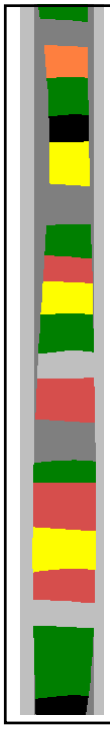


Human Computer Interaction (User Interfaces) for Games

IMGD 4000

Topics

- Background
- HCI Principles
- HCI and Games

What do these things have in common?

- A Computer Mouse
- A Touch Screen
- A program on your Mac or Windows machine that includes a trashcan, icons of disk drives, and folders
- Pull-down menus

- All examples of advances in HCI design
  - Designed to make it easier to accomplish things with computer

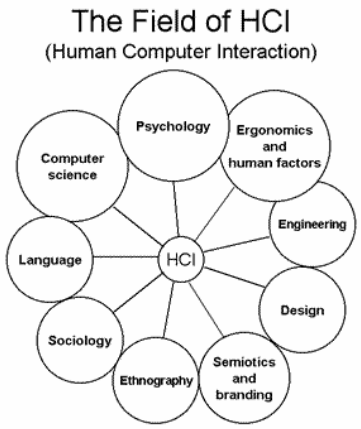
HCI

- *Human-Computer Interfaces* is a sub-discipline of CS
  - Study, design, construction and implementation of human-centric interactive computer systems
- A *user interface* (UI) is how a human interacts with system
- HCI includes
  - Designing screens and menus that are easier to use
  - Studies reasoning behind building specific functionality
  - Long-term effects that systems will have on humans
- HCI combines:
  - Computer Science,
  - Sociology and Anthropology - interactions between technology human systems
  - Ergonomics - safety, comfort of computer systems
  - Psychology - the cognitive processes of humans and the behavior of users
  - Linguistics - development of human and machine languages
- To outsiders, HCI provides recommendations for UI design
  - Menus, icons, forms, data display and entry screens

HCI Course at WPI

- *CS 3041. HUMAN-COMPUTER INTERACTION.*

  This course develops in the student an understanding of the nature and importance of problems concerning the efficiency and effectiveness of human interaction with computer-based systems. Topics include the design and evaluation of interactive computer systems, basic psychological considerations of interaction, interactive language design, interactive hardware design, and special input/output techniques. Students will be expected to complete two projects. A project might be a software evaluation, interface development, or an experiment. Intended audience: computer science majors, especially juniors.



http://www.vhml.org/theses/nannip/HCI_final.htm

User Interface

- All games have one
- Is not just what users press to get avatar to move
  - Includes opening menu, config screens, and in-game, onscreen buttons
- Basic rules:
  - Keep simple, descriptive and fast

Principles of Human-Computer Interface Design (1 of 3)

- Recognize Diversity
  - Range of users playing game: novice player, expert but not your game, knowledgeable in your game but intermittent, and frequent.
  - Accommodating all a challenge
    - Novices need help
    - Experts want speed (get to the game!)
- Shortcuts
  - Help novices and experts
  - increase the pace of interaction
  - special keys, hidden commands, and macros

Principles of Human-Computer Interface Design (2 of 3)

- Strive for consistency
  - consistent actions in similar situations
  - identical terminology
  - consistent color, layout, capitalization, fonts
- Informative feedback
  - For every user action, system should respond
  - Show user activity completed successfully.
- Error prevention and simple error handling
  - Example: prefer menu selection to form fill-in
  - Example: no alphabetic characters in numeric entry fields

Principles of Human-Computer Interface Design (3 of 3)

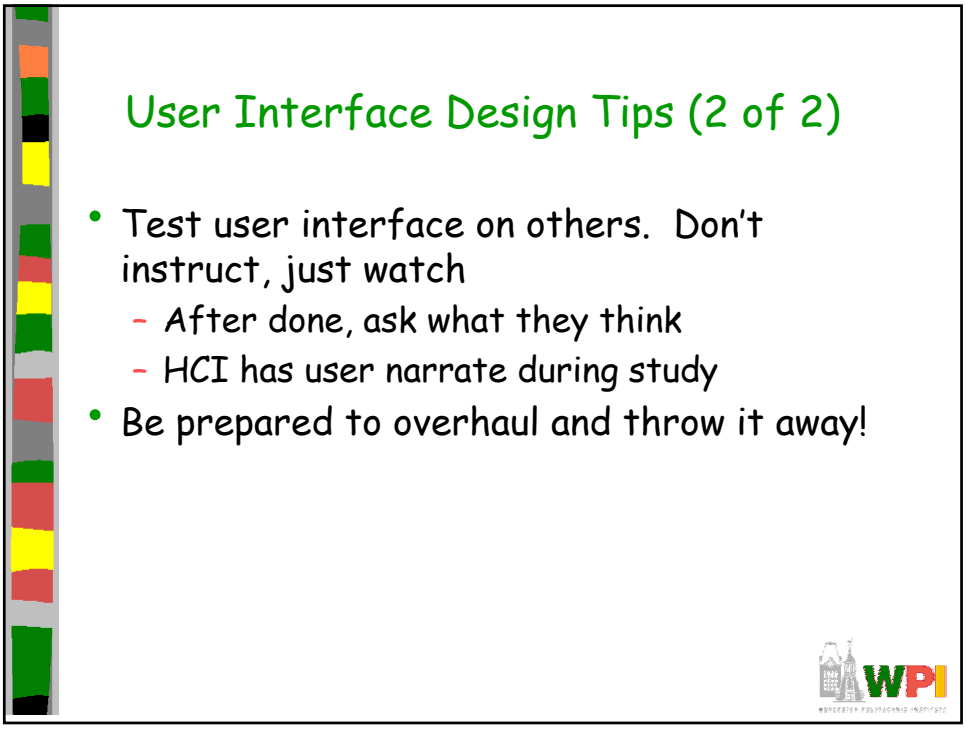
- Reduce short-term memory load
  - Humans can store only 7 (plus or minus 2) pieces of information in their short term memory
  - Screens where options are visible
  - Pull-down menus and icons

User Interface Design Tips (1 of 2)

- Keep simple, uncluttered
  - Most common options only. Easy way to view less common options ("show details" and "hide details")
- Every option/button easy to get to
  - Too many clicks frustrates users
- Where possible, use tooltips, a small description over each button
- Give response to every action
  - Play sound, change cursor
  - Avoid pauses before show action
- Provide feedback on progress during long action
  - Progress bar, etc.

User Interface Design Tips (2 of 2)

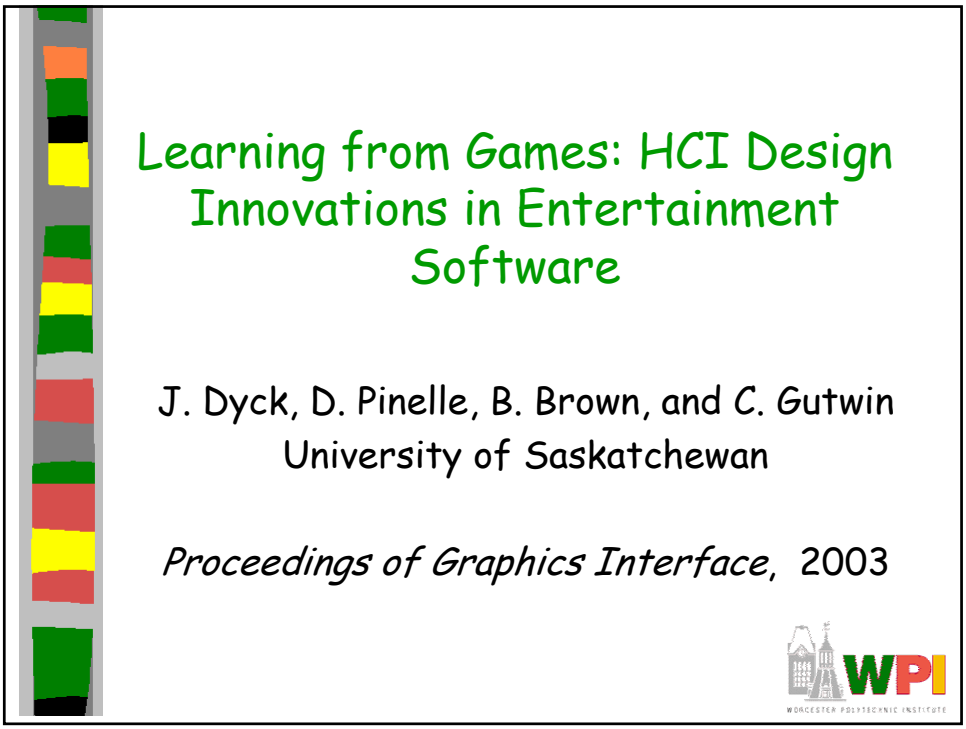
- Test user interface on others. Don't instruct, just watch
  - After done, ask what they think
  - HCI has user narrate during study
- Be prepared to overhaul and throw it away!



Learning from Games: HCI Design Innovations in Entertainment Software

J. Dyck, D. Pinelle, B. Brown, and C. Gutwin
University of Saskatchewan

Proceedings of Graphics Interface, 2003



Introduction

- Computer games successful, even though interfaces very different than other apps
- Performance was key, so avoided "windowing systems"
  - "Separated at Birth" from conventional app UIs
- Gave rise to area that rewarded creativity
- Games early-adopters of new HCI technologies
  - ex- Wii controller
- Innovations to HCI
  - Diablo 2 – transparent overlays
  - Everquest – transparent menus
  - Warcraft – radar views
  - Black and White – gesture commands
  - Grand Theft Auto – speed-coupled flying (ask?)
  - Neverwinter Nights – radial menus

Introduction

- HCI researchers considered games in 1980's, but have largely ignored
  - This paper → overdue look at design and interaction innovations
- Design review of 14 games. Goal: identify novel contributions that provide clear benefit
  - May be applicable to conventional apps!
- Found 4 contributions
  - Effortless community, Learning by watching, Deep customizability, Fluid system-human interaction

Outline

- Introduction
- Methodology (next)
- Contributions
- Summary

Methodology

- Examine 14 games, recently released (to 2003)
  - Commercially successful
  - Good reviews and awards
- Steps:
  - Played (kept diaries)
  - Catalog interaction techniques, main elements
    - Done as group
  - Observe other players
  - Collect online game reviews and discussion
- List of design elements and novel approaches (next)

Game	Genre
Warcraft III	Strategy
Ghost Recon	1st-person shooter, strategy
Rogue Spear	1st-person shooter, strategy
Half-Life	1st-person shooter
FIFA World Cup	Sports
Medal of Honor	1st-person shooter
EverQuest	Role playing
Diablo II	Action, role playing
The Sims	Simulation, strategy
Neverwinter Nights	Role playing
Comanche 4	Simulation
MechWarrior 4	Action, strategy
Grand Theft Auto	Action
Black and White	Strategy

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- Introduction
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  - Effortless Community (next)
  - Learning by Watching
  - Deep Customizability
  - Fluid System-Human Interaction
- Summary

Effortless Community

- Easy to participate in online user communities and easy to form groups
- Provides collaborators to solve problems
- Critical:
  - Need critical mass of users
  - Need way to find right subgroups

Effortless Community – Getting Critical Mass

- Many apps have lots of users (ie- Java JBuilder, Photoshop)
- comp.graphics.apps.photoshop has 140,000 discussion threads
- But community not usually together
  - When the are, done outside application
- In contrast, games make it easy to connect to other users (get critical mass)

Effortless Community – Effortless Connection to Community

- Traditionally difficult! [refs]
- Games do with 1-2 mouse-clicks
- Dedicated, fast servers
- User-hosted (with server browsers)

Effortless Community – Identifying and Forming Groups (1 of 2)

- Many users, but often have constraints
  - Similar personalities, expertise, interests
- Two approaches: meeting places, in-game grouping
- Meeting places
  - Used around games with limited time interactions, small group play

Example – Warcraft III

- Battle.net
  - Dedicated server
- Provides
  - Discussion forums
  - Player stats
  - Create and advertise games
- Automated matchmaking service

Effortless Community – Identifying and Forming Groups (2 of 2)

- In-game groups. Used in MMOs.
  - Guilds – specific purpose
  - Location – in area, similar goals
  - Conversation channels, friend lists
  - Explicit teams
  - Visual identity – avatars show skills, loyalties and expertise

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Learning by Watching

- Beginners learn from more experienced
  - Typical of real-world communities
- Games enable online through avatars
- Ex: watch avatar next to you during action
- Ex: observer mode in games, or after being shot (counter strike)

Outline

- Introduction
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Deep Customizability

- Modifying and extending the UI commonplace in games
- Let users change to support tasks, style of play
- Ranges:
  - Anything goes UI malleability
  - Natural extensibility
  - Portable customizations

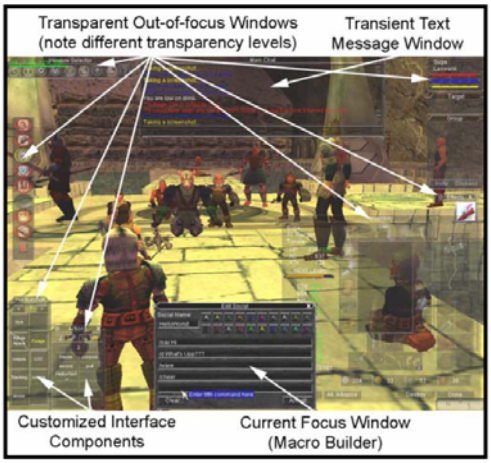
(next)

Deep Customizability - Anything Goes Interface Malleability

- Gamers learned that different configs affect performance
  - Unlike in conventional apps, difference means life or death
- Two main areas: interface layout and mapping controls to functions
- Remap functions of UI controls
  - Undo functionality allows users to try out

Example: Everquest

- Different elements useful at different times (ie- combat or in town)
- UI elements can be moved
- Also, user can create new container for commands
  - Palette of tools for particular purpose



Deep Customizability - Natural Extensibility

- Extend UI easily
  - Macros (common on office products, but hard to add - clicks)
- Ex – Everquest – 2 clicks

Deep Customizability – Portable Customizations

- Modifications and extensions can be saved
- Ex: "Mods" and skins and new levels
- Age-old argument –
  - build interface right in first place, no need to customize
  - But, as more diverse users play, less likely for one-size-fits all
- Games chose latter

Outline

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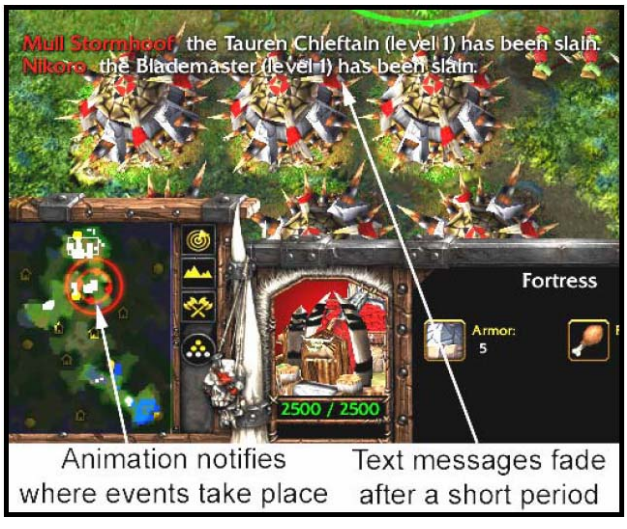
Fluid System-Human Interaction

- Minimize user disruption, demand less user attention or effort
- Calm messaging
  - Presented in unobtrusive way, no need to ack or dismiss
  - Audio – cues and instructions (ie- while flying)
  - Transient text – fade from view, or message area
  - Animation – draw user eye (relative to importance)

Example: Warcraft III



Fluid System-Human Interaction

- As interface used, changes transparency
  - Ex: Everquest 2 (shown earlier)
- Context –aware view behaviors
  - Ex: change in camera, either manually or automatically depending upon the game situation

Summary

- Take away game innovations:
  - *Effortless Community* – games make it easy to form, join and participate in communities of users
  - *Learning by Watching* – games help people learn the application by watching "over the shoulder" of more experienced users
  - Deep Customizability – give users power to modify and extend UI, allow users to share those mods
  - Fluid system-human interaction – communicate with users in a way that does not demand attention or interrupt flow of work
- Apply to your games!