

EST 323 / CSE 524 / CSE 590: HCI

Introduction

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Human



Strengths:

- is creative
- can think abstractly
- can recognize patterns
- can handle natural language well

Weaknesses:

- has low computational bandwidth
- has low memory
- limited ability to do symbolic math
- has low endurance

Computer



Strengths:

- has high computational bandwidth
- has high memory
- high ability to do symbolic math
- has high endurance

Weaknesses:

- not creative
- cannot think abstractly
- cannot recognize patterns well
- cannot handle natural language well

Supercomputer

Strengths:

- even higher computational bandwidth
- even higher memory
- even higher ability to do symbolic math
- even higher endurance



Weaknesses:

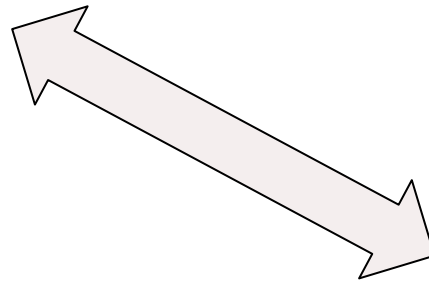
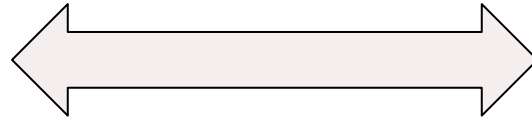
- still not creative
- still cannot think abstractly
- still cannot recognize patterns well
- still cannot handle natural language well

Create Human Computer Synergy

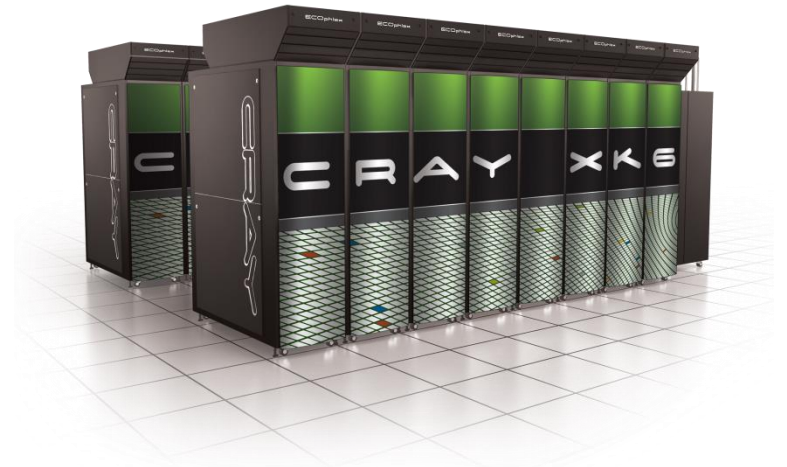


Human

Interaction



Computer



Supercomputer

Humans Are Diverse!



Humans: Software and Hardware

Human's hardware

- hands, arms, legs → the physique
- brain → the processor

Human's software

- habits
- preferences
- cultural backgrounds
- languages

Diversity and limitations

- one size fits all is difficult
- must find the common denominator
- peer pressure helps
- seduction by marketing helps



Computer: Software and Hardware



Computer's hardware imposes

- hands, arms, legs → the physique
- the brain → the processor

Computer's software imposes on

- habits
- preferences
- cultural backgrounds
- languages

Diversity and limitations

- one size fits all is difficult
- must find the most common audience
- peer pressure helps
- seduction by marketing helps

Computers Are Diverse!



Means for Human Computer Interaction

What have you seen in the previous slide?

- keyboard
- mouse
- display
- touchpad
- touchscreen
- speaker
- microphone
- windows
- icons
- menus
- more?

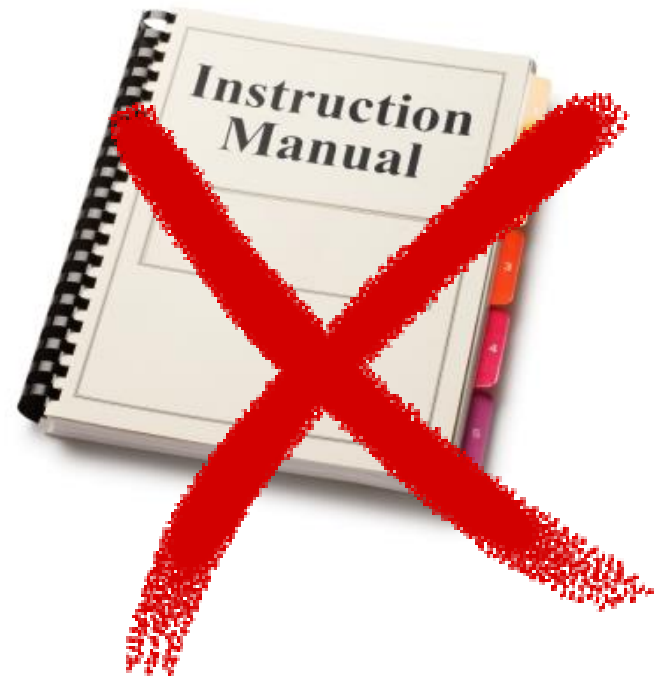
What really matters is how these things are linked to software

- this defines the 'behavior' of the computer
- it what is programmed by humans (for humans) → human centered
- it is what we will study predominantly

The Best User Interface

Best user interface:

- is natural
- is intuitive
- appeals to common sense
- does not require a manual



What's Wrong Here?



This design gives mixed messages

- handle says 'pull', but sign says 'push'

Affordance



Now the intended and the visual messages are identical

What's "Affordance"?

Definition:

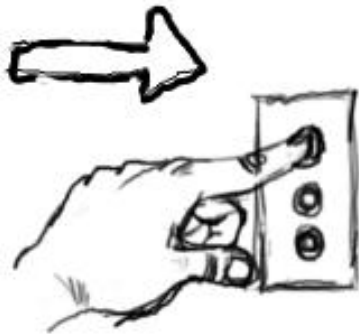
- Relation between an object, or an environment, and an organism that affords the opportunity for that organism to perform an action

Affordance: the relationship between an object and a person.



Affordable Designs

Invite their use in the intended way



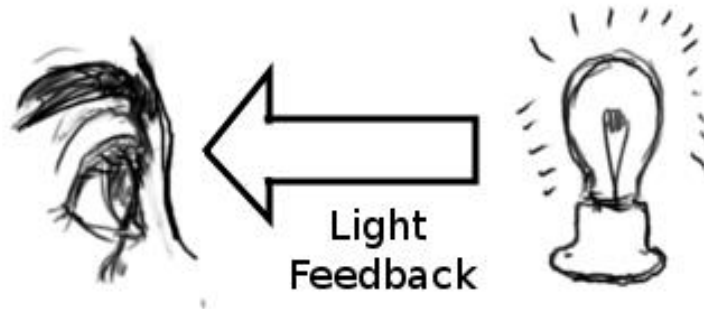
Button - Push



Switch - Flip



Knob - Rotate

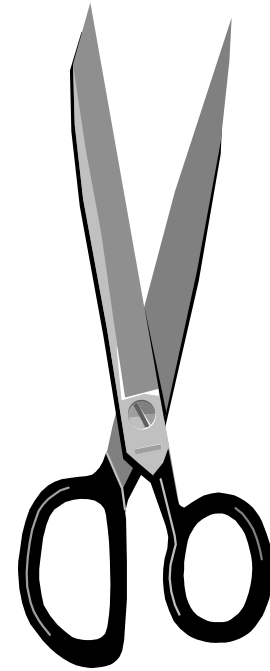


Light
Feedback

Good Affordable Designs

Communicate model through visual image

- visible affordances, mappings, and constraints
- visible causality of interactions
- cultural idioms, transfer
- instructions augments visuals



Affordances:

- holes for something to be inserted
- constraints: big hole for several fingers, small hole for thumbs
- mapping between holes and fingers suggested and constrained by appearance

Bad Designs – Contrived



Bad Design Example #1



● ● ● ●
A B C D

Bad:

- why is this a bad design?
- which controls go with which rings (burners)?

Better:

- why is this design better?



Bad Design Example #2



Bad:

- where do you plug the mouse?
- Where do you plug the keyboard?
- top or bottom connector?

- do the color coded icons really help?

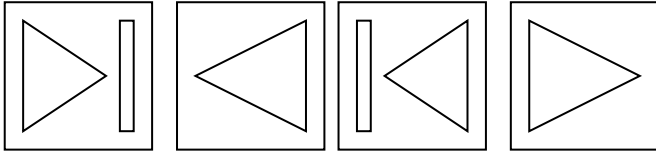


Better:

- solution A provides **direct** adjacent mapping between icon and connector
- solution B provides **color coding** to associate the connectors with the labels

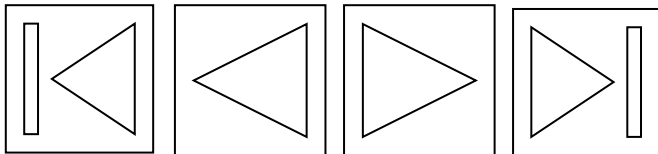
Bad Design Example #3

Bad:



- why is this a poor mapping of control buttons (rewind, play, fast forward, fast rewind)?
- because relationship between controls and their movements and the results in the world are not obvious

Better:



- why is this a better mapping?
- because now the control buttons are mapped better onto the sequence of actions (fast rewind, rewind, play and fast forward)

Why is Good Design and Usability Important?

Poor designs and usability result in:

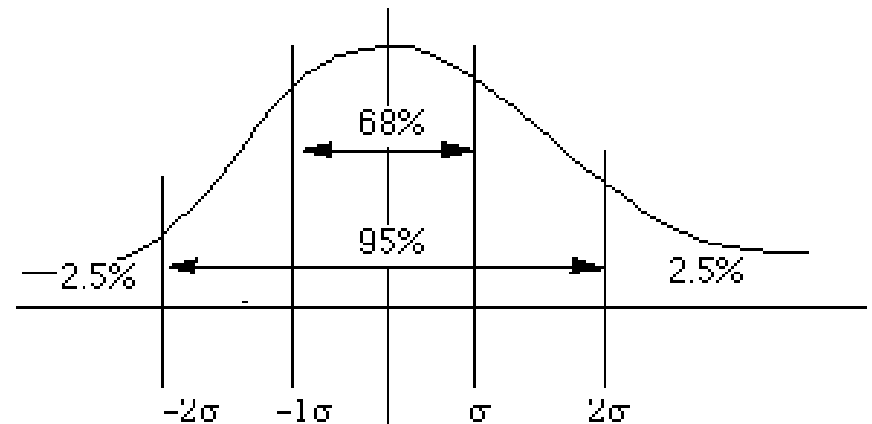
- anger and frustration
- decreased productivity in the workplace
- higher error rates
- physical and emotional injury
- equipment damage
- loss of customer loyalty
- costs money

Affordable Designs Are Difficult

People are different

It is rarely possible to accommodate all people perfectly

- design often a compromise
 - ceiling height: 8'
 - but tallest man: 8' 11"!



Rule of thumb:

- cater to 95% of audience (5th or 95th percentile)
 - but this means that 5% of population may be (seriously!) compromised
- designing for the average is a mistake
 - you may exclude half the audience

This Course

Teaches you good and affordable user interface design

- for synergistic human-computer interaction



- for happy users



- for effective and pleasurable work and leisure



Syllabus and Course Topics

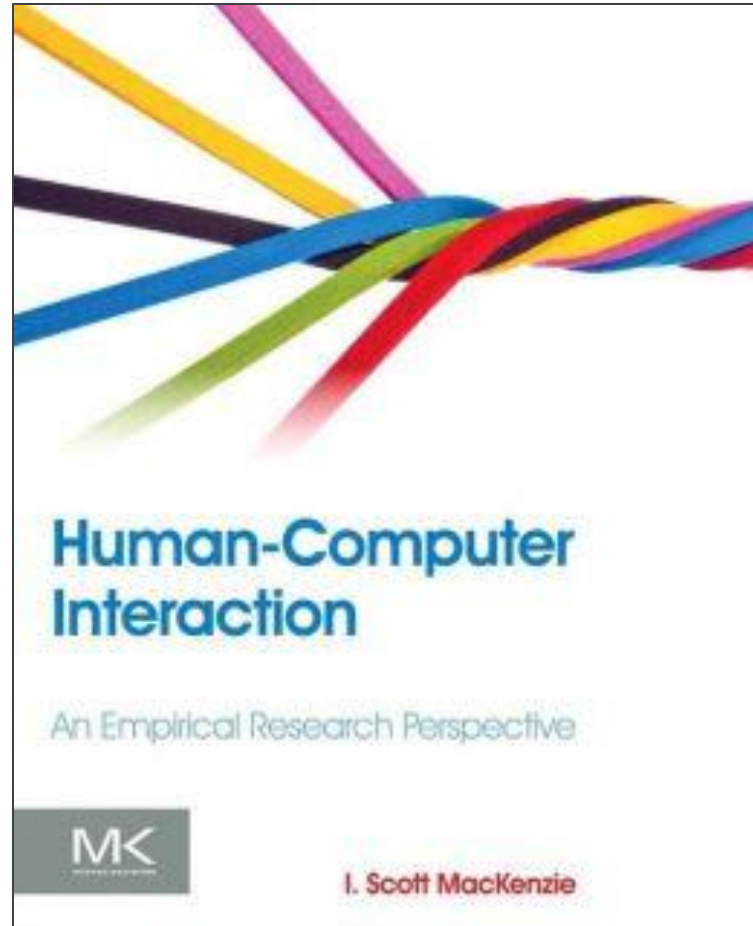
This course will introduce students to the principles of

- human-computer interaction

The topics covered include:

- human visual perception
- user interface design and visual design principles
- clipping, panning, and zooming
- interaction design
- basic research methods and design of HCI experiments

Textbook



Grading and Assignments

This is a mixed undergrad (UG) + graduate (G) student course

Assignments:

- homework (10%)
- course project (40%)

Midterm: 20% (UG)

- closed books, closed notes, bring calculator

Final: 30% (UG)

- comprehensive, but leaning towards later material
- closed books, closed notes, bring calculator

Policy

You must do your own work

- no cut and paste
- must cite the sources of any ideas, code or text

It is OK to:

- discuss ideas, approaches, etc. with other students
- get ideas from information in books, web sites, etc.
- get “support” code from example programs
- but, you must reference your sources of information in your report

It is NOT OK:

- share code and text with another student
- use ideas, code, or text acquired from another sources without citing

Violations:

- constitute academic misconduct
- will be brought to the attention of the university academic misconduct committee

Student Responsibilities

Submissions:

- all done using an external submission website
- grades will be published on course webpage (de-identified)
- up to you to check if you received a proper grade for your work
- feel free to discuss your grade if unhappy

Late policy

- you have a budget of 10 days for late submission without penalty
- spend them as you wish over the course of the semester
- upon expending the budget there will be a 10% per day late penalty
- late penalties are imposed precisely at midnight on the due date
- no extensions given to individuals unless it is an extreme case of a proven emergency

Avoid getting penalized for late submission

- plenty of time to do the labs but start right away
- overall extensions are given in case of general equipment failure or other, universal, uncontrollable, devastating circumstances

Official Disability Notice

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact the Disability Support Services office. They will review your concerns and determine, with you, what accommodations are necessary and appropriate. All information and documentation of disability is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information, go to the following web site:
<http://www.ehs.sunysb.edu> and search Fire Safety and Evacuation and Disabilities.

Course Information

Course webpage

- <http://www.cs.sunysb.edu/~mueller/teaching/cse323/>
- get all information, course notes, assignments, grades from there
- but use Blackboard for submission (not email)

TA:

- TBD