Usability and User Studies

Validity Checks

Earlier Stages

- Observe and interview target users (needs assessment)
- Design data abstraction/operation (data types, transformation, operations)
- Justify encoding/interaction design (design heuristics, perception research)
- Informal analysis/qualitative analysis of prototypes (task-based)
- Algorithm complexity analysis/evaluation

Mid- and Later Stages

- Qualitative analysis of system (task-based)
- Algorithm performance analysis
- Lab or crowdsourced user study
- Field study of the deployed system

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Formal Usability Study

Goal: Does the visualization allow the user/analyst to perform key tasks?

Task-Oriented Visual Insights

Basic Insights:

- Read a value
- Identify extrema
- Characterize distribution
- Describe correlation

Comparative Insights:

- Compare values
- Compare extrema
- Compare distribution
- Compare correlation

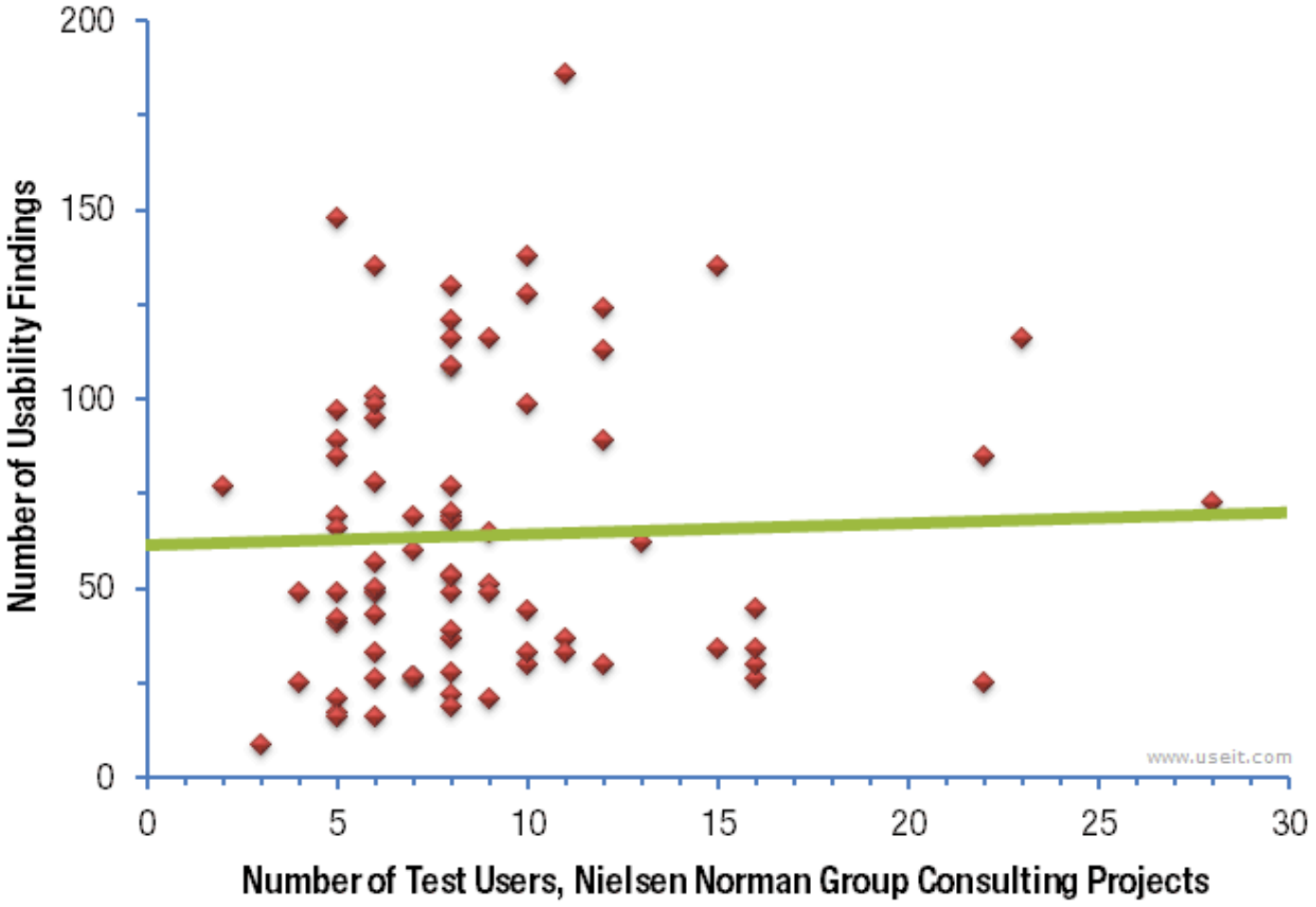
(Yang et al., 2014)

Usability Study: Logistics

You will need:

- Visualization with test data loaded
- Consent form (if required)
- Task list
- Protocol (study procedures and debrief questions)
- Surveys/interviews and any additional data-collection instruments
- Audio or video recorder, notepad

How Many People Do You Need?



“Lab” doesn’t need to mean a formal lab

Software for Collecting Audio/Video

- Video of user
- Screen capture of user actions
- Audio of entire session

Online Tools

- Surveys
- Mouse tracking/navigation tracking

You've Collected Data

- Task completion
- Time on task
- Notes
- Interview responses
- Survey responses

… then what?

Tool	TM	SB
Phase	1	1
1. Find largest file	5	7
2. Find 2nd largest file	6	8
3. Find largest dir	7	8
4. Find file via path	7	6
5. Find file via path	7	8
6. Find file via path	8	8
7. Find file via path	3	6
8. Find file via name	2	6
9. Find file via name	3	6
10. Find deepest dir	5	8
11. Find dir contents	7	8
12. Find via size and type	6	7
13. Compare files by size	3	4
14. Find duplicate dirs	1	2
15. Compare dirs by size	6	5
16. Compare dirs by contents	4	6

Table source: Stasko, J., Catrambone, R., Guzdial, M., & McDonald, K. (2000). *An evaluation of space-filling information visualizations for depicting hierarchical structures*.

What is the analyst's **information scent**?

MoSCoW Prioritization

- Must
- Should
- Could
- Won’t

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- Must
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- Could
- Won’t

Severity Ratings

0 Not a real problem

1 Cosmetic

2 Minor usability issue

3 Major usability issue

4 Critical issue

Limitations

- Ecological validity
- Are performance-oriented tasks the complete story?

Iterate

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