**Overview**

Go over syllabus
Brief introduction to me and my work
What is interaction design?

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**Syllabus**

Ali Mazalek  
Skiles Room 339  
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[Critiques / Lab Sessions] Th 1:35-2:55pm Skiles 318

Signup sheet, Syllabus handout, Class online  
http://www.lcc.gatech.edu/~mazalek/courses/fall07/lcc3710/
**geniebottles** (2000)

Boundary objects that exist at the intersection of the story space where the characters live and the real space where the user lives

Tangible containers for digital stories

Tight coupling of interface and story

artists / researchers

ali mazalek, allison wood, hiroshi Ishii

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**flights of fantasy** (2001)

Interactive installation at the Decordova Museum

- Visitors assemble story sequences using a sliding blocks interface with an iconic language
- Large database of content that tells stories about a specific set of characters and locations

researchers

barbara barry, win burleson, david crow, glorianna davenport, aisling kelliher, ali mazalek, paul nemirovsky, isaac rosmarin, james seo, aman sipitakiat

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**tviews table** (2001-present)

Tangible computer interfaces can bring people together around story exploration in the same way that board games bring friends and families together around game-play

- Design an interface that can sit in social and living spaces rather than in offices on desks
- Multiple users around one interface
- Face-to-face social interactions

researchers

ali mazalek, glorianna davenport

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**tangible viewpoints** (2001-02)

Storytelling engine for multi-viewpoint stories on the TViews table

- Physical pawns used as tangible embodiments of the character viewpoints in a story
- Story segments appear as thumbnails clustered around the pawns, fading in and out as viewers move forward through the story
- A spreading activation network is combined with a rule-based storytelling engine
- Allows the system to adapt to viewer preferences while still providing a coherent overall narrative

researchers

ali mazalek, glorianna davenport
tangible spatial narratives

(2002-present)

Creating narrative landscapes in a physical form on the TVeves table

Audiences collectively reflect upon and navigate complex spatially structured and multi-viewpoint stories
- Visual landscapes on the interaction surface provide a spatial framework for the story
- Different perspectives and narrative threads emerge as the story unfolds

Digital Dialogue: Technology and the Hand
Haystack Mountain School of Crafts, 2002

E.g. Spatial browsing of large media collections

Multi-viewpoint spatially distributed stories

Location-tagged photo collections

Tangible interfaces & media arts applications
Emerging sensing technologies
Physical fabrication (laser cutters & other fun tools)
Interactive narratives (particularly multiviewpoint stories)

I'm someone to chat with about...

I direct the Synaesthetic Media Lab in the GVU
http://synlab.gatech.edu/

Some Directions

Introduce Yourselves

Name & place of origin?
Degree major?
Academic or research interests?
Something interesting about yourself?

(Please label yourselves! I'm forgetful... :>)
Interaction Design

Designing interactive products to support people in their everyday and working lives
Sharp, Rogers and Preece (2002)

The design of spaces for human communication and interaction
Winograd (1997)

Example of bad and good design

Elevator controls and labels on the bottom row all look the same, so it is easy to push a label by mistake instead of a control button

People do not make same mistake for the labels and buttons on the top row. Why not?

From: www.baddesigns.com

Why is this vending machine so bad?

Need to push button first to activate reader

Normally insert bill first before making selection

Contravenes well known convention

From: www.baddesigns.com

Design Questions

Who are the users of the system?
What activities are they doing?
Where is the interaction taking place?

Designers need to optimise the interactions users have with a technological system:

Match between user activities and needs
Consistent interactions
Consistent interfaces
**User Needs**

Designers need to think about user needs:

- What things do people do well?
- What might help them do the things they need to do?
- What feedback do users give them?
- What are good existing practices?

**Activity**

How does making a call differ when using a:
- Cell phone?
- Public phone box?

Consider the kind of user, type of activity and context of use.
Write down at least 3 important differences.

**Evolution of HCI Interfaces**

- 50s - Interface at the hardware level for engineers - switch panels
- 60-70s - Interface at the programming level - COBOL, FORTRAN
- 70-90s - Interface at the terminal level - command languages
- 80s - Interface at the interaction dialogue level - GUIs, multimedia
- 90s - Interface at the work setting - networked systems, groupware
- 00s - Interface becomes pervasive
  - RFID tags, Bluetooth technology, mobile devices, consumer electronics, interactive screens, embedded technology

**From HCI to Interaction Design**

Human-computer interaction (HCI) is:

"Concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them" (ACM SIGCHI, 1992, p.6)

=> ABOUT THE INTERFACE

Interaction design (ID) is:

"The design of spaces for human communication and interaction" (Winograd, 1997)

=> ABOUT THE INTERACTION

More application areas, more technologies
=> more issues to consider when designing interfaces
Positioning Interaction Design

Technological Disciplines
- Computer Science
- Engineering Sciences
- Ergonomics
- Informatics
- Information Sciences

Design Practices (e.g. graphic design)
- Graphic design
- Product design
- Artist Design
- Industrial design
- Film industry

Social Disciplines
- Psychology
- Social Sciences
- Cognitive Sciences

Interaction Design

Interaction Design in Industry

Interaction designers - involved in the design of all interactive aspects of a product or system

Usability engineers - focus on evaluating products based on usability methods and principles

Web designers - develop and create the visual design of websites

Information architects - come up with ideas of how to plan and structure interactive products

User experience designers - do all the above but may also carry out field studies to inform the design of products

Interaction Design Process

1. Identify user interaction needs
2. Establish requirements
3. Develop alternative designs
4. Build interactive prototypes
5. Evaluate and iterate!

Two types of goals:
- Usability goals
- User experience goals

Usability Goals

- Useful
- Effective
- Efficient
- Safe
- Easy to learn
- Consistent
Usability

How long should it take to do the following?

Play a video using a VCR?
Pre-record two programs using a VCR?

How long does it actually take?

User Experience Goals

Satisfying, Rewarding
Fun, Enjoyable, Entertaining
Helpful, Motivating, Inspiring
Aesthetically pleasing, Emotionally fulfilling

Usability vs. User Experience

Some things to think about:

How do the goals differ?
How do we measure them with respect to one another?
What are the trade-offs?
E.g. can a product be both fun and safe?

Design Principles

What are the important aspects of design?
How can these be generalized?
What should the interface provide?
What are good and bad examples?

Interaction design principles stem from a mix of theory-based knowledge, experience and commonsense.
Visibility

This is a control panel for an elevator. How does it work?

Push a button for the floor you want...
Nothing happens.
Push any other button...
Still nothing.

What do you need to do?

What to do is not visible!

From: www.baddesigns.com

Visibility

... You need to insert your room card in the slot by the buttons to get the elevator to work.

How would you make this action more visible?

- Make the card reader more obvious
- Provide an auditory message (which language?)
- Provide a label next to the card reader that flashes until you insert your card

Make relevant parts visible
Make what has to be done obvious

Feedback

Sending information back to the user about what has been done
Includes sound, highlighting, animation and combinations of these

E.g. when screen button clicked on provides sound or red highlight feedback:

![Playback] → “click”

What are some other examples of feedback?

Constraints

Restricting the possible actions that can be performed
Helps prevent user from selecting incorrect options

Three main types (Norman, 1999)
physical
cultural
logical
**Physical constraints**

The way physical objects restrict the movement of things
E.g. only one way you can insert a key into a lock

How many ways can you insert a CD or DVD disk into a computer?
How physically constraining is this action?
How does it differ from the insertion of a floppy disk into a computer?

**Logical constraints**

Exploit commonsense reasoning abilities that people have about the way the world works
E.g. Layout can help people make logical connections

Where do you plug the mouse?
Where do you plug the keyboard?
Top or bottom connector?
Do the color-coded icons help?
What would be a more logical design?

From: www.baddesigns.com

**Other Solutions**

A. Provide direct adjacent mapping between icon and connector
B. Provide color coding to associate the connectors with the labels

From: www.baddesigns.com

**Cultural constraints**

Learned conventions, often arbitrary
Can be universal or culturally specific
E.g. Red triangles for warning

From: www.baddesigns.com
Which are universal and which are culturally-specific?

Mapping

The way in which controls and their movements are related to actions and effects in the world

Why is this a poor mapping of control buttons?

Why is this a better mapping?

Mapping

The control buttons are mapped better onto the sequence of actions of fast rewind, rewind, play and fast forward

More Mappings

Which controls go with which burners?
Why is this a better design?

Consistency

Similar operations across interfaces
Similar elements used for similar tasks
E.g. Always use the control key together with the first initial of the command for an operation – ctrl+C, ctrl+S, ctrl+O

Consistent interfaces are easier to learn and use

Consistency Breakdown

What if there is more than one command that starting with a given letter?
E.g. save, spelling, select, style

Have to find other initials or combinations of keys, breaks the consistency rule
E.g. ctrl+S, ctrl+Sp, ctrl+shift+L

Increases learning burden on users
Makes users more prone to errors

Consistency

Internal vs. External

Internal consistency: designing operations to behave the same within a single application
Difficult to achieve with complex interfaces

External consistency: designing operations, interfaces, etc., to be the same across different applications and devices
Very rarely the case, based on different designer preferences
Affordances

Refers to an attribute of an object that indicates how people should use it
E.g. a mouse button invites pushing, a door handle affords pulling
Norman (1988) used the term to discuss the design of everyday objects

Affordance and Interaction Design

Digital interfaces do not have physical affordances like physical objects
Norman argues that it does not make sense to talk about interfaces in terms of ‘real’ affordances
Interfaces instead have ‘perceived’ affordances - learned conventions of arbitrary mappings between action and effect
Some mappings are clearer than others

Activity

Physical affordances:
What do the following physical objects afford?
Are they obvious?
Activity

Digital affordances
How do the following screen objects afford?
What if you were a novice user?
Would you know what to do with them?

Usability Principles

Similar but more prescriptive than design principles
Used mainly as the basis for evaluating systems
Provide a framework for evaluation

Usability Principles

Design heuristics or rules of thumb
Visibility of system status
Match between system and the real world
User control and freedom
Consistency and standards
Help users recognize, diagnose and recover from errors
Error prevention
Recognition rather than recall
Flexibility and efficiency of use
Aesthetic and minimalist design
Help and documentation

(Nielsen 2001)
http://www.useit.com/papers/heuristic/heuristic_list.html

From Usability to Sociability

Design heuristics or rules of thumb
The social aspects of work and leisure
Humanizing design - different from the GUI
Accounting for the social spaces in which we work
Accounting for the relationships we have with other people
Respecting the behaviors of ordinary life

(Gillian Crampton Smith, in Moggridge 2006)
Key points

Interaction Design:

- Is concerned with designing interactive systems, environments and products for people in their everyday lives.
- Is multidisciplinary and involves input from many disciplines and fields.
- Involves consideration of interdependent factors: context of use, type of activity and type of user.
- Strives for both usability and user experience goals.

Readings for Thursday

- Norman, *The Design of Everyday Things*, Ch. 1-3
- Mountford, *Tools and Techniques for Creative Design*