Usability for Mobile Interfaces

Presentation by Derek Cryer

Overview

- History of usability
- Introduction of Literature Review
- Defining Usability
- Characteristics of Usability
- Measuring Usability
- Heuristics of Mobile Interfaces
- Usability differences between Desktop and Mobile Interfaces
- Best practices for designing Mobile site vs. Desktop

History

- When mobile devices emerged, the only literature on digital usability centered on Desktop UI's
- As of 2022, 81.6% of the US population used a smartphone
  - Usability on mobile devices has gained traction in academia and industry

Literature Review

- Weichbroth reviewed 790 studies (containing "usability" and "mobile devices" in titles, abstracts, or keywords) with three questions in mind:
  - What is usability?
  - What attributes make up usability?
  - What usability evaluation methods are there?
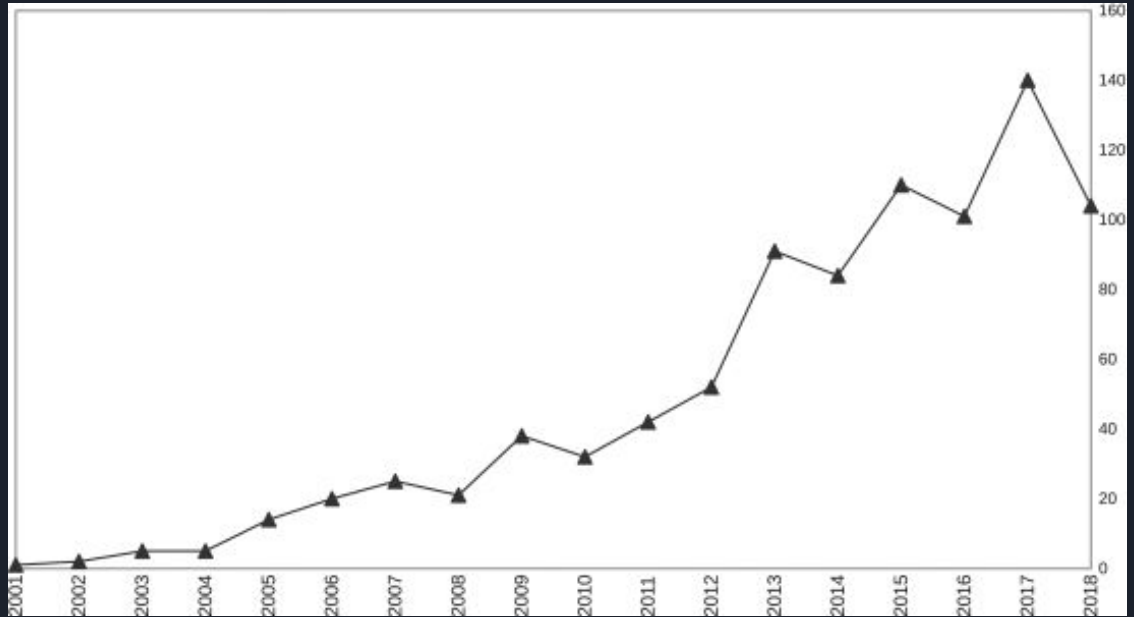
What does usability mean to you?

What is usability?

- Over time, the definition of usability has changed.
  - The Organization of Standardization said:
    - 1991 - a set of attributes of software which bear on the effort needed for use, and on an individual assessment of such use, by a stated or implied set of users
    - 1998 - the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use
    - 2011 - degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use
  - Other definitions exist but are less popular among researchers

What is usability in terms of mobile interfaces?

- In the literature review, none of the authors defined usability as it pertains to mobile device applications
    - 88% reference the 1998 definition in the previous slide
        - This follows the standards of devices that were around at the time
            - Does not take into account "multimodality, connectivity, small screen size, different display resolutions, limited processing capability and power, and restrictive data entry methods"

What three attributes of usability do you think were referenced most by authors?

75 attributes of usability were identified

- Efficiency (70%)
- Satisfaction (66%)
- Effectiveness (58%)
- Learnability (45%)
- Memorability (23%)
- Cognitive Load (19%)
- Errors (17%)
- Simplicity (13%)
- Ease of use (9%)

How do you think those attributes are most commonly measured?

Surveys and Controlled Observations are the most common

Attribute	Survey	Controlled observation	Eye tracking	Thinking aloud	Interview
efficiency	5	8	0	0	0
satisfaction	15	0	0	0	0
effectiveness	3	6	0	0	0
learnability	4	5	0	0	0
memorability	3	3	1	1	0
cognitive load	1	1	1	1	0
errors	1	4	0	0	0
simplicity	4	2	0	0	1
ease of use	2	0	0	0	0

Experts can use other methods, such as the heuristic evaluation.

1. Transparency of System Structure
2. Immediacy of Action Feedback
3. Awareness of Errors
4. Flexibility of Use
5. Familiarity of Universal Experiences
6. Limitation of Information and Design Aesthetic
7. Prioritization of Function over Form
8. Availability of Information
9. Reliability of Consistency
10. Judicious Redundancy

"*Nielsen's heuristic principles have stood the test of time and have been revisited to be further integrated with human-centered design for mobile—including clear definitions and design examples.*"
- Devos, 2020

Does the usability of mobile interfaces really differ from that of desktop interfaces?

- As mentioned, the definition of usability has remained consistent and has been accepted since 1998.
  - Software has the capability to interact with the user, yet emphasizes the user's proficiency in doing so
  - Usability is focused on the product, in most definitions, as opposed to the user
  - "Efficiency, satisfaction, and effectiveness are valid for studying the usability of both desktop and mobile applications."
    - However, their presence in research, along with other attributes of usability, has fluctuated in the past decade

Frequency of Usability Characteristics in multiple literature reviews

Attribute	Coursaris (2007)	Harrison (2013)	This study (2020)
effectiveness	62%	51%	58%
efficiency	33%	55%	70%
satisfaction	20%	58%	66%
errors	0%	33%	17%
learnability	11%	21%	46%
cognitive load	0%	23%	19%
accessibility	7%	0%	4%
memorability	2%	2%	23%
operability	4%	0%	8%
flexibility	2%	0%	0%
acceptability	2%	0%	0%

Same year the first iPhone was released.

Things to consider when comparing desktop sites to mobile sites…

- Optimize mobile sites
  - Cut features that are not vital to mobile use case
  - Reduce word count when possible
  - Enlarge interface elements
- This is not full desktop version vs. less featured mobile version
  - Comply with mobile usability guidelines when possible
  - Link out full-site (less used) when content or features are missing
  - This leads to a good mobile experience on most tasks, and a slightly delayed experience for the other minority of tasks
- This also doesn't mean to optimize a whole website to mobile
  - Desktop users create more traffic (and more business) compared to mobile users

Nielsen, 2018

References

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