



Aalto University  
School of Science

# CS-5200 Design Project

18.3.2019 User testing

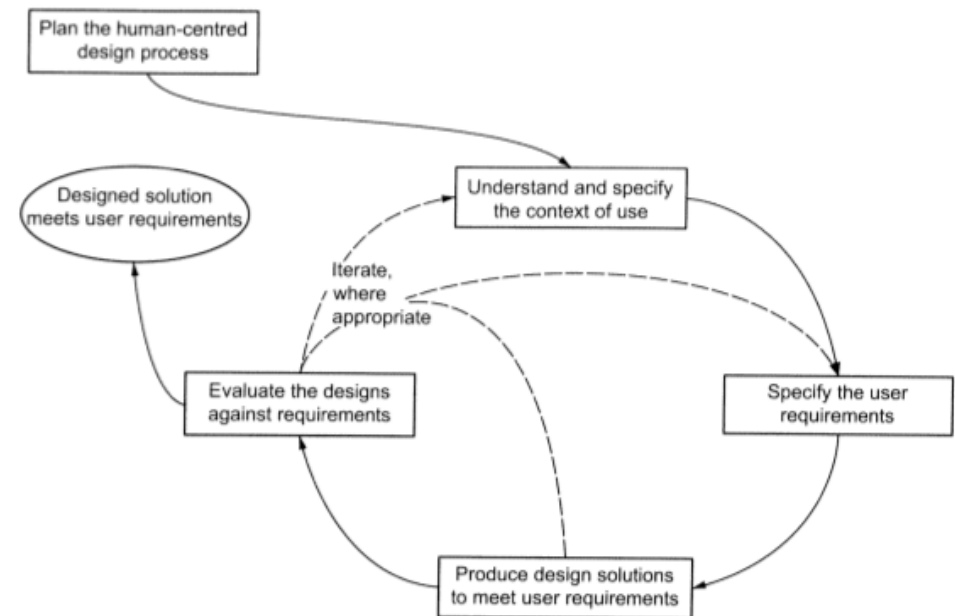
Mika P. Nieminen

Based on Sirpa Riihiaho

# Definition of Usability

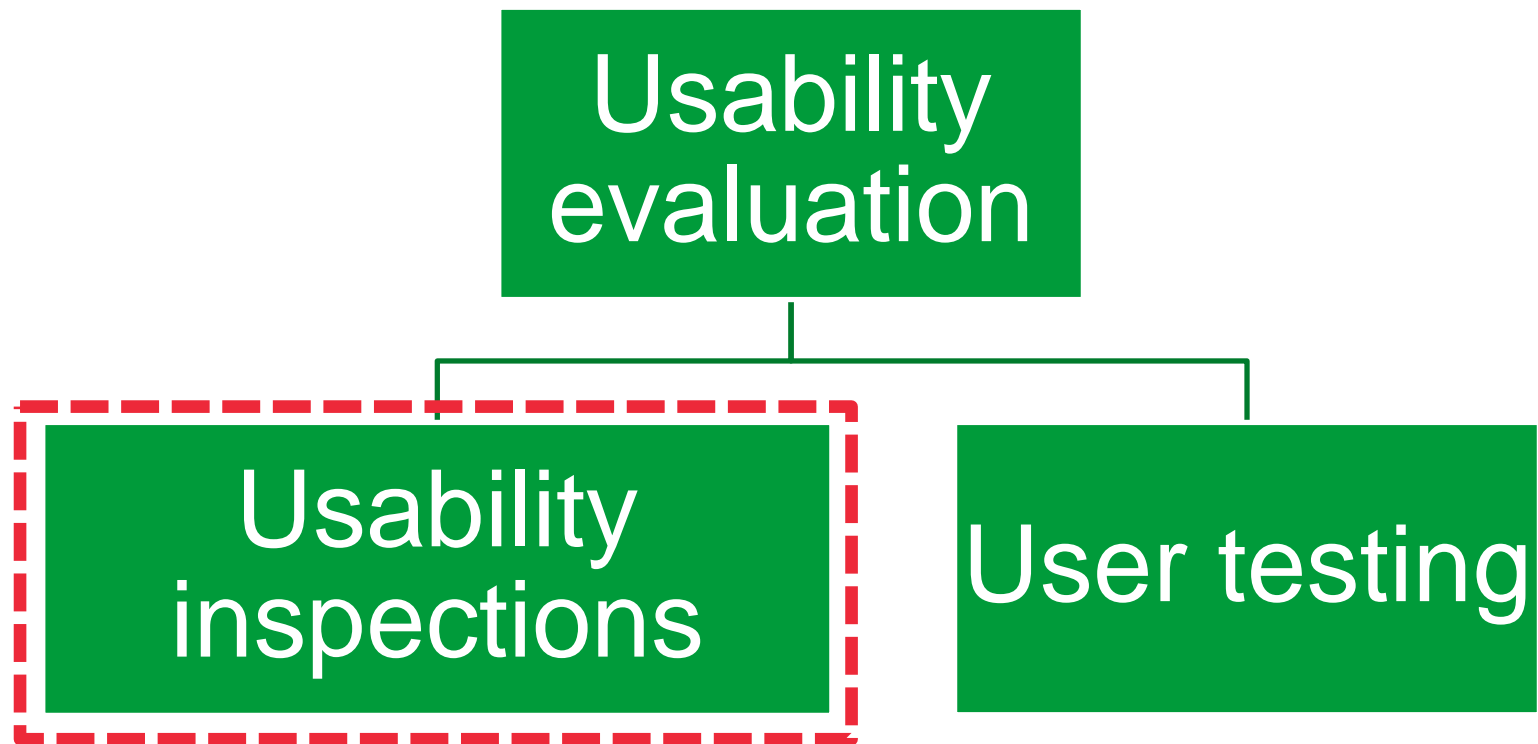
- *The extent to which a product can be used by specified users to achieve specified goals with **effectiveness, efficiency and satisfaction** in a specified context of use*

ISO 9241-11 (1998)

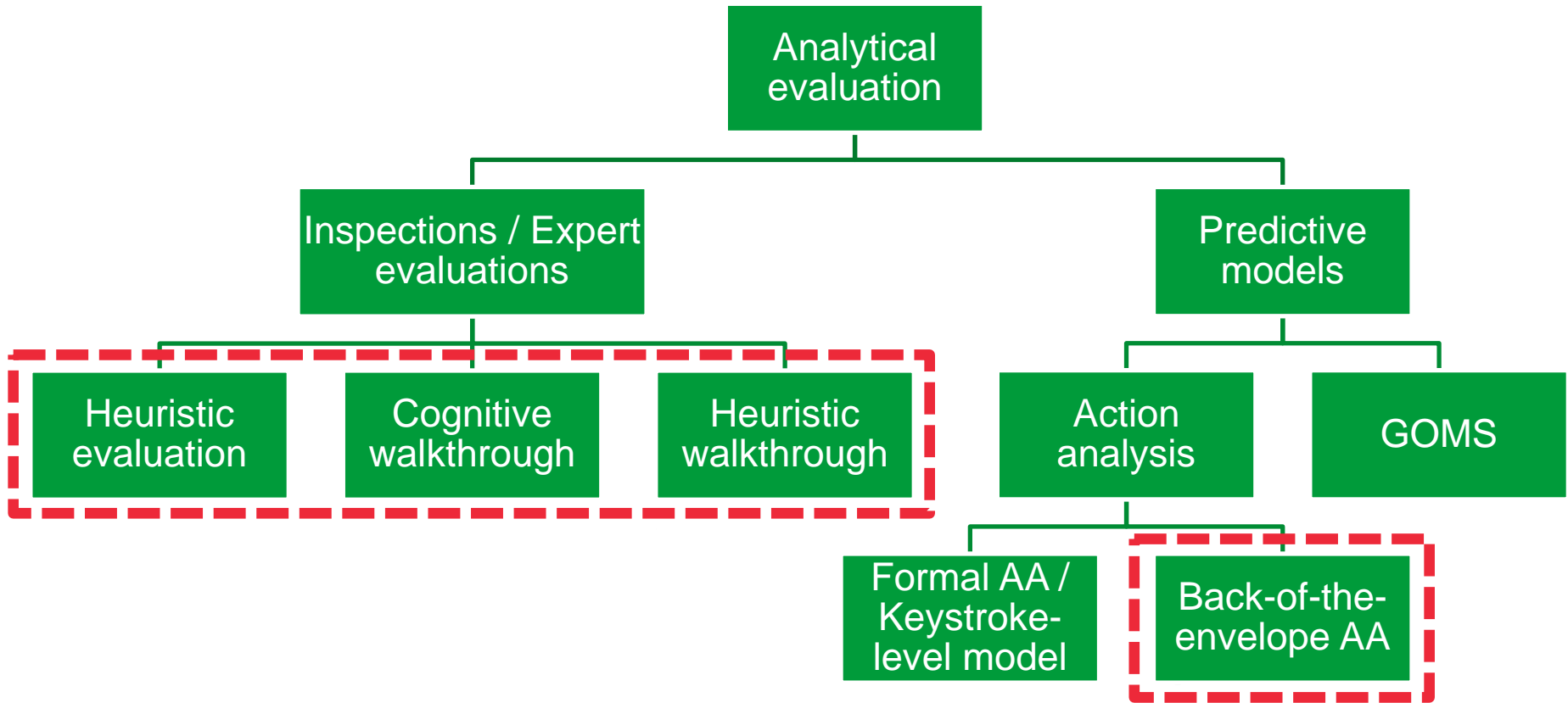


ISO 9241-210 (2010)

# Usability Evaluation Methods



# Usability Evaluation without users





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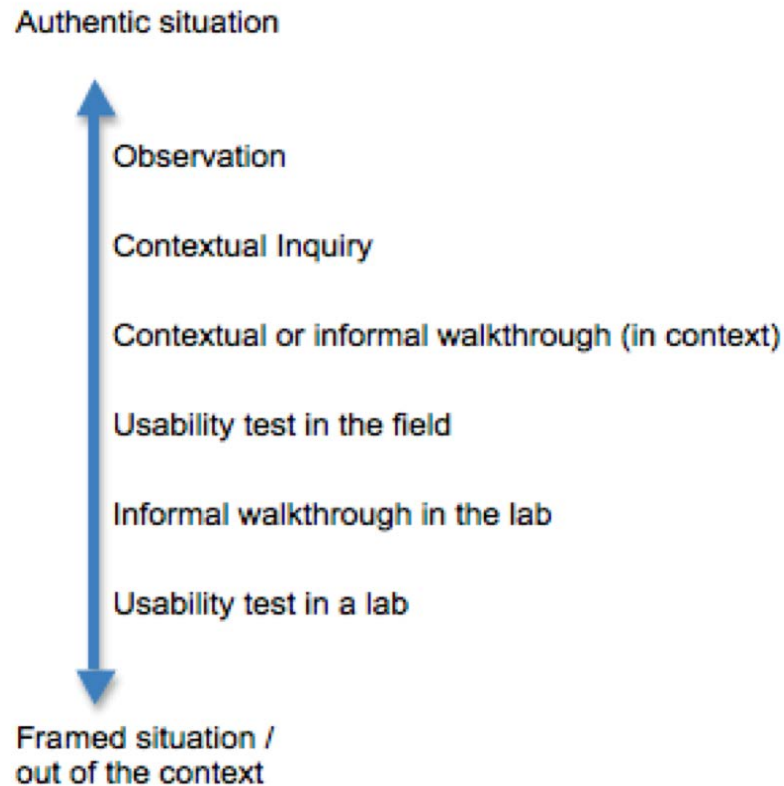
# User testing methods

# User testing

- Traditional usability test
  - Test moderator
  - Thinking aloud
- Modifications
  - Paired-user testing
  - Pluralistic usability walkthrough
  - Informal walkthrough
  - Contextual walkthrough
  - Experience Clip
- Summary and conclusions



# Level of reality



# Traditional usability test

- Controlled test environment
- One user at a time
- Thinking aloud
- Moderator creating a relaxed rapport with the user
- Pre-defined test tasks
- Functional prototype



See Table 9, p 184. Jacob Nielsen (1993): *Usability Engineering*. 1<sup>st</sup> ed.

e.g. Jeffrey Rubin & Dana Chisnell (2008): *Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests*. 2<sup>nd</sup> ed.



# Thinking aloud<sup>1</sup>

- One of the most direct methods to gain information about participants' internal states
- Concurrent or retrospective
- 3 levels: direct, translated, selected/explained
  - 3<sup>rd</sup> level may change performance
- Give an example
  
- Recommended in formative testing, but not in summative testing

1: Ericsson, K.A. and Simon, H.A. (1980) Verbal reports as data. Psychological Review, Vol. 87, no. 3, pp. 215-251.

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# Some user testing methods

- Usability test  
(käytettävyystesti)
- Paired-user testing  
(paritesti)
- Pluralistic usability walkthrough  
(ryhmäläpikäynti)
- Informal walkthrough  
(vapaa läpikäynti)
- Contextual walkthrough  
(tilannesidonnainen/kontekstuaalinen läpikäynti)
- Visual walkthrough  
(visuaalinen läpikäynti)
- Questionnaires, interviews, observations



# Paired-user testing<sup>1,2</sup>

## Co-discovery / Constructive interaction

- Users in pairs
- Users of equal experience and hierarchy
- Thinking aloud more natural
- Moderator's role eases up
- Especially for kids: peer tutoring<sup>3</sup>
  - Learnability easy to assess



- 1: Shrimpton-Smith, T., Zaman, B. & Geerts, D. (2008) Coupling the Users: The Benefits of Paired User Testing for iDTV, *International Journal of Human-Computer Interaction*, Vol. 24, No. 2, pp. 197-213.
- 2: Wildman, D. (1995) Getting the most from paired-user testing. *interactions*, Vol. 2, No. 3, pp. 21-27.
- 3: Höysniemi, J., Hämäläinen, P. and Turkki, L. (2003) Using peer tutoring in evaluating the usability of a physically interactive computer game with children. *Interacting with Computers*, Vol. 15, No. 2, pp. 203-225.

# Pluralistic usability walkthrough<sup>1</sup>

- Users and developers in group
- Usability experts as moderators
- Paper mock-ups
- Everyone takes user's role<sup>2</sup>
- Users tell their opinion first<sup>2</sup>
- Instant feedback to developers

1: Original version: Bias, R. (1994): The pluralistic usability walkthrough: Coordinated empathies. In Nielsen, J. & Mack R.L. (Eds.) *Usability inspection methods*.

2: Modified version: Riihiaho, S. (2002) The pluralistic usability walk-through method. *Ergonomics in Design: The Quarterly of Human Factors Applications*. Vol. 10, No. 3, pp. 23-27.

# Informal walkthrough

- Users alone, in pairs or in groups
- In the fields or in laboratory settings
- The concept must be familiar
- No pre-defined tasks to user
- Intuitivity can be assessed



Riihiaho, S. (2000) *Experiences with usability evaluation methods*. Licentiate's thesis.

Riihiaho, S. (2009) User testing when test tasks are not appropriate. In *European Conference on Cognitive Ergonomics (ECCE 2009)* Pp. 228-235

# Checklist for informal walkthrough

Functionality	User found (X/A/-)	Correct use	Needed help
<b>Newspaper concept</b>			
Navigation in table of contents	X	X	
Navigation in news	X	X	
Page numbers	A		
Background info	-		X

# Contextual walkthrough

- Tasks emerge from the use context
- Not convenient to interrupt the work or to think aloud
- Utility and role in work flow can be assessed



Riihiaho, S. (2000) *Experiences with usability evaluation methods*. Licentiate's thesis.

Riihiaho, S. (2009) User testing when test tasks are not appropriate. In *European Conference on Cognitive Ergonomics (ECCE 2009)* Pp. 228-235

# Visual walkthrough<sup>1</sup>

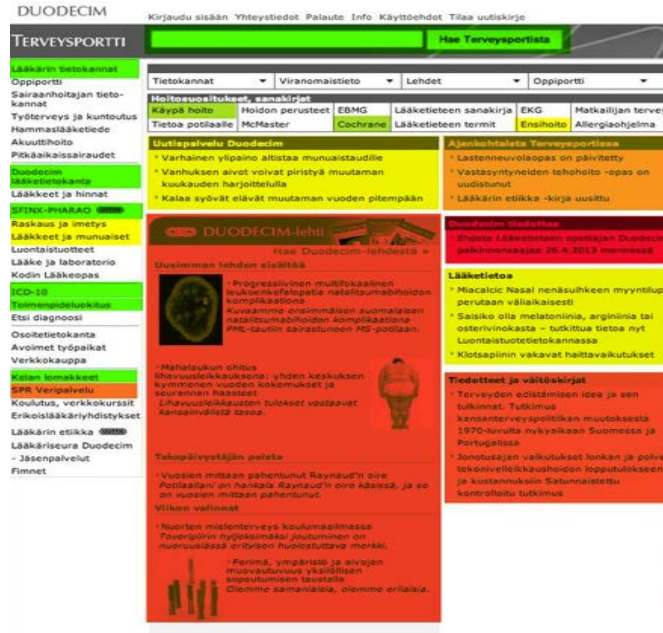
- Process:
  1. What do you see and notice first?
  2. What elements, groups, details?
  3. Meaning of elements; functionality?
  4. Give a scenario to user
  5. How would you start with this scenario?
- Affects to learning, so may change performance
- Modification with colouring<sup>2</sup>  
(essential / sometimes needed / unnecessary)

1: Nieminen, M., & Koivunen, M. (1995) Visual Walkthrough. In HCI, Vol. 95, pp. 86-89

2: Juurmaa et al. (2013) Visual walkthrough as a tool for utility assessment in a usability test. (HCI 2013).



# Visual walkthrough with utility assessment



Juurmaa et al. (2013) Visual walkthrough as a tool for utility assessment in a usability test. (HCI 2013).

# Experience Clip<sup>1</sup>

- Testing mobile systems in the fields
- Recruit two users on the fly from the streets
- One uses the mobile system; the other video records the use with another phone
- When they return the phones, they select which clips they discuss more

1: Isomursu, M., Kuutti, K. and Väinämö, S. (2004) Experience clip: Method for user participation and evaluation of mobile concepts. In *Proceedings of the eighth conference on Participatory design: Artful integration: Interweaving media, materials and practices* (PDC 04)

# Summary of testing methods

	Controlled environment	Test tasks	Thinking aloud	One user at a time	Functional proto
Paired-user testing	(X)	X	(X)		X
Pluralistic usability wt	X	X			
Informal wt	(X)	(in case)	X	(X)	X
Contextual wt			(X)	(X)	X

# Conclusions

- No step-by-step instructions for the methods
- Informal walkthrough for leisure time systems
- Contextual walkthrough for professional systems
- Methods should be modified to serve the goals