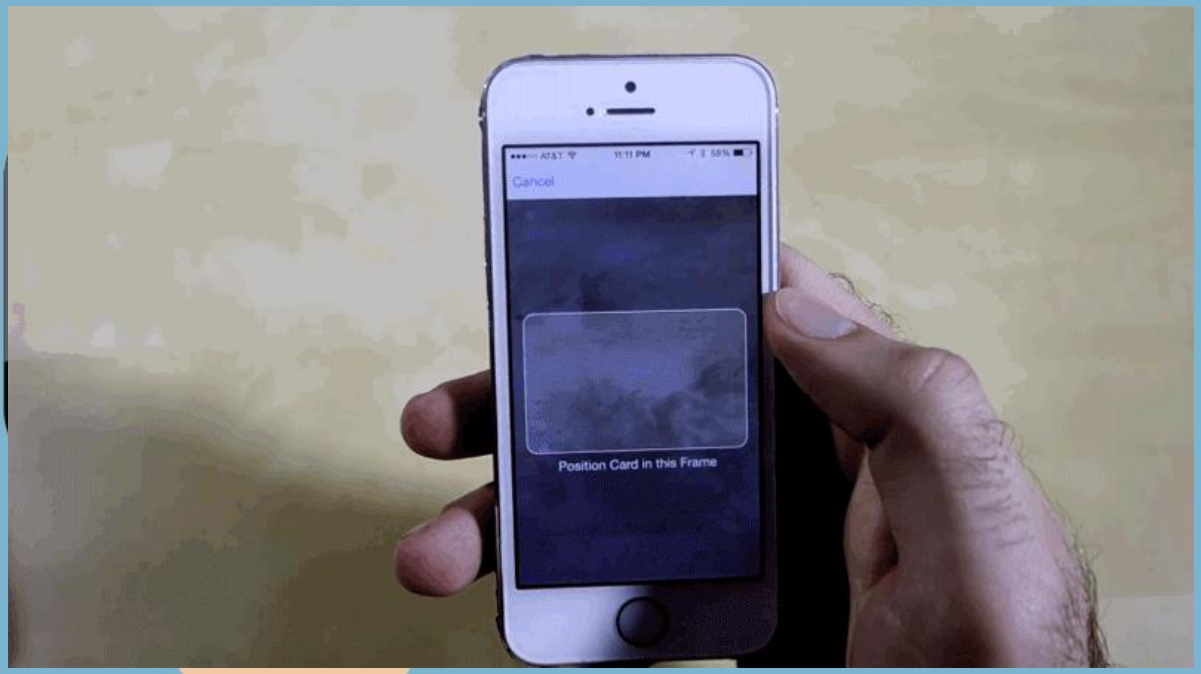
Design for Interruption

- A lot of mobile sessions happen when users on the go.
- Such sessions can be interrupted at any time.

- Users can be easily frustrated when an app forgets their current progress as soon as they close it.
- When an interruption occurs, your app should save the current state (context) and allow users to continue where they left off.

Take Advantage of Device Capabilities

Mobile devices have a lot of sensors (camera, location tracking, accelerometer) that can be used to improve the UX.

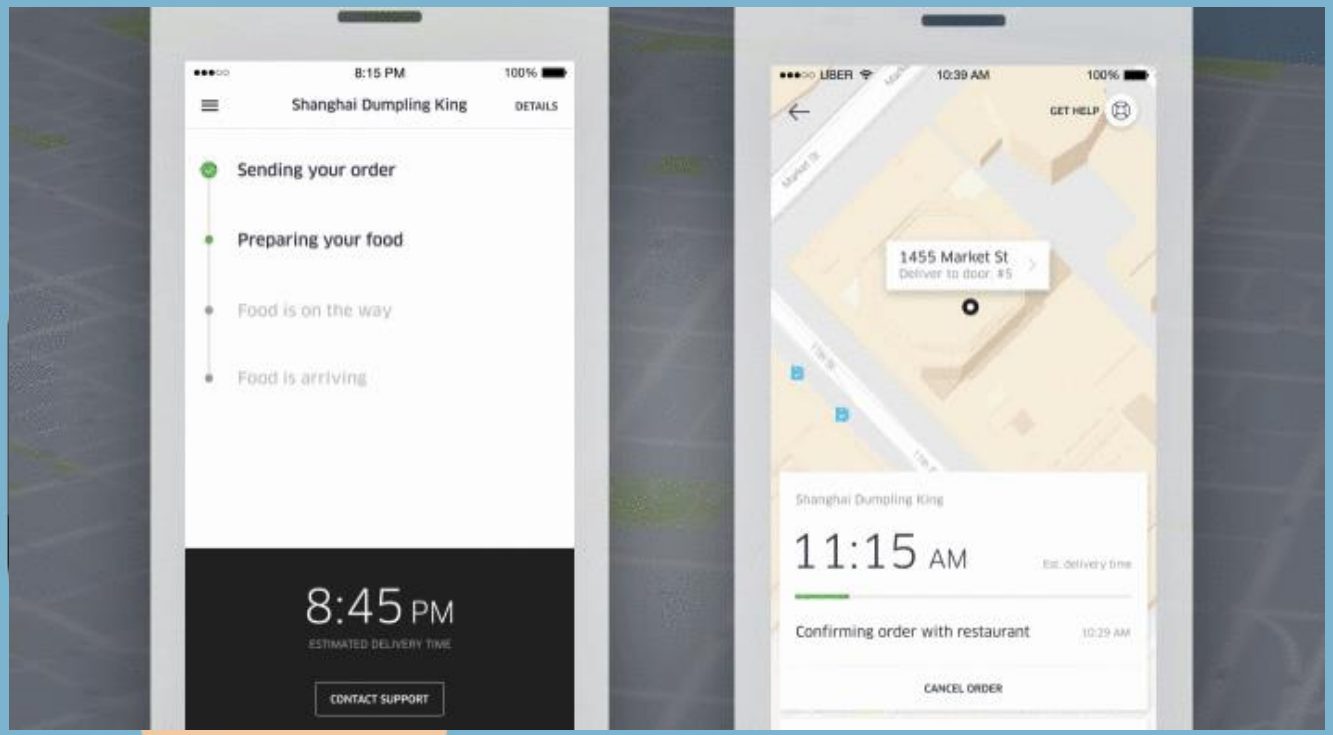


(Image credit: Business Insider)

It’s possible to simplify data input operations by using a camera.

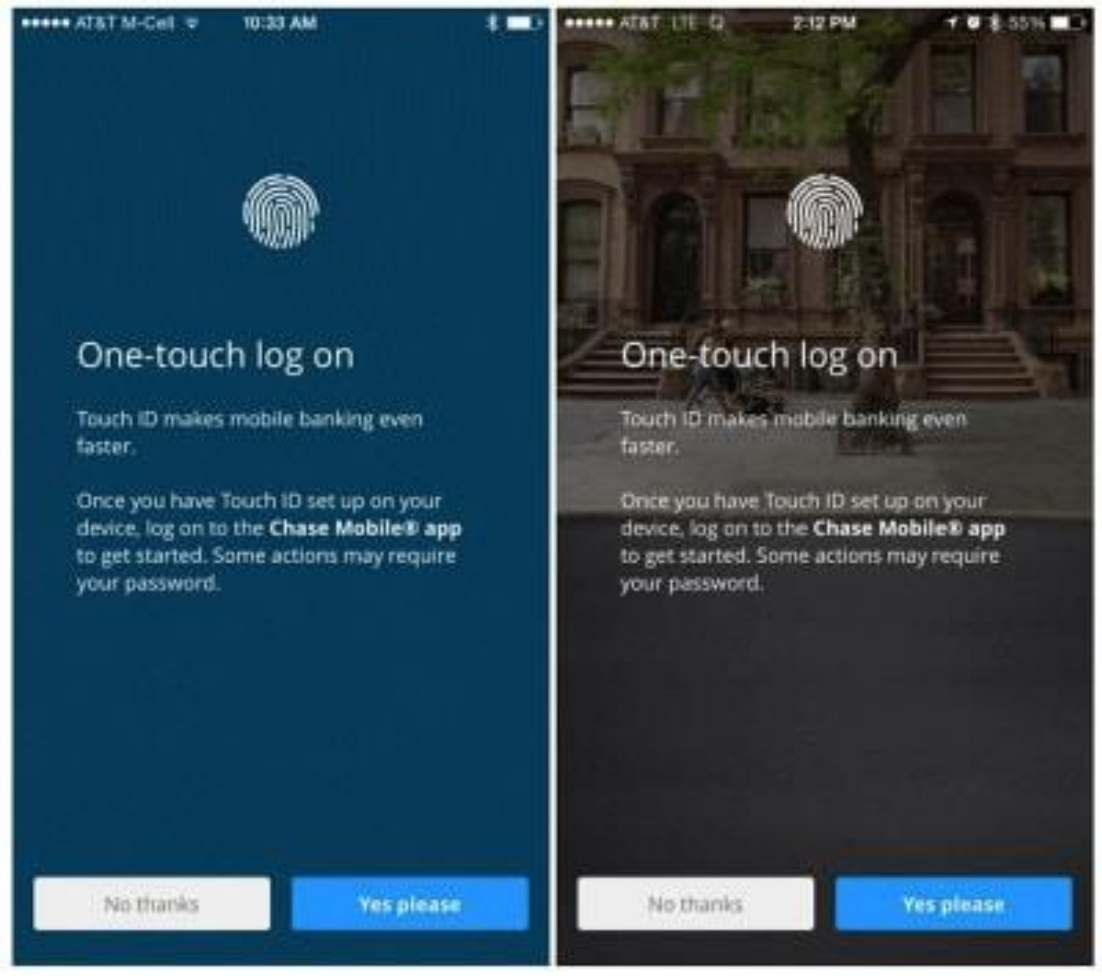
Take Advantage of Device Capabilities

Location awareness can be used to improve the UX.



Apps like Uber Eat already use this property to reduce the number of actions required by the user.

Take Advantage of Device Capabilities



Chase Mobile's app provides a one-touch log-in feature.

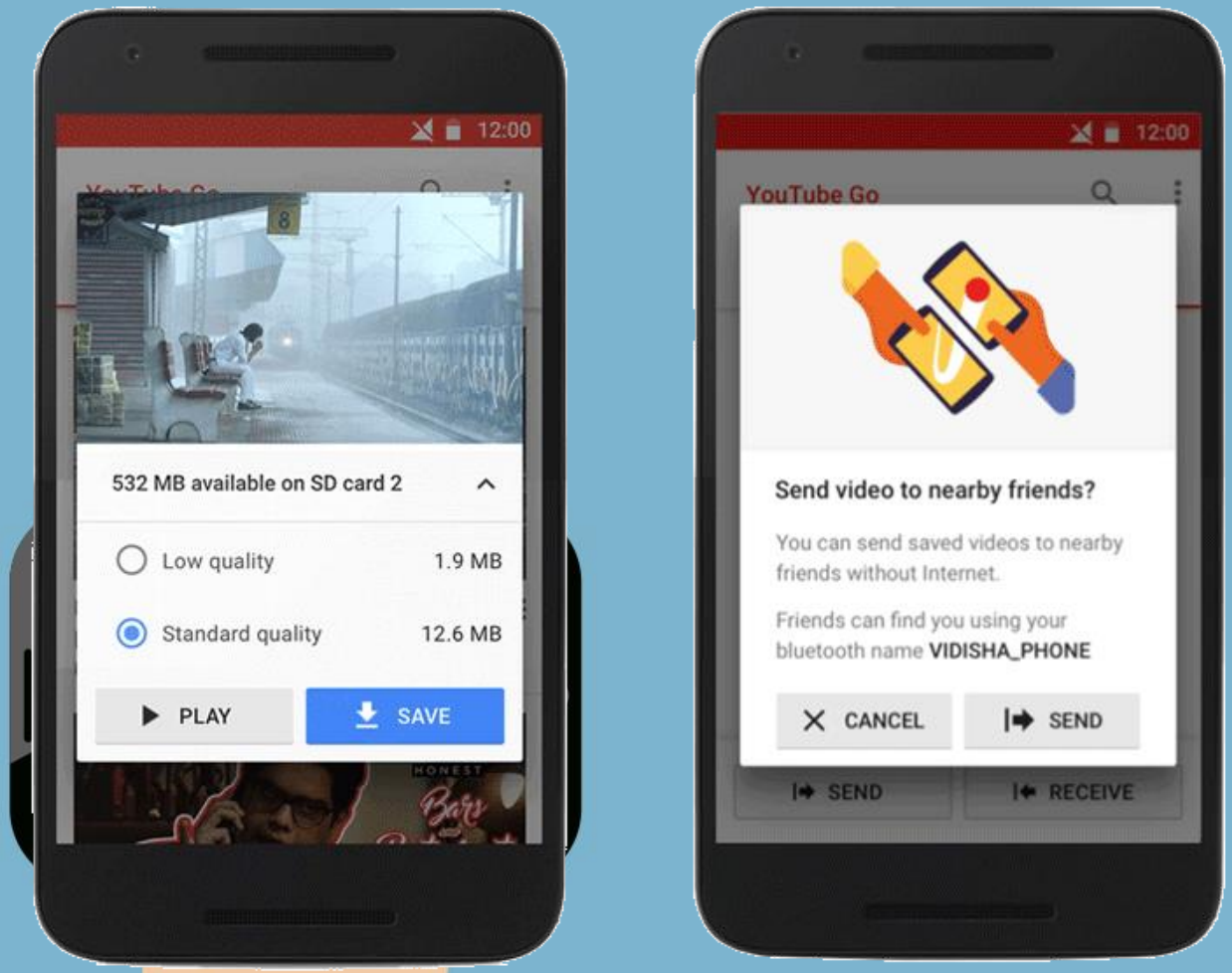
Biometric authentication: It's possible to minimize the number of steps required to log in to an app using fingerprint touch login, facial or voice identification.

Multi-Channels Experience

- Create a seamless experience, across all devices.
- Users should be able to switch to a different medium and continue the journey.

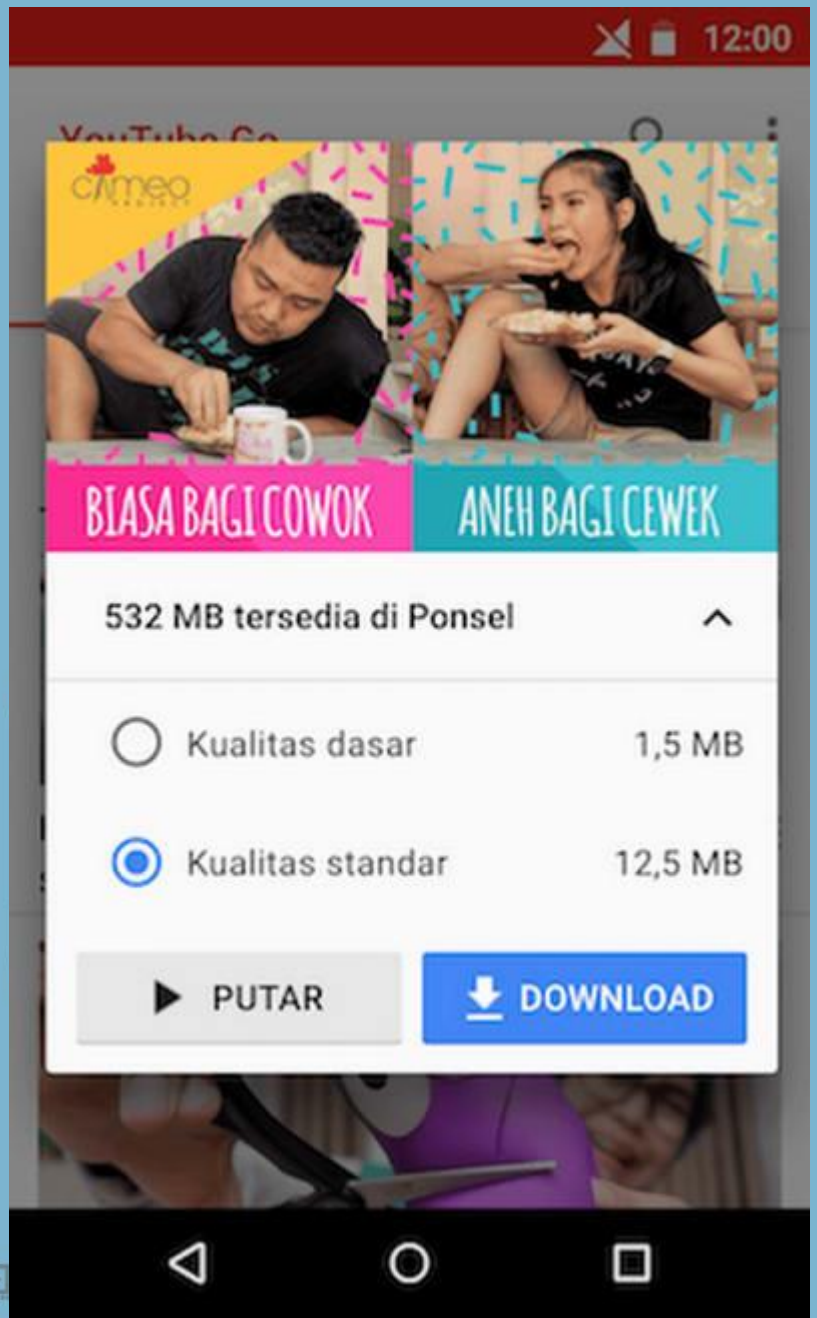
- Example:
  Designing an e-commerce app, that enables mobile users to switch to their desktop to continue the journey.

Poor Internet Connectivity



Depending on a person's location, the network might switch from Wi-Fi to 3G to 2G to no connectivity at all, and your product has to accommodate that.

YouTube Go lets users send and receive videos when they're together, using offline peer-to-peer sharing.



Limited Data

- Some users appreciate transparency when it comes to understanding their data consumption.
- They also value the ability to control whether a product downloads over Wi-Fi or uses data.

YouTube Go lets you preview videos and choose their file size before saving it offline to watch later.

Limited Device Capabilities

- Most emerging-market devices cost below $100 and might come with limited storage and processing power.
- Make sure that the product you design works with older, low-end devices and software.

Local Aesthetic

- Minimalist design, which is popular today, might be considered too bare for other cultures.
- If you want your product to succeed in emerging markets, pay attention to the cultural aesthetics.
- Designing according to local aesthetics will make your product feel more relatable.

Specific of Region

- When Google adapted Google Maps for India, it considered that India is the largest two-wheeler market in the world
- The millions of motorcycle and scooter riders have different needs than drivers of automobiles.
- It released two-wheeler mode in Maps.
  - This mode shows trip routes that use shortcuts, not accessible to cars and trucks.

Practical Recommendations to Mobile App Design: Humanize Digital Experience

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Nick Babich

https://bit.ly/2HZmMHS

8. Humanize Digital Experience

UX isn’t only about usability; it’s mostly about feelings.

- Personalized Experience
- Delightful Animation

Personalized Experience

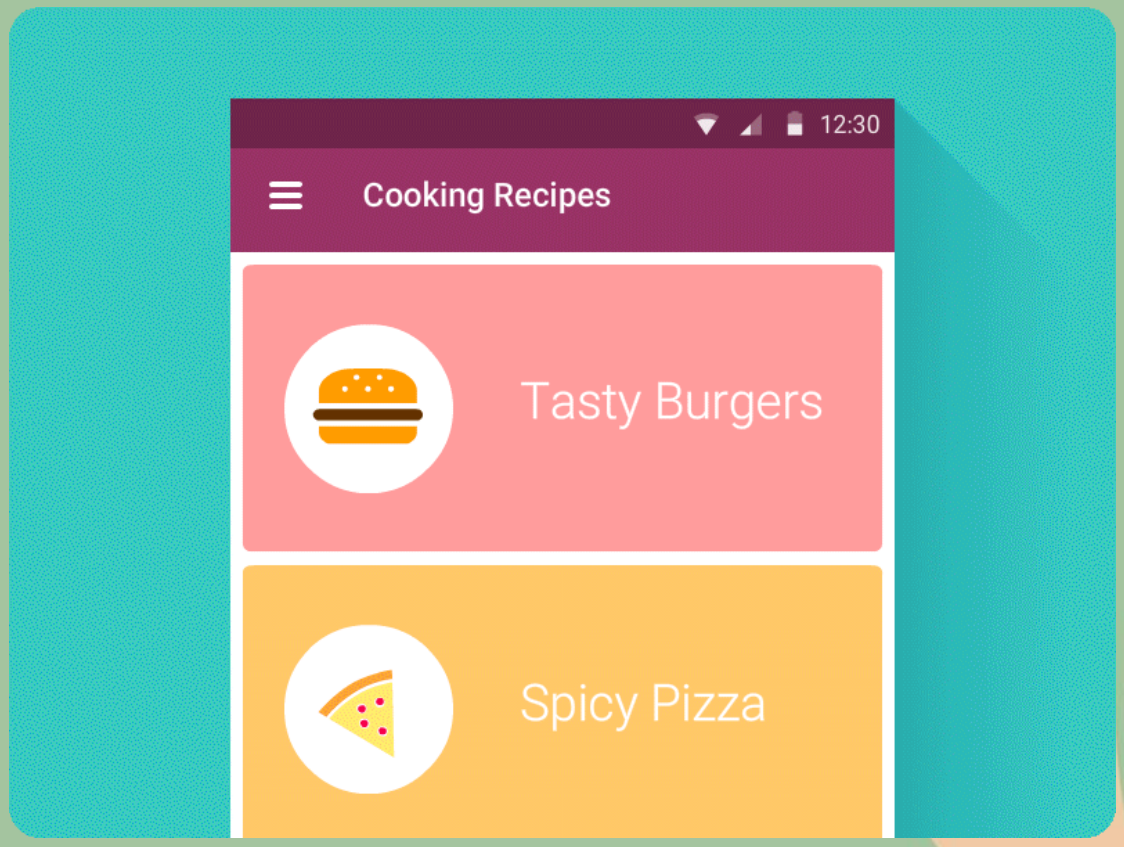
- There are countless ways to improve the mobile UX by incorporating personalization.
- It’s possible to offer personalized content depending on the user’s location, their past searches and their past purchases.

Starbucks provides offers and services tailored to individual customers

Delightful Animation

Delightful animation is used to make an interface feel human.

Using delightful details is an opportunity to create an emotional connection with your users.



(Image credit: Serhii Hanushchak)

Design in General

A great design is the perfect combination of beauty and functionality

But don’t try to build a perfect app right on the first attempt.

It is almost impossible.

Instead, treat your app as a continually evolving project, and use data from testing sessions and user feedback to constantly improve the experience