USER INTERFACE DESIGN (C1U)

CLASS 01

Class presentation (course outline)

What is a user interface?

- Generally : visual layout of the elements that users interact with on a machine, a website or application
  Can be : buttons of a radio / visual layout of a web page

- Interface : Between man and machine
  (e.g. switches, levels, meters, etc.)

- Must not only be attractive = must also be functional and created with users in mind

Designing interfaces

- Must understand basic human-system interaction processes

- Based on : request-answer model
  (intention - request - computer action - computer answer - answer evaluation)

- Interface must be produced with user in mind (adapted to the user. Example : language)

- User must also adapt to the interface (learn how to use it)

- Designer task : make the interface easy to understand and use

Historical overview of interactions between man and computer

- First computers (1945) = Batch interface
  - Punch card / paper tape
  - Operator would feed the machine
  - Results could be recorded on magnetic tapes
  - No real-time response
  - Changing system logic/function needed rewiring : plugboards
  - No screen : results printed
  - 1957 : batch monitor finds errors earlier = better end data (could take days to complete a task)

- 1969- now = Command line interface
  - Evolved from batch monitor (took seconds/minutes to complete task)
  - Results shown on computer screen (from TV invention)

    - Evolved from text screen to visual-screen display

- 1985 = SAA user interface / text-based user interface
    - SAA (IBM) Systems Application Architecture
    - Beginning of microsoft
    - Various interface until DOS then Windows
    - Started standard :
        - Pull-down menu from the top of interface
        - Status bar at the bottom
        - Shortcut keys
    - Made learning and using softwares a lot faster

1968-now = Graphical user interface

- AMX Desk made a basic WIMP GUI

- 1989 : Linotype WYSIWYG 2000

- 1968 – Douglas Engelbart demonstrated NLS
  (System using mouse, pointers, hypertext, and multiple windows

- 1970 : Xerox Palo Alto Research Center develop WIMP paradigm
  (Windows, Icons, Menus, Pointers)

- 1973 : Xerox Alto: commercial
  (expense, poor user interface, not enough programs)

- 1979 : Steve Jobs (+ Apple engineers) develop GUI

- 1981 – Xerox Star: focus on WYSIWYG.
  Commercial failure (25K sold / $16K each)
  (minutes to save a file, couple of hours to recover from crash)
  + poor marketing

- 1984 : Apple Macintosh popularizes the GUI

- 1984 : MIT's X Window System: hardware-independent platform and networking protocol
  (for developing GUIs on UNIX-like systems)

- 1985 : Windows 1.0 (GUI interface to MS-DOS)
  No overlapping windows (tiled instead).

- 1985 : Microsoft and IBM work on OS/2
  (would eventually replace MS-DOS and Windows)

- 1986 : Apple threatens to sue Digital Research
  (GUI looks too much like Apple's Mac)

- 1987 : Windows 2.0
  (Overlapping and resizable windows, keyboard and mouse enhancements)

- 1987 :Macintosh II (first full-color Mac)

- 1988 : OS/2 1.10 Standard Edition (SE)
  (GUI written by Microsoft, looks a lot like Windows 2)

Common components of an interface

Functional and communicational aspects

- Identifies the company / product / service...
- Presents a navigation (content segmentation)
- Presents content
- Can present functionalities (e.g. online shopping, reservation, etc.)

Design aspect

- Usually represents the company / brand
- Corresponds to users minimal expectations
  designed marketing-wise (so user feels he is concerned)
- Equals or overpass competition
- Contributes to efficiency (cognitive ergonomics)

Assignment 1 :

Design a UI based on teachers given details (purposely giving minimal details).
Using Photoshop or Illustrator, students get minimum half of the class to produce and submit work.
Student must produce a home page and a section page.
(can be handled at the beginning of class 02)

* the same project could be used as final project so it is possible to compare the before/after results.

CLASS 02

Presentation of assignment 1

(Comments from students + basic teachers comments)

What's wrong with the presented interfaces

- The interfaces were built on intuitions / aesthetic / predefined solutions...
- Students didn't know much about :
    - The company / product
    - The market / competition
    - The customers / potential users
    - Cognitive ergonomics theories
    - The importance of design
    - etc.
- First thing they should have done : ask questions!
- UI cannot be improvised : must be well planned
- Requires at least basic knowledge

3 aspects of user interface design

Interface design

- How user interacts with the web site
- Should be viewed as collections of tasks
  (with a beginning, a middle and an end)
- Wonder what people want to do (tasks) upon arrival on the web site :
    - Example (Facebook) :
        - I want to tell people I bought a new car
        - Click update status (start)
        - Write a status in the pop-up window (middle)
        - Click publish (end)

Information design

- Organization and structure of the information
- Presentation of the information

Aesthetic design

- Look and feel of the overall web site

User interface design process

- Mandate definition
- Research and documentation
- Development of a theoretical solution (architecture)
- Ideation / conceptualization (visual design)
- Creation and presentation of mock-ups
- Fine tuning of the final design (and architecture)
- Alpha version and testing
- Content integration and layout

Mandate's definition

Meeting the clients (sometimes tender / specs)

- Goal : getting as much information as possible
- What does the client wants (precisely) + why (product, service, reputation, etc.)
- Objectives (short, medium and long term)
- Who are the customers and potential customers (precise portrait of target public)?
- What is the market and the competition?
- What about their image (present, desired, perceived)
- What is the deadline (what is possible within a certain period of time?)
- What is the budget (what is possible with the budget's limitations)

Research and documentation

- Verify informations obtained from the client
- Gather more informations
- Acquire knowledge from the field of activity
- Know about the environments (complementary businesses, competition and users)
- Know what type of content is offered
- Know what functionalities are needed
- This helps creating the overall structure

Prototyping (flow chart)

- It's a structure : mapping the design flow
- Gives a visual understanding of the entire web site projects
  (Without focusing on aesthetic and positioning of elements)

- Boxes represents different pages/sections of the web site :
  - 1st level : home page
  - 2nd level : section pages (more/less detailed overview)
  - 3rd level : content pages (details)

- Boxes linked together depending on accessibility possibilities (navigation)
- Boxes contains title + bulleted content description
- Boxes numbered or names (to be recognized in the production script)

- Also very useful to evaluate production time

Production script

- Document defining the structure and contents of a web site's project

- Usually presented landscape under 3 columns/categories :
    - 1st column : name/page number
    - 2nd column : text content
    - 3rd column : images, multimedia and/or technology

- At first = pretty empty (defining what type of content should be there)
  THEN would gradually be replaced by content supplied or produced

- Useful when working in team :
  Color code can let everyone knows what is done, to do or in process to be done

- Also acts as a contract with the client = document needs to be approved before starting working

- Would also be added to the production script (for presentation/approval to client) :
    - Gantt chart
    - List of content to be supplied/produced
    - Estimate
    - Copyright, billing and legal details

Assignment 2 :

Using the same project as for assignment 1 (or another project supplied by the teacher) complete the following steps :

- Mandate definition (Students question the teacher)

- Research and documentation

- Project structure (site map)

- Production script

CLASS 03

Presentation of assignment 2

(Comments from students + teacher)

Basic principles of user interface design

Usability

- Part of user experience (UX) = ease of use
- Too complex or not adapted to targeted users :
  user may not be able to find what they are looking for
- Should be clearly set out for users = elements can be found in a logical position (cognitive ergonomics)
- 3 aspects to consider :
    - User should become rapidly familiar with the interface
    - User should find or complete task easily
    - Interface operation should be easy to remember for returning users

Characteristics of a great interface

Utility

- Result of the value-effort ratio
- Users need motivation
- Users have expectation
- Result of the value-effort ratio must be positive

Clarity

- Things must be clear (no ambiguity/confusion)
- Hierarchy and flow must feel natural and logical
- Navigation must be easy (natural) to use and to understand
- Use of icon (visual metaphors) whenever possible

Concision

- Don’t give to many details (we’re often scared not to be clear enough)
- Don’t label everything
- Interface must be light (not over clustered)
- Too many elements/informations leads to confusion
- Too much text = the user won,t read anything
- Challenge : be concise and clear

User-friendliness

- Level of user comfort and satisfaction associated with using the interface

Familiarity

- Make the user feel at home (even on first visit)
- You don't want to chock the user and it disoriented
- Real-life metaphors can be used
- Cognitive ergonomics also helps (standards)

Responsiveness

- The interface needs to give feedbacks to the user at all times
- Example :
    - Clicking on a button to launch a module which can take some time to load
    - Using a progress bar or spinning pointer = tells user it is processing
    - Submit a form : Pop-up window telling user the message has been delivered

Reliability

- Interface minimizing the risk of errors
- Confidence in the possibility to achieve tasks

Consistency

- Cohesion (navigation and layout)
- The interface remains the same across entire web site
  User recognize where he is instead of being recalled (both should be used)
- Dedicated zones to certain types of content

Aesthetics

- Sometimes seen as secondary (not very important) = FALSE
- User experience is better with good aesthetic (see uses and gratification)
- Aesthetic choices can help other characteristics (e.g. color coding)
- Minimalist designs are far more efficient

Efficiency

- User should save as much time as possible finding what he searches for
- Should diminish the number of clicks necessary to reach content
- Shortcuts could/should be provided (flexibility)
- The interface should make it as easy as possible to complete the task
- User should be given control
- Anticipate typical user need = create defaults
  (e.g. pre-filled input fields)
- Supply help and documentation if needed

Control

- Don't trap users in an interface
- Give them control
- Anticipate users needs
- Use patterns and standards (e.g. pre-filled forms)
- Don't dictate what to do (make it sound like suggestions)

Forgiveness (reversibility / recoverability)

- Users mistakes should be anticipated
- Easy solutions should be provided to user in case of mistakes
  (e.g. back arrow, continue shopping, etc.)

Cognitive ergonomics

- Commonly described as : fitting the system to the human

- Adapting interface and processes to fit unique human abilities and limitations

    - PHYSICAL Ergonomics :
        - Adapting the handle of a tool to avoid hand unnatural movements
        - Design of a chair lowering risks of back pain
        - Qwerty keyboards

    - COGNITIVE Ergonomics :
        - Adaptation between human cognitive abilities and limitations and the machine
        - Symbol that is universally (or widely) understood by people (red light)
        - Systems taking in consideration human can make mistakes (nuclear plant controls)
        - Creating easy to use interfaces for machines, softwares or web sites
        - CTRL-P (for printing) makes more sense than F-4

10 Principles of Cognitive Design

Standardize :

- Creating a widely common way of doing things (e.g. color coding of electricity wires)
- User learn from usage (more usage = solid knowledge = reflex)
- Helps prevent errors
- Usage rapidly becomes simple, fast and easy

Use of stereotypes :

- Concept very closed to Standards (less consciously determined)

- Good standard generally follows a stereotype

- Vertical wall light switch : up = on / down = off
  (installed horizontally, not sure how to operate them anymore)

- Red = stop / danger

- Level up = more power

Controls matching equipment layout :

- Example : power knobs of stoves
- Good design = configuring elements so that usage becomes obvious

Simplify presentation of information :

- Well organized informations makes understanding easier and faster
- Example : using Icons or images replace a lot of text

Present information in appropriate detail :

- Not all users need the same quantity of details
- Not all tasks requires the same quantity of details
- Adapting system to user allows to give everyone the amount of details needed

Present clear images :

- User must be able to see and interpret images clearly

- Images must be :
    - Visible :
        - Appropriate size
        - Appropriate location
        - Appropriate distance
        - No obstruction
        - Should contrast with background / environment

    - Distinguishable :
        - From other surrounding signals and information
        - Similar signals should be different enough to avoid confusion
        - Enough space between signs / signals

    - Interpretable :
        - Easy to understand
        - Not being confused with another sign
        - Easy to remember / use

Using redundancies :

- Meaning : repeating the message (sometimes in different ways)

- Example : Stop signs
    - Red
    - Octagonal
    - Text telling user to stop

- Example : emergency vehicles
    - Uses sirens + flashing lights

- Example : Standard address writing pattern
    - With zip code = city and province are not necessary
      (Mistake writing numbers and letters is easy : more infos provided)

Using patterns (Leverage pop-out effect) :

- Using patterns = anything abnormal sticks out
- Information presented as pattern = easier to understand
- Grouping elements by themes makes operation easier
- Graphs easier to understand number data
- Charts make it easy to compare numbers or quantities

Provide variable stimuli :

- Anything new is easier to notice

- Emergency vehicles use flashing lights and sirens : Pitch and rhythms are changing

- Animations attract attention efficiently

- Written warnings : rapidly become ignored
  (Become part of the background)

- Avoid excessive use of presenting information in a single manner

Provide instantaneous feedback :

- To confirm an action
- To confirm something is being processed
- To tell what action should now be taken
- Example : clicks of keyboard tells you the key has been pushed correctly
- Example transition page changing

Essential UI design principles

POLA principle

- Principle of least astonishment :
  If a necessary feature has a high astonishment factor, it may be necessary to redesign the feature
- Design should be adapted to the user's experience, expectations, and mental models
- Human beings can only pay full attention to one thing at a time
- Novelty should be minimized

MAYA principle

- Most advanced yet acceptable
- People naturally resistant to change / irregular interface (people like standards)
- Bring novelties gradually (so user gets used to it)
- Offer traditional fallback options (when novelties are offered)
  (users have different levels of comfort)

Baby duck syndrome

- Related to MAYA
- Users attitude using a new interface for the first time
- User then judges the new interface (comparing it with the older version)

Habit formation

- An interface used persistently = user develops habits using the interface
- Designer must ensure the user forms good habits
- Careful not to make bad assumptions about users behaviours

Hick's Law

- The time it takes to make a decision increases with the number and complexity of choices
- Important to reduce the number of choices presented to users
  (Too many choices adds to their cognitive burden)
  More choices = more risks for the user to leave
- Make navigations shorter (hierarchy) + use contextual sub-navigation
  Learn to identify essential and secondary contents

Banner blindness

- Users have developed a mechanism to avoid anything resembling advertising
- Careful not to place anything important over a attention grabbing image (it could be avoided)

Fiitt's Law

- The time it takes to acquire a target is a function of the distance to and size of the target
  (The farther away a target is, the larger it needs to be for a user to be able to reach it easily)

- Important to consider for button and clickable elements
  Large button = call to action (make sure the button isn't too big) = User could click inadvertently

Miller's Law

- The average person can only keep seven (plus or minus two) items in their working memory

- Benefits of fragmenting to ease complex tasks
  (examples : formats of phone numbers / credit cards numbers)
  Instead of retaining a long number = you retain limited groups of numbers

- Group content within logically organized groups

Zeigarnik effect

- People have problem leaving an uncompleted task

- Studying with interruptions = remember more the details of studies

- EXAMPLE : forms using progress bar = more likely for users to complete the task

Assignment 3 :

Students with make screen captures of different web site and make a presentation to illustrate the principle of cognitive ergonomics and some of the design principles they can identify.

CLASS 04

Presentation : assignment 3

Usual components of homepage user interfaces

Homepage

- Official first page of a web site
- BUT : user may enter the site in another page (depending of search engine indexation)
- SOMETIMES : used as a book cover (high end brands/products) = splash page
- Home page establishes the structure and method
  It tells users the rules of the game (you've got to then stick to it)
- ALSO : establishes the style + tone + ambiance
  (formal, friendly, etc.)
- Use of corporate chart (style, colors, typography...)
- USUALLY : header, main, footer

Header

- Like a letter head
  Answers basic questions : What is it? What does it offer?
- Identifies the company or brand (logo)
- Give insight of content, features, functionalities (navigation)

Identification of company / brand / product / service

- USUALLY : Up-left = Start of reading pattern
- Logo (not too big = amateur)

Navigation

- Follows the logo = BECAUSE F shaped reading pattern
- Basic explanation of Z (printed) and F (virtual) reading patterns
- Links to different sections (= content must be segmented)
- USUALLY between 5 and 9 navigational items
- Far and different enough not to be confused with content

- Navigational approach = horizontal and vertical development :
    - Horizontal dev = one click to content
    - Vertical dev = click lead to more detailed contents

- Limit the number of click between user and needed content (minimum-clicks approach - 2-3 max)

- Entire site-map can also be used (horizontal dev)
  Sub-navigation OR contextual navigation within sections (vertical dev)

- Navigation must be consistent and clear

- User should always know where they are
  (Navigation item highlight OR breadcrumb trails OR headings can be used = in content page)

- OFTEN : Navigation (or entire header) is fixed = always present when user scrolls

Main section

- Body = main content (related to section)

- Home page usually shows small volume of content (more space for image)
  (More user clicks = more you are allowed to offer more detailed content)

- Use proper page layout :
  If content is not read = web site doesn't achieve its goals

- Apply hierarchy to content :
  Use titles, subtitles, captions and image legends

- Paragraphs :
  Short and 400 px wide maximum

- Use inverted pyramid approach :
    - Leads (what is important : 5 W + H)
    - Important details
    - Complementary and background informations (least important)

- Based on F reading pattern :
    - 70% of contents read = positioned left
    - 70% of image and figure legends are read (put important informations there)

Footer

- Fixed (sticky) or relative
- 75%+ visitors read above fold contents
  progressively decreasing as they have to scroll
  Still can be a lot of people
- STANDARD : people not finding what they are looking for go check the footer
- Possible content of footer :
  - Copyrights
  - Site map
  - Privacy policy
  - Terms of use
  - Contact informations (complete)
  - Contact infos
  - Social networks
  - Email sign-up
  - Press link
  - Award and certifications (except hotels+ restaurants = homepage)

Common entry page types

- Splash page
- Home page
- Landing page

Common website types

- Informational
- Advocacy
- Media
- Entertainment
- Brochure
- Business and marketing
- E-commerce
- Progressive web application

Assignment 4 :

Students search the Internet making screen-captures of different types of homepages, headers (navigations) and footers (minimum 5) and will have to explain their findings.

CLASS 05

Presentation : assignment 4

Revision

Workshop

CLASS 06

Intra exam

CLASS 07

Homepage design

- Structural considerations are important
- BUT aesthetic as well

Sketching the interface

Stay away from the computer

- Biggest unexperienced designer mistake = starting work on the computer
- Working on computer :
    - Limits imagination (force concentration on technical aspects)
    - Affect imagination negatively (left brain in control)
    - Slows you down (technical solution instead of design solutions)
- Apply conceptualization process :
    - Research and documentation
    - Divergent thinking
    - Convergent thinking
    - Concepts

Working on paper first

- Cheap, fast, easy to correct mistakes
- Work with pencil (can be erased)
- Start with light drawings
  Make it bold when you are sure of your decisions

Sketching (wireframe)

- Graph paper very helpful
- Focus on usability : positioning, sizes, content type zones
  (not disturbed by aesthetic matters)
- Start with wireframes, then prototypes

Creating the overall interface frame

- Will interface use full width content presentation?
  OR 960 approach?
- Will it be responsive? Adaptive? fluid? Degrading? Etc.
- Will it detect language, country, etc,? AND reorient user automatically?
- Will you give power to user to decide what he or she wants?

Identification and navigation

- USUALLY : better to work on content structure
  THEN : navigation (header and footer)
  FINALLY : Aesthetic aspect
- HEADER is probably the most important part
  Identification + navigation
- Define navigation type + position (horizontal development)
  (give technological details if needed)

Structuring content layout

- Apply content hierarchy and organization (using headings)
- Work with a layout grid (content type zones)
- Gradually offer more content with clicks (vertical development)

Bringing sketches to the computer

Visual prototype

- Using softwares such as Photoshop/Illustrator :
  - Create the desktop overall look and feel for :
    - Homepage + navigation
    - Section page
    - Content page
  - Create the mobile overall look and feel for :
    - Homepage + navigation
    - Section + content pages

Assignment 5 :

Using the same project as for assignment 1, students create the design of the homepage including navigation of the web site.

CLASS 8

Presentation : Assignment 5

Alpha version

- Building the interface

Slicing the interface

- Analyze the interface structure
- Use layer guides to define containers
- Extract all images to correct format

Coding the homepage

- Create the containers structure (using colors and names)
- Integrate the interface elements
- Create the main navigation
- Test the interface

- Code the breakup point
- Code/adjust the mobile version
- Test the mobile homepage

Coding a section page

- Create the section page containers structure
- Integrate the interface elements
- Integrate the main navigation
- Test the interface

- Code the breakup point
- Code/adjust the mobile version
- Test the mobile homepage

Producing the alpha version

- Duplicate the section page as many times as needed + rename them (to get all the needed pages)
- Create content pages if needed
- Integrate the main title in each of the section and content pages
- Update the navigation
- Test the desktop and mobile versions (Alpha testing)

Final project (alpha) :

Create the Alpha version of the website project

CLASS 9

Beta version

- Fine tuning of the homepage

Mobile first approach

- It is easier to add content than to remove it
- Starting with the mobile content integration first
- THEN creating media queries to add desktop content (hidden to mobile)
- THEN make adjustments to the desktop version

Content integration

In one section page

- Create and style the headings and captions
- Create and style the body text
- Integrate and style the images and legends

In all section page

- Integrate and style headings and captions
- Integrate and style all texts
- Integrate and style all images and legends

Final project (beta) :

Create the Alpha version of the website project

CLASS 10

Revision

Workshop

CLASS 11

Handle final version of the website project

Final exam

Given contextual details, format and material (text and images), and using Photoshop or Illustrator, students create the design of a web site's homepage and section page.