



Expert - based evaluation

Heuristic Evaluation
Cognitive Walkthrough



Aims:

- ✦ Describe the key concepts associated with inspection methods.
 - Explain how to do heuristic evaluation and walkthroughs.
 - Explain the role of Usability Metrics in evaluation.



Inspections

- ✦ Several kinds.
- ✦ Experts use their knowledge of users & technology to review software usability.
- ✦ Expert critiques (crits) can be formal or informal reports.
- ✦ Heuristic evaluation is a review guided by a set of heuristics.
- ✦ Walkthroughs involve stepping through a pre-planned scenario noting potential problems.



Heuristic evaluation

- ✦ Developed Jacob Nielsen in the early 1990s.
- ✦ Based on heuristics distilled from an empirical analysis of 249 usability problems.
- ✦ These heuristics have been revised for current technology.
- ✦ Heuristics being developed for mobile devices, wearables, virtual worlds, etc.
- ✦ Design guidelines form a basis for developing heuristics.



Nielsen's original heuristics

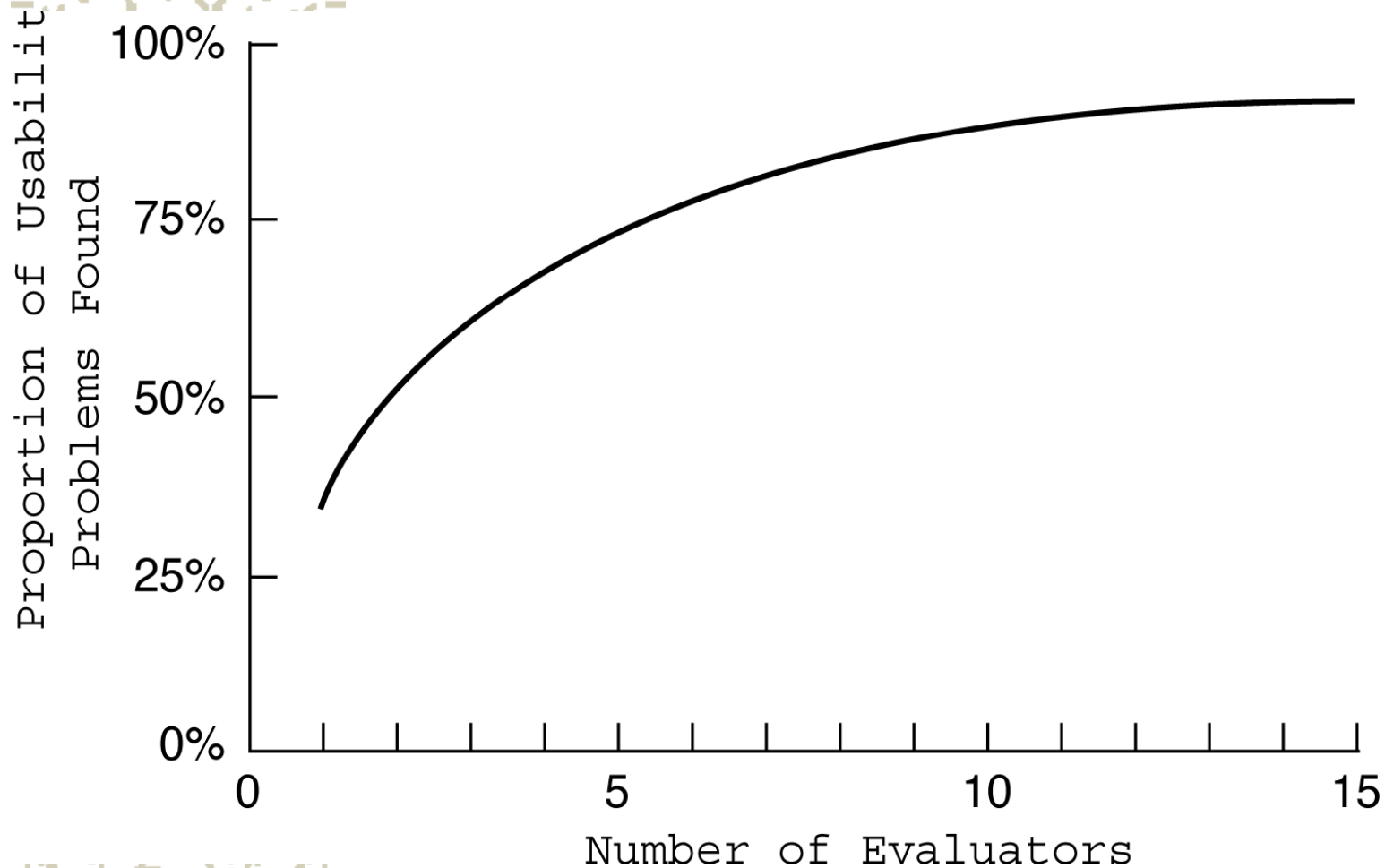
- ✦ Visibility of system status.
- ✦ Match between system and real world.
- ✦ User control and freedom.
- ✦ Consistency and standards.
- ✦ Error prevention.
- ✦ Recognition rather than recall.
- ✦ Flexibility and efficiency of use.
- ✦ Aesthetic and minimalist design.
- ✦ Help users recognize, diagnose, recover from errors.
- ✦ Help and documentation.



Discount evaluation

- ✦ Heuristic evaluation is referred to as discount evaluation when 5 evaluators are used.
- ✦ Empirical evidence suggests that on average 5 evaluators identify 75-80% of usability problems.

No. of evaluators & problems





3 stages for doing heuristic evaluation

- ✦ Briefing session to tell experts what to do.
- ✦ Evaluation period of 1-2 hours in which:
 - Each expert works separately;
 - Take one pass to get a feel for the product;
 - Take a second pass to focus on specific features.
- ✦ Debriefing session in which experts work together to prioritize problems.



Advantages and problems

- ✦ Few ethical & practical issues to consider because users not involved.
- ✦ Can be difficult & expensive to find experts.
- ✦ Best experts have knowledge of application domain & users.
- ✦ Biggest problems:
 - Important problems may get missed;
 - Many trivial problems are often identified;
 - Experts have biases.

Heuristics for websites focus on key criteria

(Budd, 2007)

- ✦ Clarity
- ✦ Minimize unnecessary complexity & cognitive load
- ✦ Provide users with context
- ✦ Promote positive & pleasurable user experience

10 Usability Heuristics for User Interface Design

Jakob Nielsen's 10 general principles for interaction design. They are called "heuristics" because they are broad rules of thumb and not specific usability guidelines.

Visibility of system status

The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

Match between system and the real world

The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

User control and freedom

Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

Consistency and standards

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.



Error prevention

Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.

Recognition rather than recall

Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

Flexibility and efficiency of use

Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.



Aesthetic and minimalist design

Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

Help users recognize, diagnose, and recover from errors

Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

Help and documentation

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.



Cognitive walkthroughs

- ✦ Focus on ease of learning.
- ✦ Designer presents an aspect of the design & usage scenarios.
- ✦ Expert is told the assumptions about user population, context of use, task details.
- ✦ One or more experts walk through the design prototype with the scenario.
- ✦ Experts are guided by 3 questions.



The 3 questions

- ✦ Will the correct action be sufficiently evident to the user?
- ✦ Will the user notice that the correct action is available?
- ✦ Will the user associate and interpret the response from the action correctly?

As the experts work through the scenario they note problems.



Pluralistic walkthrough

- ✦ Variation on the cognitive walkthrough theme.
- ✦ Performed by a carefully managed team.
- ✦ The panel of experts begins by working separately.
- ✦ Then there is managed discussion that leads to agreed decisions.
- ✦ The approach lends itself well to participatory design.



Key points

- Inspections can be used to evaluate requirements, mockups, functional prototypes, or systems.
 - Heuristic evaluation may reveal usability problems fast related to usability heuristics.
 - Walkthroughs are focused so are suitable for evaluating small parts of a product.



Usability Metrics

User-friendliness is not measurable but

Is Usability measurable?



Usability Metrics

- Many attempts to quantify usability measures
- **Usability metrics** are quantitative features of use that are used in statistical techniques to produce an overall picture of the usability of an application.
- Nielsen cautions that usability metrics should not be used at first but rather that experts should go for the “low hanging fruit of qualitative methods”



Usability Metrics

- Experimental data could be easily misinterpreted and misconstrued by people who are not well versed in statistical techniques and research design methodology (consider taking a course in statistics)



Four Common Metrics

- ✦ **Success rate:** the percentage of times that users can accomplish a task
- ✦ **Total time a task requires:** measured in seconds
- ✦ **Error rate:** Percentage of times users fail to accomplish a task
- ✦ **Users' Subjective satisfaction:** How the users feel about the task and their performance (scale 1 to 5)



A Test Scenario

- ✦ Task 1. Find the system requirements for Xolax IDE 4.5
- ✦ Initial state: Browser located at <http://www.xolax.de>
- ✦ Script: " Please locate sys reqs (minimum CPU speed, RAM) for Xolax IDE 4.5. Please begin."
- ✦ Goal State: Browser located at <http://www.xolax.de/product.php?ide45;>
- ✦ Additional criteria: Task compl.<15 sec; clicks<= 3



ANSI Usability Metrics

- Metrics for effectiveness

- Percent of tasks completed
- Ratio of success to failures

- Efficiency

- Time to complete a task, Time to Learn, Time spent on errors, number of errors

- Satisfaction

- Rating scale for usefulness and satisfaction of the product



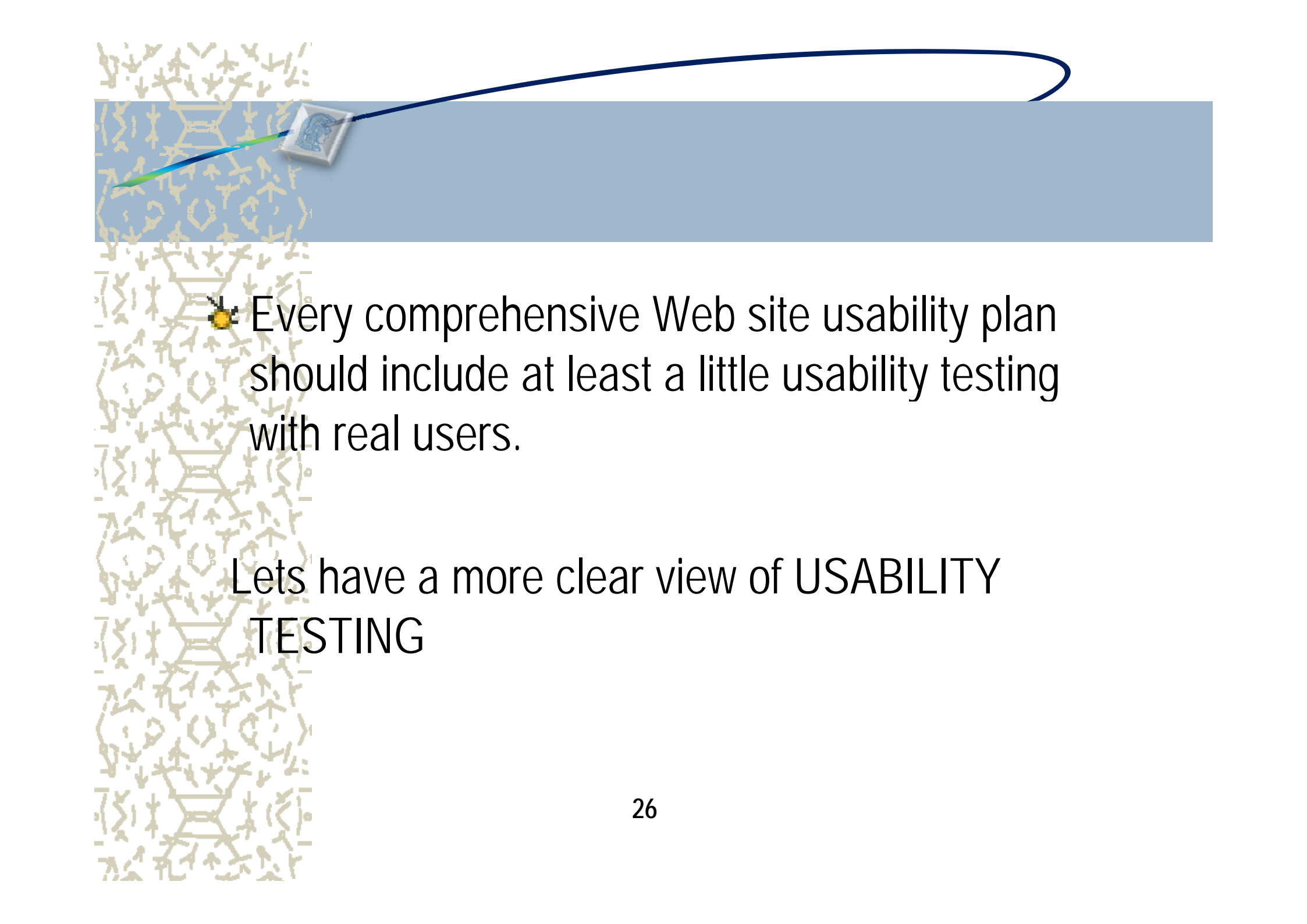
Usability Testing - Taking User Feedback

- ✦ Is a scientific process of obtaining user feedback through directed task-oriented sessions and measuring the degree to which users can efficiently use an interface for its intended goal
- ✦ Is specifically designed to provide statistically meaningful data about specific task
- ✦ Usability Testing is the most complex tool available to the usability specialist and requires some knowledge about the scientific method, research design methodology, and statistics.



Important Measures

- Mean time to complete all tasks on the site
- Mean number of successful/failed tasks
- Mean time of clicks to accomplish tasks

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- Every comprehensive Web site usability plan should include at least a little usability testing with real users.

Lets have a more clear view of USABILITY TESTING