Week 3.

Human Error? Bad Design? Slips & Mistakes

MIS3506 * Lavin * Fall 2025

When an accident is thought to be caused by people, we blame them and continue to do things just as we've always done.

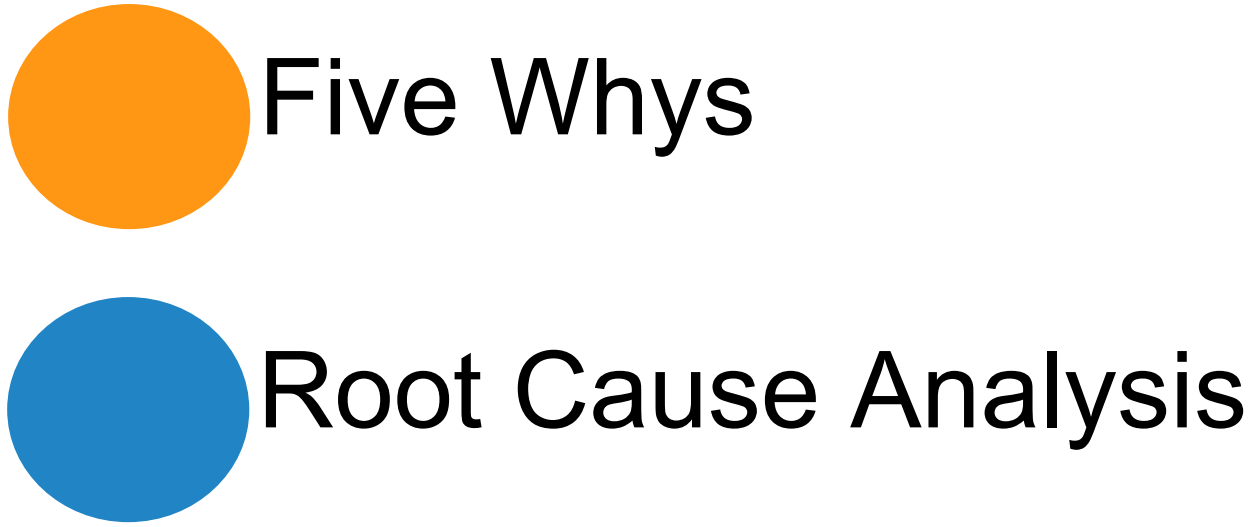
Norman, p. 162

Defining the problem or opportunity

Understanding **WHY** there is error

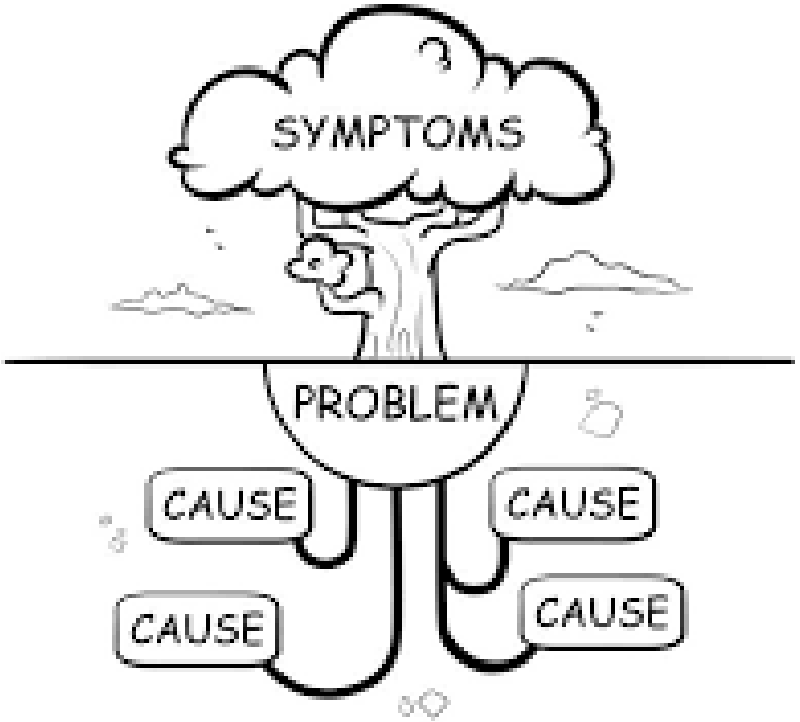
Diagnosing Error

What is the role of each of these in understanding a process so that it can be improved?



Root Cause Analysis

- **More than putting out fires**
- Identify the problem
- Define the problem
- Collect Data
- Identify Possible Causal Factors
- Identify the Root Cause
- Recommend & Implement Solutions/Changes



Five Whys

The 5 Whys is a problem-solving technique that involves asking "why?" (five) times in a row to identify the root cause of a problem. It's a simple, iterative process that can help you pinpoint the underlying causes of an issue.

How to use the 5 Whys

Clearly state the problem
Ask "why?" five times
Use the answer to the previous question as the basis for the next question
Continue asking "why?" until you reach the root cause

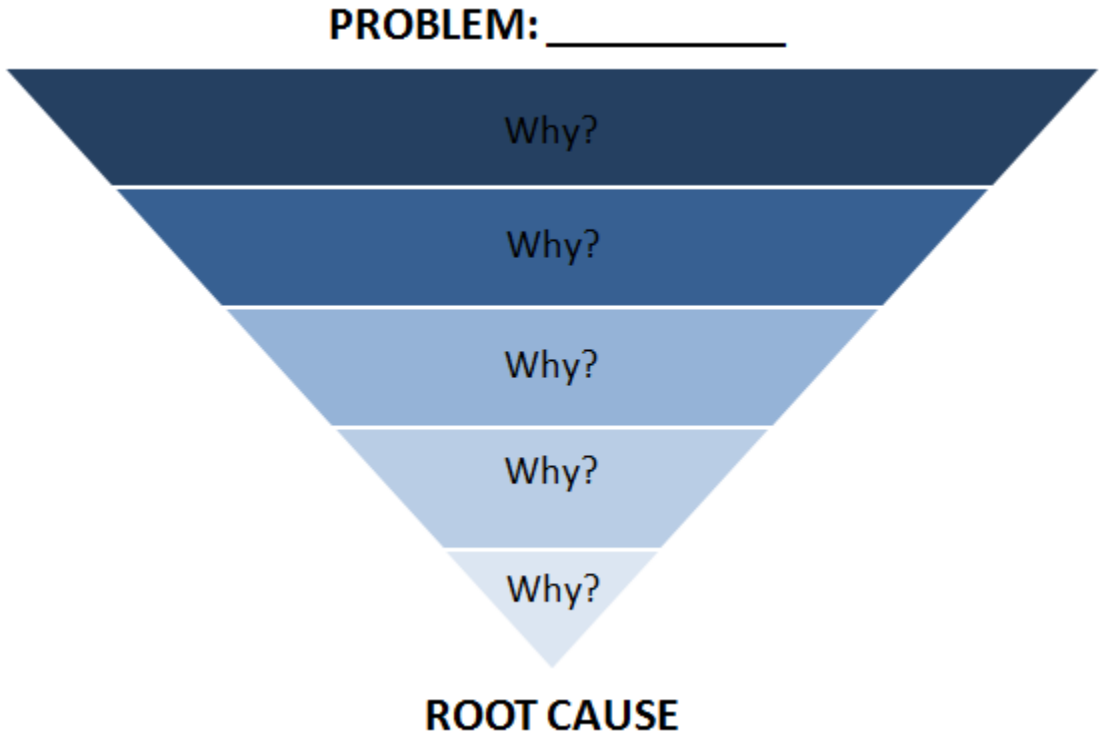
Benefits of the 5 Whys

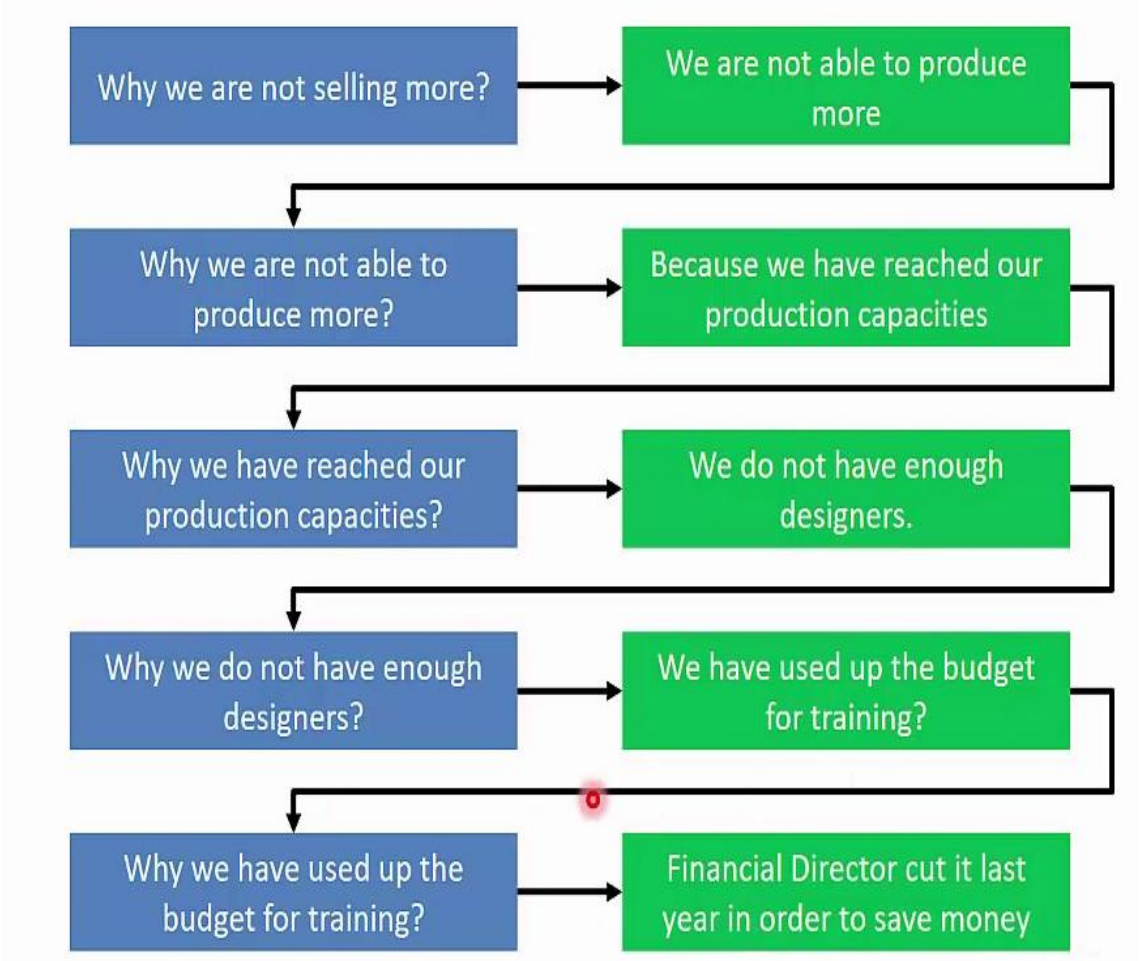
Helps you dig deeper into the problem
Helps you identify the underlying causes of a problem
Helps you turn a problem into a solution
Helps you find the root cause of a defect

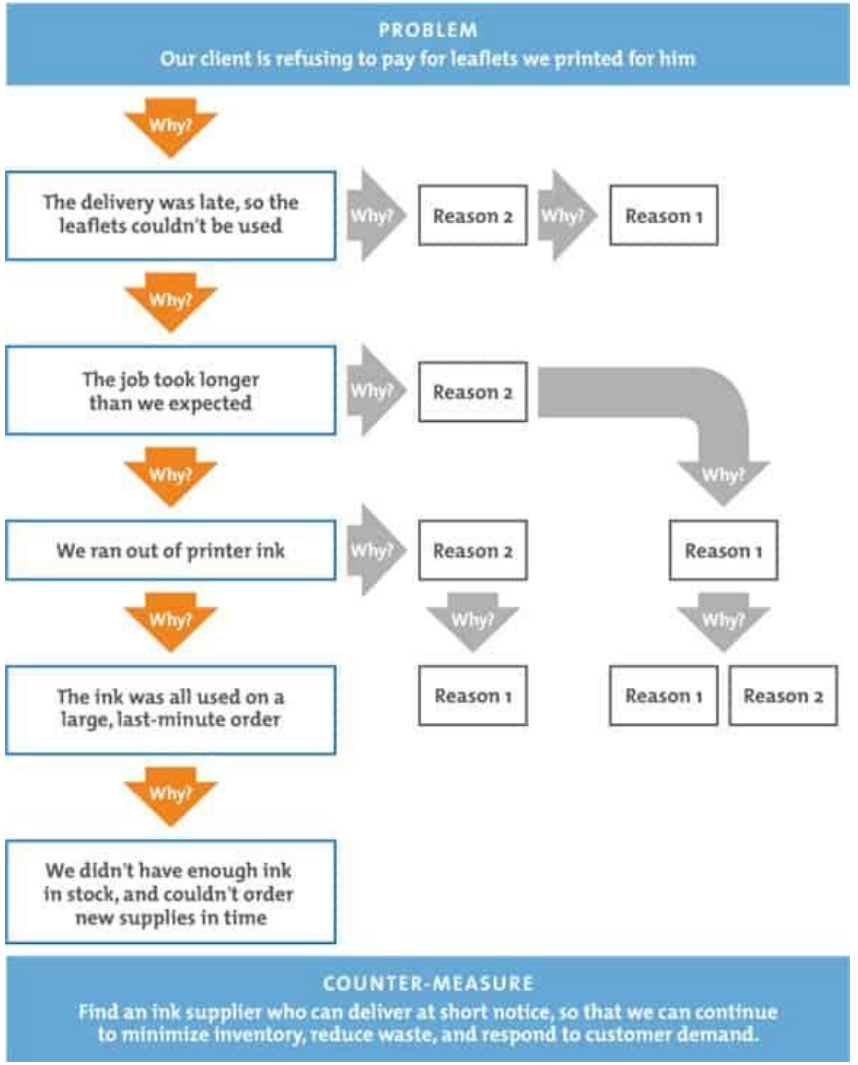
Goal: Determine the root cause of a problem or defect

Keep asking!

1. What is the problem?
2. Why did the problem occur?
3. Why did the reason in question 2 happen?
4. Why did the reason in question 3 happen?
5. Why did the reason in question 4 happen?




Why we are not selling more?
We are not able to produce more
Why we are not able to produce more?
Because we have reached our production capacities
Why we have reached our production capacities?
We do not have enough designers.
Why we do not have enough designers?
We have used up the budget for training?
Why we have used up the budget for training?
Financial Director cut it last year in order to save money


PROBLEM
Our client is refusing to pay for leaflets we printed for him
Why?
The delivery was late, so the leaflets couldn't be used
Why?
Reason 2
Why?
Reason 1
Why?
The job took longer than we expected
Why?
Reason 2
Why?
Why?
We ran out of printer ink
Why?
Reason 2
Reason 1
Why?
Why?
Why?
The ink was all used on a large, last-minute order
Reason 1
Reason 1
Reason 2
Why?
We didn't have enough ink in stock, and couldn't order new supplies in time
COUNTER-MEASURE
Find an ink supplier who can deliver at short notice, so that we can continue to minimize inventory, reduce waste, and respond to customer demand.

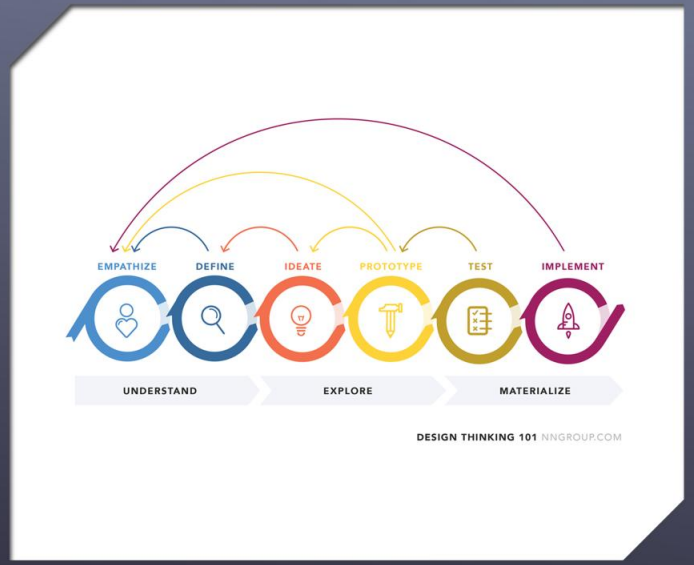
PROBLEM

An issue that is preventing the achievement of goals and objectives.

VS

OPPORTUNITY

Initiatives that will assist in reaching goals and objectives if implemented appropriately.



DESIGN PROCESS:

IS IT A PROBLEM?

IS IT AN OPPORTUNITY?

8

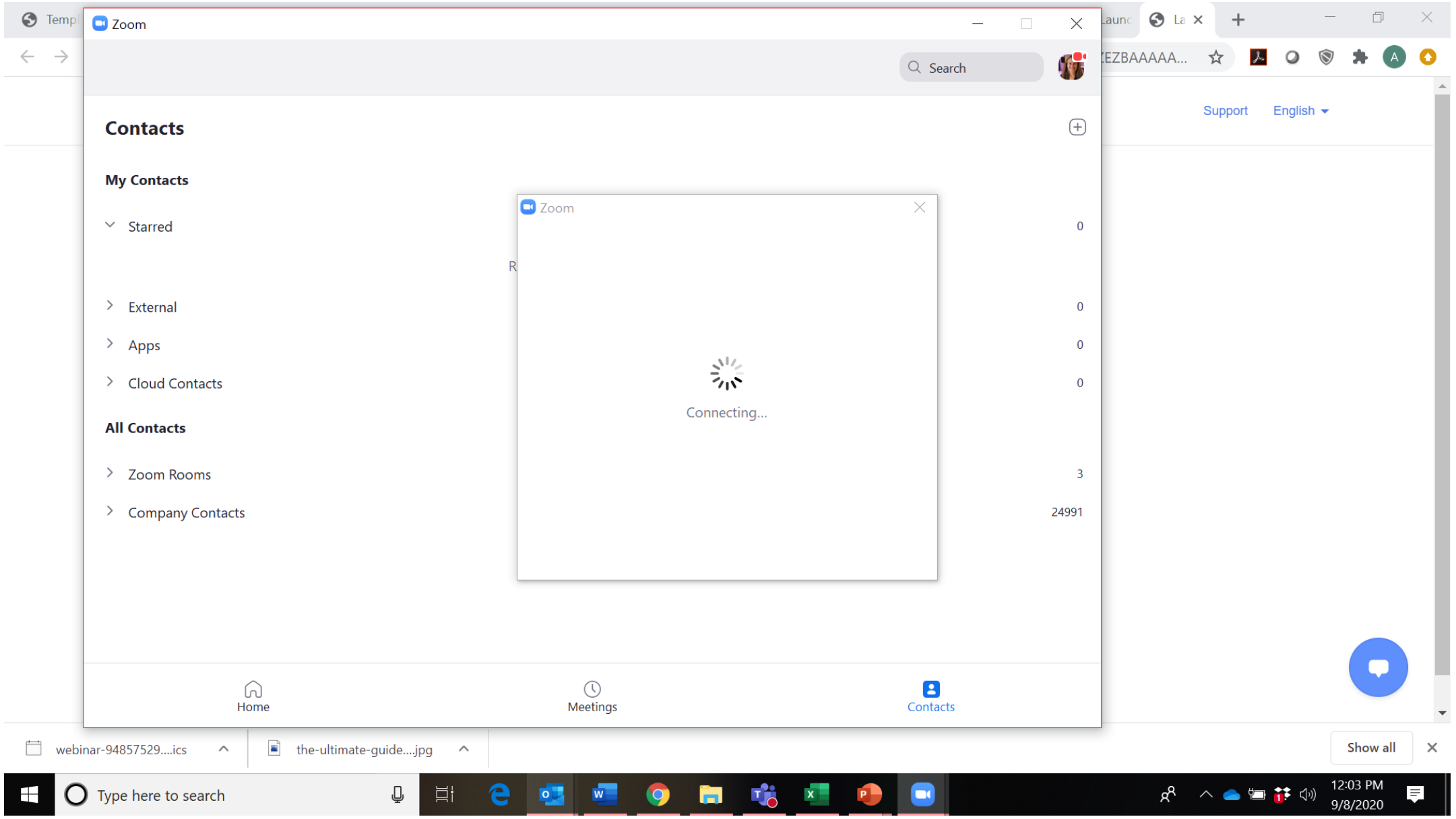
Diagnosing Error

If the system lets you make the error it is badly designed…

Week 3.

Why is Usability Important?

Mistakes vs. Slips & Usability


Zoom
Search
Contacts
My Contacts
Starred
0
External
0
Apps
0
Cloud Contacts
0
All Contacts
Zoom Rooms
3
Company Contacts
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Zoom
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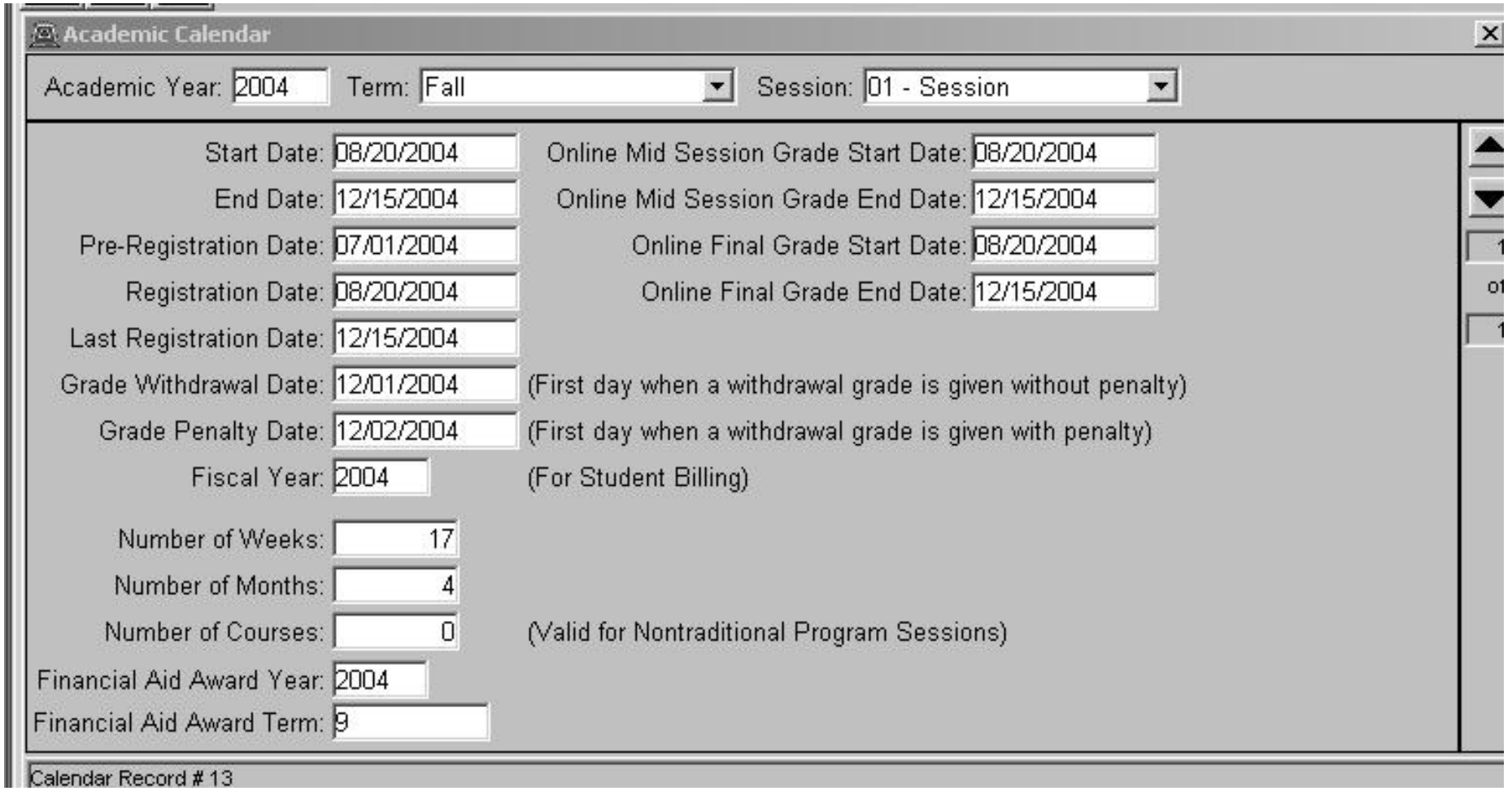

Academic Calendar
Academic Year: 2004
Term: Fall
Session: 01 - Session
Start Date: 08/20/2004
End Date: 12/15/2004
Pre-Registration Date: 07/01/2004
Registration Date: 08/20/2004
Last Registration Date: 12/15/2004
Grade Withdrawal Date: 12/01/2004
(First day when a withdrawal grade is given without penalty)
Grade Penalty Date: 12/02/2004
(First day when a withdrawal grade is given with penalty)
Fiscal Year: 2004
(For Student Billing)
Number of Weeks: 17
Number of Months: 4
Number of Courses: 0
(Valid for Nontraditional Program Sessions)
Financial Aid Award Year: 2004
Financial Aid Award Term: 9
Online Mid Session Grade Start Date: 08/20/2004
Online Mid Session Grade End Date: 12/15/2004
Online Final Grade Start Date: 08/20/2004
Online Final Grade End Date: 12/15/2004
Calendar Record # 13

An anecdote….

Error: any action that differs from the general understanding of appropriate behavior

Slip – An error of execution
We have the right goal, but end up performing a different action
Unconsciously – *error of doing*

Mistake – An error of evaluation
Action is executed correctly, but the goal, plan or understanding of the situation is wrong
Consciously – *error of thinking*

Slip

- Action Based
- Memory Lapse

Slips – Everyday Errors

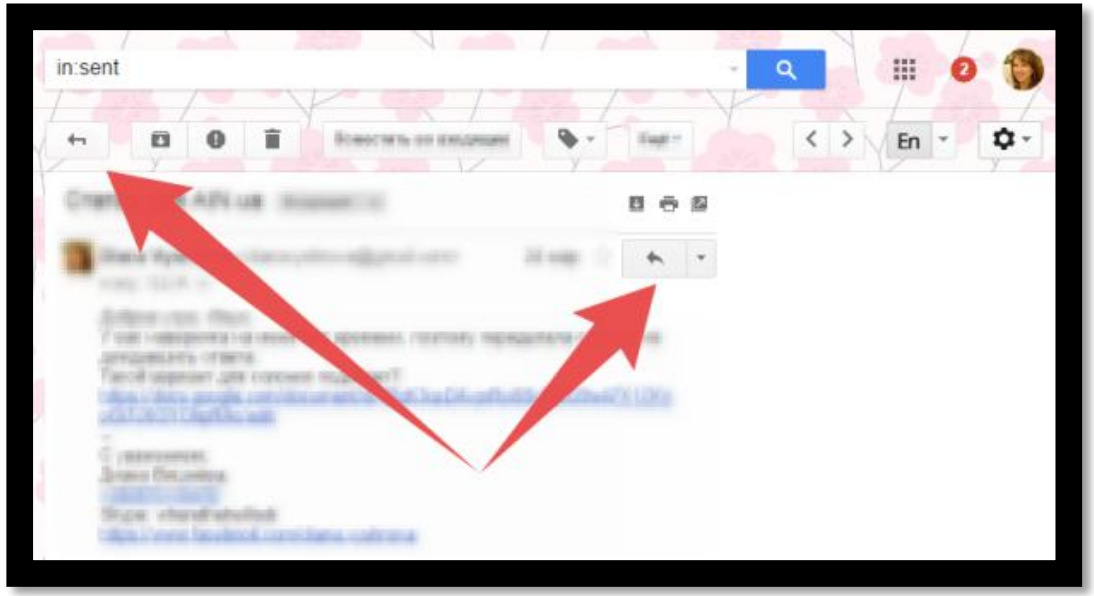
- Intending to do one thing and doing another
- Occur more frequently to skilled people?

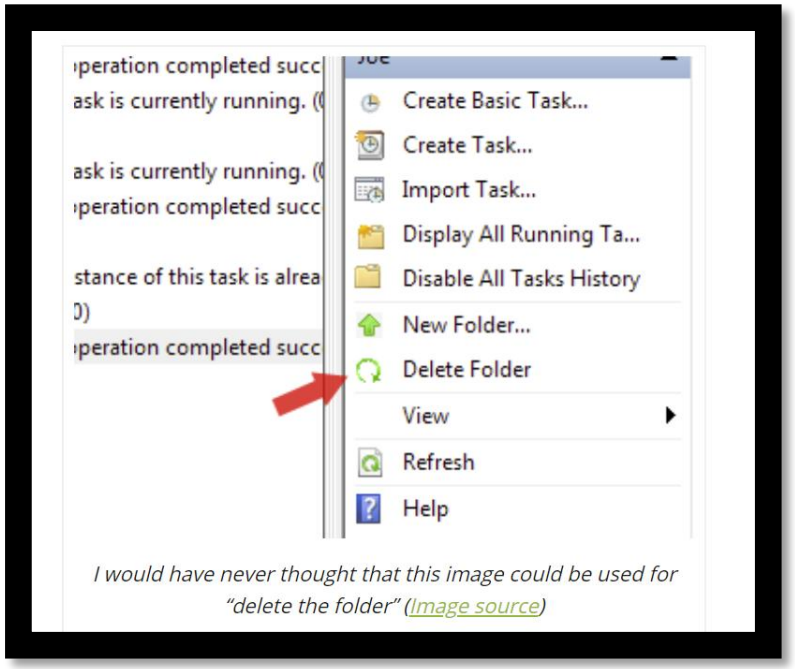
Slips – Capture Slips

- Perform a frequent activity
- Partial memory-lapse

Slips – Description-Similarity

- Wrong & Right Items Look Similar

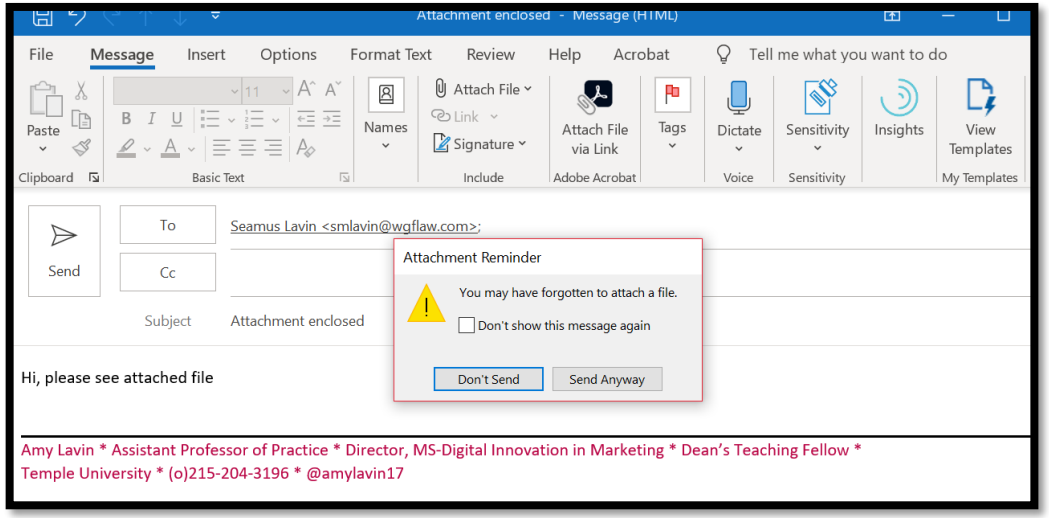




I would have never thought that this image could be used for "delete the folder" (Image source)

Slips – Memory-Lapse

- Failure to perform all steps
- Interruption of steps



Slips – Mode Error

- Different states – different meanings

Mistake

- Rule Based
- Knowledge Based
- Memory Lapse

Mistakes - Rule Based

- Experience
- Formal Procedures

Mistakes – Knowledge Based

- New situation – can't relate a similar experience

Mistakes – Memory Lapse

- Memory failure leads to forgetting the goal or plan of action

Memory Lapse

- **Mistakes** are **errors** **in** choosing an objective or specifying a method **of** achieving it whereas **slips** are **errors** **in** carrying out an intended method for reaching an objective

Slip

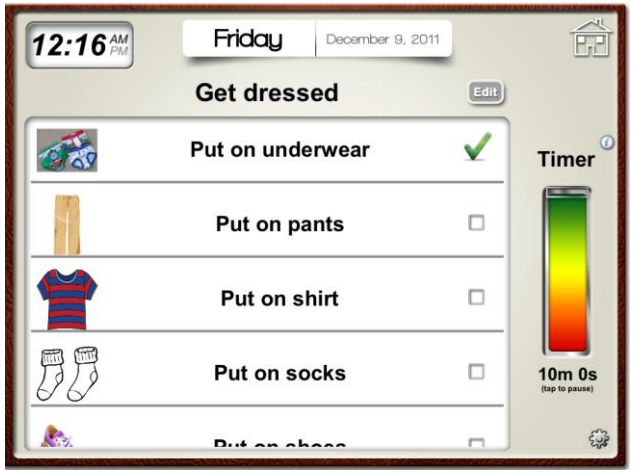
Get waylaid enroute

Mistake

The goal or plan of action is wrong

How can the designer combat these?

- Understand the design and the user
- Usability testing
- Discoverability of errors
- Availability of help
- Checklists
- Provide assistance to users through visual clues, feedback



Human error - slips and mistakes

slip

- understand system and goal
- correct formulation of action
- incorrect action

mistake

- may not even have right goal!

Fixing things?

slip – better interface design

mistake – better understanding of system

Recap: (from AI)

Slips and mistakes are two types of human errors that can occur in design:

•Slips: Unintended errors that occur when someone is carrying out an intended action but something goes wrong. Slips can happen during routine tasks when someone is on autopilot, and they are often caused by not giving full attention to the task.

EXAMPLE: a user might accidentally type a password into a username field, or click the wrong button.

To fix slips, designers can focus on low-level interface solutions

•Mistakes: These are errors that occur when someone has an incorrect goal or misunderstands how something works.

EXAMPLE: a user might try to drag and drop a file into an application that only supports uploads via a file selection dialog.

To fix mistakes, designers can improve the system's underlying structure and feedback.

Understanding the differences between the types of user error will help you design to prevent or minimize these problems

Slips often arise from environmental factors like distractions or poor interface design that leads to confusion.

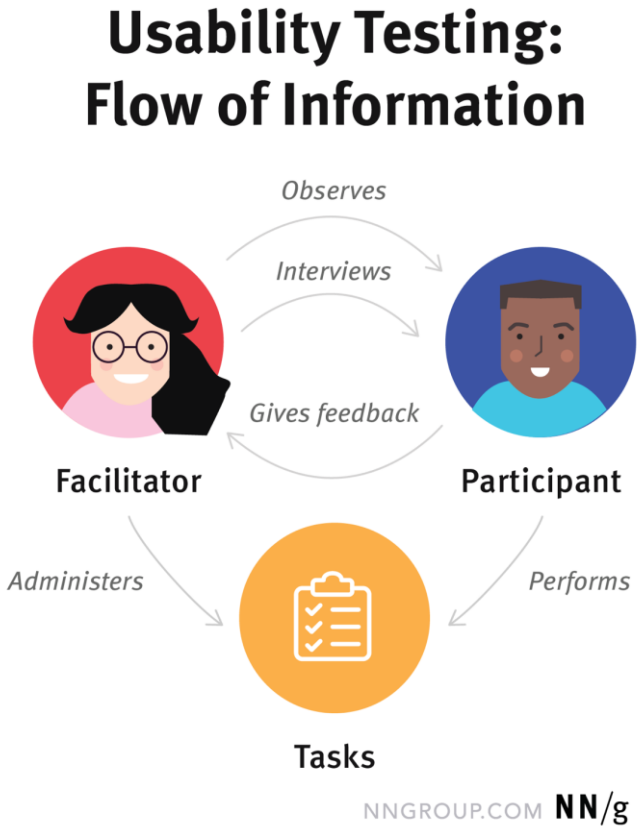
Mistakes can stem from a lack of knowledge or misunderstanding of the system's functionality.

What are some examples in your daily life? What would you do differently if you were the designer?

4.
Usability Testing

Usability Testing

A method of testing the functionality of a website, app, or other digital product by observing real users as they attempt to complete tasks on it



Test Goals

- Identify if users are able to complete specific tasks successfully
  - Determine how long it takes to complete tasks
- Establish how efficiently users can undertake predetermined tasks
- Identify changes required to improve user performance and satisfaction
- Running a usability test helps you to make subjective findings too:
  - Do users enjoy using the product?
  - Does the product work effectively?

Planning Your Test

Scope

Choose website
Specify test components
Identify concerns
Select Scenarios

Schedule

Indicate test location
Determine times
Define test length
Indicate testing equip.

Scenarios

Who is the user?
- Personas

Why do they use the site?
- Motivations & Goals

Indicate # of types & tasks included
Create multiple test plans

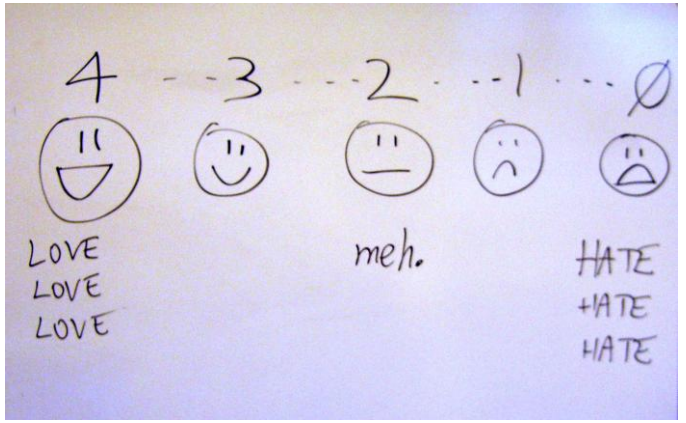
Metrics

Subjective:
- Background questions to the user
- Completion satisfaction questions

Quantitative:
- This is all about Data
- Completion Rates
- Error Rates
- Time on Task…

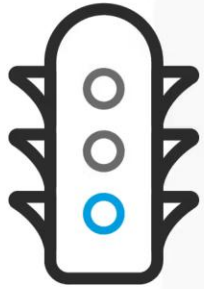
Tips for conducting a successful Usability Test

“Heuristics simply means guidelines. In user experience design, it is nearly impossible to define rigid rules. There is no fool-proof way to create experiences that are guaranteed to work. Instead, you can refer to principles to guide you in your design process, to help you evaluate your work before you test it with real users.”



https://www.interaction-design.org/literature/article/heuristic-evaluation-how-to-conduct-a-heuristic-evaluation

10 Usability Heuristics



Visibility of System Status

Match Between System & the Real World

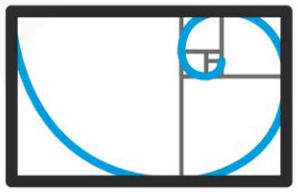
User Control & Freedom

Consistency & Standards

Error Prevention

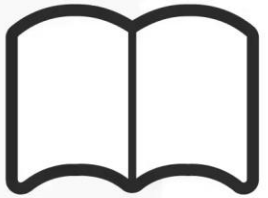
Recognition Rather than Recall

Flexibility & Efficiency of Use



Aesthetic & Minimalist Design

Help Users Recognize, Diagnose & Recover from Errors



Help & Documentation

Interaction Design Foundation
interaction-design.org

HEURISTIC REVIEW – UX - NIELSEN

- Visibility of System Status
- Match Between the System & 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 and recover from errors
- Help and Documentation

Test early & often: Small, frequent tests beat big, infrequent ones.

3 users per round is enough: You'll uncover most major issues without overloading your team.

Keep it simple: Use lightweight protocols—task lists, think-aloud, and screen recording if possible.

Fix the obvious first: Tackle high-friction issues and "low-hanging fruit" between rounds.

Recruit scrappily: Any reasonably representative user is better than none; avoid perfectionism in sampling.

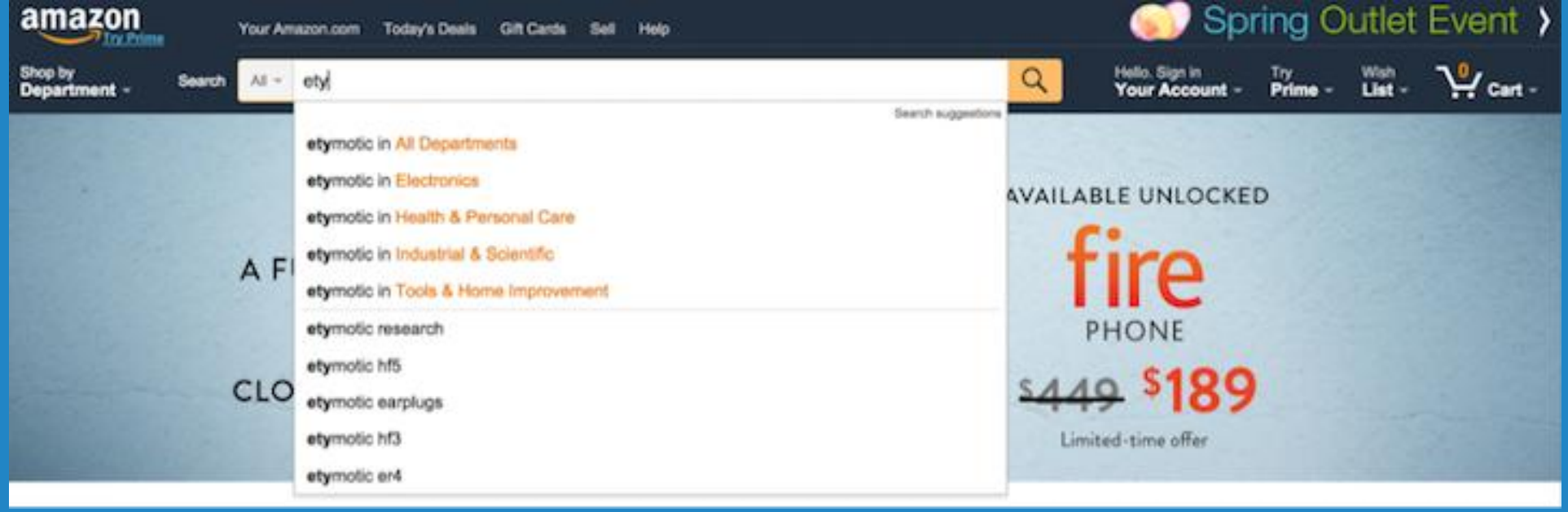
Team observation: Invite stakeholders to watch; it builds shared understanding and buy-in.

Make tasks realistic: Reflect real goals (find a product, complete checkout, locate support).

Iterate quickly: Short cycles of test → fix → retest produce steady, compounding improvements.

Observational test in a Café (Café testing)

Observational test in a lab



Usability

In-class Activity – Usability Dry Run

Source: https://www.nngroup.com/articles/slips/

Class activity

https://owlsports.com/

Heuristic evaluation

- Team member 1: Apply first five heuristic evaluation items
- Team member 2: Apply second five heuristic evaluation items

Café test

- Team member 1 – task: Join the owl club
- Team member 2 – task: Purchase a ticket to a future b-ball game

Tools

How do we ensure safe/good practices & behaviors?