

HCI Guidelines and Techniques.

HCI Toolkits - collection of resources, guidelines, & software tools designed to assist in the design and evaluation of user interfaces. These toolkits provide developers and designers with essential tools to create user-friendly systems that enhance overall UX.

Benefits of HCI Toolkits -

- ↳ saves time
- ↳ improves quality
- ↳ collaboration among team members
- ↳ user friendly
- ↳ encourages creativity
- ↳ UCD & consistency

Examples

GUI Toolkits - GTK & Qt.

Prototyping Toolkits - Axure & Figma.

Accessibility Toolkits - WAVE & AXE

Speech Recognition Toolkits - Google's Speech API & Microsoft's Azure Speech Service

User Interface Management System (UIMS) -

UIMS is a tool that helps developers create and manage the user interface (UI) of applications. It separates the UI from underlying application logic, making it easier to design, maintain and update software.

Architecture of UIMS

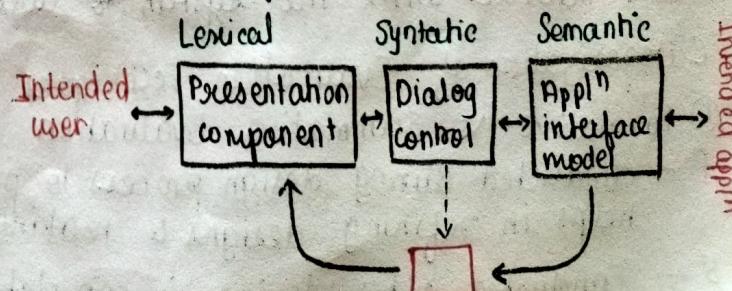
It includes 3 layers -

- ① Presentation Layer - displays UI elements to the user. This layer handles the visual representation of data & user interactions. Eg., buttons, text boxes and menus.
- ② Dialog Control Layer - this layer manages the flow of interaction between user & the application. It interprets user inputs and translates them into actions that the application can understand. like clicks / keystrokes
- ③ Application Layer - this contains core logic of the application - the rules and processes that handle data & perform tasks based on user I/O

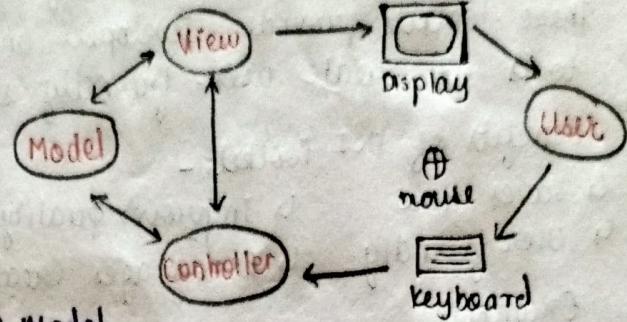
Models in UIMS

- ① Seeheim Model - first conceptual architecture of UIMS in 1985 at Seeheim, Germany.

Promotes separation of UI from appl'n logic, enhancing modularity & maintainability.

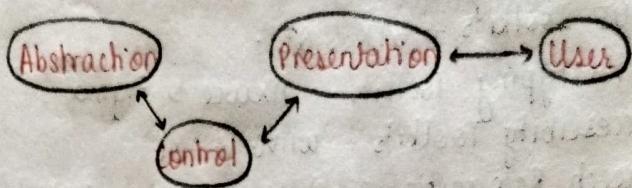


- ② Smalltalk Based Model -
 focus on - utilizes object-oriented programming principles.
 Based on MVC. It has ability to build new interactive systems based on existing ones.
- Rules of Smalltalk object model :-
 everything is an object.
 Every object is an instance of a class.
 Every class has a superclass.
 Inheritance chain is followed.



③ PAC (Presentation - Abstraction Control) Model.

States :-
 Parent Presentation
 Child Abstraction
 Admin Control



Goals of Evaluation

① Access System functionality -

The goal is about making sure the system does what users need it to do.
 The system should have the right features that users expect.
 Users should be able to easily find & use these features.

How to evaluate - measure how well user can complete their tasks, looking at things like how many tasks they finish & how quickly they do it.

② To assist users experience of the interaction / evaluating UX -

The goal is about how users feel when they interact with system.
 The system should be easy to learn & use.
 Users satisfaction & enjoyment matters.

How to evaluate - use surveys to ask users about their satisfaction & observe them while they use the system to spot any difficulties.

③ Identify specific problem -

The goal is about finding any issues in the design that confuse users/ lead to mistake.

look for areas where users get frustrated.

How to evaluate - Conduct expert reviews & usability tests where real users interact with the system to uncover specific trouble spots.

Categorization of Evaluation Techniques

① Formative vs Summative Evaluation

F - conducted during design process to provide ongoing feedback. It helps in refining designs & making iterative improvements.

S - conducted after design is complete to access the effectiveness of

final product.

② Qualitative vs Quantitative evaluation

Qualitative - focuses on understanding UX & perceptions

Quantitative - involves numerical measurements & statistical analysis.

③ Expert vs User Based Evaluation

Expert - involves expert reviewing a system to identify issues based on heuristic guidelines.

User-Based Experience - involves real user testing the system, providing feedback based on their interactions.

Cognitive walkthrough

Proposed by Olson et al. The origin is based on software engineering code walkthrough. Walkthrough means sequence of steps.

Cognitive Walkthrough is a way to evaluate how easy it is for new user to use a system. It involves stepping through tasks that users need to complete.

In order to conduct CW, experts need to know 4 things

- ↳ A specification / prototyping of a system.
- ↳ Description of the task that user performs on system.
- ↳ A complete, written list of actions needed to complete the task.
- ↳ An indication of who the users are & what kind of experience & knowledge the evaluators can assume about them.

When to do cognitive walkthrough -

CW can be done at any stage in the development process once you have a 'prototype' / actual system implementation to work on.

- ↳ Can be done with paper prototype.
- ↳ Can be done with a shrink-wrapped product.

Benefits -

- ↳ Helps find problems that might confuse new users.
- ↳ Gives insights into how well the system supports users in completing their tasks.

Heuristic Evaluation

Proposed by Nielsen & Molich

HE is a method where experts look at the interface & check it against established usability rules (heuristic rules) to find potential problem.

When to use HE -

- ↳ Can be used at very early stage of development & from first sketches & outline descriptions

Heuristic evaluation - 10 guidelines, can guide a design decision / be used to critique decision that has already been made. 3-5 evaluators are sufficient.

Severity rating on scale 0-4 (less-most)

- 0 - No problem.
- 1 - cosmetic problem only.
- 2 - minor usability problem
- 3 - major usability problem
- 4 - Usability catastrophe

10 Heuristic principles are:

- ↳ Visibility of system state
- ↳ Match betw real & system world
- ↳ User control & freedom
- ↳ Consistency & standards
- ↳ Error prevention
- ↳ Recognition rather than recall
- ↳ flexibility & efficiency of use
- ↳ Aesthetic & minimalist design
- ↳ Help users recognize
- ↳ Help & documentation.

DECIDE framework

Structured approach used for evaluating user interfaces & systems in HCI. It helps to guide evaluation process to ensure that it is comprehensive & USD. The DECIDE acronym stands for:

Define the Goals - Decide what you want to achieve with evaluation
Eg. You might want to find out if users can easily navigate the website

Explor the questions - Think about specific questions you want to ask during the evaluation.

Eg. How quickly can user find products?
Are users happy with checkout process?

Choose Evaluation method - Pick right method to gather info
Eg. Usability testing (watching user try the system)
Surveys (asking users their feedback)

Identify Practical Issues - Consider any challenges you might face during the evaluation.

Eg. Make sure you have enough time & participants for testing.

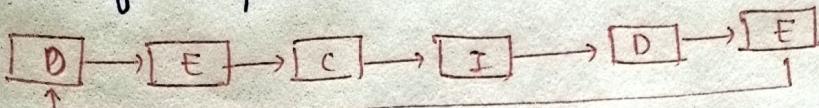
Decide on Ethical Considerations - Think about user privacy & consent.

Eg. Let participants know how their data will be used & keep their responses confidential.

Evaluate, Analyze, Interpret & Present Data - Collect data, look at it carefully & share your findings.

Eg. Analyze how many users completed tasks successfully & present

this info. to your team



write full forms
for diagram !!

Eg. evaluating a new online shopping website.

D - find out if users can easily navigate & make purchases.

E - How fast can users find items?
Are they satisfied with checkout?

C - Conduct usability test.

Use surveys for feedback

I - schedule testing sessions & recruit enough participants.

D - Inform users about data use & ensure privacy.

F - Look at task completion rates & survey results, then share findings with your team.

Usability Testing -

Technique used to evaluate a product by testing it with real users.
This method addresses how easy & effective a system is for its intended users.

Goal - uncover pain points in UX & improve the design based on user feedback.

Objectives - Identify pain points of user.

Evaluate effectiveness - how well user completes tasks.

Gather feedback - user satisfaction.

How to perform usability testing on interactive interface

① Define Your Goals -

② Create user Tasks - make list of specific tasks for user to complete during test

③ Choose testing method -

④ Recruit Participants - find ppl who matches your target audience.

⑤ Conduct a Pilot test - run a small test with few ppl to check if your tasks are clear & easy to follow.

⑥ Run the usability test

⑦ Analyze the Result

⑧ Report findings.

Eg. Testing an Online Store

- ① ② search "running shoes"
 - ③ VC (video calls) for moderated testing
 - ④ find 6 ppl who visit daily
 - ⑤ Test with 1 member first
 - ⑥ Watch ⑦ ⑧ them ✓✓
- add to cart
checkout