

Usability, Tasks, Chunking Information, Mental Models

COMPUTER SCIENCE DEPARTMENT

Usable Security and Privacy

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Usability

Usability

- The heart of usable security
- It's a way that we can measure and understand, how easy it is for people to use a system

Key Factors in Measuring Usability

1. **Speed:** How quickly can users complete tasks?
2. **Efficiency:** How many errors do users make?
3. **Learnability:** How easy is it for users to learn the system?
4. **Memorability:** How well do users remember how to use the system?
5. **User Preference:** How much do users like the system?

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Measuring Speed

Timing Tasks: Measure the time it takes users to complete specific tasks.

Example: Compare iPhone login times for fingerprint , 4-digit code, and Face ID.

- **Fingerprint:** 1.5 second
- **FaceID:** 1 Second
- **4-digit code:** 5 seconds



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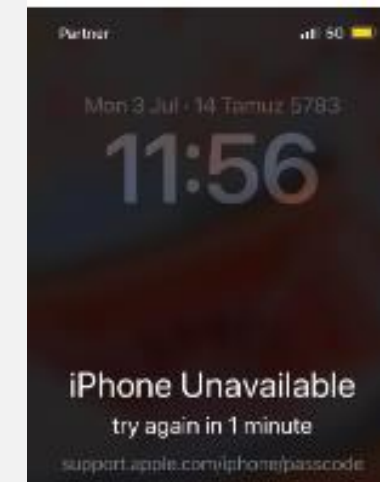
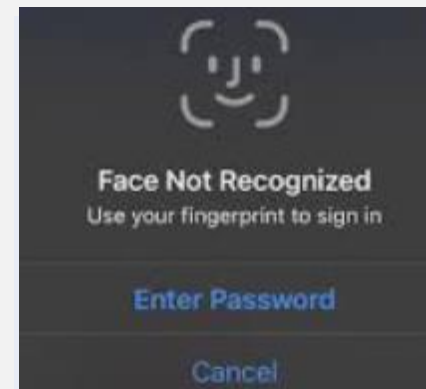
Key Factors in Measuring Usability

Measuring Efficiency

- **Counting Errors:** Count the number of errors users make while completing tasks.

Example: iPhone login errors

- **Fingerprint:** Failed recognition attempts
- **FaceID:** Face Not Recognition
- **4-digit code:** Incorrect code entries



Key Factors in Measuring Usability

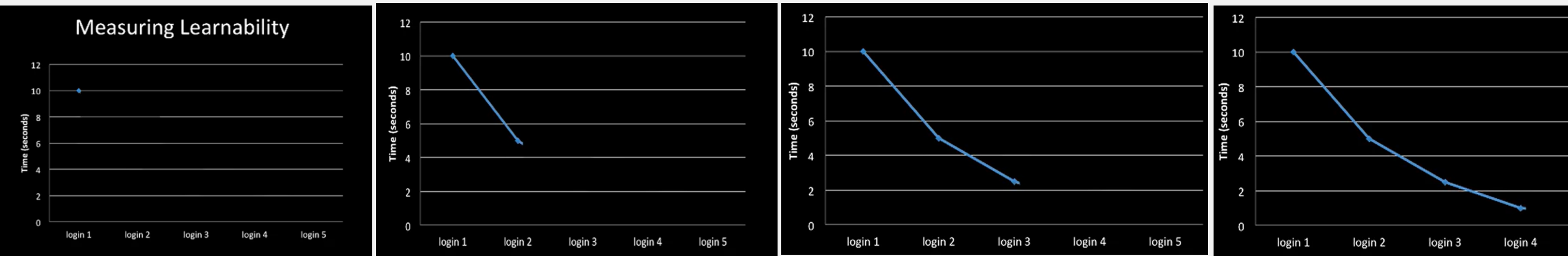
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Measuring Learnability

- **Tracking User Progress:** Monitor how quickly users learn to use the system.
- **Example:** iPhone login learning curve

Visualize the time it takes users to complete the login process over multiple attempts



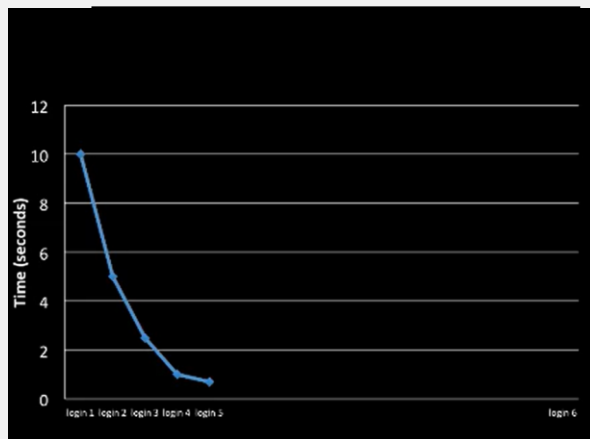
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Key Factors in Measuring Usability

Measuring Memorability

- **Re-Testing After a Break:** Test user performance after a period of non-use.
- **Example:** iPhone login after a week of non-use
Measure how long it takes users to log in again



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Key Factors in Measuring Usability

Measuring User Preference

- **Surveys and Questionnaires:** Gather user feedback on system usability.
- **Interviews:** Conduct in-depth interviews to understand user experiences.

How easy was the system to use?
(very difficult) 1 2 3 4 5 6 7 (very easy)

questioner

"Tell me about your
experience using
this system."

talk to user

Balancing Usability Factors

- **Trade-offs:** Sometimes, improving one factor may negatively impact another.
- **Example:** Speed vs. Efficiency
 - **Faster typing speed** may lead to **more errors**.
- **Striking the Right Balance:** Aim for a system that is both efficient and user-friendly.

Tasks

Task

- Goals users set out to accomplish in a system.
- Analyzing usability requires focusing on tasks rather than the system as a whole.

Key Characteristics of Tasks

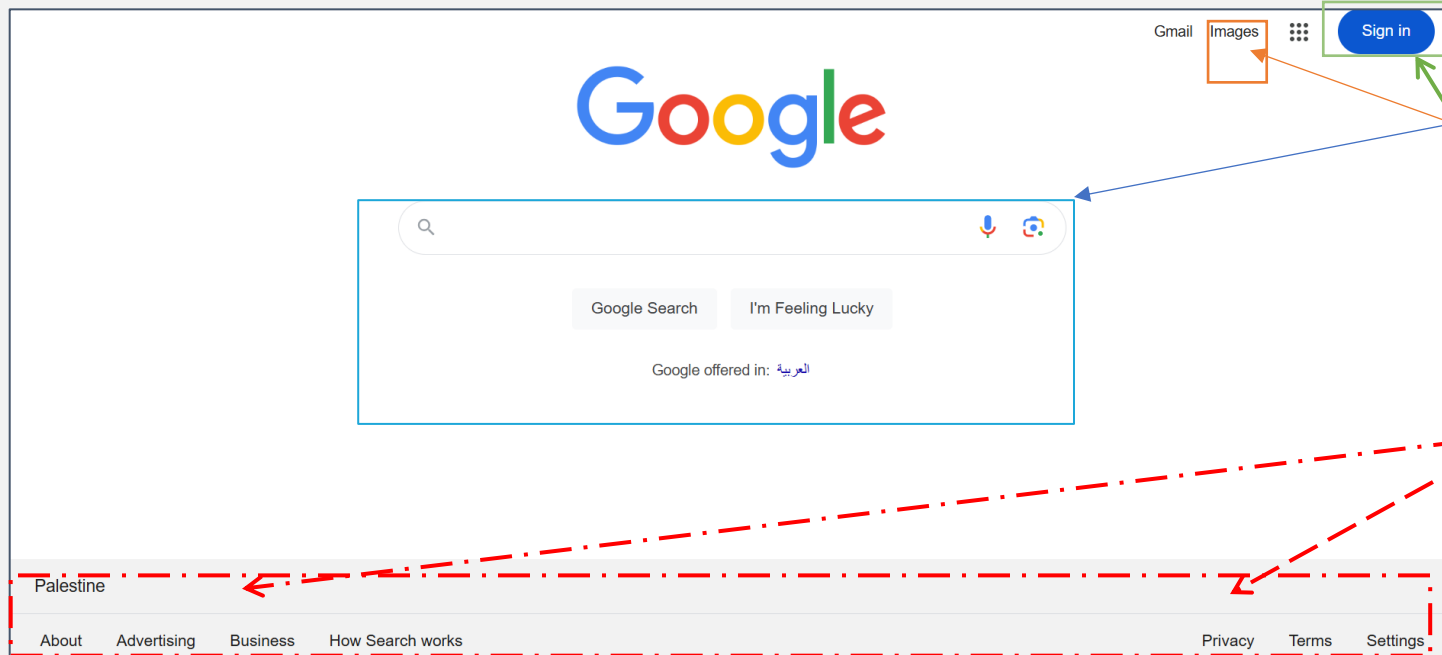
- Specific:**

- Tasks should be concrete goals users aim to accomplish.

- Ranked by Importance:**

- Some tasks are more important than others, so prioritize them in your task analysis.

Example: Example: Google Website



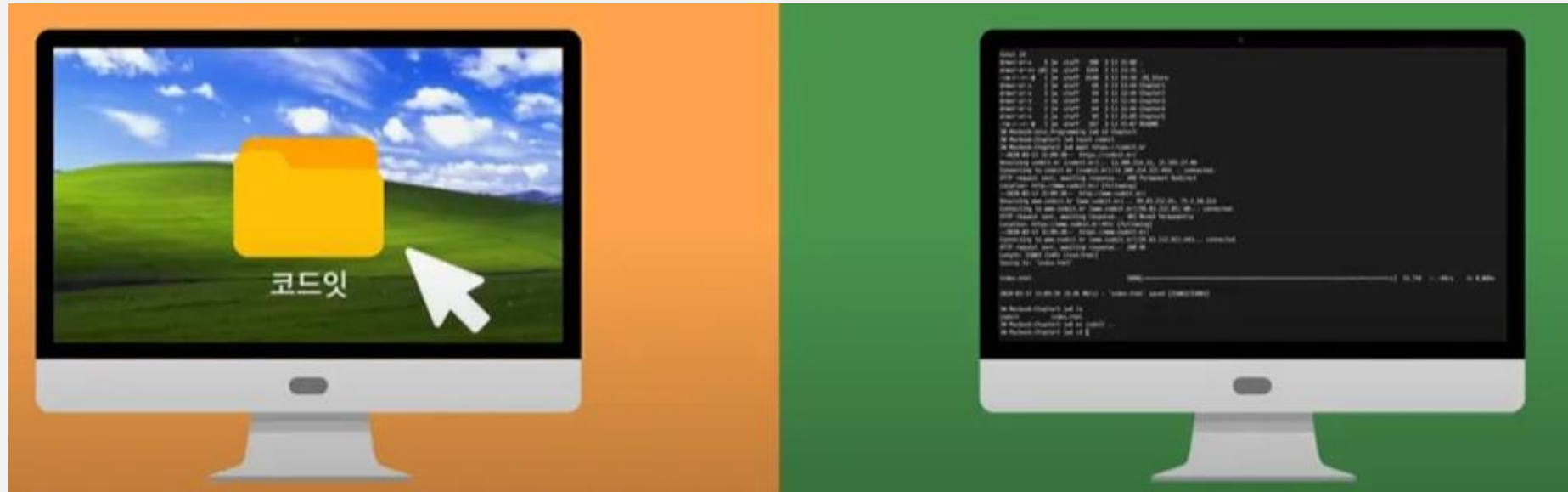
- **Task 1:** Conduct a Web Search
 - Search box prominently placed.
- **Task 2:** Perform an Image Search
 - Clear option for image search.
- **Task 3:** Log In to Google Account
 - Login in the top right, a familiar pattern
- **Task 4:** Access Other Google Services
 - Easily accessible from the homepage.

- Important tasks are easy to find and access.
- Secondary tasks are clearly placed without interfering with primary tasks.
- The page is uncluttered (غير مزدحم) and simple to navigate.

Case study: Comparing Tasks Across Systems

•Example Task: Granting Write Access to a File

- **Command Line Interface (CLI):** Fast but complex for beginners.
- **Graphical User Interface (GUI):** Simple, intuitive, but less efficient for experts.



References

- Usable Security lecture notes by Jennifer Golbeck