CS 121
“Ordering Chaos”

User Interface Design
Usability

“Mike”
Michael A. Erlinger
Admin

List of knuth ids.

GLECS – Educational Goals for Games

Survey for Team/Game assignment

Hwk/Lab
Usability

Usability is a measure of how easy it is to use a piece of software to perform a task.

To design for usability you need to understand and prioritize the user tasks.
Usability

Usability is a measure of how easy it is to use a piece of software to perform a task.

To design for usability you need to understand and prioritize the user tasks.

Develop design that is simple, intuitive, consistent, ...
Model Hierarchy

architecture

component architecture

data architecture

analytical models/ prototypes

specification

UI

functional interfaces

component requirements

external data specification

design

component design

CS 121
UI Design

Too much

Too little

Examples?

Examples?
UI Experience

As pairs list:

5 Good Designs: why??

5 Lousy Designs: why??
My UI Experience

As pairs list:

5 Good Designs
- iPad tools interface
- DirecTV recording

5 Lousy Designs
- Portal
- VCRs
- AC controls at school, actually any AC controls
- Dishwasher Interface
Properties of good UI design

Familiar and consistent – easy to learn
- familiar contexts, objects, actions
- consistent icons, positions, styles, metaphors
- Evaluate CS Dept Web page

Intuitive and understandable
- current context is clear (middle school)
- available actions obvious
- all important information is obvious
- Enjoyable
- RFC System
Properties of good UI design

Simple and convenient
- user does not have to remember too much
- Does not overwhelm user with info
- anticipates needs but does not force down path

Helpful and robust
- error response meaningful
- help when user is lost

Adaptable and configurable
- supports different users/goals
- Portal, HMC web page
Properties of good design

Simple and convenient

- user doesn’t have to remember too much
- doesn’t overwhelm user with info
- anticipates needs but doesn’t force down path
Properties of good design

Intuitive and understandable

- current context is clear
- available actions obvious
- all important information is obvious
Properties of good design

Familiar and consistent

- familiar contexts, objects, actions
- consistent icons, positions, styles, metaphors
Properties of good design

Helpful and robust

- error response meaningful
- help when user is lost
Properties of good design

Adaptable and configurable

- supports different users/goals
Usability Metric

Learnability: How easy is it to learn how to use?

Efficiency: How easy is it for users to perform common tasks?

Accuracy: How difficult is it for users to make mistakes? How easy is it to recover from a mistake?

Emotional response: How enjoyable is it to use?
UI Principles

Four Aspects from the readings

- Learnability
  - Sometimes all you care about is learnability: for example, if you expect to have only occasional users. An information kiosk at a tourist attraction is a good example; almost everybody who uses your interface will use it exactly once, so learnability is much more important than usability. But if you're creating a word processor for professional writers, well, now usability is more important.
  - Use of the UI should be based on recognition rather than recall.
  - Immediate and repeatable feedback between input and output are critical for learnability

- Simplicity
  - The design should make simple, common tasks easy, communicating clearly and simply in the user's own language, and providing good shortcuts that are meaningfully related to longer procedures.
  - Best UIs are those that determine ways to keep the game mechanic efficient and engaging, but still only use simple controls
UI Principles

Four aspects from the readings

- Efficiency
  - What you really really need to do to make an interface efficient is to figure out what exactly the user is trying to achieve, and then let them do exactly that without any fuss.
  - Implement an interface that lets people easily accomplish what they want instead of simply implementing access to a list of features.
  - Efficiency mainly concerns expert users who want to accomplish tasks quickly…think about player demographics

- Asethetic
  - 1. What can constitutes aesthetics in computers' User Interfaces?
  - 2. How much aesthetics can be incorporated in a software application - i.e. a tool that has solely a functional purpose?
  - Pleasing aesthetic that makes it enjoyable to use.

Rarely Possible to follow all principles….
Apple IOS Usability principles


Aesthetic integrity

Direct manipulation

Immediate feedback

Metaphor
And then there is

JUICE:

http://www.youtube.com/watch?v=Fy0aCDmgnxg
Usability

Usability is a measure of how easy it is to use a piece of software to perform a task.

To design for usability you need to understand and prioritize the user tasks.

Develop design that is simple, intuitive, consistent, …

Test, refine, test, refine …
Usability test

Assess
Learnability
Efficiency
Accuracy
Emotional response

By asking users to complete tasks with your UI prototype
The intro:

http://www.youtube.com/watch?v=QckIzHC99Xc

Testing a paper prototype:

http://www.youtube.com/watch?v=QckIzHC99Xc
Sudoku tasks

View grid

Select number to enter into grid

Enter selected number into grid

Change user-entered number in grid
From Lab 1: important features

1. Erase a user-entered number
2. Undo/redo move
3. Turn off consistency checking
4. Error checking
5. Report when player wins, loses, or can’t enter a number because there are no remaining consistent options
6. Provide feedback when a cell is pressed (e.g. changing background color or text color while depressed)
7. Timer
8. Highlighting all instances of the current number in the grid
9. Counting how many of any number still need to be placed in grid
10. Support entry by choosing a grid cell and then the number to be entered
11. New game
12. Save/load game
13. Provide the rules of Sudoku
14. Provide varying levels of difficulty
15. Provide some mechanism for entering guesses
16. Provide hints

What are most important? Let’s vote. Let’s each vote for our top five features.

9/23/13
Process of UI Design

Identify needs and establish requirements

Done this

Develop alternative designs that meet requirements

Have not done this for Sudoku

Build prototypes of the UIs

Not Doing this for Sudoku….can be paper

Test and Evaluation of UIs

Will do this in class after uploading Sudoku to iPad
GOMS

Used as a model for analysis of UIs

Goals – what the user intends to accomplish

Operators – actions to accomplish Goals (cognitive, physical, perceptive)

Methods - sequence of operators to accomplish goal
  ■ could be more than one method for achieving a goal

Selection - different ways of doing the same thing, i.e., different methods
GOMS Procedure

Select user goals

Choose interface design

Write out procedures user must learn and execute better relate to User Stories….

Assess design

- informal: unneeded complexity, slow or difficult steps
- formal: calculate predicted times to learn/execute

Issues in GOMS

- user behavior being affected by fatigue, social surroundings, or organizational factors.
- apply to experts, not novices...user suppose to know what to do
Alpha

UI Design & Test

Implement as much as you need for Alpha, for example, the start menu, one or two levels.

As Will Wright describes in his (long) 29 Game Design Video

http://www.youtube.com/watch?v=CdgQyq3hEPo

at any time while playing your game, the player will have a collection of goals that run from the very short term (seconds) to the long term (winning the game). The UI provides the access to completing the goals
Exercise

Choose a mid-level goal for your game

Construct an elaborated Use Case incorporating cognitive aspect

Come up with an initial UI design

Assess it
The End
Tic Tac Toe

Use cases:

1. Start game
2. Play game
3. Take turn (sub-case of 2)
4. Save game
5. Reload saved game
6. Play new game
Tic Tac Toe Sequence

1. Select Play from main menu
2. Take turn
3. If three in a row player wins (win Use Case)
4. AI responds with 0
5. If three in a row player loses (lose Use Case)
6. Repeat from 2.

Elaborated use cases includes cognitive aspects as well as UI components.
Task: Play game

1. Select Play from main menu

2. Choose empty square with goal of
   (a) creating 3 X’s in a row, or (b) stopping
   opponent from making 3 O’s in a row.

3. Click empty square to enter X

4. If three in a row player wins (win use case)

5. AI responds with 0

6. If three in a row player loses (lose use case)

7. Repeat from 2.

Elaborated use cases that includes cognitive aspects as well as UI components
Play game, take turn

Click square

New
Load
Save
Quit
Lose game

You lose!
Assess tasks

EXPERT EVALUATIONS
USER TESTS

wire frames

CS 121
User Test

User: Play a game of Tic Tac Toe
Do they know what to do?

click? what my fingers? square? like the green one?
User Test

User: Play a game of Tic Tac Toe
Do they know what to do?
Do they know how to do it?

Hmmm I’m using the arrow keys but I don’t see a cursor. How am I supposed to make an X.
User Test

User: Play a game of Tic Tac Toe
Do they know what to do?
Do they know how to do it?

UNDERSTAND CONCEPTUAL MODEL OF YOUR APPLICATION: it is not likely to be the same as yours!
Different UI Designs

Loads of Fun
Fast Paced Adventure

Play Load Quit

USER TEST

Problems

redesign
Users’ conceptual model

Especially important for novice users
Especially important for educational games
Different UI Designs

Tasks

You will user test yourself
You will user test another team
Your user test may be videotaped

Problems
CS 121

Loads of Fun
Fast Paced Adventure

Play Load Quit

Redesign
UI Design & Usability
Sudoku beta

Teams of 4: current teams merge
Plan next week of work
Usability testing on Thursday