Introduction to User Testing

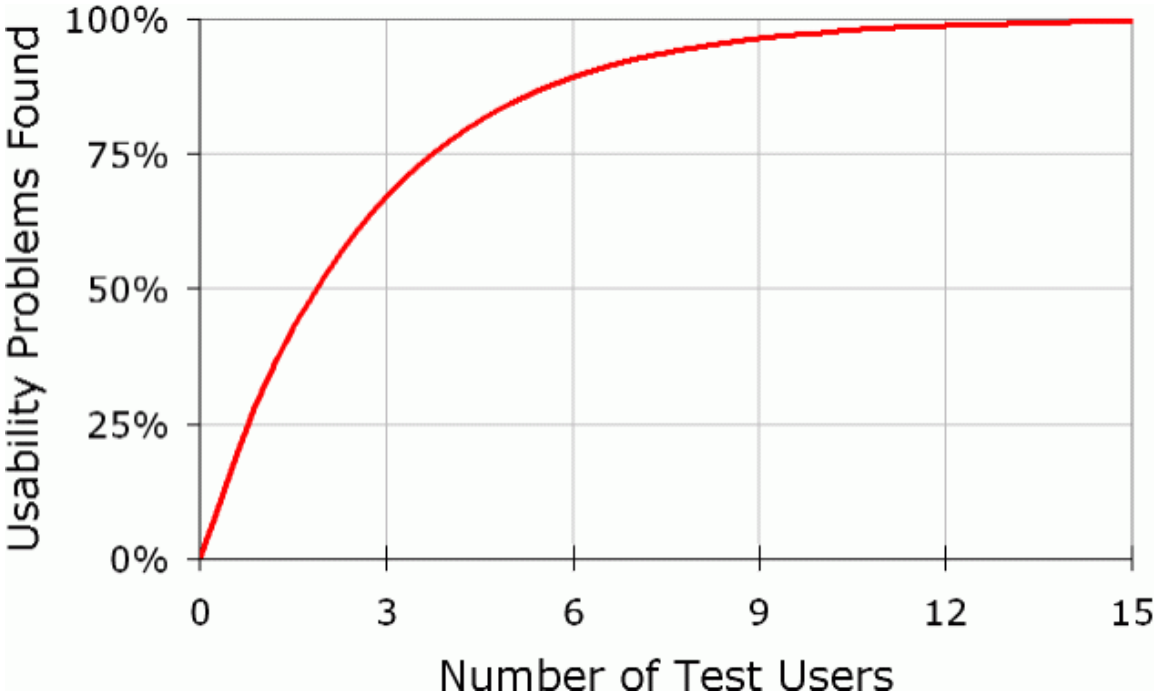
- User testing is a crucial process where actual users interact with a system or product to identify usability issues and pain points.

Importance of Early Usability Testing

- Early CHI work stressed the value of usability testing before the design is finalized. It helps avoid costly changes later.

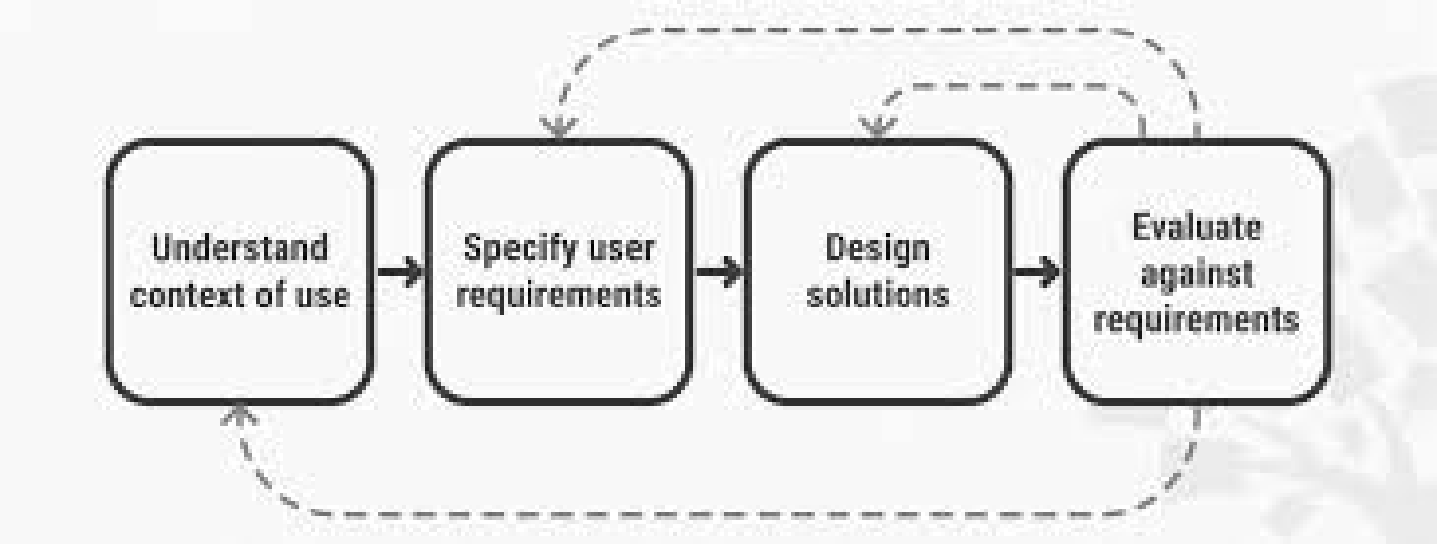
Nielsen's Law of User Experience

- Jakob Nielsen advocated for testing with small groups. 'You only need to test with 5 users to uncover 85% of usability issues.'



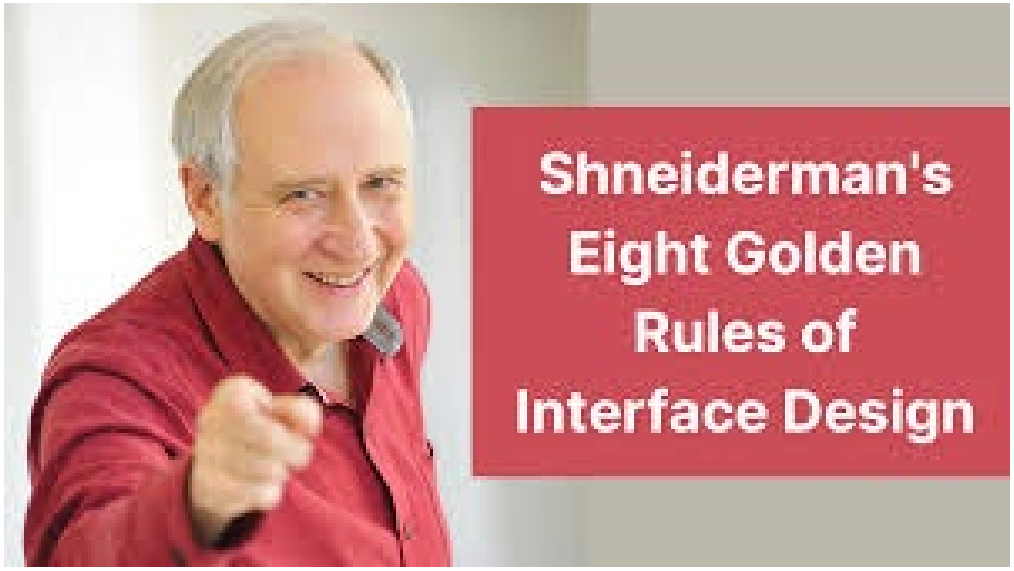
Iterative Testing

- Donald Norman stressed the need for iterative testing, with regular user feedback loops to refine products based on real-world interactions.



Shneiderman’s Eight Golden Rules

- Ben Shneiderman developed 8 design principles, which include 'Strive for consistency' and 'Seek universal usability.'



Thinking Aloud Protocol

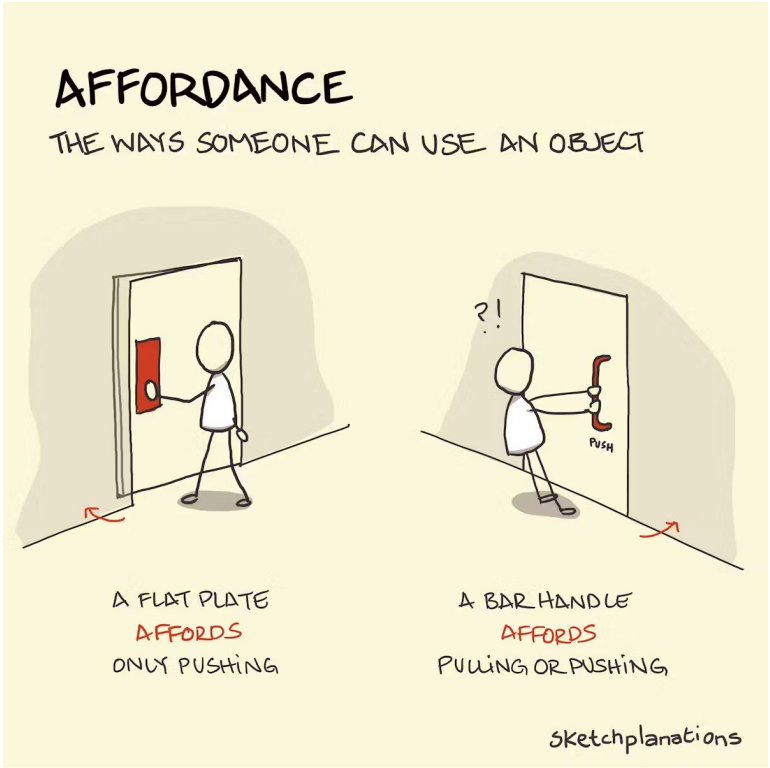
- Nielsen popularized the 'think aloud' method where users verbalize their thoughts while using the system to identify usability challenges.

Thinking Aloud Protocol

Problem type	Description	Typical protocol-items signalling the problem
Uncertainty about action planning	Subjects do not see where they possibly could go (click) next, or they see several possibilities but haven't got a clue about which one to select	I see books, I see a lot of things...but where should I go now? Can I click this at all? OK, let me see of something is clickable here.
Orientation	Subjects do not understand where they are or cannot interpret their current location in the context of other locations in the website	What does this mean? Where am I now? I guess I should be in a completely different part of the website?
Stuck in loops	Subjects think they move on to a different location in the website but appear to (repeatedly) return to where they came from	… hey, I've been here before! **, again this stupid page.
Unexpected result	Subjects expect a certain result after clicking a link, but this result does not occur	…and then I click this and hope something happens…but it doesn't.
Failed repetition of actions	Subjects think they remember how to navigate because they feel they did that before, but the (assumed) repetition fails	Oh … yes…and now I should be able to select a title here…. Oh no, apparently I can't.
Reasoning about navigation logic	Subjects start reasoning about why the interface makes them think they can find certain information behind a link	A clock that is ticking… ah, perhaps that's a time machine. Let me try that….
Interface manipulation problem	Subject have problems handling certain objects in the interface (e.g. dragging a pointer over a calendar in order to get to information about a certain year)	There's a calendar here, but when I click it nothing happens… how can I do this?

Donald Norman's Concept of Affordances

- Affordances refer to the perceived properties of an object that suggest how it should be used. Testing ensures that these are clear to users.



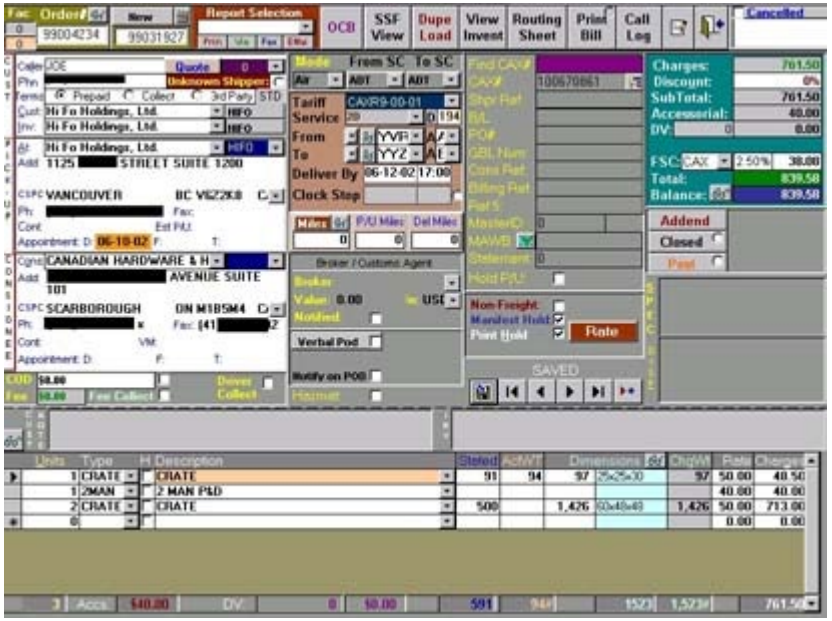
Task-Based User Testing

- CHI pioneers emphasized testing based on real-world tasks that users would perform, to simulate actual usage scenarios.

Effectiveness	Efficiency	Satisfaction
Tasks completed	Task time	Overall satisfaction
Objectives achieved	Time efficiency	Satisfaction with features
Errors in a task	Cost-effectiveness	Discretionary usage
Tasks with errors	Productive time ratio	Feature utilisation
Task error intensity	Unnecessary actions	Proportion of users complaining
	Fatigue	Proportion of user complaints about a particular feature
		User trust
		User pleasure
		Physical comfort

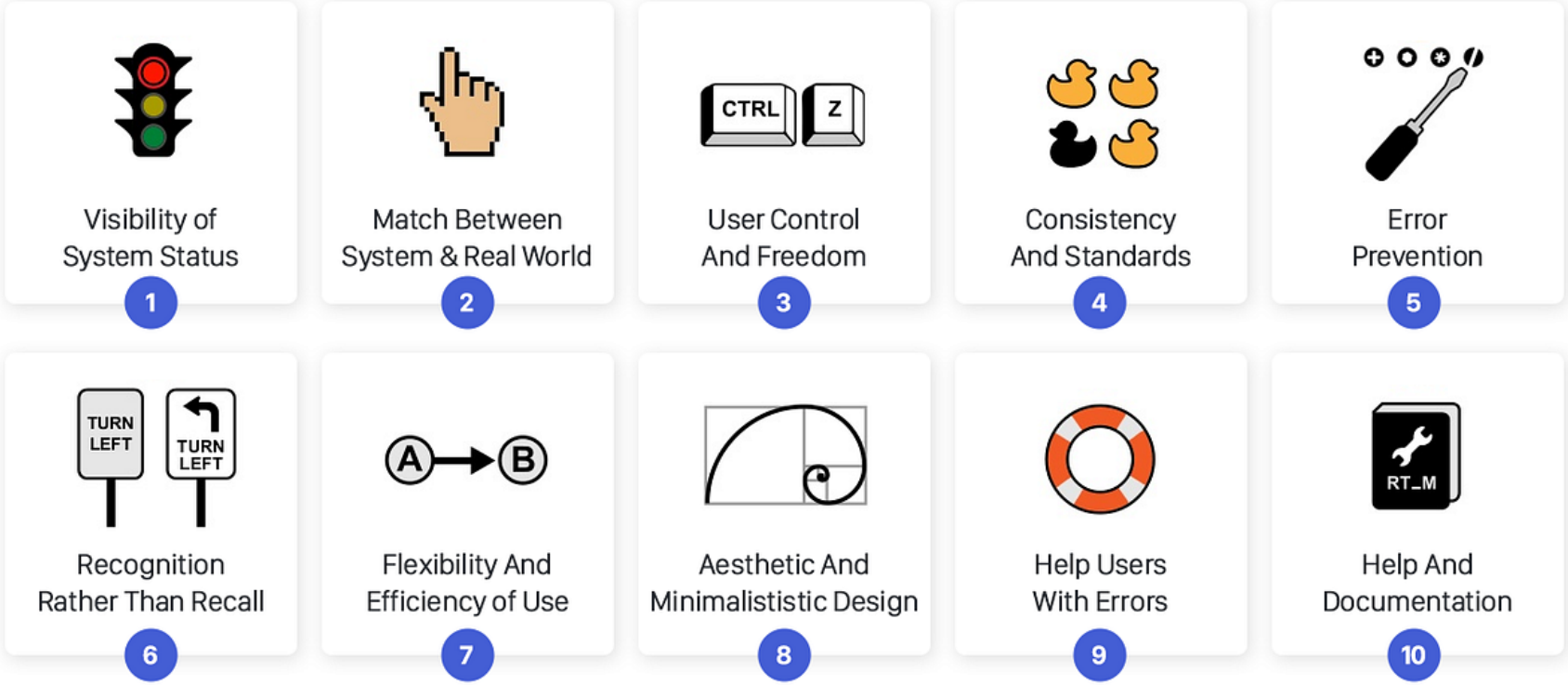
Reducing Cognitive Load

- Shneiderman and others emphasized reducing cognitive load in interfaces through testing, ensuring users are not overwhelmed by complexity.



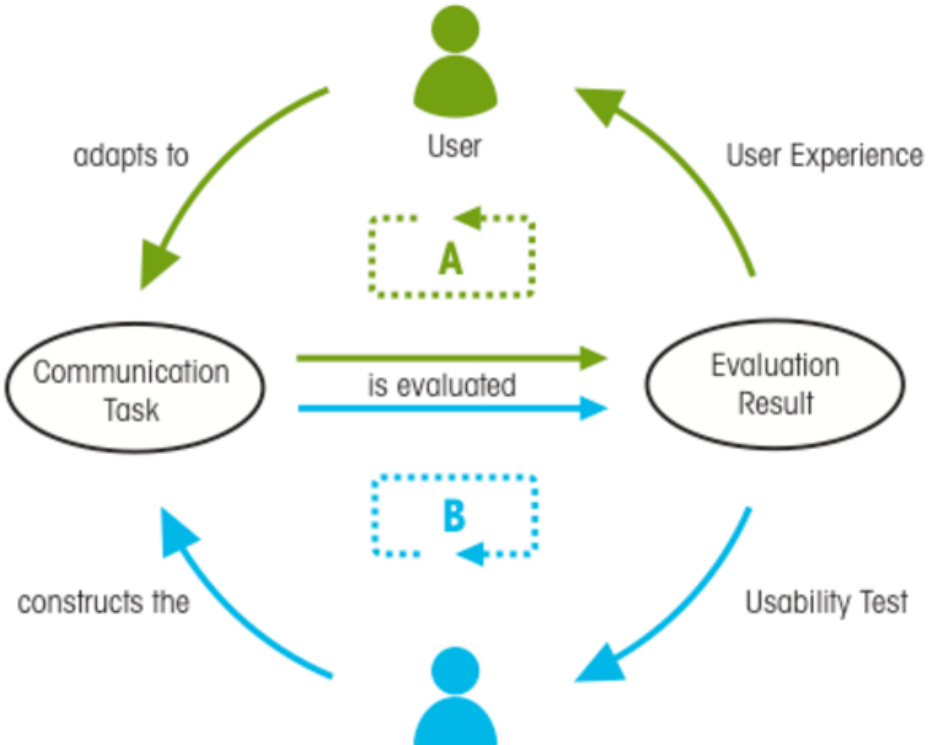
Nielsen's Heuristic Evaluation

- Jakob Nielsen proposed 10 usability heuristics that could be used alongside user testing to identify design flaws.



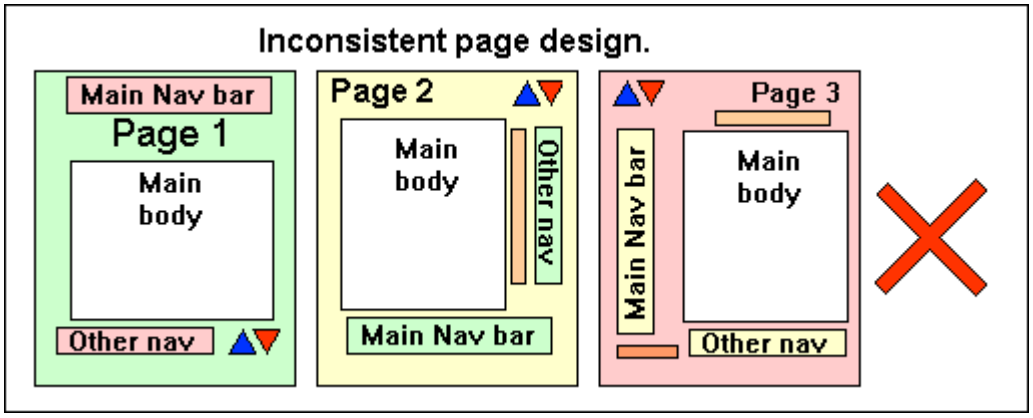
The Role of Feedback in Interfaces

- Don Norman stressed the importance of giving clear, immediate feedback to users, which user testing can help refine.



Consistency in User Interfaces

- Shneiderman's work highlighted the importance of consistency across interface elements, which user testing can help validate.



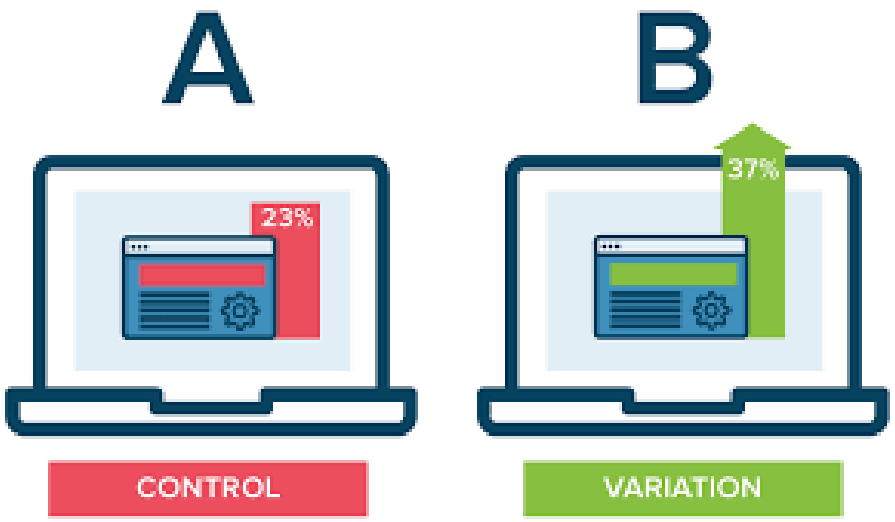
Error Prevention

- Testing can identify areas where users are prone to making errors. Early CHI literature highlights the importance of preventing errors through design.

  https://www.nngroup.com/videos/slips-vs-mistakes/

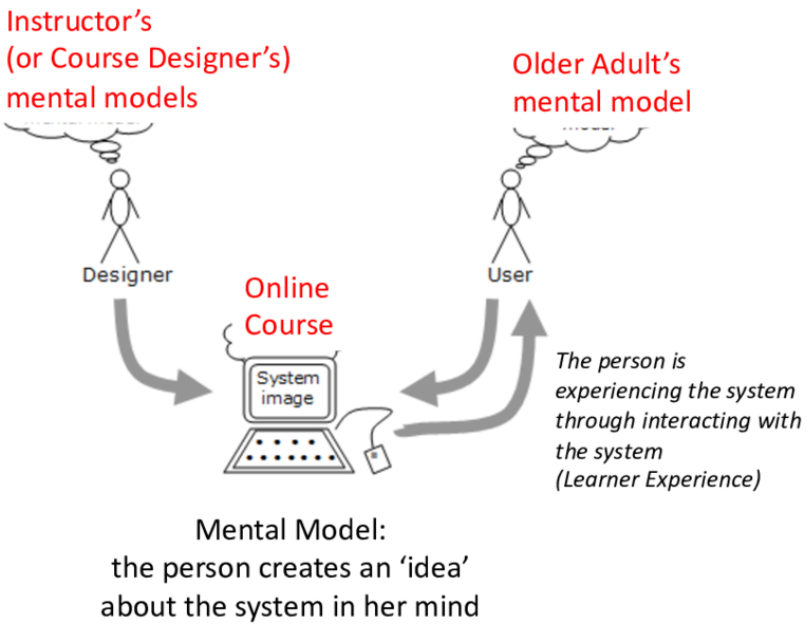
A/B Testing

- A/B testing is a form of user testing where two versions of a design are compared to see which performs better with real users.



The User's Mental Model

- Don Norman's work showed that users build mental models of how systems should work. Testing helps ensure that the design aligns with those models.



Usability Metrics

- Early CHI research emphasized the importance of measuring usability with metrics like task completion rate and time-on-task.

Shneiderman's Direct Manipulation Interfaces

- Shneiderman advocated for direct manipulation interfaces, which allow users to interact with objects on the screen directly. Testing ensures ease of use.

The Cost of Poor Usability

- Jakob Nielsen's studies showed that the cost of fixing a usability issue post-launch can be up to 100 times more than if it were caught during testing.

Simplicity vs. Complexity

- Norman's work argued that while simplicity is desirable, it’s more important to design interfaces that are understandable, which is validated through testing.
- He has a great book on this topic – Living with Complexity.

Usability Testing in Agile

- Agile methodologies encourage frequent iterations, and user testing is key to ensuring each version of the product is moving towards better usability.

Remote User Testing

- With the advent of remote tools, user testing can now be conducted anywhere, providing a broader and more diverse set of feedback.

The Role of User Personas

- Creating user personas can guide user testing by representing real-world user groups and ensuring that their needs are met.

Cultural Considerations in Testing

- Testing with users from different cultural backgrounds can reveal usability issues that might not be apparent with a homogenous testing group.

The Importance of Real-World Contexts

- Testing in real-world environments can uncover usability issues that controlled lab testing might miss.

Early CHI and Usability Engineering

- CHI pioneers like Nielsen and Norman laid the foundation for modern usability engineering practices through rigorous user testing.
- This is empirical, largely quantitative and what we call a ‘discount’ technique.

Field Studies in CHI

- Field studies allow researchers to observe users in their natural environments, providing insights into usability challenges that structured lab testing may miss.

User Experience vs. Usability

- While usability focuses on how easy a product is to use, early CHI literature also highlights the importance of overall user experience.

Identifying Pain Points

- Through user testing, pain points or areas where users struggle are identified and addressed before the product goes to market.
- You will have to mix and match to get good value.

Prototyping and Testing

- Prototypes allow designers to test concepts before full development. Early CHI pioneers advocated for testing as early as possible.

The Role of Surveys in Testing

- In addition to observing behavior, surveys can provide direct user feedback on specific aspects of the interface.

The Concept of Learnability

- Nielsen stressed the importance of learnability—how quickly a user can become proficient in using a new system.
- Also memorability, in coming back to the system and ‘remembering’ how to use it.

Paper Prototyping

- Before digital tools, early CHI researchers often used paper prototypes for testing designs cheaply and effectively.
- They are still useful! Bill Buxton has a book on the topic.

The Role of Accessibility

- User testing is crucial for identifying accessibility issues and ensuring that products are usable by people with varying abilities.

Testing for Error Recovery

- User testing helps ensure that when users make errors, the system provides them with clear, easy-to-follow recovery options.

Testing Mobile Usability

- Mobile devices introduced new usability challenges, and CHI researchers were among the first to highlight the importance of mobile user testing.
- My PhD supervisor Professor Steve Love wrote some books on this topic.

The Importance of Documentation

- User testing can also highlight gaps in user documentation, helping to improve onboarding and learning materials.
- We can mix and match with TDD to get value.

Cognitive Walkthroughs

- A cognitive walkthrough involves stepping through the interface as a user would, predicting usability challenges before testing.

Multimodal Interfaces

- CHI research also explored the usability of multimodal interfaces, where users interact via touch, voice, and other inputs.
- Lots of mathematical models such as Fitts' Law provide empirical evidence to support these mechanisms being loosely similar and quantifiable.

Performance Metrics

- Through user testing, performance metrics like task efficiency and error rates can be measured to evaluate the design's effectiveness.

Testing for Satisfaction

- User testing should not only focus on efficiency but also on whether the user enjoys the interaction and finds it satisfying.

Visual Hierarchy in UI

- Testing helps determine whether the visual hierarchy of a design is clear, guiding users through tasks efficiently.

Simplicity in Interaction Design

- Shneiderman emphasized the importance of keeping interactions simple, which user testing can validate.
- Essentially one click is better than four!

Test Early, Test Often

- One of Jakob Nielsen's principles is to test early and test often. User feedback is critical at all stages of design.

Heuristic Evaluations vs. User Testing

- Nielsen recommended using both heuristic evaluations and user testing for comprehensive usability insights.

Evaluation criteria (3 usability rules for each heuristic)	Score	Values
1. Visibility of system status	3/3	75 - 100%
2. Match between system and the real world	2/3	50 - 74%
3. User control and freedom	1/3	25 - 49%
4. Consistency and standards	1/3	25 - 49%
5. Error prevention	2/3	50 - 74%
6. Recognition rather than recall	1/3	25 - 49%
7. Flexibility and efficiency of use	0/3	0 - 24%
8. Aesthetic and minimalist design	3/3	75 - 100%
9. Help users recognise, diagnose and recover from errors	1/3	25 - 49%

Testing with Diverse User Groups

- Early CHI work emphasized the importance of testing with a wide range of users to ensure the system is usable by as many people as possible.