

# Conducting your first usability research

Daniel Roeven, 8 juni 2016



“They drag programmers into dark rooms, where they watch through one-way mirrors as hapless users struggle with their software. At first, the programmers suspect that the test subjects have brain damage. They cannot believe that any user could be so stupid as to not understand their program. Finally, after much painful observation, the programmers are forced to bow to empirical evidence. They admit that their interface design needs work...”

Alan Cooper in *About Face: The essentials of Interaction Design*

# PEBCAK



**PEBCAK**

Problem Exists Between Chair And Keyboard

## User error is design error!

“ People don't make errors. Your product makes errors when it doesn't interpret the user's actions correctly.



Don Norman in *The Design of Everyday Things*  
Expert in design, usability engineering and  
cognitive science

# What is usability?

1. effective
2. efficient
3. engaging
4. error tolerant
5. easy-to-learn



Whitney Quesenberry  
Usability Expert

# What is usability?

1. memorability
2. efficiency
3. satisfaction
4. errors
5. learnability



Jakob Nielsen  
Usability Expert

## What is usability?

1. effectiveness
2. efficiency
3. satisfaction

*ISO 9241-11*



International  
Organization for  
Standardization



# What is usability?

1. Visibility of system status
2. Match between system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognise, diagnose, and recover from errors
10. Help and documentation



Jakob Nielsen

# Mental Models

## Mental Models

“ A user interface is well designed when the program behaves exactly how the user thought it would.

Joel Spolsky in *User Interface Design for Programmers*



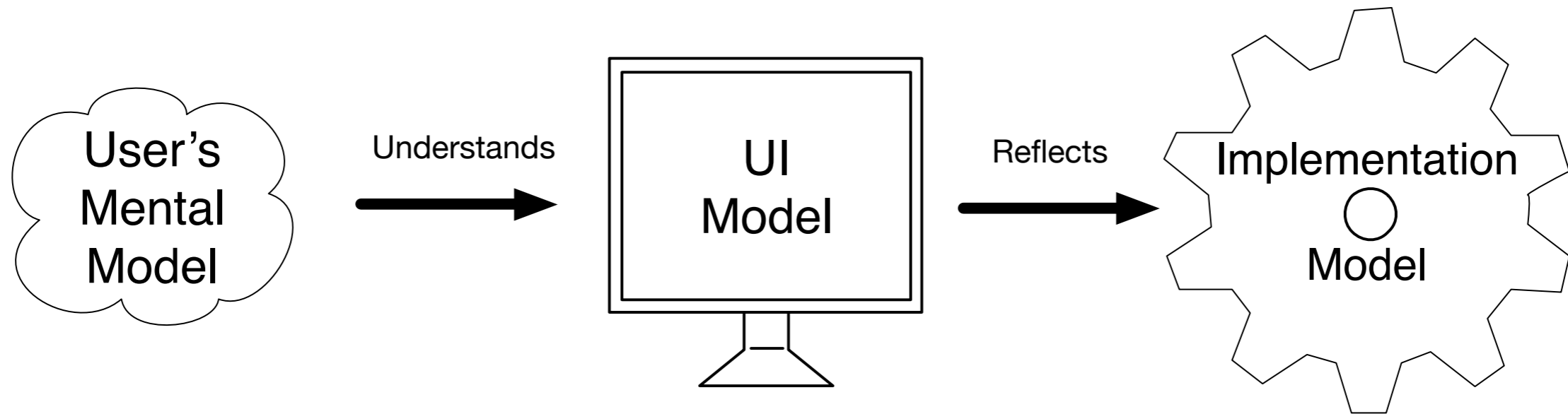
## Three different models

1. User's mental model

2. UI model also design model, manifest model, designer's model

3. Implementation model also system model, programmers model

## Three different models



# Designing for mental models

1. Simplicity
2. Familiarity
3. Recognition
4. Flexibility
5. Feedback
6. Safety
7. Affordances

from *Mental models and Usability* by Mary Jo Davidson, Laura Dove, and Julie Weltz

# Designing for mental models



## 7. Affordances



# Modes



## Modes

“ A part of an application that a user has to formally enter and leave, and that restricts the operations that can be performed while this mode is in effect.

Caroline Rose, *Inside Macintosh*

# Modes

Password:

Password:

# Modes

Password:  

# Modes



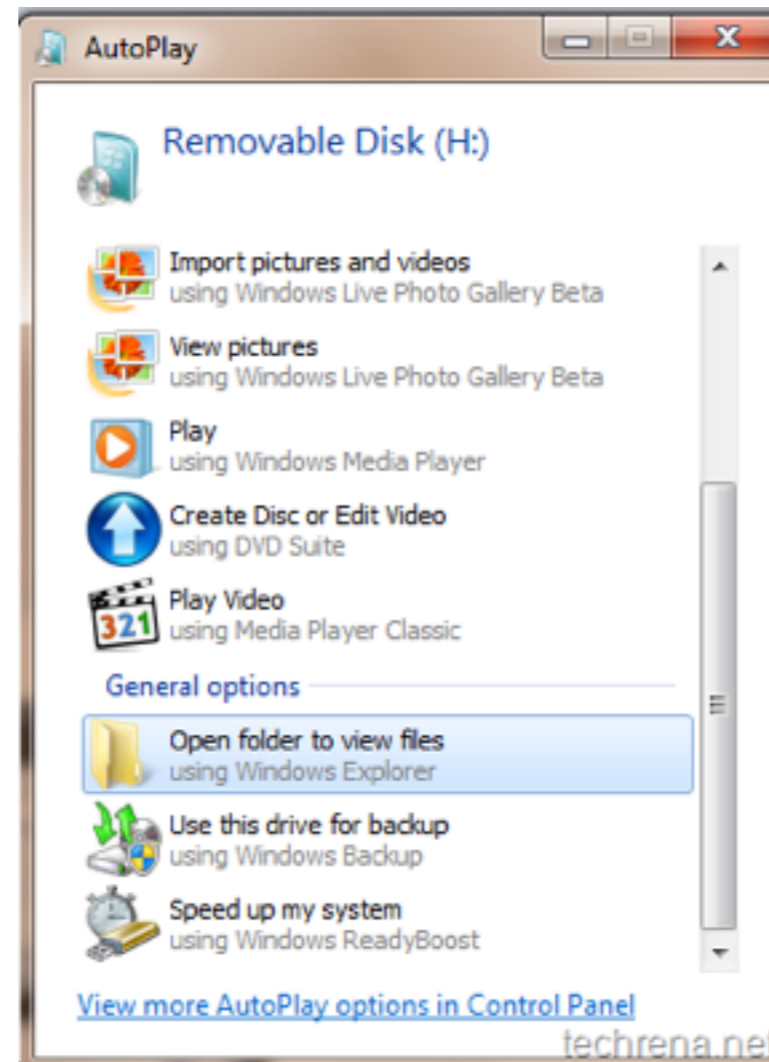
<http://arstechnica.com/apple/2010/09/hdr-photography-with-iphone-4-and-ios-41/>

# Modes

HDR

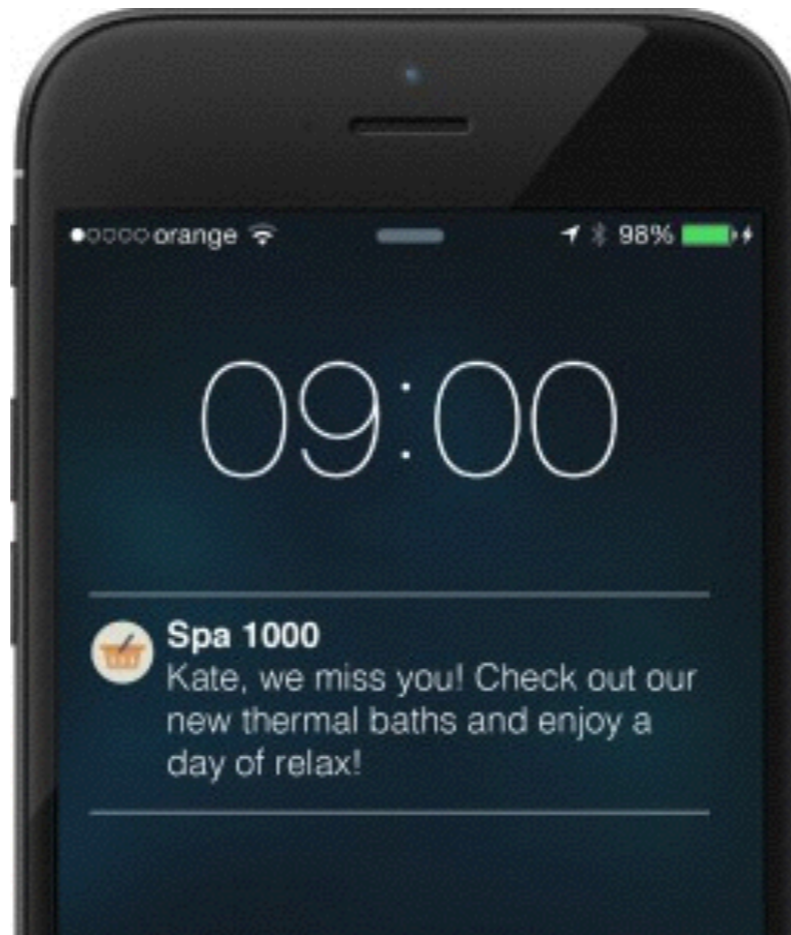
HDR

# Interrupts



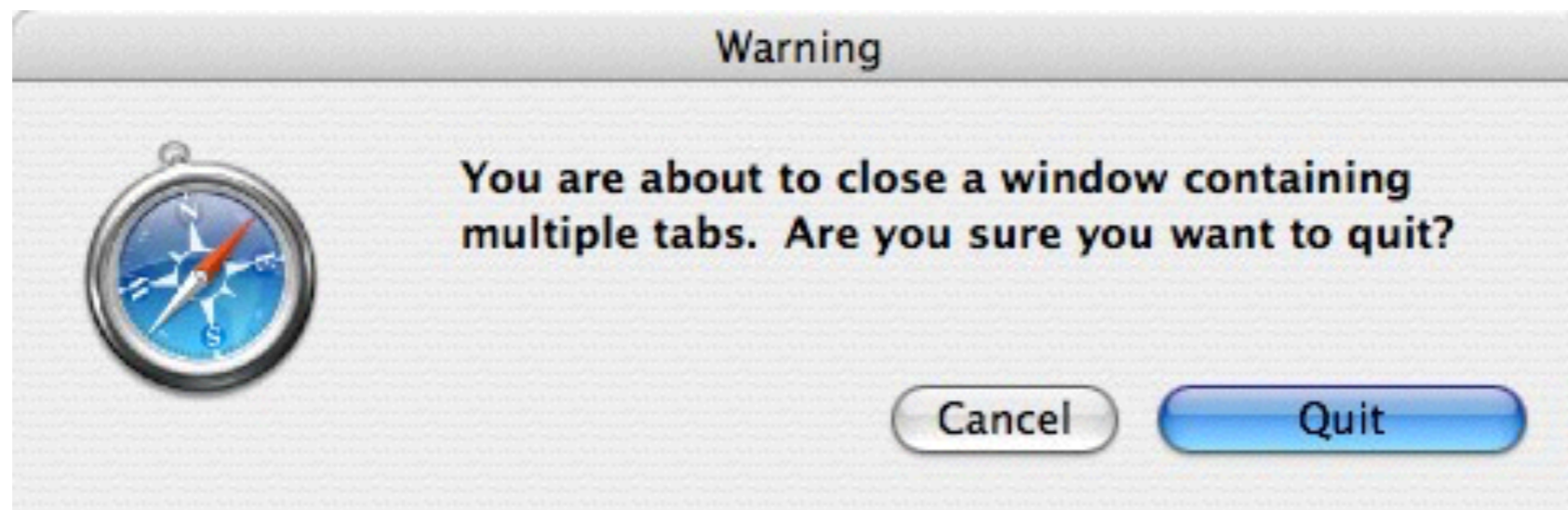
<http://techrena.net/enable-disable-autorun-configure-autoplay-windows-7/>

# Interrupts



<http://blog.apps-builder.com/5-push-notification-campaigns-start-right-away/>

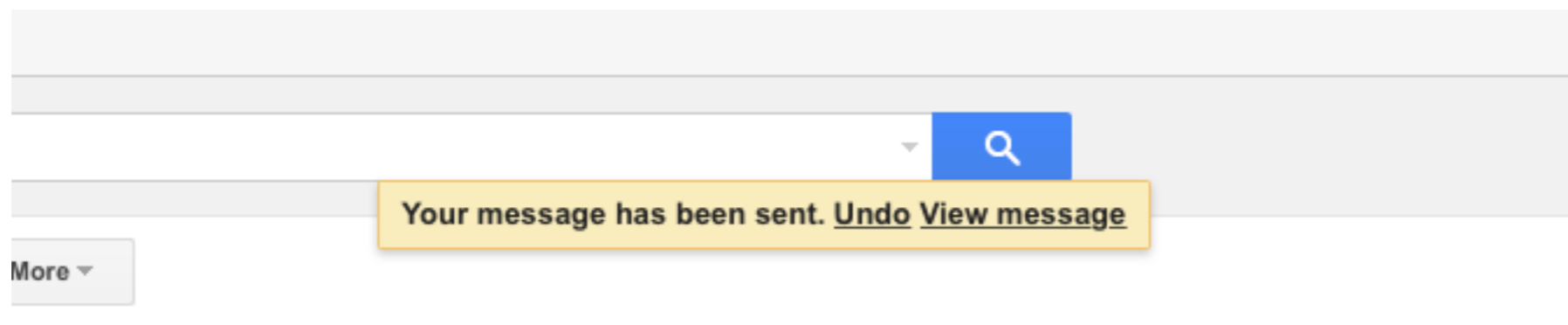
# Offer Undo



<http://www.macworld.com/article/1044825/taboo.html>



# Offer Undo



<https://gmail.com>

## Consistency

“ I don't think this app is entirely consistent...”

# Consistency

- Visual consistency
- Behavioural consistency

# Consistency

## Behavioural consistency

Consistency and standard problem, at all points during the test phase: the Android return button closes the app, while the app provides its own return button, that works, as the Android return button, in apps following the platform convention. This will be a bigger problem for Persona Monique, as she is impatient, and will get angry, as she repeatedly presses the wrong buttons.

*Orange Cobras*

## Consistency

“ Make it exactly the same,  
or make it decisively different!

Bryan Mamaril (Microsoft)

<https://medium.com/@bmamaril/an-ocd-critique-of-the-new-instagram-logo-ui-2c8f9917c651>

## Discoverability

“ If a tree falls in a forest and no one is around to hear it, does it make a sound?

## Discoverability

Is there a difference between a feature that doesn't exist and one that you can't find?

## Discoverability

Which things need to be easily discoverable? Which need to be accessed often? Which can we hide?



# Errors

User error is design error!

# Errors

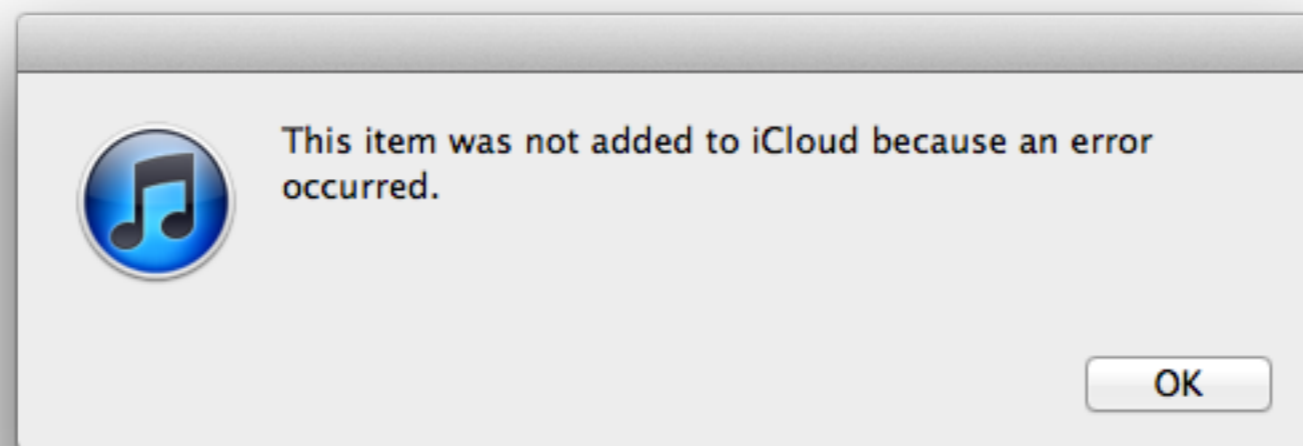
Don't blame the user!

Offer solutions, helpful error messages, prevent the problem altogether!

# Errors



# Errors



## Errors

De fout die als eerste kwam was de GPS fout. Deze foutmelding krijg je wanneer je je GPS niet hebt aanstaan terwijl je op melden drukt. Je krijgt dan een melding waarin staat dat je de GPS moet aanzetten en het opnieuw moet proberen. De applicatie helpt je zoeken naar een oplossing voor een probleem.

*Campgemini*

# Personas



# Personas

“Embodies” group of users, serves as metaphor to reason about user group.

# Personas

Describe different groups precisely, based on real information!



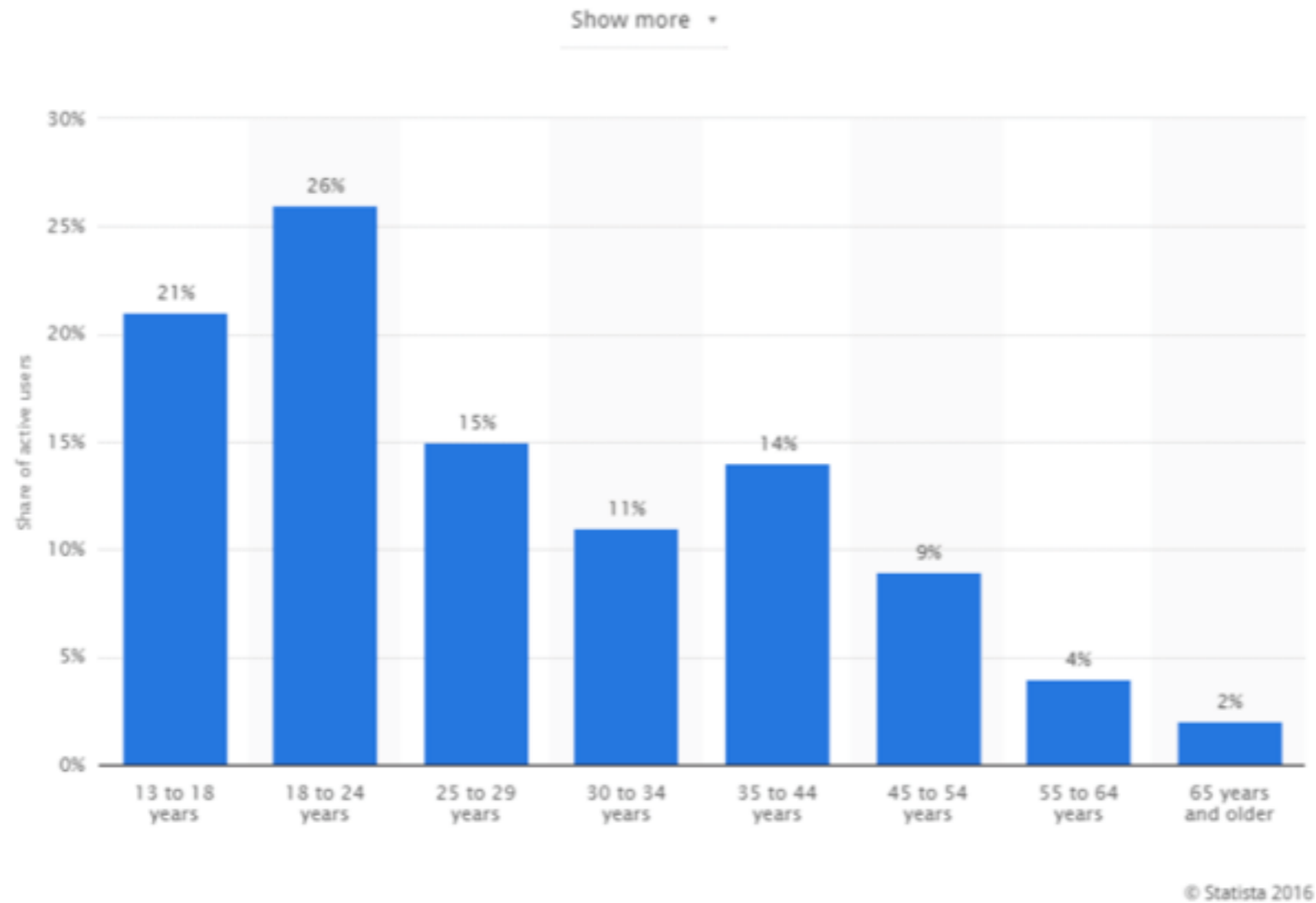
# Personas

The target audience for this application is meant for the **big public**. It is a simple, multitasking application that can be used by **almost all people** and be used for a wide spread of tasks. The only audience that isn't part of the target audience are people with disabilities causing them to not be able to use the touch screen properly, not see the screen properly, not easily understand the working of applications, or not being able to understand/process the information provided by the application.

# Personas

## Distribution of active Spotify users in the United States as of April 2015, by age

The graph presents the distribution of active Spotify users in the United States as of April 2015, broken down by age. During the survey period it was found that 21 percent of U.S. Spotify users were 13 to 18 years of age.



## Personas: insights

Pjotr is a 29-year-old trucker, originating from Poland. He works for a company in The Netherlands. As a trucker, **he is on the road a lot**, and visits **many different stores**. He likes Albert Heijn because it is such a recognisable brand and can be found almost everywhere he goes. He usually buys the cheaper products, because he is saving up money for his family in Poland. He checks the Bonus as well to see whether anything he wants is for sale. He also takes the Allerhande with him, which is a magazine containing recipes. Pjotr likes cooking and the recipes are quick but tasty. If Pjotr likes something, he will cook it much more often. Pjotr uses the Albert Heijn website often to find out **where the nearest store is**, because he is always on the road and does not know his way around in all of the cities he visits.

*New Button*

## Personas: insights

Location: A nice addition to the functionality of finding the closest store, is to be able to find a store using GPS instead of postal code. *ys* on the road and does not know his way around in all of the cities he visits.

*New Button*

# Usability testing is research!

# How to conduct usability research

Determine test goals:

- Using specifications
- Using persona's
- Using usability criteria

*from Erik Barendsen's slides, see werkplaats*

# How to conduct usability research

- determine scenario's and tasks
  - in user's language
  - in context that user will understand
  - defined by goals rather than actions
  - prepare data for forms, logins, etc.
  - let users indicate they're finished
- determine test variables / indicators
- determine methods for data collection (and argue their correctness)
  - Thinking aloud
  - Observation
  - Questionnaires (pre-test, post-task, post-test)
  - Interview (for example 'stimulated recall')
  - Eye tracking
- Determine how to analyse your data
- Determine testers
- Determine test procedure

*from Erik Barendsen's slides, see werkplaats*

# Observation

What do you look for?



# Operationalisation

## Operationalisation of research question (validity)

eigenschap (theoretische variabele)	indicator	observatie/meting (empirische variabele)
wat wil je onderzoeken?	waar ga je op letten?	welke data verzamel je?
	waar ga je op letten?	welke data verzamel je?
		welke data verzamel je?

# Tests

1. Moderated task test
2. Unmoderated task test
3. Free-form test

## Moderated *task* testing

That means defining tasks:

- Think about most important activities
- Don't make tasks too prescriptive
- Do not describe steps
- Do not use terminology from interface

# Thinking-aloud testing

Testers “think-aloud”, live commentary on what they are *doing*

## Example

*Een vader, een moeder en hun zoon zijn samen 80 jaar oud. De vader is tweemaal zo oud als de zoon. De moeder is even oud als de vader. Hoe oud is de zoon?*

## Example

1: a father, a mother and their son are together 80 years old

2: the father is twice as old as the son

3: the mother is as old as the father

4: how old is the son?

5: well, that sounds complicated 6:

let's have a look

7: I just call them  $F$ ,  $M$  and  $S$

8:  $F$  plus  $M$  plus  $S$  is 80

9:  $F$  is 2 times  $S$

10: and  $M$  equals  $F$

11: what do we have now?

12: three equations and three unknowns 13: so  $S$  ...

14: 2 times  $F$  plus  $S$  is 80

15: so 4 times  $S$  plus  $S$  is 80

16: so 5 times  $S$  is 80

17:  $S$  is 16

18: yes, that is possible

19: so father and mother are 80 minus 16

20: 64

21: er ... 32.

## Example

1: father, mother and son are together 80 years old  
2: how is that possible?  
3: if such a father is 30 and mother too  
4: then the son is 20  
5: no, that is not possible  
6: if you are 30, you cannot have a son of 20  
7: so they should be older  
8: about 35, more or less  
9: let's have a look  
10: the father is twice as old as the son  
11: so if he is 35 and the son 17  
12: no, that is not possible  
13: 36 and 18  
14: then the mother is  
15: 36 plus 18 is 54  
16: 26 ...  
17: well, it might be possible  
18: no, then she should have had a child when she was 9  
19: oh, no  
20: no, the father should, the mother should be older  
21: for example 30

22: but then I will not have 80  
23: 80 minus 30, 50  
24: then the father should be nearly 35 and the son nearly 18  
25: something like that  
26: let's have a look, where am I?  
27: the father is twice ...  
28: the mother is as old as the father  
29: oh dear  
30: my mother, well not my mother  
31: but my mother was 30 and my father nearly 35  
32: that is not possible  
33: if I make them both 33  
34: then I have together 66  
35: then there is for the son ... 24  
36: no, that is impossible  
37: I don't understand it anymore  
38: 66, ..., 80  
39: no, wait, the son is 14  
40: almost, ... the parents are too old  
41: 32, 32, 64, 16, yes  
42: the son is 16 and the parents 32, together 80

## Thinking-aloud: hard?

It's okay to encourage them or subtly remind them to keep talking, but don't force the issue!



## Thinking-aloud: hard?

They're speaking too quickly — I can't keep up!



Record!\*

\*with permission

# Questionnaires

For example: *System Usability Scale (SUS)*

*Brooke, J. (1996). SUS: a "quick and dirty" usability scale. In P. W. Jordan, B. Thomas, B. A. Weerdmeester, & A. L. McClelland. Usability Evaluation in Industry. London: Taylor and Francis. <http://www.itu.dk/courses/U/E2005/litteratur/sus.pdf>*

# Interviews

## Stimulated Recall Interview

# Testing: common mistakes and how to avoid them

# Avoiding stressful and awkward situations

# Avoiding stressful and awkward situations

In regular tests, we don't want to make mistakes

## Avoiding stressful and awkward situations

In regular tests, we don't want to make mistakes

In usability testing, we do want to make mistakes!

## Avoiding stressful and awkward situations

In regular tests, we don't want to make mistakes

In usability testing, we want the tester to make mistakes!

Most testers are not usability experts, so make it clear that it's the ***interface*** that's being tested.

*You are not testing the user.*



# Avoiding stressful and awkward situations

Why?

1. We do not want to put anybody into stressful situations. (*ethics*)
2. People behave differently in stressful situations. (*influences experiment*)

## Don't influence the tester!

- Don't interact with the tester unless necessary.
- Sit outside their field of view.
- Be aware of your own posture, word choice, facial expressions
- Don't use terminology from the interface!
- etc.

# Report

- Introduction
- Methodology
- Results
- Conclusion
- Discussion

# Report

Write in a 'dry', distant, objective tone!

## Conclusion

- Relate to test goals (why did you conduct this research and how does your research answer this)
- Discussion
  - Future development (using your knowledge of aspects of usability)
  - Explain interesting test results
  - Provide commentary/critique methodology (if applicable)

# Assignment



# Uitwisselschema

Onderzoekers	gebruiken testpersonen van	om de app te testen van
()xxxx(=====>	AssertTrue	Wis4
AssertTrue	()xxxx(=====>	ATM
ATM	CampGemini	AssertTrue
CampGemini	ATM	CBD
CBD	Cervisia	CampGemini
Cervisia	CBD	DikkeBMW
DikkeBMW	Facultime	Cervisia
Facultime	DikkeBMW	Fristiboyzz
Fristiboyzz	MALT	Facultime
MALT	Fristiboyzz	New Button
New Button	Niet te lang en niet te gek	MALT
Niet te lang en niet te gek	New Button	PuC
PuC	RandInt	Niet te lang en niet te gek
RandInt	PuC	RSI
RSI	SaltInc	RandInt
SaltInc	RSI	Teamo
Teamo	TheMurmaiders	SaltInc
TheMurmaiders	Teamo	TheOrangeCobras
TheOrangeCobras	Wis4	TheMurmaiders
Wis4	TheOrangeCobras	()xxxx(=====>



## Further reading

*Usability testing essentials: Ready, set... test!*, Carol M. Barnum



*Designed for use*, Lukas Mathis



*About Face: The Essentials of Interaction Design*, Alan Cooper



*Interaction Design: Beyond Human-Computer Interaction*, Preece, Rogers, Sharp

And of course... the internet!





## A word of thanks to

Erik Barendsen, upon whose lectures these slides are based.

Lukas Mathis, from whose book I've borrowed many an example.