

**COSC 442:
Mobile Educational Game
Development**

Dr. Bowen Hui

University of British Columbia
Okanagan

Midpoint Feedback

- 27 out of 30 responded by deadline
- Thanks for your feedback
- 90% response rate
=> +1% bonus to assignments component of the course for everyone
- Goal is to improve remaining semester (and future years) using your feedback

Midpoint Feedback

- Are you finding the course content...

Difficulty



■ Too easy ■ Just right ■ Too hard

Midpoint Feedback (cont.)

- Are you finding the pace of the course...



Midpoint Feedback (cont.)

- I think the in-class design exercises help me understand/apply concepts from the lectures

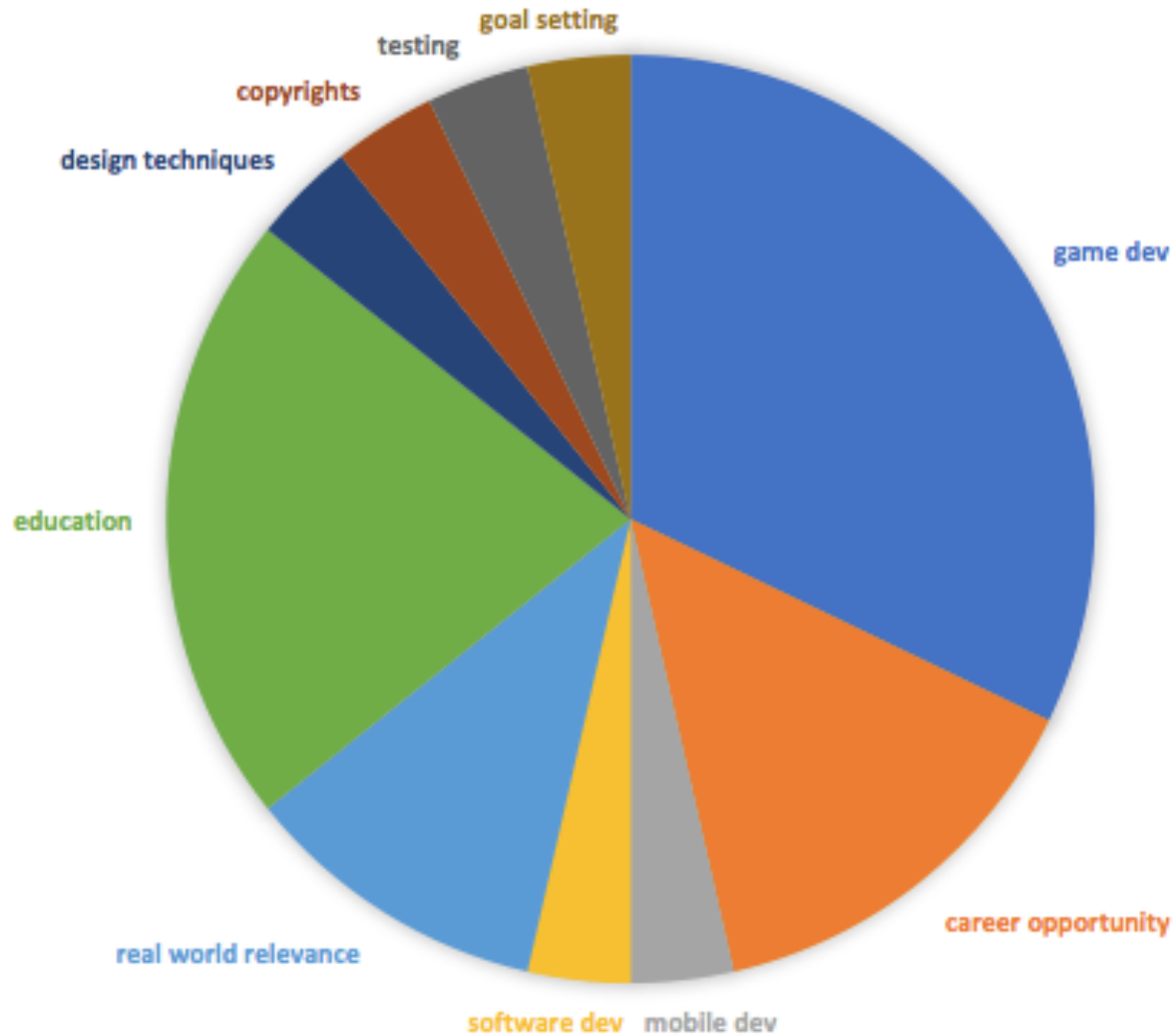
Design Exercises Help Understand
Lecture Concepts



■ Strongly agree ■ Agree ■ Neutral ■ Disagree ■ Strongly disagree

Midpoint Feedback (cont.)

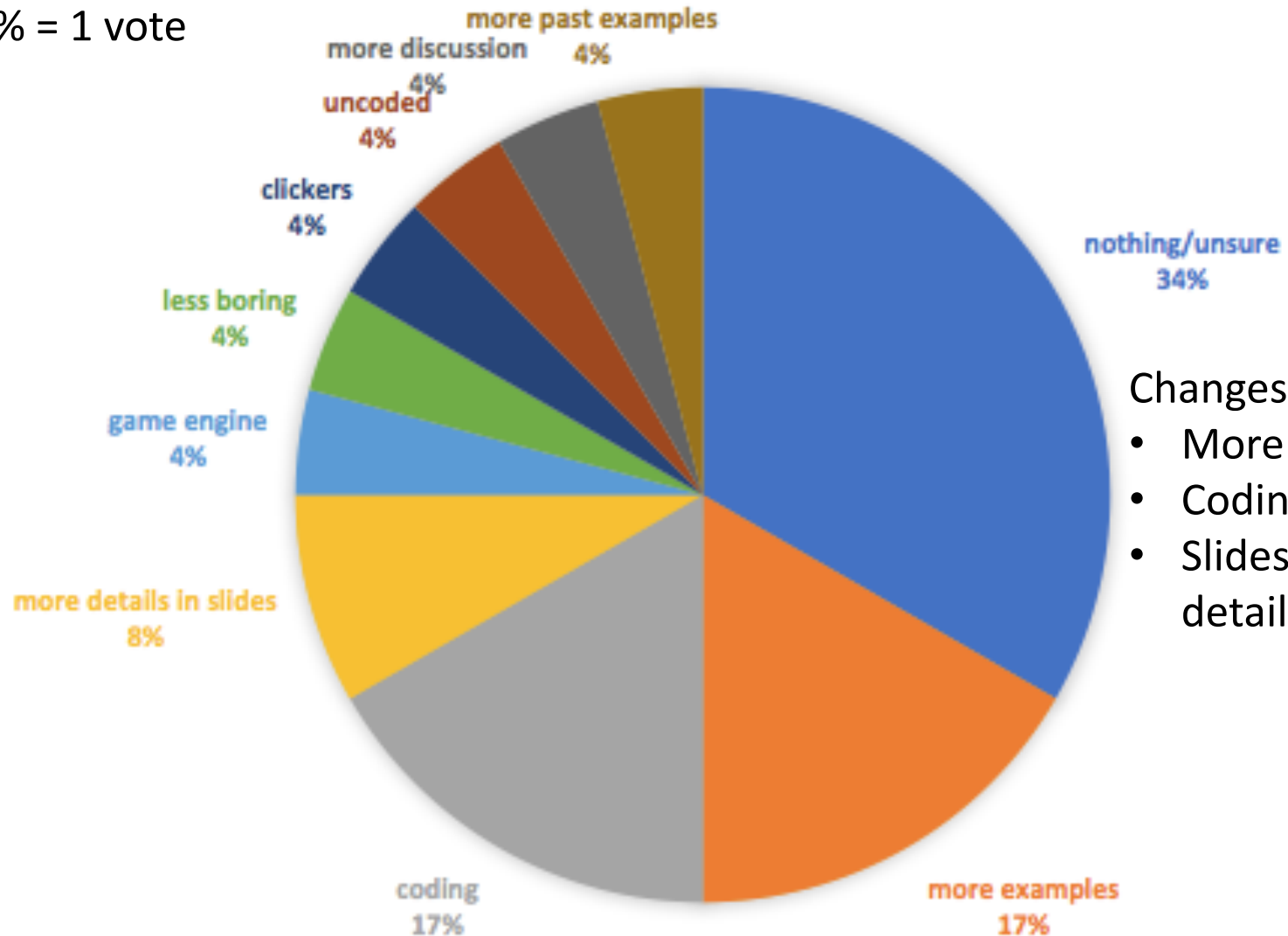
RELEVANCE OUTSIDE CLASS



Midpoint Feedback (cont.)

IMPROVE LECTURES

Note: 4% = 1 vote



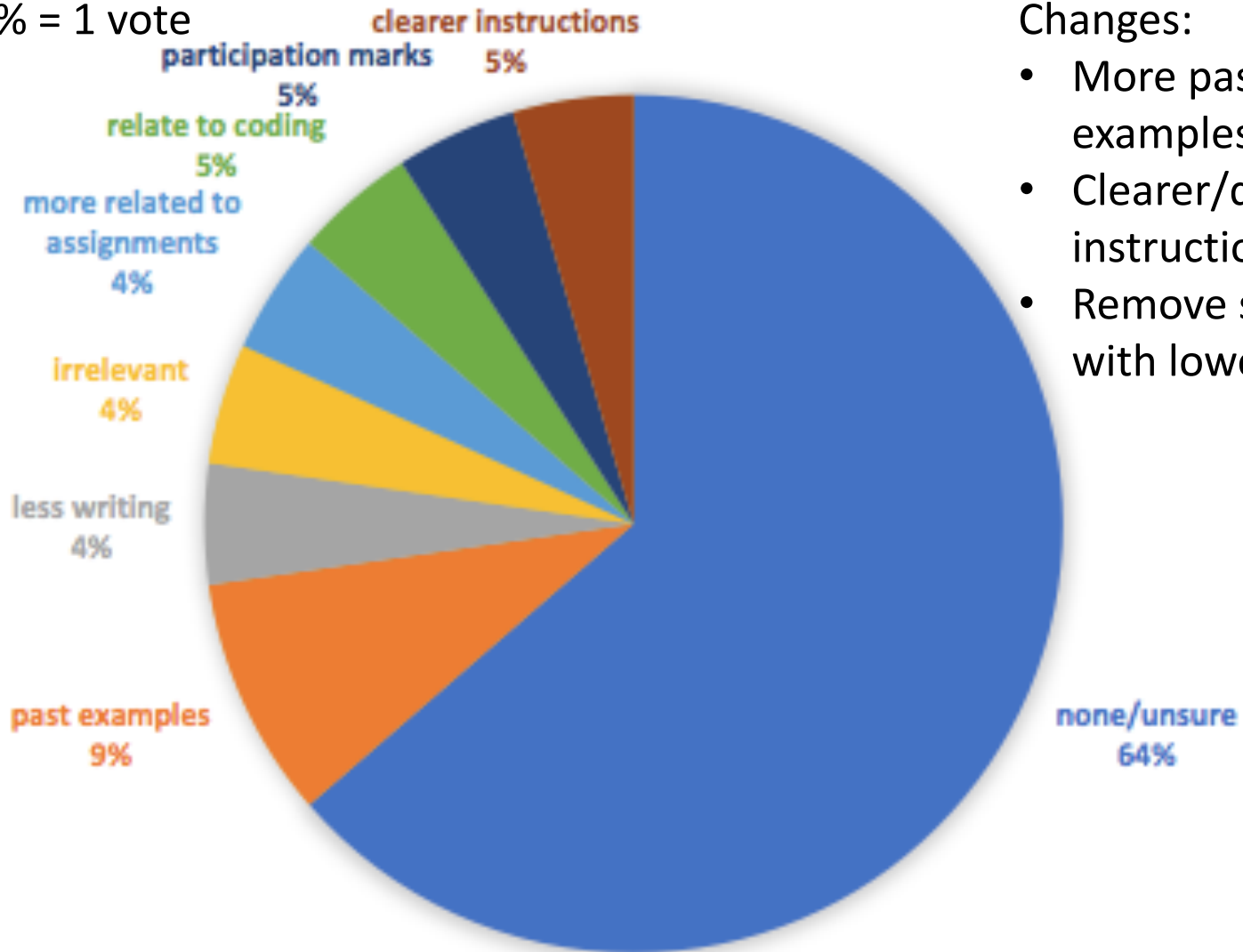
Changes:

- More examples
- Coding (future)
- Slides more details?

Midpoint Feedback (cont.)

IMPROVEMENT ON DESIGN EXERCISES

Note: 4/5% = 1 vote



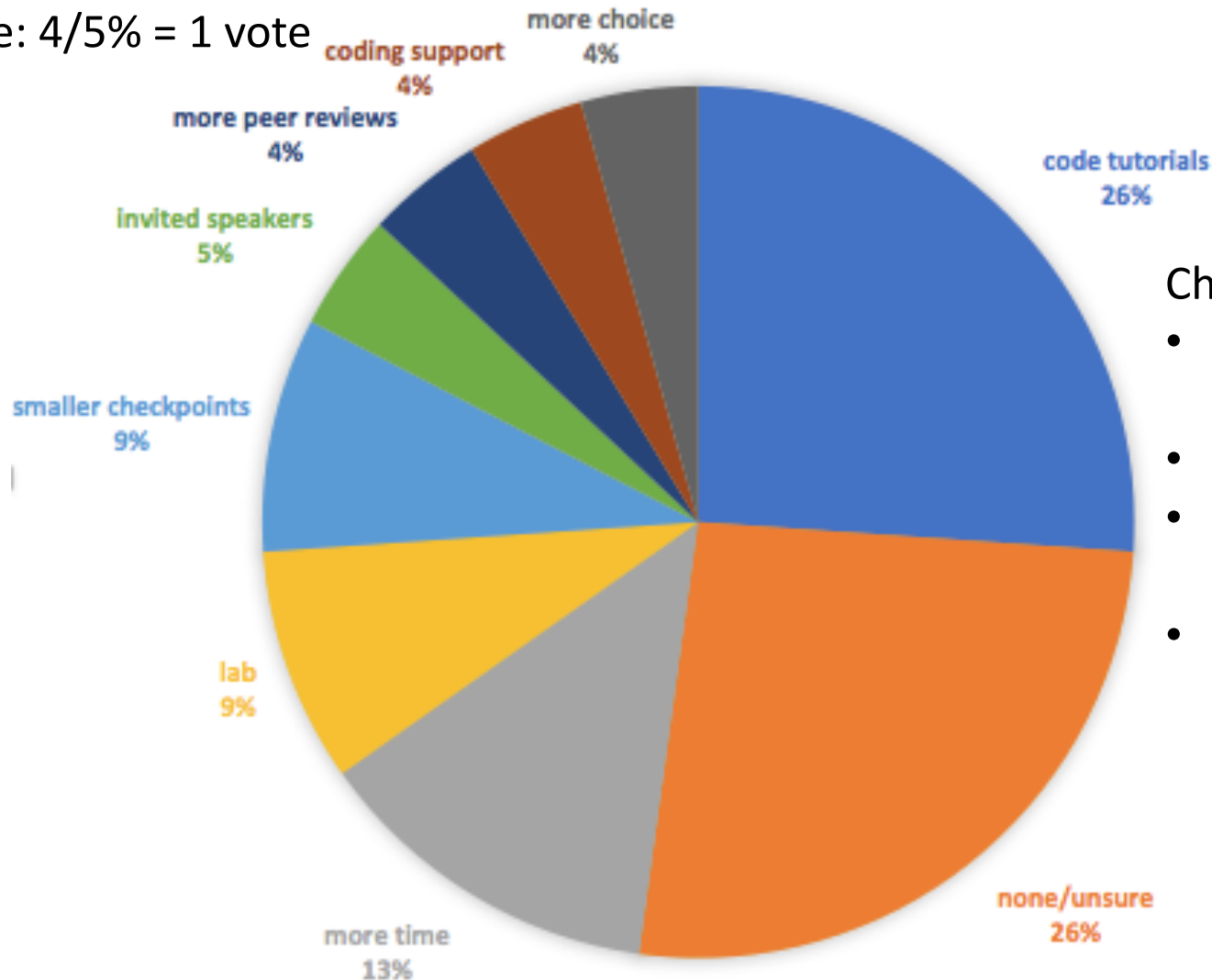
Changes:

- More past examples
- Clearer/detailed instructions
- Remove submission with lowest mark

Midpoint Feedback (cont.)

IMPROVE PROJECT/ASSIGNMENTS

Note: 4/5% = 1 vote

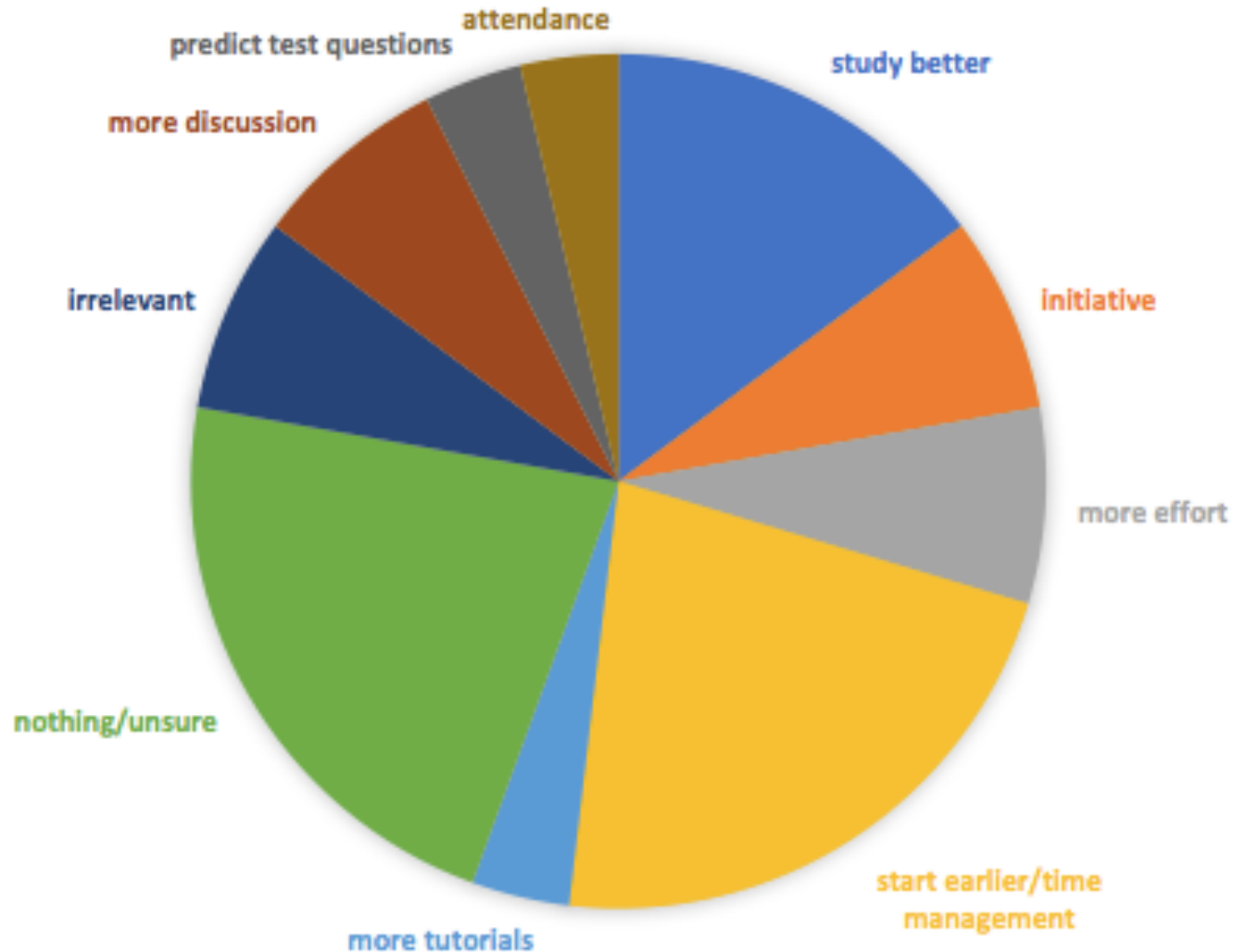


Changes:

- Code tutorials (future)
- Extensions
- Smaller checkpoints (future)
- More peer reviews? (future, if lab)

Midpoint Feedback (cont.)

SELF IMPROVEMENT



Summary of Immediate Changes

- More examples
- Slides more details?
- More past examples
- Clearer/detailed instructions in design exercises
- Remove design submission with lowest mark
- Extensions to assignments, where possible

Overview of the next few weeks

- Given A2 prototype:
 - A3: implement data logging
 - Week 10: data collection in class
 - A4: deployment on Google PlayStore
 - A4: extra features

Recall: Software Development Process

- Process: design, implement, evaluate
 - Repeat for iterative prototyping
- Design phase:
 - Used design rules/guidelines to direct creative works
- Evaluate phase:
 - Can use the same rules to guide evaluation
 - Identify interface and interaction problems

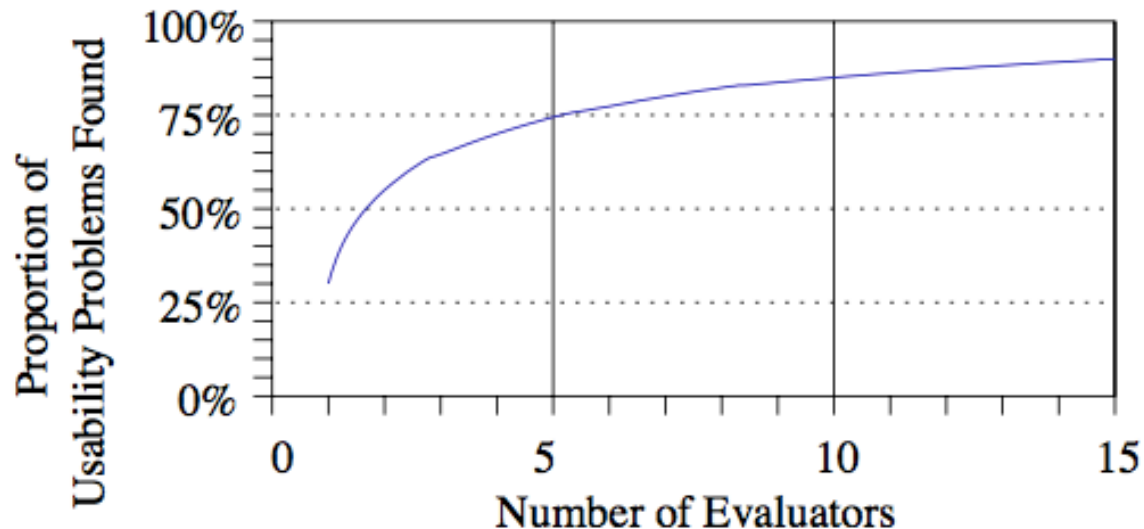
Get feedback as often as possible

Recall from COSC 341: Expert Reviews

- Informal demos can provide useful feedback
- More formal expert reviews have proven effective
- Variety of expert review methods:
 - Heuristic evaluation
 - Guidelines review
 - Consistency inspection
 - Cognitive walkthrough
 - Metaphors of human thinking
 - Formal usability inspection

(Dis)Advantages of Expert Reviews

- Different experts tend to find different interface problems
- 3-5 expert reviewers can be highly productive!



- Cons:
 - Experts may not have an adequate understanding of the task domain or user groups

Usability Heuristics

- Our focus:
 - Nielsen's 10 usability principles (www.nngroup.com)
- Many others:
 - Sneidermann's 8 golden rules
 - Norman's rules from Design of Everyday Things
 - Guidelines from Mac, Gnome, Windows, etc.
- Purpose:
 - Help designers choose design alternatives
 - Help evaluators identify design problems

What is Usability?

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 - **Learnability**: how easy to learn software for first time users?

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 - **Errors**: how many errors do users make and how severe are they? how easily can users recover from errors?
 - **Satisfaction**: how pleasant is the experience?

Imagine...

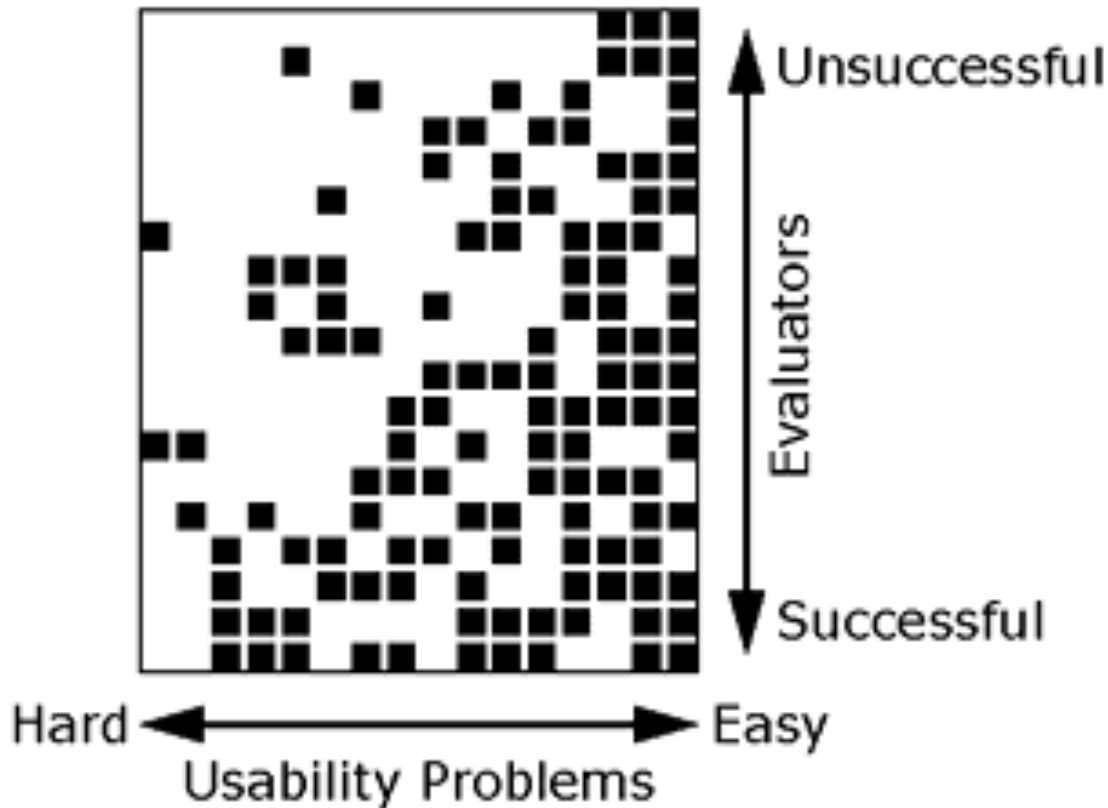
- You developed some awesome software
- Distributed it
- But...
 - Not many people are downloading it
 - Got some bad reviews
- What's wrong?



Image taken from www.dreamstime.com

Nielsen's Case Studies

- Projects from the 90's:



Different people identify different errors

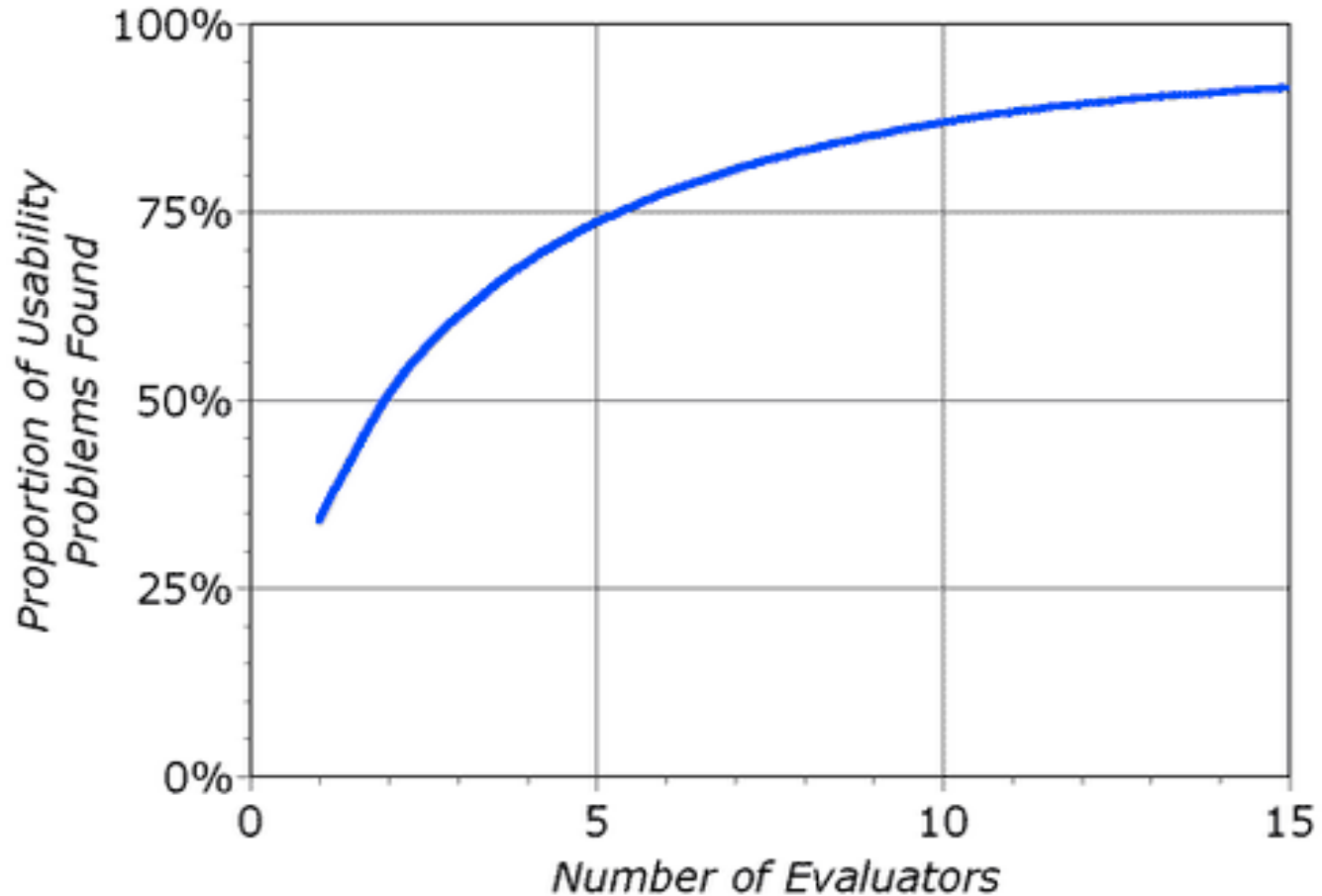
Involving Human Evaluators

- Pros:
 - Can observe real use
 - Get initial reaction
 - Get immediate feedback
 - Ask users open ended questions

Involving Human Evaluators

- Pros:
 - Can observe real use
 - Get initial reaction
 - Get immediate feedback
 - Ask users open ended questions
- Cons:
 - Takes time
 - Costs money
 - Logistical constraints
 - How often?
 - How many is enough??

Case Studies Results



Fewer new problems identified as we increase more and more people

Heuristic Evaluation

- Recruit ~5 evaluators
- Have evaluators carry out meaningful tasks in order to become familiar with the system
- Have evaluators complete a questionnaire based on the pre-established heuristics
- Report on:
 - Identify problems encountered during tasks, attribute each problem to a heuristic, assign priority to each
 - Summarize quantitative results in questionnaire

Heuristic Evaluation

- Recruit ~5 evaluators
 - Can be UI experts or potential users
- Have evaluators carry out meaningful tasks in order to become familiar with the system
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Heuristic Evaluation

- Recruit ~5 evaluators
- Have evaluators carry out meaningful tasks in order to become familiar with the system
 - Design 5-10 meaningful tasks to do in about 30-60 minutes
 - Observe participants (take notes) during session
 - This class: tasks should take 15 minutes total
- Have evaluators complete a questionnaire based on the pre-established heuristics
- Report on:
 - Identify problems encountered during tasks, attribute each problem to a heuristic, assign priority to each
 - Summarize quantitative results in questionnaire

Heuristic Evaluation

- Recruit ~5 evaluators
- Have evaluators carry out meaningful tasks in order to become familiar with the system
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 - Use Nielsen's 10 heuristics
 - This class: Discuss changes next
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Example from Apple ID Account

- **Issue:** Unable to edit year of birth
- **Severity:** Minor
- **Heuristics violated:**
 - User control and freedom
- **Description:**

When you first create an account you can enter basic information about yourself. Sometimes you don't want to reveal private info so you write whatever to get pass the profile. Later, if you want to give an honest birth year, you can't find where to edit it.

Example with User Profile

Issue: Profile Picture cannot be changed

Severity: Major

Heuristic Violated: Consistency and Standards

Description: The default profile picture is displayed and cannot be changed.

Example with Website links

Issue: Reference requesting works, but throws an error

Severity: Major

Heuristic Violated: Error Prevention

Description: Once a user hits submit after filling out the request form, they get an error. But if the person they are trying to request to is an Edge Map member, they'll receive the request anyway regardless of the error.

A screenshot of a web error message. It consists of a white rounded rectangle with a thin red border. The top half is white and contains the text "We're sorry, but something went wrong." in a dark red font. The bottom half is a light gray color and contains the text "If you are the application owner check the logs for more information." in a dark gray font.

We're sorry, but something went wrong.

If you are the application owner check the logs for more information.

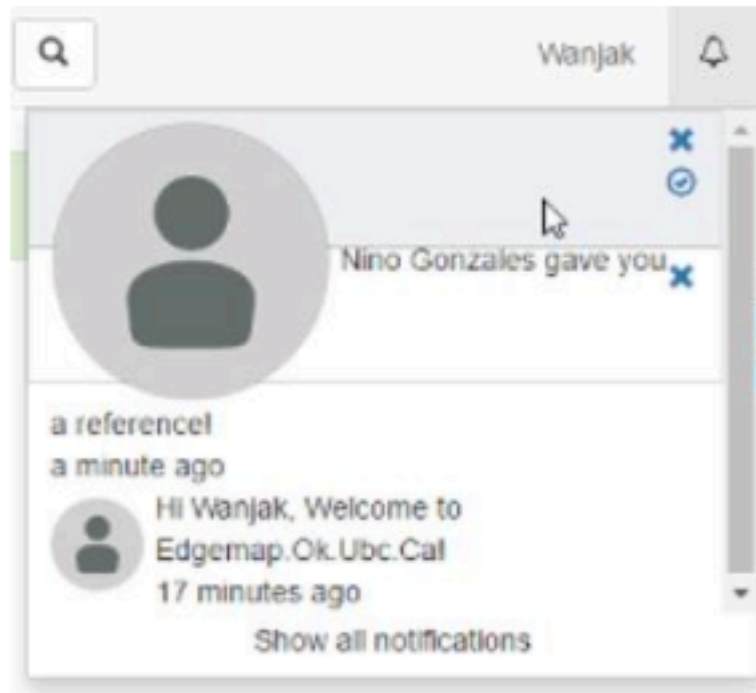
Example with Layout

Issue: Notification Layout

Severity: Cosmetic

Heuristic Violated: Aesthetic and Minimalist Design

Description: When a user has a reference notification, the layout becomes cluttered and disorganized.



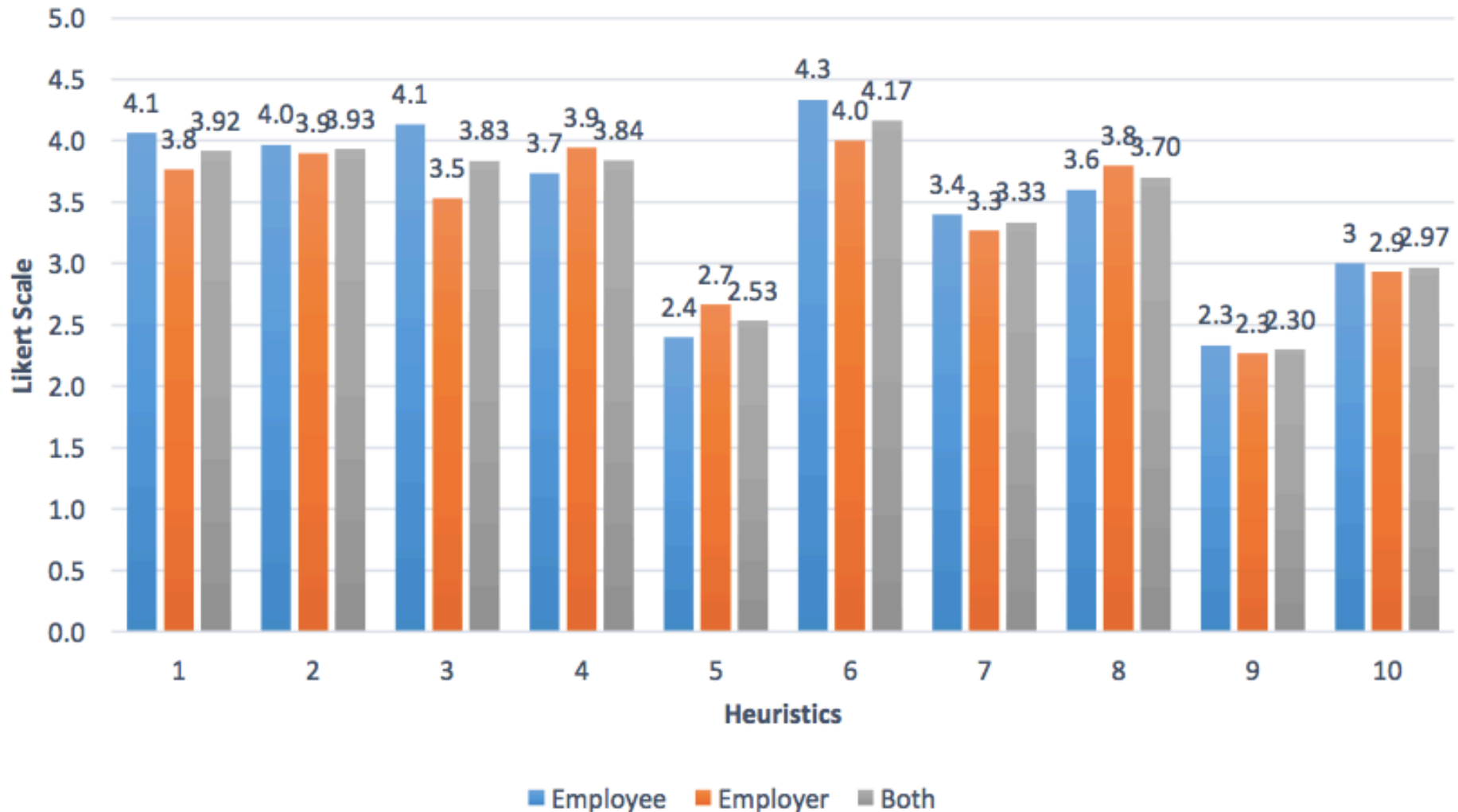
Example Heuristic Questionnaire

- Used Nielsen's 10 heuristics
 - Visibility of system status
 - Match between system and real world
 - Etc.

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- Used Nielsen's 10 heuristics
 - Visibility of system status
 - Match between system and real world
 - Etc.
- Sample question:
 - I agree that this system has good design that helps users recognize the visibility of system status.
 - Responses: Strongly agree, Agree, Neutral, Disagree, Strongly disagree

Example Quantitative Results



This evaluation had 2 user groups

Details of 10 Usability Heuristics



Visibility of System Status

- “The system should always keep users informed about what is going on, through appropriate feedback with reasonable time.”



Image taken from www.dwuser.com

Match between System and Real World

- “The system should speak the users’ language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.”

Example: Language

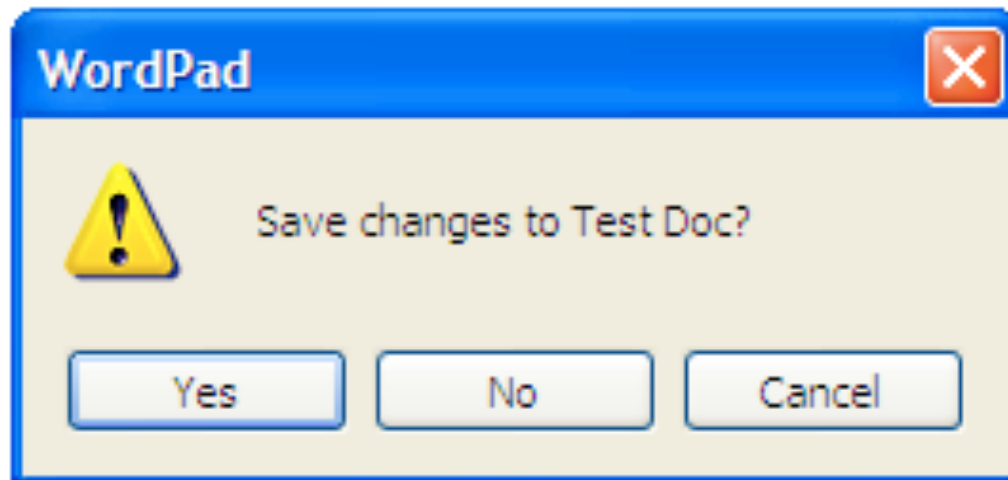


User Control and Freedom

- “Users often choose system functions by mistake and will need a clearly marked ‘emergency exist’ to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.”
- Used to be called “clearly marked exits”

Example: Cancel

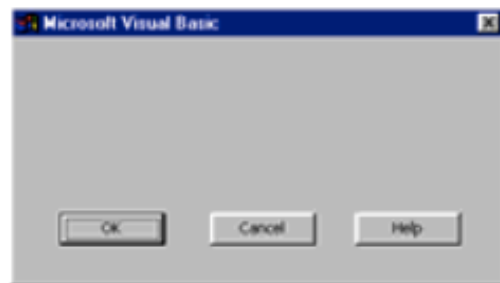
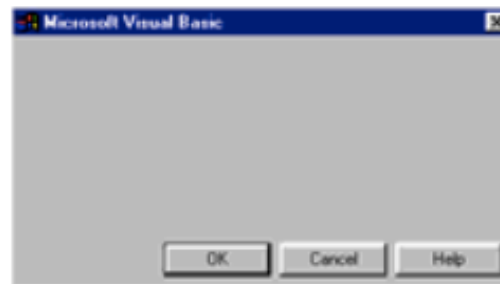
- Provide undo and redo
- Long operations should be cancelable
- Offer option to cancel in dialog boxes
 - Sometimes Cancel \neq No



Consistency and Standards

- “Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.”

Example: Button Location



If you want the user to click "OK", where should the "OK" button be?

Error Prevention

- “Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.”

Example: Syntax Checking



The following example is a demonstration from the usage tab

Date	<input type="text"/>	99/99/9999
Phone	<input type="text" value="(123) 456-7"/>	(999) 999-9999
Tax ID	<input type="text"/>	99-99999999

Image taken from www.noupe.com

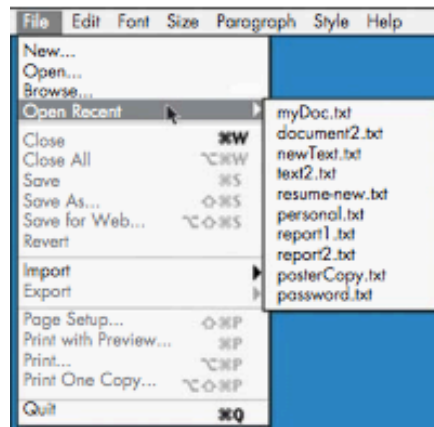
Recognition rather than Recall

- “Minimize the user’s memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.”

Example: Operating Systems

```
[4:00am tmi2] pwd
/usr/group/juser/xxx1
[4:00am tmi2] ls -la
total 5
drwxr-x---  2 juser          540 Mar 28 03:45 .
drwxr-x--- 20 juser        4423 Mar 28 03:46 ..
[4:01am tmi2] cp ~juser/test.txt .
[4:02am tmi2] cp ~juser/test/txt text2.txt
[4:03am tmi2] ls -la
total 7
drwxr-x---  2 juser          512 Mar 28 03:45 .
drwxr-x--- 20 juser        3584 Mar 28 03:46 ..
-rw-r-----  1 juser        1522 Mar 28 04:03 test1.txt
-rw-r-----  1 juser        1522 Mar 28 04:02 test2.txt
[4:03am tmi2] pwd
/usr/group/juser/xxx1
[4:03am tmi2] cd..
[4:03am tmi2] pwd
/usr/group/juser
[4:04am tmi2] cp text.dat ~juser/xxx1/test.dat
[4:05am tmi2] cp text.dat ~juser/xxx1/testnew.dat
[4:06am tmi2] cd..
[4:07am tmi2] ls -la
52 .
46 ..
04 test.dat
03 test1.txt
02 test2.txt
05 testnew.dat
```

Image taken from <http://www.jedbrubaker.com/>

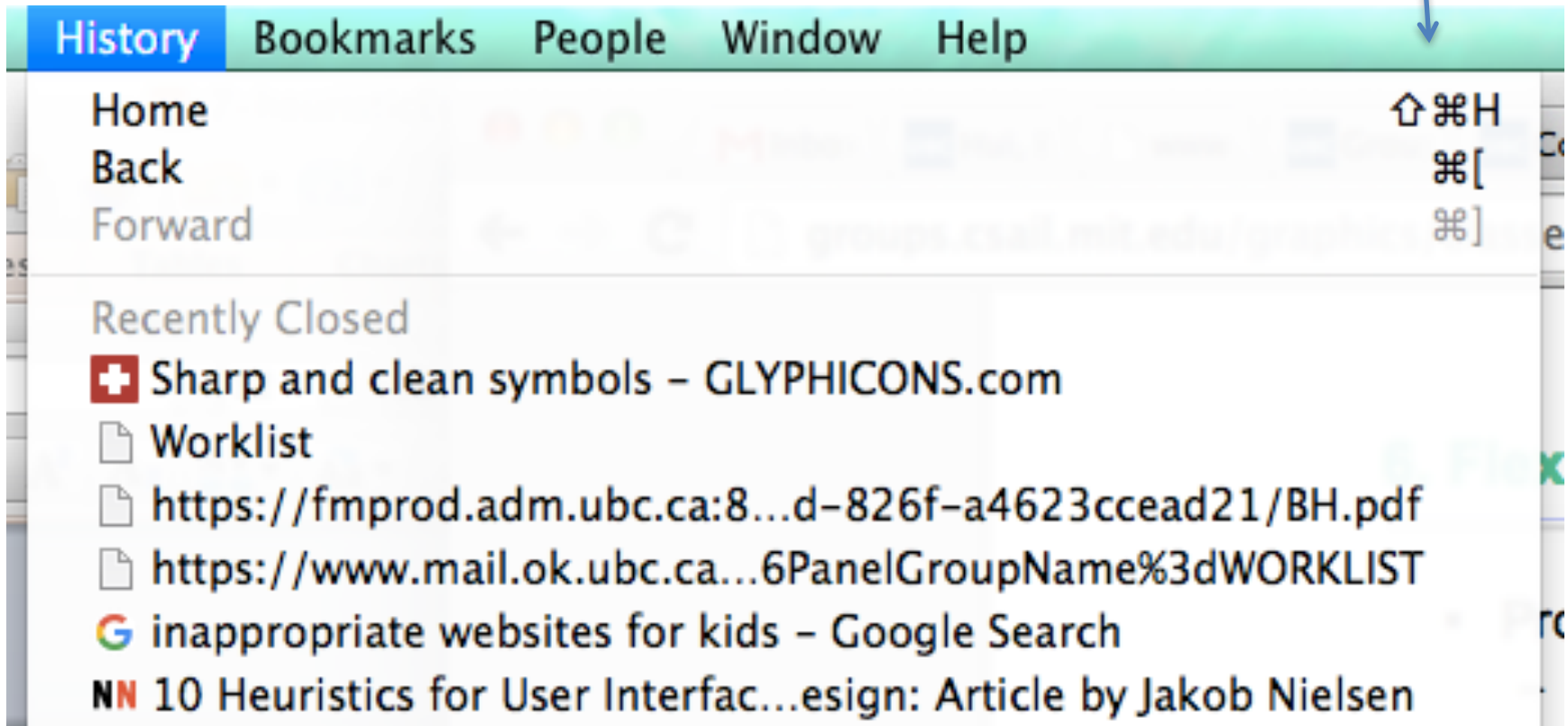


Flexibility and Efficiency of Use

- “Accelerators – unseen by the novice user – may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.”
- Used to be called “shortcuts”

Example: Shortcuts

shift-command-H



page links

Aesthetic and Minimalist Design

- “Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.”

Example: Minimalist (Not)

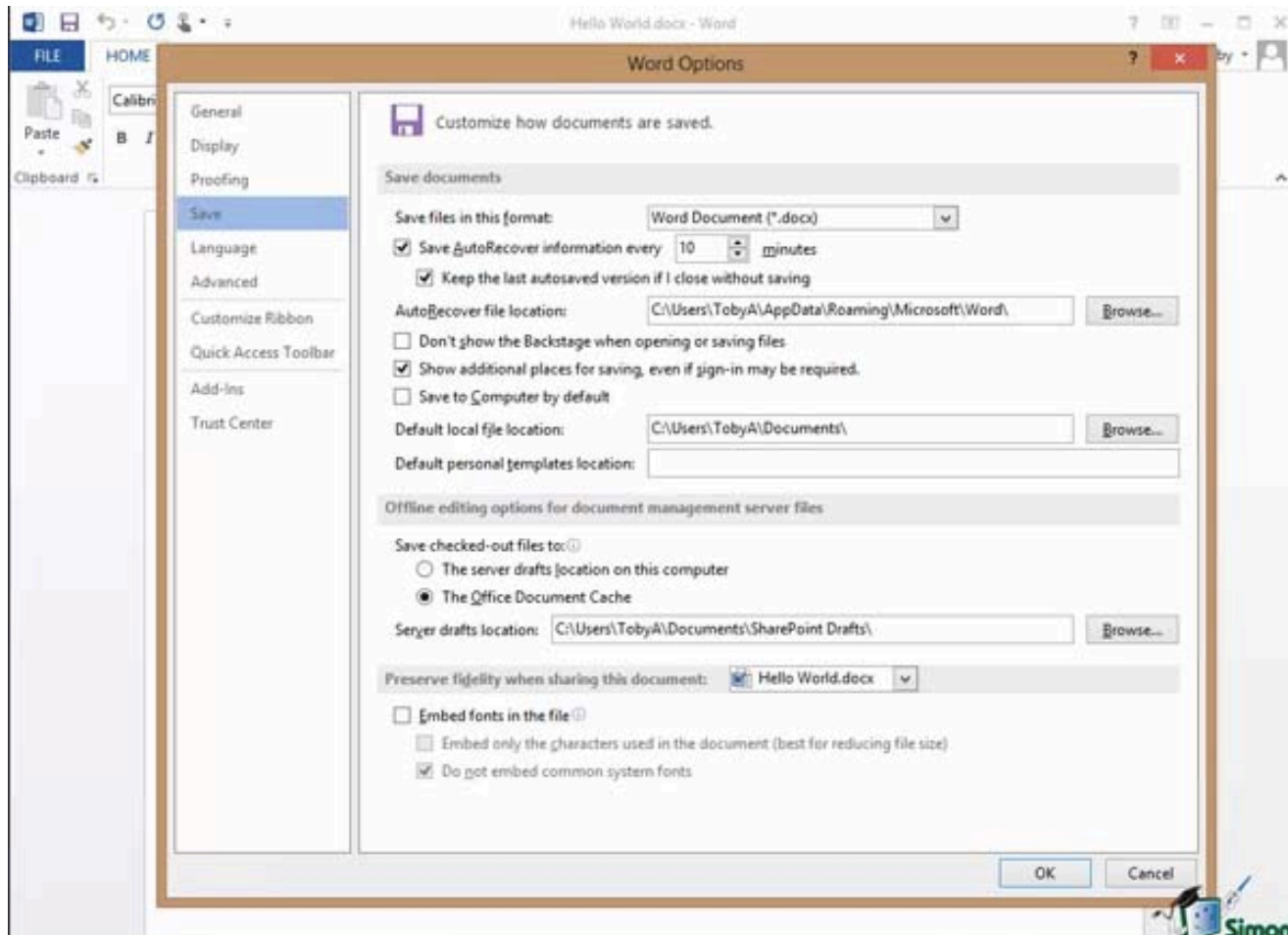
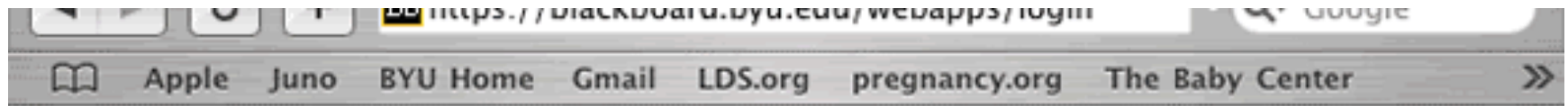


Image taken from www.simonsezt.com

Help Users Recognize, Diagnose, Recover from Errors

- “Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.”

Example: Uninformative Message



Welcome to **Blackboard Learning System™ (Release 6)**. Please enter your username and password to access the system

Click the **Preview** button below to access as a guest.

Preview

Have an Account? Login Here.

Enter login information here and click the **Login** button below.

Username:

sab234

Password:

••••••••

Login

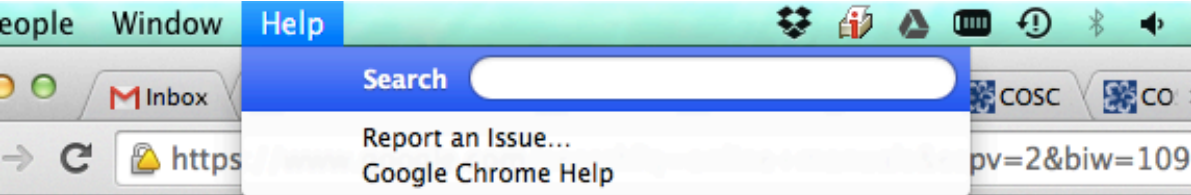
Could not login. Valid authentication credentials were not provided.

Copyright © 1997-2004 Blackboard Inc. Patents Pending. All rights reserved.
Accessibility information can be found at <http://access.blackboard.com>.

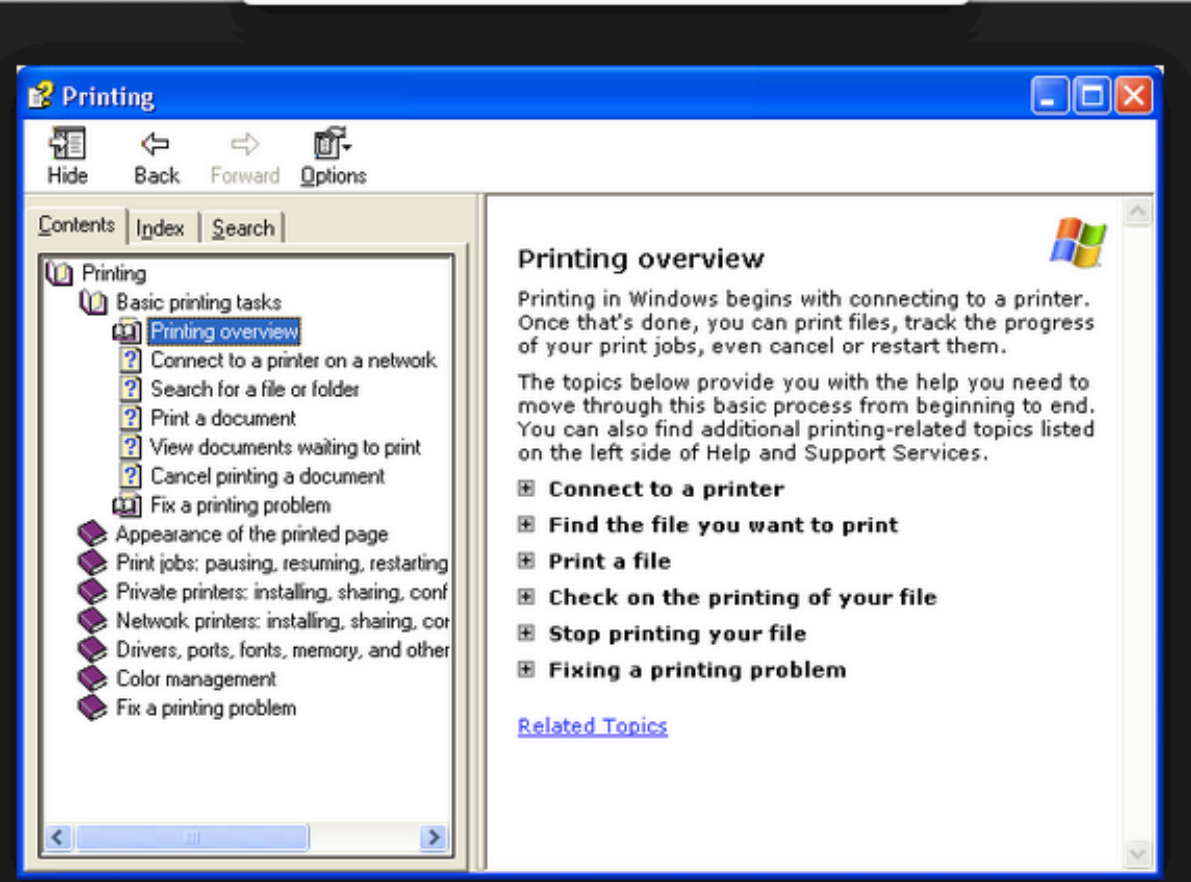
Help and Documentation

- “Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user’s task, list concrete steps to be carried out, and not be too large.”

Example: Online Help



← Chrome help



← Printer help

Designing Online Help

- Users don't read manuals

Designing Online Help

- Users don't read manuals
- Help should be:
 - Searchable
 - Context-sensitive (how to find help on...)
 - Task-oriented (how to accomplish something...)
 - Concrete (specific to your system)
 - Short (don't make users read a lot)

Summary of Heuristics

- Meet expectations
- User is the boss
- Handle errors
- Keep is simple

Summary of Heuristics

- Meet expectations
 - Match between system and real world
 - Consistency and standards
 - Help and documentation
- User is the boss
- Handle errors
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Summary of Heuristics

- Meet expectations
- User is the boss
 - Visibility of system status
 - User control and freedom
 - Flexibility and efficiency of use
- Handle errors
- Keep is simple

Summary of Heuristics

- Meet expectations
- User is the boss
- Handle errors
 - Recognition rather than recall
 - Error prevention
 - Help users recognize, diagnose, recover from errors
- Keep is simple

Summary of Heuristics

- Meet expectations
- User is the boss
- Handle errors
- Keep is simple
 - Aesthetic and minimalist design

Developing Educational Game Heuristics

- Develop heuristics for:
 - Educational value
 - Gaming experience
 - Usability fit

- Considerations:
 - Adapting Nielsen's heuristics other usability guidelines
 - Revisit A1
 - Consider your own experience

Adapting Heuristic Evaluation

- Design tasks and estimate time
 - What game tasks should participants do?
 - How much exposure (time) is needed?
 - What data to collect?
 - Objective data: game metrics from A2
 - Subjective data: heuristic evaluation
 - Reporting and analysis of results
 - Report objective data (graphs)
 - Report subjective data based on 3 categories of heuristics
 - Compare between objective and subjective data
 - Suggestions of changes needed
- Implement metrics into your games before Peer data collection!

Administration

- Next class:
 - Invited speaker from Hyper Hippo
- TA office hours:
 - Postponed to next Thursday