AARHUS
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# USER INTERFACES FOR EMBEDDED SYSTEMS

**Lecture 11: Issues-Based Metrics**

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# ISSUES-BASED METRICS

- Usability **issue**
  - "A problem that must be settled"
  - Has **negative** connotations
  - Often rated / quantified by severity
  - We want to **get rid of issues**

- Usability **finding**
  - "Something that is found via investigation"
  - Has **positive** connotations
  - Often rated / quantified by impact
  - We want to **keep findings**

# EXAMPLE USABILITY ISSUES

- Anything that prevents task completion
- Anything that takes user off-course
- Anything that creates confusion
- Anything that produces an error
- Not seeing something that should be noticed
- Assuming something is correct when it is not
- Assuming a task is complete when it is not
- Performing wrong actions
- Misinterpreting information or content
- Not understanding the navigation

- **Identify** and take **action** to improve design

# EXAMPLE USABILITY FINDINGS

- Supporting the user in completing a complex transaction without any confusion and in the most efficient way possible
- Anticipating a user's needs at every step of a process
- Educating a user without any effort involved
- Displaying complex information in a clear, simple format that users can easily understand
- Here - Think Aloud is a well-suited method!

# SEVERITY RATING

- Granularity
  - 3: Low, medium, high
  - 5: Cosmetic, low, medium, high, catastrophe
- Examples
  - **Cosmetic**: Minimal, e.g. visual changes in UI
  - **Low**: Irritates user, but does not yield task failure. May reduce efficiency and/or satisfaction.
  - **Medium**: Adds time on task and impacts effectiveness, efficiency and satisfaction
  - **High**: Leads to task failure. Significant impact on effectiveness, efficiency, and satisfaction.
  - **Catastrophe**: Loss of data or damage to SW/HW

# SEVERITY RATING

Combination of Impact on user experience and problem frequency

| | Few users experiencing a problem | Many users experiencing a problem |
|---|---|---|
| Small impact on the user experience | Low severity | Medium severity |
| Large impact on the user experience | Medium severity | High severity |

**FIGURE 5.1**

Severity rating scale taking into account problem frequency and impact on the user experience.
*Source*: Adapted from Nielsen (1993).

[T&A]

# BIAS IN IDENTIFYING USABILITY ISSUES

## Bias types

- Participants: Range in knowledge, motivation etc.
- Tasks: Determines exercised area of product
- Methods: Lab test, expert review etc.
- Artifacts: Paper or (semi) functional prototype, or...
- Environment: Lab, simulated or real environment …
- Moderators: Usability professional's experience ...

# ISSUE-BASED METRICS IN ACTION (1/4)

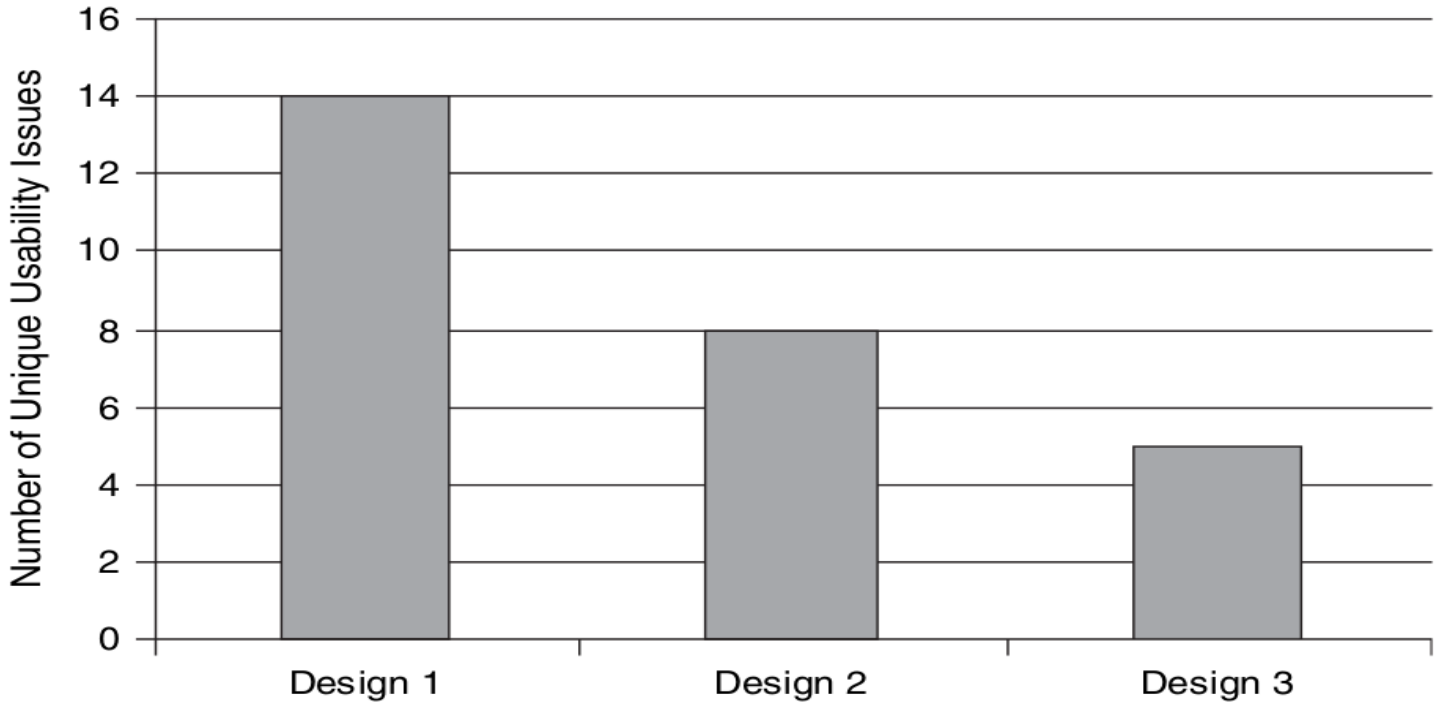


**FIGURE 5.2**

Example data showing the number of unique usability issues by design iteration. Ideally, the number of issues decreases with each new design iteration.

[T&A]

# ISSUE-BASED METRICS IN ACTION (2/4)

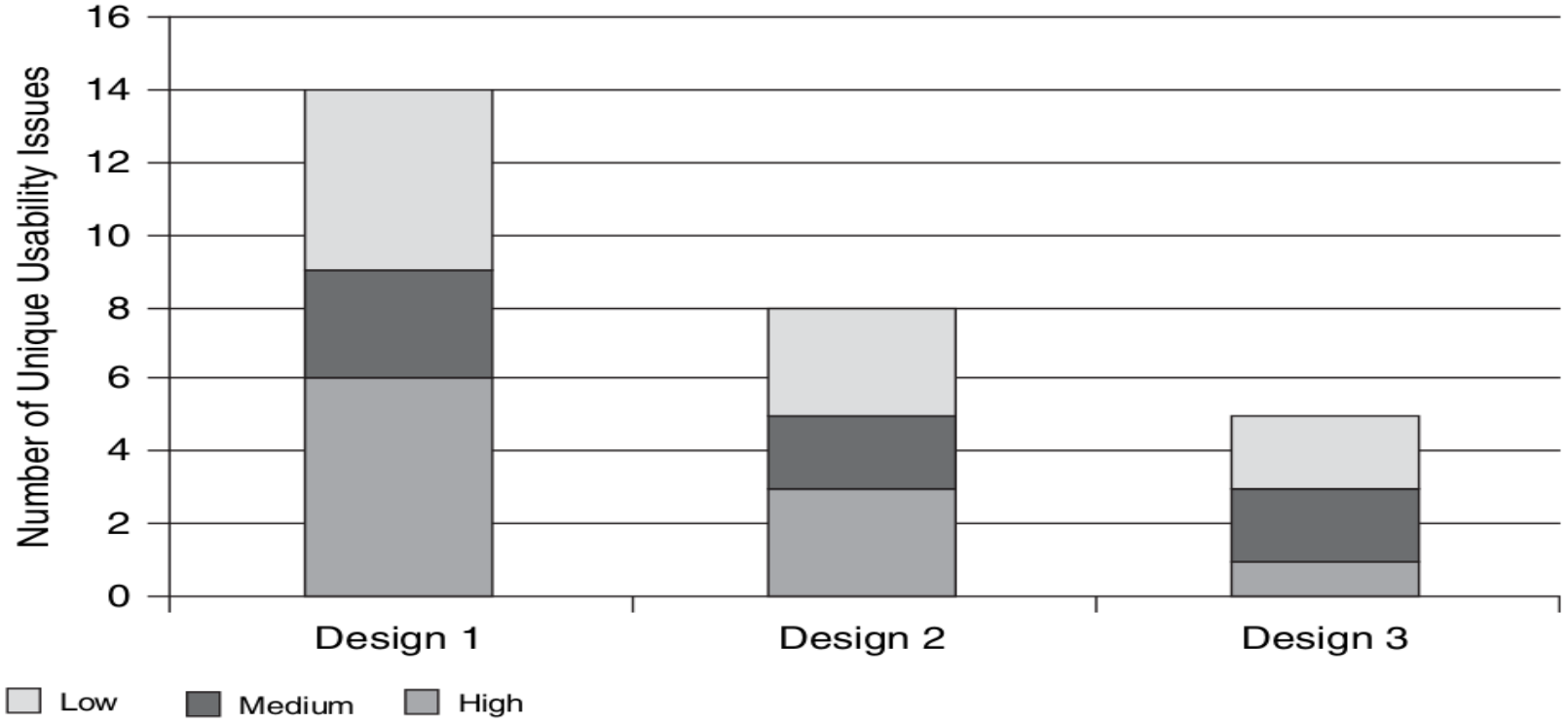


**FIGURE 5.3**

Example data showing the number of unique usability issues by design iteration, categorized by severity rating. The change in the number of high-severity issues is probably of key interest.

[T&A]

# ISSUE-BASED METRICS IN ACTION (3/4)

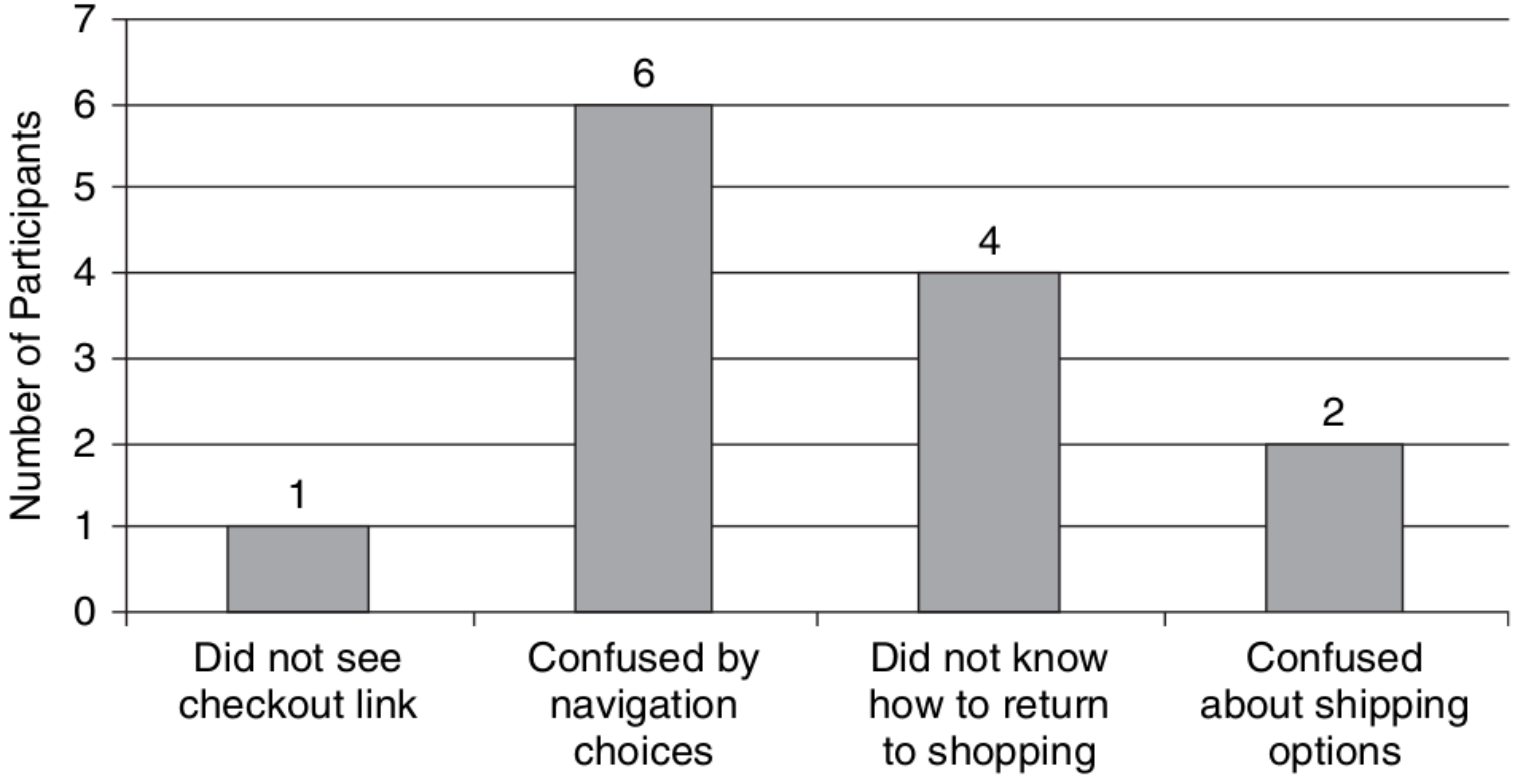


**FIGURE 5.5**

Example data showing the frequency of participants who experienced specific usability issues.

[T&A]

# ISSUE-BASED METRICS IN ACTION (4/4)

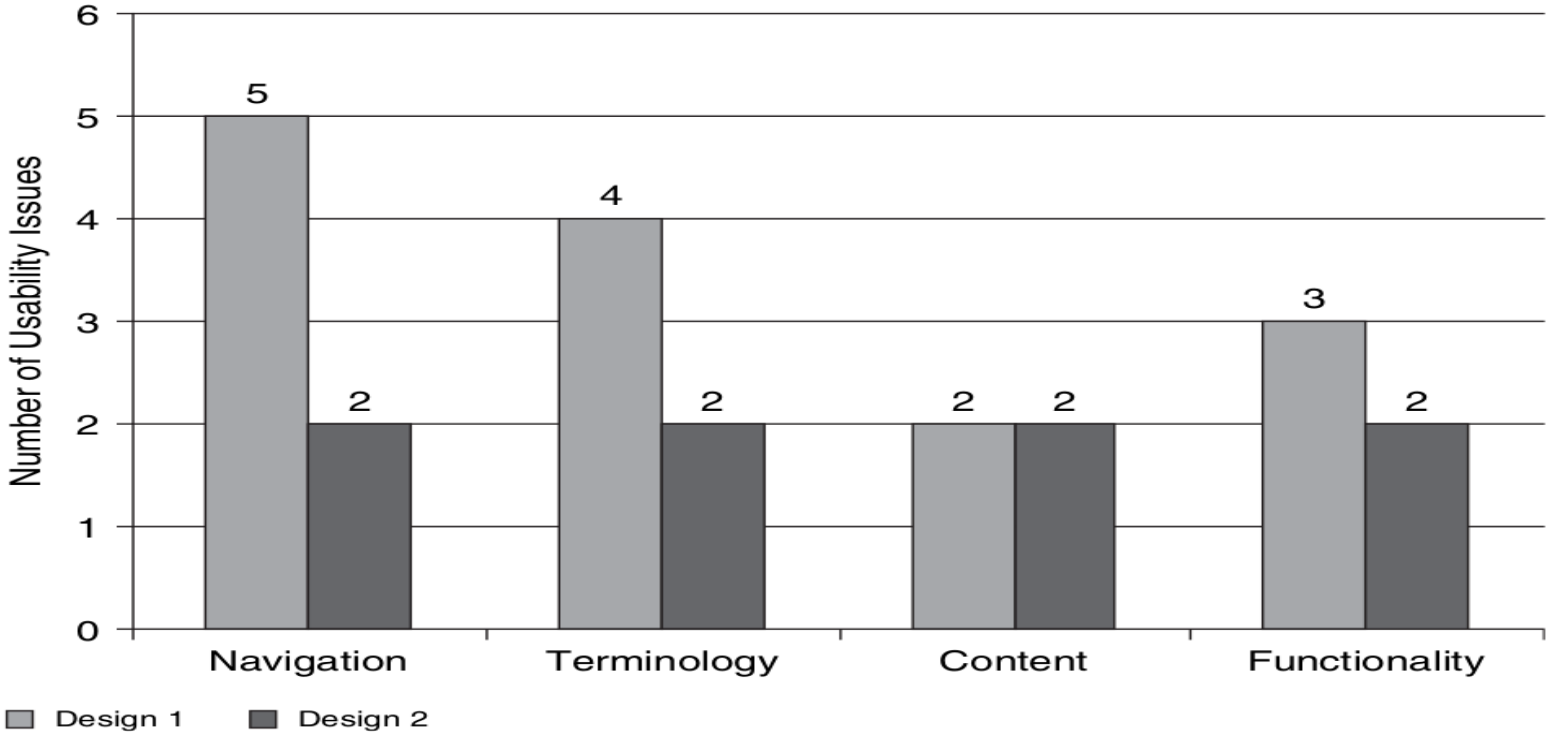


**FIGURE 5.6**

Example data showing the frequency of usability issues categorized by type. Notice that both navigation and terminology issues were improved from the first to the second design iteration.

[T&A]

# HOW MANY USERS ARE NEEDED?

- Two different viewpoints on “the magic number 5”
- 5 participants are enough
  - Studies back this...
- 5 participants are **not** enough
  - Studies back this...
- What to believe?
  - Choose at least 5 participants per “significantly different user class”
  - Keep the scope of evaluation task limited to few functions
  - Keep user population “well” represented

# REFERENCES


- [T&A] Tullis and Albert, Measuring the User Experience, 2008
- [S,R&P] Sharp, Rogers, and Preece, Interaction Design, 2002
- [JN] Jakob Nielsen, Usability Engineering, 1994
- [JR] Jeffrey Rubin, Handbook of Usability Testing, 1994
- [JJG] Jesse James Garret, The Elements of User Experience, 2002