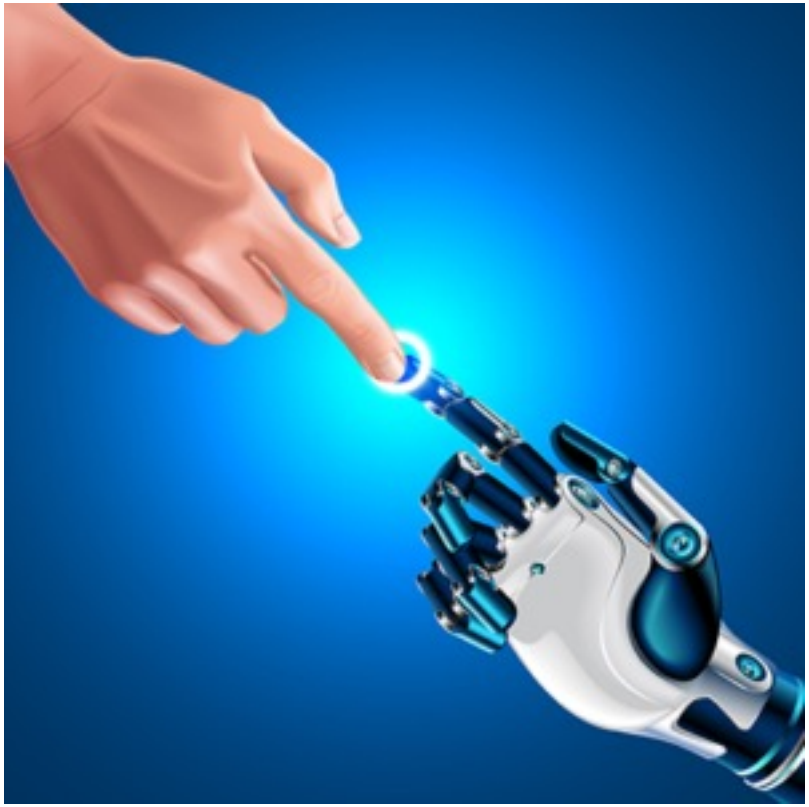
HUMAN COMPUTER INTERACTION

LECTURE 12



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LESSON PLAN

- **Evaluation with users (Usability testing)**
- **Evaluation without users**

REMINDER…

WHAT IS A DESIGN PROCESS?

A Systematic Method for Designing User Interfaces

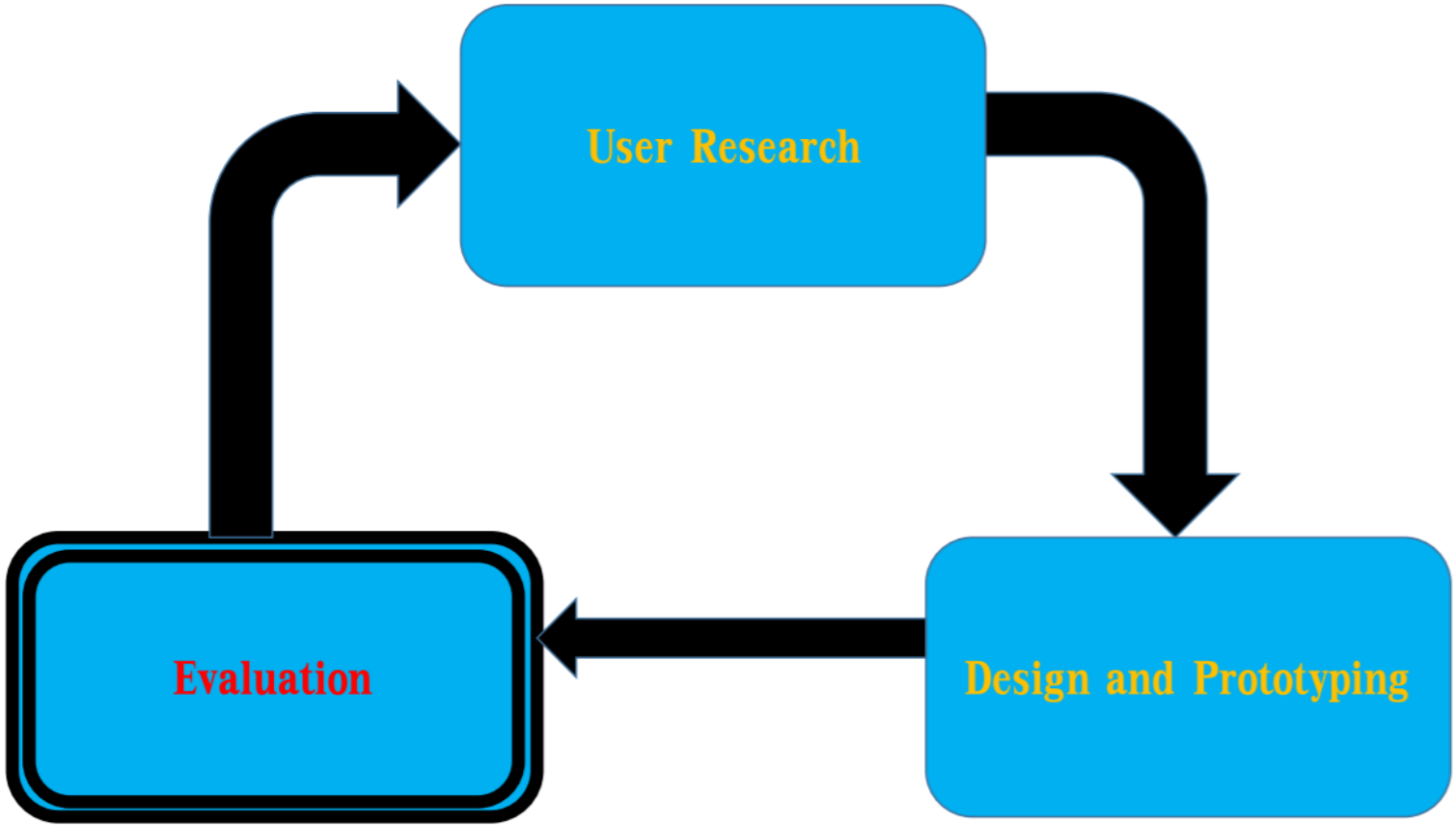
Key Elements of our Design Process

User-Centric Process as well as Goals

Iterative Design

- Easier to Improve than to Get it Right the First Time!!

WHAT IS A DESIGN PROCESS?



KEY POINTS

- **Evaluation is part of an iterative process**
- **Design focus**
- **Set goals**
- **May occur multiple times…**
  - At different phases of the process
  - On different types of ‘interfaces’
  - Using different types methods

EVALUATION WITHOUT USERS

Surprising!

May be ‘cheaper’ – recruiting users can be difficult; user’s time is valuable

Systematic methods to step through an interface, looking for problems

Each method provides a “focus”

For example: does the interface satisfy a checklist of well-known principles of good design?

For example: step through key tasks, carefully considering whether a typical user will be able to complete each step of task

Cognitive walkthrough

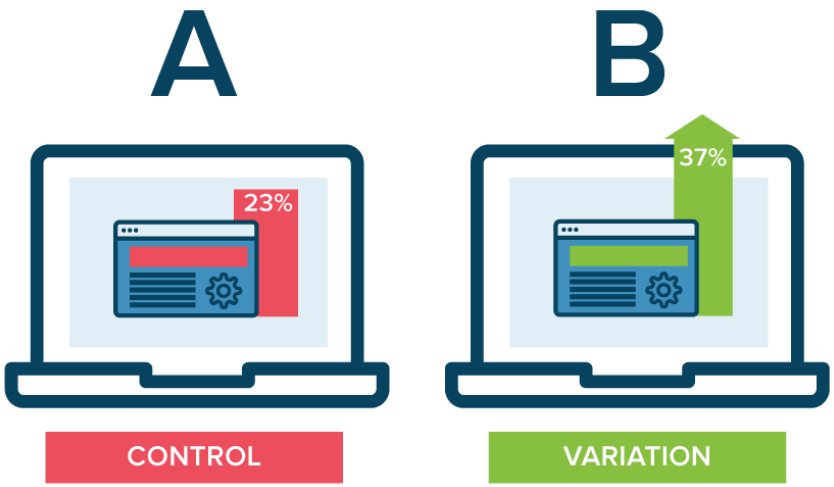
Heuristic Evaluation

EVALUATION WITH USERS

- Ethical issues… consent

- Qualitative usability studies
- Controlled lab studies
- Field studies
- Field experiments
- A/B testing

- *Preparation*
- *Think aloud*
- *Eye tracking*



EVALUATION WITHOUT USERS

Many forms of evaluation…

- **Action Analysis (quantitative evaluation)**
  - KLM, GOMS, and other formal analyses
  - Informal action analysis

- **Qualitative Methods**
  - Expert evaluation
  - Cognitive Walkthrough
  - Heuristic Evaluation

WHAT IS ACTION ANALYSIS?

- **Action – the steps a user has to carry out with an interface**
- **Analysis – a methodical review or study**

- ***Action Analysis* is a methodical review of the steps required to carry out tasks in an interface.**

KLM AND THE GOMS FAMILY

- **Formal action analysis**
  - Accurately predict task completion time for skilled users
- **Break task into tiny steps**
  - Keystroke, mouse movement, refocus gaze
  - Retrieve item from long-term memory
- **Look up average step times**
  - Tables from large experiments
- **Key insight is that total time is sum of step times**

KLM AND THE GOMS FAMILY

- **Primary utility: repetitive tasks**
  - E.g., telephone operators
  - Benefit: can be very accurate (within 20%)
  - May identify bottlenecks
- **Difficulties**
  - Challenging to decompose accurately
  - Long/laborious process
  - Not useful with non-experts
- **GOMS (Goals, Operators, Methods, Selection Rules)**
  - Family of methods; explicit hierarchy of goals

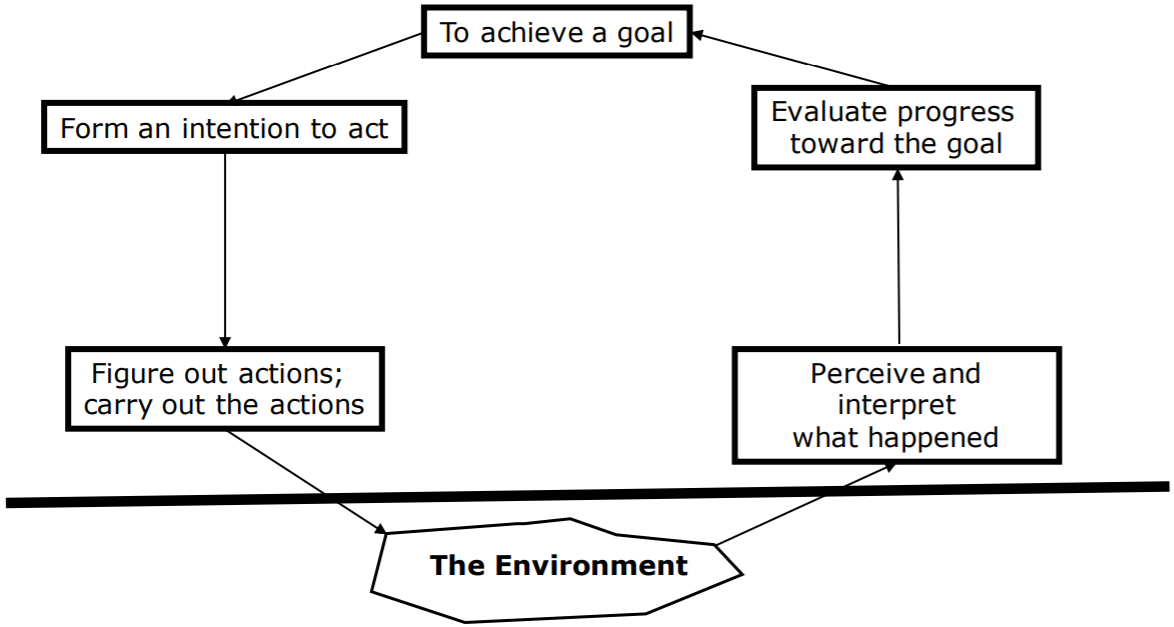
INFORMAL ACTION ANALYSIS

- **As described in Task-Centered UI Design**
- **Coarse-grain**
  - List basic actions (select menu item)
  - Each action is at least 2-3 seconds
  - What must be learned/remembered?
  - What can be done easily?
  - Documentation/training needed?

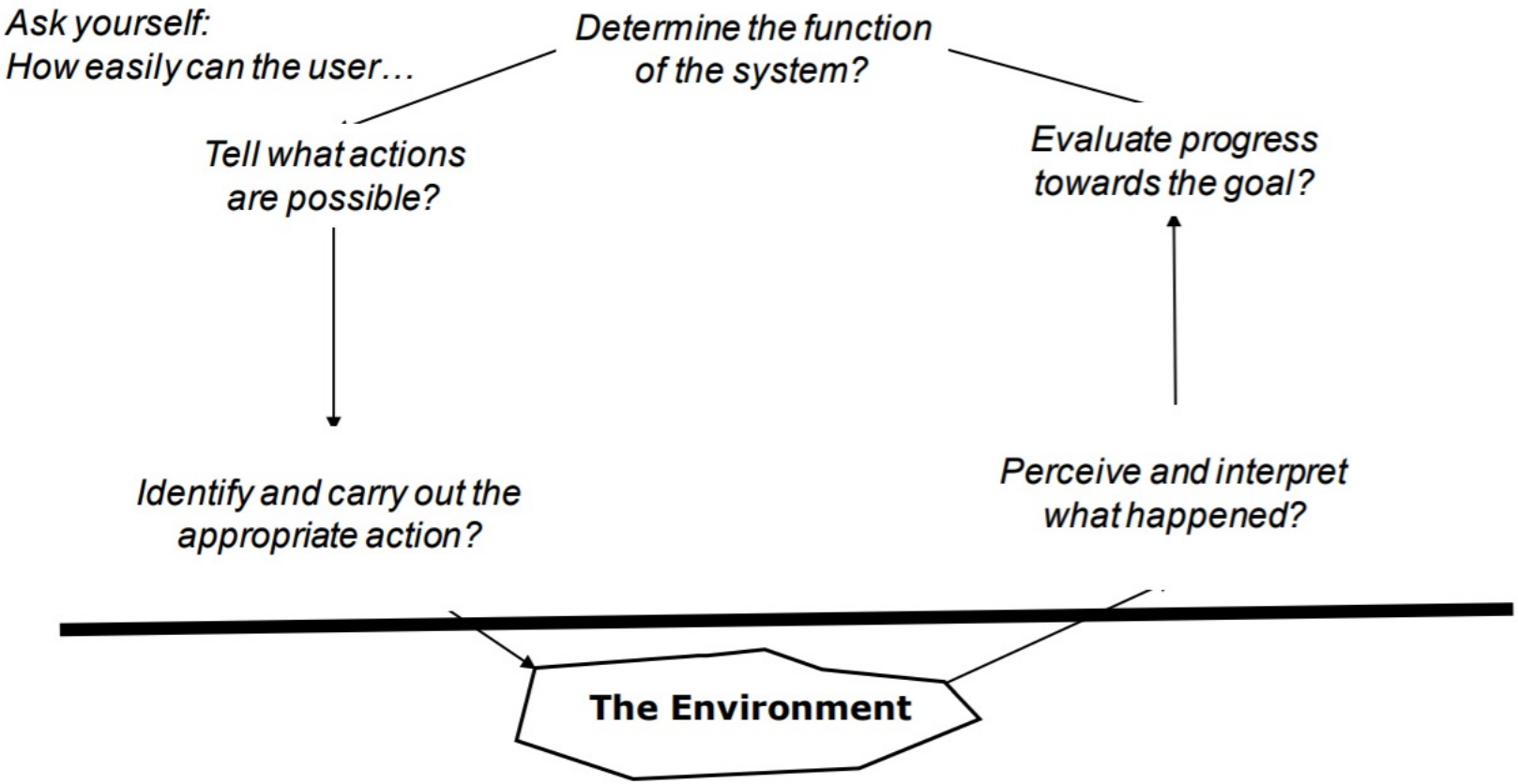
COGNITIVE WALKTHROUGHS

- **Formal methods for evaluating a UI without users**
- **Focuses on first-time use**
- **Task-oriented**
  - Requires tasks and walkthrough scenarios
  - Fundamental question: “Will users be able to follow this scenario?” Can you tell a believably story?
- **Must be aware of user capabilities**

REVIEW: NORMAN'S STAGES OF ACTION



STAGES OF ACTION MODEL AS GUIDE FOR DESIGN



COGNITIVE WALKTHROUGH PROCEDURE

- For each action in the scenario
    - "Tell the story" of why the user will do it
    - Ask critical questions (look back to Stages of Action)

1. Will users be trying to produce the right outcome? I.e., does the user understand that this step is needed to reach their goal?

2. Will users see the correct action they need to perform to produce the outcome? (visibility)

3. Will users recognize that this is the action they need to take to achieve the correct outcome? (Or will they select a different action instead?)

4. Will users understand the feedback? That is, if users performed the correct action, will be they be able to tell that they made progress toward their intended outcome?

1. Will users be trying to produce the right outcome?

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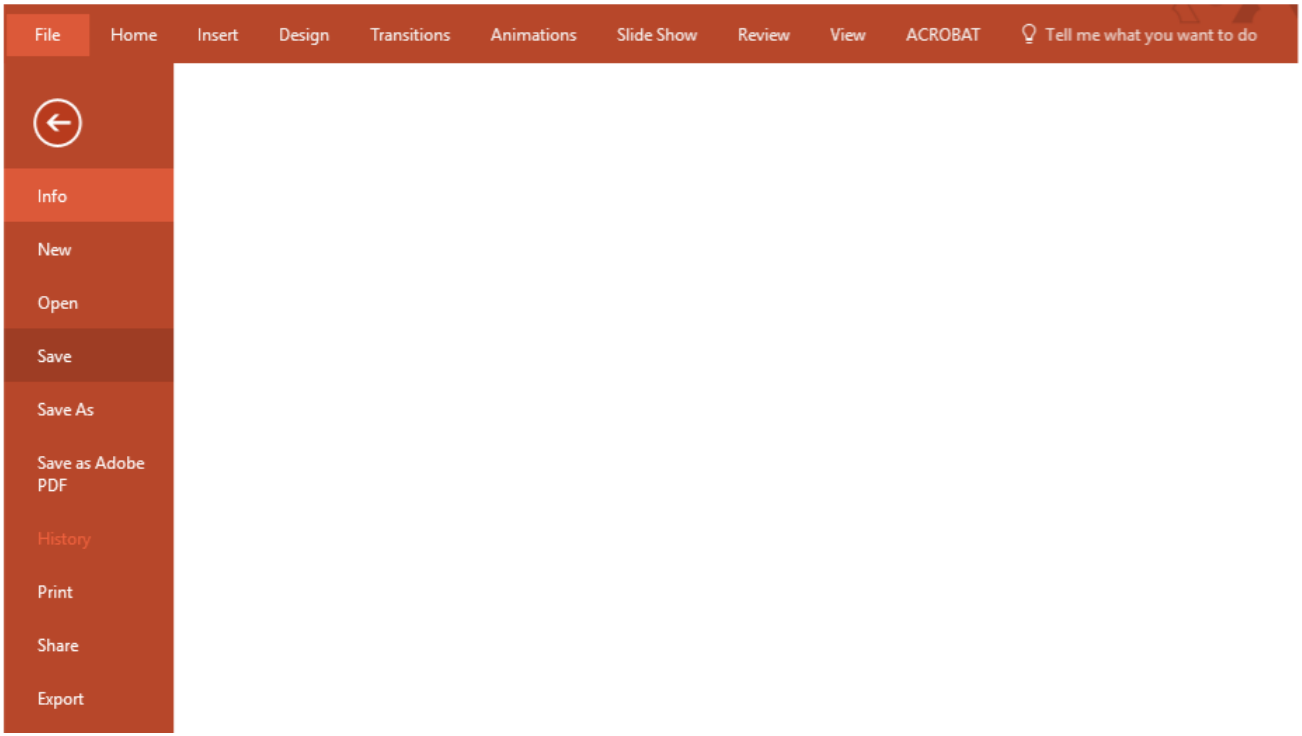

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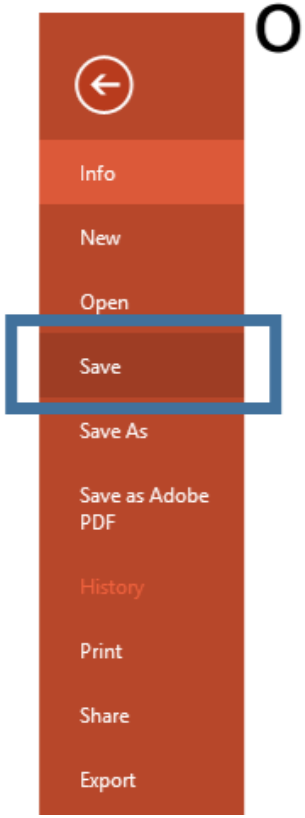

4. Will users understand the ***feedback***?

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What you need to do a walkthrough (well)

- A well-developed interface: paper prototype is fine, but should be pretty complete
- One or more task descriptions
- A walkthrough scenario for each task
- Clear understanding of users; personas are good

- Be skeptical!
- Work together

Cognitive Walkthroughs: What they can do for you

- Learn about / improve initial user experience
- Task-oriented – focus
- Easy to learn; quick to do
- Forces you to articulate assumptions about user knowledge and thought process
  - Do users understand how to carry out tasks?
  - Will users really see the right control? Will they understand this *is* the right control?
  - Will they understand labels/text?
  - Will they understand the feedback?
- Can do early in the process – LoFi prototype
- Finding problems often implicitly suggests solutions

Cognitive Walkthrough Limits

- Designers must understand their users
- Focuses on first-time users
- Identifies problems, doesn't (automatically) produce solutions
- Does not tell you how frequent or severe problems are

END OF LECTURE