LECTURE 1

What makes a good or bad experience? <- answer in diary

How easy is it for a user to pick up, if a design is difficult to use and seems like it requires pre-knowledge it can create a bad non-inclusive experience.

Does the user feel that the time they spent on the product was a waste of time? For example imagine 2 websites that allow for file compression, if one website takes 15 minutes to finally get working and another website is a simple drag and drop, the user would feel a mix of emotions, horrible feeling of wasted time from the first one but a sense of relief they finally found the second one.

Is the user overwhelmed at any stage? When a website in particular has many re-directions, everything is thrown at them it can create both a frustrating and unpleasant experience. If tasks are over-complicated and re-direction is confusing, it can create a bad user experience

Example of good user experience

Twitch.tv, the website is very intuitive even for first time users, nothing is thrown at the user and re-direction will always have a standardised home bar at the top so that they can always navigate regardless of where they are. So even if a user somehow gets lost around the website they can go to somewhere familiar from the home bar eg. Home page/browse channels/browse games

Example of horrible user experience

Sony vegas pro video editing software

A lot of the features supplied to the user comes with a hurdle of learning how to use, for a user the product they spend money on should be intuitive and help the user pick the right options, having a learning barricade behind products we purchase causes a irritating and unpleasant experience

So many different effects to chose from and timelines that it just gets overwhelming for a user trying to learn

TOO MANYYYYYYYYYYYYY OPTIONS

Important design principles

Affoardance -> what is the intuitive purpose of an object

Button -> push button

Chair -> sit on chair

Rubbish -> throw away remove

Visibility

Feedback

Constrains -> physical/semantic/cultural

Semantic – logically thinking

Cultural – the car on different side

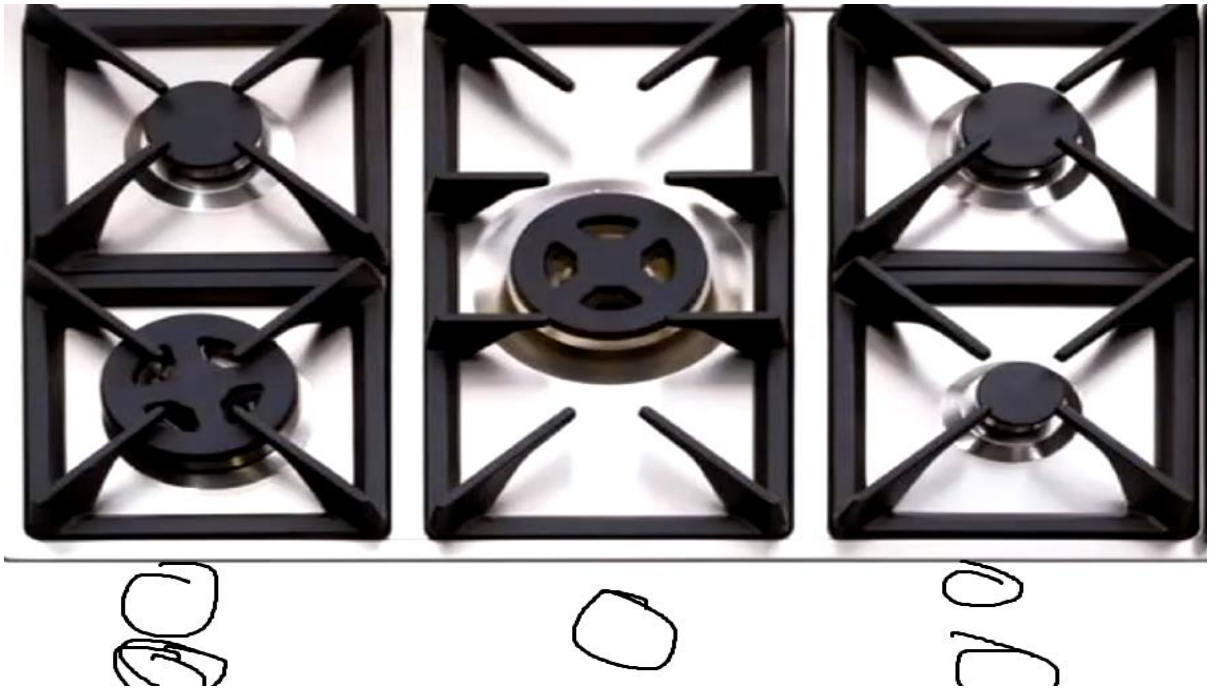
Physical – literally fences

Logical constraints -> sort of semantic, make it for a user to use their common sense to use the product. Where do things go?

Mapping -> grouping so that it is familiar to a user

DON'T MAKE USERS DO TRIAL AND ERROR TO FIGURE STUFF OUT

DESIGN DIARY -> DRAW BETTER MAPPING OF THE STOVE TOP!!!<- date 25/07/2018



10 usability principles

- Visibility of system status
    - Is there sufficient feedback telling the user what it is doing
    - Low delay with meaningful feedback
        - If an action is instant no feedback required as it is instant!
        - If an action takes ~1 second, then provide some hourglass or idle feedback
        - If an action takes longer than 10 seconds the user should have freedom to perform other tasks in the background eg. Uploading files on youtube lets u edit description/tags/etc.
- Match between system and real world
    - Avoid jargon, you are communicating to users! Make things familiar eg. Recycle bin has bin icon, not some command! Icons should be meaningful
- User control and freedom
    - User wants to feel like the king he wants control over interaction, DON'T GIVE TOO MANY OPTIONS THOUGH
    - Let users go back to previous step incase of mistakes with undos/back buttons
    - No unpredictable and automated actions from system which will confuse user, eg. Click on a link to browse videos and you are not sent to a list of videos!
- Consistency and standards
    - Users have used similar applications before (assumed) eg. If you are making an online retail shop you can assume the users have used sites previously like amazon/ebay etc. and they have their own perceived understandings
    - Need to know the expectations of the users! User centered design
    - Don't use different terminology, and make sure the site is consistent so that when you are going from page to page you are not confused, actions/sequences should follow same patterns!
    - Eg. Login right hand side/browse left hand side!
- Help and documentation
    - Information can be easily searched however don't provide too much make it just enough

    - Don’t overwhelm users!
    - Allow multiple steps to help
- Help users recognise/diagnose and recover from errors
    - Users need to understand what caused the error
    - Describe the error in laymans term
    - Provide steps for recovery from the error
    - Make errors not feel irritating, humour/quirky and add suggestions
    - Don’t make a mistake piss off the user
- Error prevention
    - Provide ways to stop users from making errors
        - Label stuff!
        - Spacing from controls
    - Make it clear what we expect from the users to prevent program errors!
- Recognition rather than recall
    - We are better at choosing an option rather than asking for exacts!
    - Make things visible
        - Example the font in word is given in the font, users don’t know the exact font but they can recognise fonts!
    - Icons! Unix vs GUI
- Flexibility and efficiency of use
    - Really easy to learn hard to master
    - Want to have a core that allows you to perform functionality
    - Allow quicker options that are hidden from novices to not overwhelm them however available
        - Eg. Ctrl + c to copy instead of right clicking copy
        - Ctrl + z to undo
        - League of legends changing keybinds through the .json folder rather than ingame
    - In all the examples there were multiple approaches with the same destination, one was quicker but the quicker one was hidden to avoid confusion!
- Aesthetic and minimalist design (important!!!!)
    - Leave out un-needed information
    - Design to give pleasure by keeping things simple and only keeping relevant informations
        - Eg. Google super simple! Just icon, search bar and 2 buttons

DESIGN DIARY come up with an example of good design and an example of bad design can be ANYTHING!!!!!!!! Also post in forum (already did this) use the heuristic analysis we have from here example from my own experiences

LECTURE 2

Look at existing designs, and talk to users!
Don’t just make assumptions! Think realistically.
Assumptions and claims made about 3d TV

- Cost wouldn’t be too big a deal
- Glasses people don’t mind
- Claimed better quality

Conceptual model

- Apple took PC -> stuck it into phone added GUI
- Internal! Backend

- If user can't sort of guess how the system works they can't understand how to use it properly!
- IMPROVE ON EXISTING IDEAS take something that exists maybe problematic and can be improved and make it better -> ledger sheets to spread sheets!

Interface metaphor
- Something that exploits user knowledge to help them understand something unfamiliar
- Sort of like when you guess based on past experiences!
- Makes learning new systems easier and can help with making it more accessible to more people.
- It can constrain designers in the way they think of a problem space
- Forces users to be familiar with previous knowledge

Conceptual models
Three components
- Designers mental model
- System created by designer
- Users interpretation of the model from interaction

We want to create a system that allows the users to know how it works! Remember we are creating stuff for people.

If someone goes to buy something that LOOKS like a sports car but doesn't have sports car functionality you'll annoy the user.

Good conceptual design articulates the designers conceptual model in the system image.

Universal access
- The power of the web is in its universality, access by everyone regardless of disability, is an essential part
- All people to have equal opportunity to access a service or product regardless of social class, ethnicity, background or physical disability
- Disabilities
    - Visual
    - Auditory
    - Physical
    - Cognitive/learning
    - Literacy
- Technology
    - Slow connection
    - No sound card
    - Older browser/technology
- Accessibility is making a user interface perceivable, understand for people with a wide range of abilities (and operable)
- Accessibility support is the technology to make this all possible.
-

Personas Vs scenarios as design tools
- Capture user characteristics
- Not real people synthetic
- Based on user research
- Give them a name goal and personal background

- Scanerios are just stories
- Persona describes attributes of a person while scenarios describe activities.
- Don't tie scanerios to technology
- High level description of tasks that they are performing
- Sequence of information exchange, actions and results.
- Help see possibilities don't bog down in the details

Assistive technology

- Screen readers
    - Software used by people who are blind that interprets what is on the screen in text
- Screen magnification software
- Variety of keyboard/moose options
- Sip and puff interface
- Tapgram
    - Communication platform that makes it easy to make messages without a keyboard all tap based
- Voice recognition software
- Braille displays
- Eye typing
- HUGE AND GROWING MARKET!!!

Why accessibility is important

- Over 18% of Australians have a disability
- 10-20% in most countries
- ALL POTENTIAL CUSTOMERS
- Accessible sites are more usable for all users
- Disabilities increase with age
- Legislation mandating accessibility
- Websites have to be accessible by all
- Anti-discrimination laws
- Socog case study.
    - All they needed was alt tags. For accessibility.
    - They refused to fix this issue and were fined $20,000

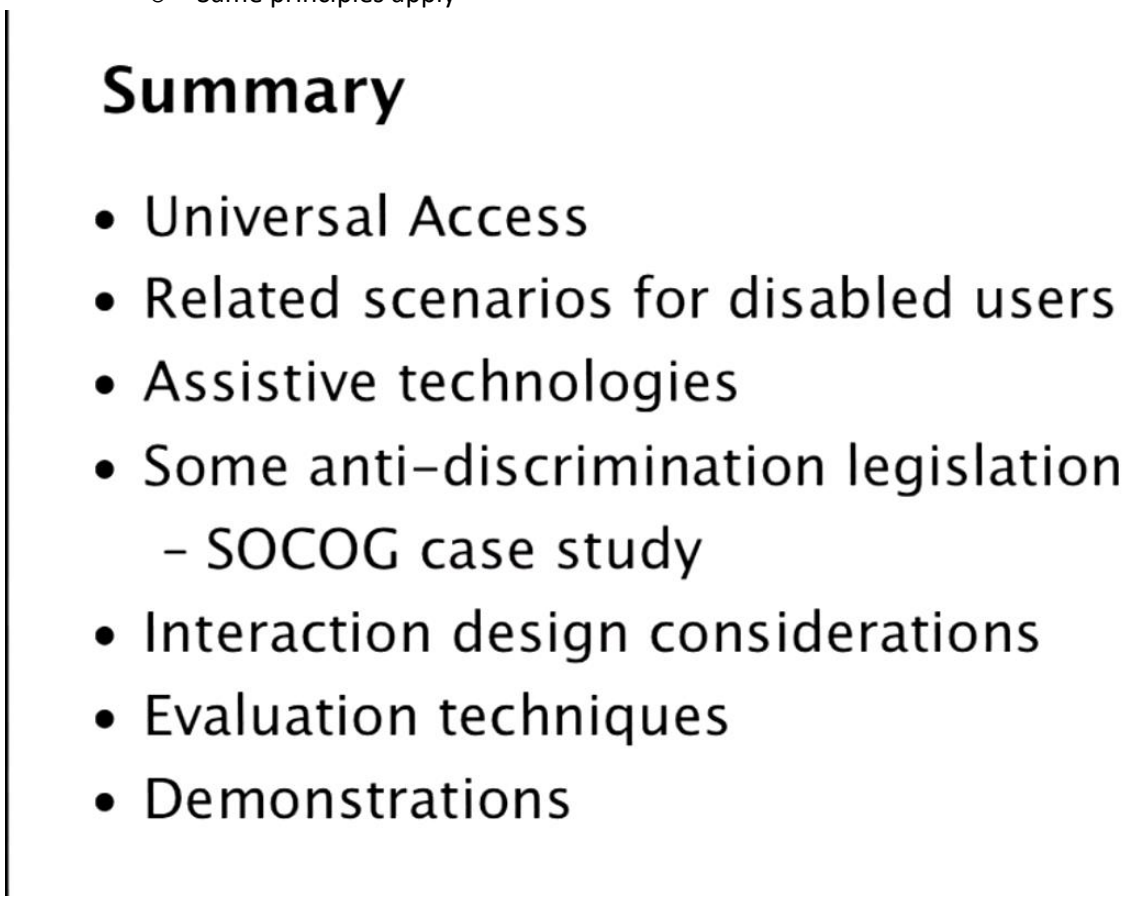
Accessibility interaction design considerations

- Labels and controls
    - Make sure its all properly places with place holding characters
    - Make sure table have proper headings
- Screen flickering
    - Allow users to control flickering or just don't have it → epilepsy just don't use blinking text
- Frames
    - Each frame needs a title
- Keyboard shortcut for important links
- Good summaries for table
- Pop ups → reduces accessibility
- Text equivalent for every picture/ non text element
- ALT tag* style written
- A long description can be used

Eveluation techniques

- Validation tools
    - W3C validators
        - Checks for conformance to W3C layout
    - accessibilityOZ

        - returns a report
    - WAVE
        - Shows errors
    - Web accessibility checker
        - Checks a single page url for errors
    - W3C is the world wide web consortium which has guidelines + standards
- Human review methods
    - Make the website bare bones
    - No sound
    - No style sheet
    - No graphics
    - Does it still work?
    - Check colour constant viewing in greyscale
    - Try different browsers
    - Font sizes check
- Cascading style sheets
    - Used to create visual appearance independent of the content
    - Can the website support this? -> styles provided by author!
- Usability testing
    - Consider and involve a range of user types
    - Get different types of users involved
    - Same principles apply



INVERT COLORS ON MY MAC NOW OMG SO OP

LECTURE 3
Design is iterative, always improve and repeat → idea to product
Pre-design stage, gathering information about the users
As the project evolves we move from the creative side to the business side.
Ultimate goal is to develop products that helps users achieve their goals.
Bring chaos to order.
To gather information from users we can

- Questionnaire
- Interview users
- Interpret information gathered

Bad first impression → users never come back so make it count
Scientific method

> Results/conclusions --> hypothesis --> experiment -->results/conclusions etc

Design method

- Observe and analyse
  - Identify needs and requirements
- Envisage and design
  - Develop alternative designs
- Evaluate and refine
  - Build interactive versions

The best way to get good ideas is to get lots of ideas

Product description statement, in 30 words or less tells users the goals and aims of the product. A small summary for the users. Sets a direction.

People

- Direct users → primary
- Indirect users → secondary, don't use application but get informations about it
- Other stakeholders → teritiary, get benefit from product or application

Indirect users' people who get output from the product

- Those who manage direct users → management
- Those who receive output from product → administration
- Those who make purchasing decisions

Other stakeholders' people who indirectly benefit from the application

- Library
- Lecturers
- Executives
- It support
- Support and training staff
- Professional services
- Community

Design team – facilitating

- Interactive designer, generates and synthesis the ideas
- Visual designer
- Industrial designer → coder
- Team leader → me xD

Understand the users!
Three types of users

Raiding!

- Casual users, use it time to time → casual raiders
- Business users, use it for profit → raid sellers
- Power user, uses product frequently → qT

Interview target market rather than just friends or family. Pick target population to test!

Data gathering

- Questionnaires
- Interviews
- Focus groups
- Natural observation
- Study groups

TALKING TO PEOPLE,
interview

- Structured/unstructured

Focus groups

- Gather a bunch of users to get opinions and collect data

Interview process

- Being prepared beforehand so you can know what you want to say and what u want out of it
- Remember capturing technique for data, audio/video/etc

Questionnaire surverys fml

- Develop set of questions to ask users and stake holders
- More people we talk to the better
- Is there a need to analyse the data in the questions.

Natural observations

- In controlled environment perform task
    - Think aloud technique
- Indirect observation by seeing what they do when doing task

Think aloud technique

- Observation technique
- User verbalises their thoughts as they interact with the system
- The facilitator listens and takes notes
- Gathers a lot of user comments about interaction however it is unnatural
- People don't naturally speak all the time so facilitator can prompt them to keep talking if they stop, with queues
    - "what are you thinking about now?"
    - "Describe what is on the screen?"
    - "what should happen now"
    - "Thoughts"

Facilitating think-aloud protocol

- System to test
- Facilitator + diary
- Participant
- Note taker
- Recording equipment
- Ethics + privacy bro

It's a formal process involving consent. Explain the objectives and give the participant a task scanerio. Describe the goal but don't give them the tasks.

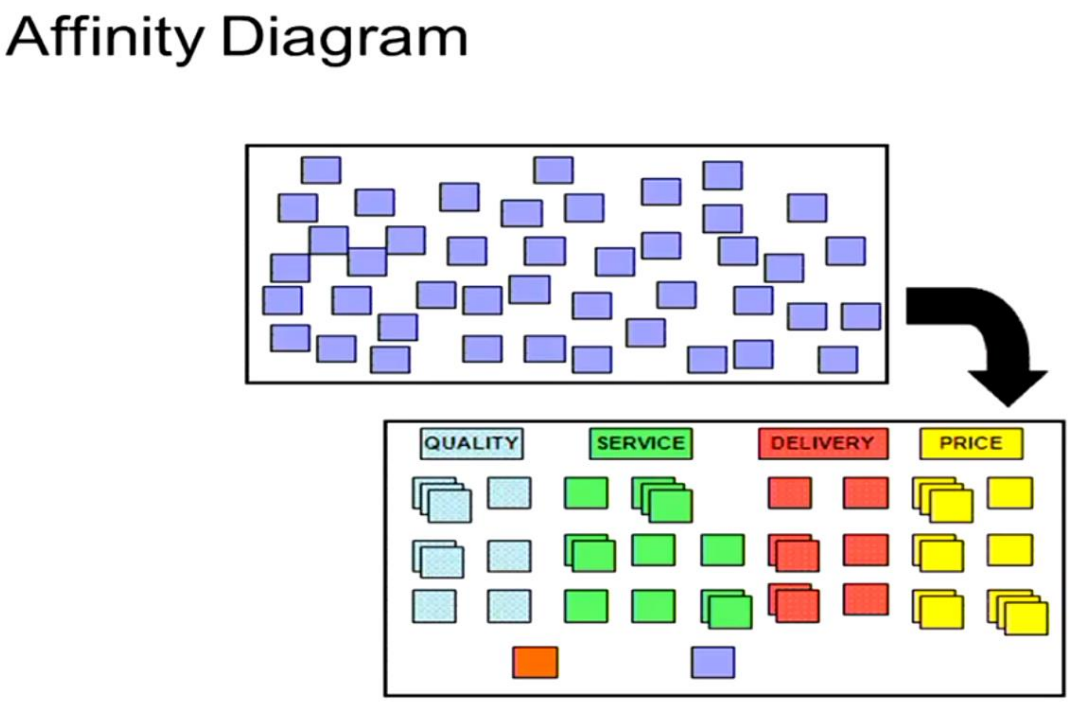
When you observe

➔ LISTEN DESIGN LATER ONLY LISTEN

- ➔ Prompt to keep thinking for silence

Ask appropriate questions. Take notes on what the user is doing what they are doing etc.
BUSINESS IDEA??
Have an eye tracker app that notices user interaction with website, see when and where they are looking to gather their natural response i.e what they first notice etc.

Affinity mapping helps us plot our data, organising data
Helps catagorise and group ideas
Categorise groups and ideas
Talk about the ideas



Affinity diagram organizes a larger number of ideas into their natural relationships and patterns
Grouping ideas!
Use posted notes or just fucking use trello

We need to create a personas → a fictional person that represents the categories of the data
Think of someone with a life who would use the product
Narrow down on a group of users, the more bloated features the more expensive and harder to grasp.

Personas

- ➔ First do research on user group
  - Marketing-targeted personas that model purchase motivations
  - Interactive personas usage motivation
- ➔ Give them
  - Age/demographic
  - Gender
  - Name
  - Age
  - Photo
  - Goals aims

- Online activity

This helps us create a believable character to put everyone on the same page so we all know who we are designing for.

How many personas depends on features of interface and complexity of the product

- ➔ How nmany features
- ➔ How many stake holders?

Personas create empathy to guide design but disappear when they aren't believable.
Scenarios

- ➔ Need a story for our persona, background life story
- ➔ Give our persona context

Developing scenarios

- ➔ From your analysis might see trends

Create scenarios that imagine ideal user interactions
Scenarios then define the requirements
Using requirements we define the wireframe
Fill the framework with design details

Three types of scanerios
Context scenario → the main one!!
Key path or task scenario → revised version of context scenario
Validation scenario → used to test product and system, what ifs etc.

Context scenarios

- A day in the life of a user
- Narrative form, a story
- Explain goals and needs
- Not technology specific
  - Don't talk about actions or using a specific technology or system behaviours
  - LIFE STORY A DAY IN THE LIFE OF M3M3S
- High level description of tasks that they are performing, don't be specific about interface details no "they pressed button labelled …."
- Focus on user not systems
- Need to be compelling and believable not bogged down in details

Context provides a snapshot of critical points of user interaction
Helps to get into user shoes and see their workflow

Template

Persona -> who
Action (user) -> what
Sequence -> when
User goals -> why
Context -> where

Task analysis

- Don't focus on superficial activities but on
  - what are people trying to achieve
  - Why are they trying to achieve it
  - How are they going to achieve it

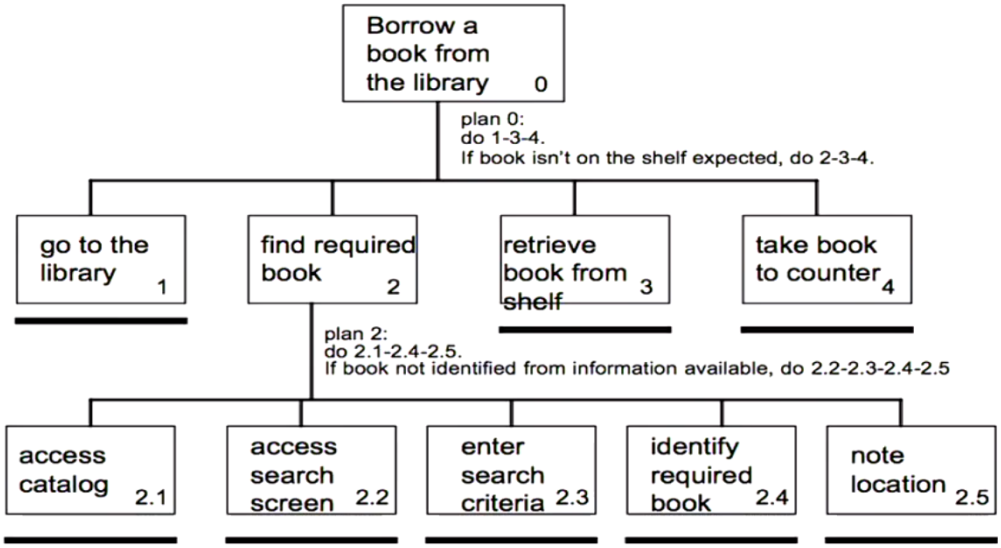
Hierarchial Task Analysis

- Breaking down a task into subtasks and then so on and so on → divide and conquer

- HTA focuses on physical and observable actions and looks at actions not software or interaction devices

Borrowing a book from library → HTA

1. Go to library
2. Find the book
    a. Aaccess catalogue
    b. Access earch screen
    c. Enter search
    d. Identify book
    e. Find location
3. Go to correct shelf and retrieve book
4. Take book to counter



Doesn't scale well to complex tasks
Cant model parallel or overlapping tasks
Cant model interruptions in task

Interaction design is much more than visual look, psychological!

Ethics + Privacy
The information gathered from design process can be personal or sensitive so it must be non disclosed without their consent.
We often record information as transcripts or audio recordings or video recordings
Treat information with utmost care respecting ethics and privacy
There are privacy laws to take into consideration
There is to be no coercion

- No pushing or persuading to do something by force or threats
- Should be voluntary and concenstual

Research context

- Need participatnt consent
- Assure confidentially of the participant so they remain anonymous
- Too much information to participant could effect the results

- Too little could be misleading and unethical

According to the American psychological assosciation guidelines, deception is permitted only if the following conditions are met

- The research is of great important to society and cant be done without deception
- Participants can be expected to find the procedures reasonable once they have been informed after the experiment
- Participants may withdraw at anytime
- Experimenters debrief participants afterwards explaining the purpose of the study and removing any stressful after effects.

During user feedback session we must

- Ensure that the participant understands the purpose of the session and exactly what kind of observation and recording is taking place
- Ensure the participant that there is no judgement or performance ands that they are comfortable

We need consent form before a study/interview from the participant
Ensure that the pariticpants identity remains confidential
Allow the participant to terminate the session at anytime

Consent form – main points
Introduction

- Describe the study

Body

- Description of any recordings or observers
- Data use
- Contact

Conslusion

- Signatures

Example data use
The data recorded can be used for

- Analsysis to review interactions after the session
- Documenting the findings of the sessions
- Providing feedback
- Training purposes

Signatures and initials

- In all interviews/user sessions only initials are required from the participant, not a full signature on documents
- For the consent from you need a signature
- Once the course is over you must destroy the consent forms

Before

- Plan the interview or session in advance and develop a written protocol of what will be achieved in the session
- Consider the duration of the session
- Prepare the consent documentation
- Prepare any other documentation
- Find participants

During the session

- Welcome the participant
- Make them feel comfortable
- Give an introduction to the purpose of the session
- MEMESSSS
- Provide an opportunity to ask questions at all times

- Provide and complete the consent form (2 copies) → slide it in the dm
- Let em know its chill af
- Inform them their their participation is voluntary and they can terminate at any time
- If it's a user interface we are testing don't give too much detail on how to complete tasks
- Be polite but meme
- If an interview provides answers to any of their questions
- Be conscious of time

After the session
- Provide an opportunity for the participant to ask questions
- Ensure them they have a copy of their consent form
- Thank them
- Analyse the results
- Prepare for the next interview

Online quiz

- Available from week 4 onwards in Moodle
- Please review this material
- Read the web links on ethics
- Complete the online quiz
  - There is a delay between attempts
- You cannot conduct any interviews unless you have correctly completed the online quiz

Academic ethics
- We can promote ourselves and our work within reasons
- We can't lie or mislead

LECTURE 4
Functional and non-functional requirements
Requirements are functional and non-functional
They are also specific, and non-ambiguous
It is an iterative process and will be influenced by data gathering.

Functional requirements
- Refer to specific behaviours or functions
- What the system is supposed to do

NON functional requirements
- Qualities of a system – usability, accessability
- How a system is meant to be

Requirements are specific and non ambigous
Iterative process and will be influenced by data gathering

What comes first??
non-functional requirements come first as they set the foundations and business value for the project.
Examples of non-functional requirements

- Things important to user
    - Performance
    - Security – privacy
    - Usability – easy to learn
    - Compatibility
    - Accessibility – available to use for all people regardless of disability
    - Flexibility
    - Disaster recovery
- Things important to team
    - Maintainability
    - Portability
    - Reusability
    - Testability
    - Naming convention
    - Tech stack
    - monitoring
- Things important to the business
    - Time to market
    - Cost
    - Flexibility
    - Speed

Data Gathering

- Questionnaires
- Interviews
- Focus groups and workshops
- Naturalistic observations → observe people in their natural environment
- Studying documentation

Product description statement

- 30 words or less
- Describe what the product will do to meet the user goals
- Trilogy (purpose)
    - Align
    - Define
    - Care

Keep it short and precise so we know what we are making straight away

Components of an interface can be broken down into 3 parts
Information design, interaction design and visual design

Information design

- Meaningfulness and usefulness of information
- Structure of data
- Heirarchies
- Relationships
- Discover how information is used
- What elements constitute a meaningful peace of information

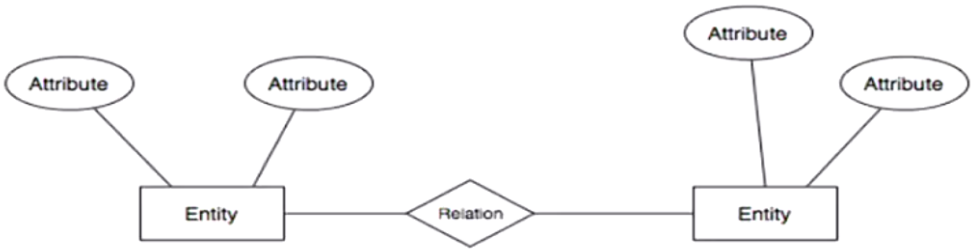
- How information is combined at different stages of the process
- Formulated as the requirements of the system are discover
- An existing paper based system will reveal the groups of information that need to be present in one place to make a meaningful unit of information
- Involves talking with the users of the system

Talk to user see if it makes sense, user is at centre of design process

Entity relationship diagramming

- Entities
  - Nouns
- Relationships
  - Verbs
- Attributes
  - Properties of the entity

ERD



-

Or UMLS I love UML DADDIES
Use cases too!

Forms of a prototype

- Paper mock up of screens
- Storyboard
- 3d object
- Electronic mock ups

Evolutionary prototyping

- Each piece of prototype is a piece of the final product → dangerous, especially with throwaway prototypes → not financially feasible
- Throw away prototype
  - This cant go into production systems

The process of prototyping is iterative
Communicate the aspects of the current design

Low-fid → high-fid seng
Horizontal + vertical prototyping
Horizontal – broad lots of functions
Vertical – analyse specific functions deep

Table 8.1 Relative effectiveness of low- vs. high-fidelity prototypes (Rudd et al., 1996)

Type	Advantages	Disadvantages
Low-fidelity prototype	• Lower development cost. • Evaluate multiple design concepts. • Useful communication device. • Address screen layout issues. • Useful for identifying market requirements. • Proof-of-concept.	• Limited error checking. • Poor detailed specification to code to. • Facilitator-driven. • Limited utility after requirements established. • Limited usefulness for usability tests. • Navigational and flow limitations.
High-fidelity prototype	• Complete functionality. • Fully interactive. • User-driven. • Clearly defines navigational scheme. • Use for exploration and test. • Look and feel of final product. • Serves as a living specification. • Marketing and sales tool.	• More expensive to develop. • Time-consuming to create. • Inefficient for proof-of-concept designs. • Not effective for requirements gathering.

Advantages and disadvantages of low fid/high fid ^^^^^

High fidelity prototyping

- They take too long to build
- Reviewers and testers tend to comment on superifical aspects rather than content, eg. Look
- Developers are reluctant to change → time investment

In favour of low fidelity prototyping

- When a software prototype can set expectations too high
- Just one bug in high fidelity prototyping this can bring test to a halt

Prototypes are based on

- Product objectives
- User research
- Scenarios
- Information design

Storyboards

- Sequence of interactions will be an important tool in design process
- Screen layouts will be used in the images

Evolution

- As we understand more about users, we will understand the priority of competing goals
- High priority scenarious are very important factors for success, this is a key path scenario

Scanerious will help validate the design, we read and compare to original goals

Design patterns

- Common user interface elements used in user interface design
- Design patterns can be thought of as a solution to a problem with no specifics → java bro

Common characteristics of interviews and questionnaries

- Has to involve planned questions
- Involve sampling
- Describe characteristics of a population of interest
- Need clear set goal
- Not useful for an exploritoy research where still under development

Interview techniques

- Consistency is key
    - Same questions, same wording, same order
- Avoid leading questions such as “many people ___ with function ___, do you?
- Avoid jargon and long questions
- Don’t embarrass the users
- Need accurate record of interview
- Need to make the participant feel comfortable
- No right or wrong answers
- Written consent needed and sometimes ethics approval

Running interview

- Introduce yourself, explain goals reassure about ethical issues, ask to record, present consent form
- Warm up, and make first questions easy and non threatning
- Main body, present questions in a logical order
- A cool-off period, include a few easy questions to defuse tension at the end
- Closure, thank interviewee, signal the end

Types of interview

- Unstructured
    - Open-ended questions, process not predetermined, can’t be replicated
    - Generates rich data but it is difficult to analyse
    - Eg. Tell me about experience using _____
- Structured
    - Pre-determined questions, closed ended questions, standardised, replicable but lack richness
    - Used when study goals are clear and need a pilot study
    - Eg. Which function did you find most useful and provide multiple choice for user
- Semi-structured
    - Both closed and open ended questions, start with pre-planned questions, and probe for more details
    - Broadly replicaable, provided balance between richness and analysis capabilities
- Group interviews
    - Multiple interviews at once
    - Access to more participants and participants are less intimidated, and build on each others ideas
    - More difficult to setup and require skilled facilitator to keep interview on right track

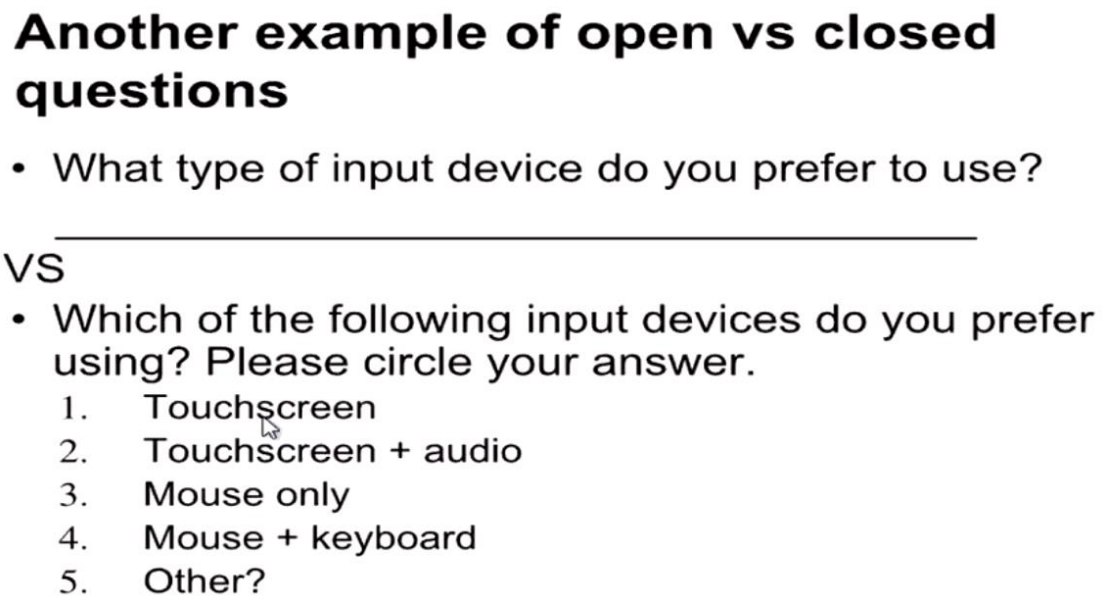
Open ended questions

- What do you think of ____
- How often do you think you use _____
- What are your favourite websites for _____

Close ended questions

- Yes/no questions
- Multiple choice
- 1 option

Only ask necessary questions, all questions must have purpose



Focus groups

- Type of group interview used in social science research
- Involves 3-10 users chosen as a representative sample of target market
- Trained facilitator
    - Guides discussion
    - Preset agenda, however unanticipated issues can be explored
    - Prompt less active participants
    - Discourages verbose pariticpants from dominating
- Allows diverse and sensitive issues to be raised
- Enables people to put forward their opinions in a supportive social environment
- Can be used in requiremenet gathering to identify conflicts in terminology or expectations from different users

Interviews

- General considerations
    - Do peoples reported behaviour correspond to actual behaviour
    - How representative is the sample
    - Were respondents interviewed together or separately
    - How do these impact on the results

Personal interviews

- Good control over sequencing
- Unclear questions and answers can be clarified
- More details obtained
- More costly
- Interviewer bias

Telephone interview/questionnaires

- High response rate
- Easy to administer
- Participants are more accessible
- Less personal
- Interviewer and selection bias

Mail questionnaire

- Good for highly personal topics

- Has to be completely self explanatory
- No control over order survery is fileld out
- Response bias
- Some people don't send it back

Online questionnaire

- Reach large numbers quickly
- Lower costs – no copying and postage
- Data analysis is qiuicker and easier
- No control over order
- Response bias
- Email – limited to text
- Web based can include graphics/help secreens and enforce rules

Questionnaires

- Similar to a structured interview
- Can have closed and open questions
- Can be distributed easily to large number of people
- Less personal, may be more difficult to get subject participation
- Can be paper based or online
- Sampling can be a problem with the size of a population unkown

Questionnaire construction

- Steps involved in preparing a questionnaire
    - Decide what we want what information e want
    - Decide type of questionnaire to be used
    - Write a draft of the questionnaire
    - Re-examine and revise the questionnaire
    - Run a pilot study to see if it makes sense to small sample
    - Make changes and specify the procedure for use
- Order of questions is important because users might leave based on early difficulty etc.
- Wording must be chosen carefully
    - No ambigous or offensive words use familiar words no jargon
    - Words used can effect responses, avoid leading questions
- Free response vs closed questions
    - Free response -> easier to consdtruct + more flexible however more difficult to analyse
    - Closed -> have a predetermined answer + format, easy to write/make, however restricts user response
    - Layout
        - Easy to understand /fill out
        - Make asthetically pleasing
        - Include numbering, balance needed between htie space and keeping questions compact
        - Procide clear instructions on how to complete the questionnaires
        - Avoid long sentences – split compound sentences into two
        - Keep it short and simple

Question/response formate

- Yes/no checkboxes
- Checkboxes that offer many options
- Rating scales
- Open ended responses
-

Avoiding biases

- Use a simple checklist of adjectives, user selects 5

Observation

- Direct observation in the field
    - Structuring frameworks used to guide observation
    - Degree of participation (insider/outsider)
    - Ethnography, which is where observers immerse themselves in the culture that they study
        - Direct observation in controlled environments
            - Think-aloud technique
        - Indirect observation: tracking users' activities
            - Diaries
            - Interaction logging
    -

Sample structuring framework to guide observation

- *Who* is present?
- *What* is their role?
- *What* is happening?
- *When* does the activity occur?
- *Where* is it happening?
- *Why* is it happening?
- *How* is the activity organized?

Recording data

- Using notes/audio/video/photographs
- Notes plus photographs
- Audio plus photographs
- Video

Key issues when data gatheiing

- Setting goals
    - Decide how to analyse data once collected
- Relationship with participants
    - Clear and professional
    - Informed consent
- Multiple approaches
    - Gather information/data using more than one approach
- Pilot study

- Testing the waters

Choosing and combinging techniques
Depends on

- The focus of study
- Participants involved
- Nature of technique
- Resources available

Ethnography

- Time consuming + expensive tho
- Ethnography is a philosophy with a set of techniques that includes participant observation as well as interviews, questionnaires and studying artifacts.

Paper prototyping

- Different levels of fidelity
- Different stages of design require different requirements/fidelity

Fidelity refers to how close a prototype resembles final product
Several stages

- Scoping
- Planning
- Sketching
- Testing

The beginning of Twitter...

Pros of paper prototyping

- Everyone can draw
- Focused on user testing
- Easy and fast iterations
- 100% uptime during testing
- Inexpensive
- Low intimidation

Cons of paper prototyping

- Less useful near end of a production cycle
- Cannot convey specifics as well as electronics
- Can't do proper timing measurements
- Doesn't account for same level of interactivity
- Rudimentary for working models
    - Electronic prototypes and actual system need to be eventually built

Be creative when simulating prototype

Paper prototypes are

- Easy to change
- Easy to test concepts
- Can re-run testing over and over very quickly

Cognitive psychology

- Refers to all process where sensory input is trandformed, reduced, elobrated, stored, recovered and used

This is the yanny + laurel situation,

Three major branches in cognitive psychology

Experimental cognitive psychology

- Involves empirical work on normal subjects

Cognitive science

- Combine experiementaion + computational modelling of human cognition
- Use either neural network or production systems

Cognitive neuropsychology

- Tries to map the relationship between dirretnt parts of brain and speicifc processes

Why we need cognitive psychology?

We need to take into account cognitive processes and limitations.

We can't expect users to remember a long sequence of actions, but they can recognise an action they learnt

Also help identify and explain nature and cause of problems

We want to know the strengths and limitations of human cognition so we do not cognitively overload our users.

Helps identify what people are good and bad at

Information processing approach

- The acquisition, storage, retrieval and use of information involves a number of separate stages and process arpproach attempts to identify what happens during these stages.
- Inspired by computer metaphor, ram short term, hard drive long term, cpu proccessing

Cognition is reffered to as the acquisition of knowledge. How users learn

Cognitive processes overlap and don't occur in insolation, eg. We multi-thread the processes

Overview memory

- Sensory memory
    - Preserves information in original sensory form for a very brief period of time
    - Echoic or auditory memory has similar limitations
    - We can store up to 12 items up to a brief period of time, and drops off rapidly
    - Give users right context so they can see what u want them to see, don't want users to be like wtf am I looking at
- Perception memory
    - Refers to hwo information is acquired from the environment, based on context
    - The way the information is presented effects how we perceive the information

    - The whole is more than the sum of the individual parts (your rank in league is sum of all your skill-based components, but your whole is more important)
    - Colour can be used to imply belonging/grouping, useful for search tasks/identifications. Too many colours will be bad though! 4-5 at a max.
- Attention memory
    - Attention is a very limited mental resource
    - Used to cut out background and focus on something
    - The more automated a process is, the easier it is for users to get their attention
    - Attention is not all or none process, however it is filtered to focus on one thing
- Multitasking and attention
    - People who multi-task are much easier distracted
- Spacing
    - Spacing information can make it much easier to recognise what they are looking for important!
- Attention grabbing techniques
    - Pop ups, colour, bold,underlining,animation,flashing text however too much can be very negative and piss people off
    - Important information should be in a prominent position
    - Information extras should be displayed on request to avoid cluttering interface
    - Reminder prompts should be displayed for routine background tasks
- Automatic processes
    - Processes that are highly practiced and require little or no attention are referred to as an automatic process, e.g. Typing or spelling or reading, can be done while doing other things, effortless and fast and difficult to suppress once learnt.
    - Parallel in nature and is not affected by working memory load.
- Controlled processing
    - Needs conscious attention
    - Slow and easily established, easy to alter or reverse
    - Is under conscious control
    - Serial in nature
    - Dependant heavily on working memory load
- AUTMOATE THE BASIC SKILLS

Being an expert with a domain involved automatic basic skills and processes
Highly practiced skills are often difficult to suppress eg. A key press sequence
Short term or working memory

- Often reffered to as consciousness
- Short term memory is limited in both capacity and duration
- Span of attention – the largest number of items one can recognise in a single glance
- Memory span – the number of items one can remember after reading a list once
- Grouping (chunking) helps us increase our storage. We can alter the size of items stored!
- We shouldn't expect the user to process large amoounts of information simultaneously or overload their memories with complicated procedures for carrying out tasks

Working memory

- Temporary storage buffer for processing current information
- Modern conceptions
- Focus on memory being active moving from short term to long term memory
- Switch from a computer metaphor to a brain metaphor
    - Phonological loop
        - Store and rehearses speech or auditory information
    - Visuospatial sketchpad
        - Allows people to temporarily hold and manipoulate visual imagery

    - Central executive processor
        - Controls the operations of the working memory

Encoding

- Maintenance and rehearsal – information is reheasrsed at a superficial level, repetitions without thinking
- Elaboration – information is rehearsed in terms of meaning and is linked to other stimulus, eg. Using an example xD or metaphors etc.
- Organisation – material that is well organised in terms of meaningful groups or categories will be better encoded, take notes on ur own, the process of my own notes helps with encoding

Retrieval

- Context and emotional state
    - Serve as cues in retrival of information
    - Context -> can be both the physical situation or related information
    - Try to remember a lecture/exercise during problem solving
- Tip of the tongue phenomena
    - We know what it is but cant retrive it exactly, we can kind of get 30% of it
    - We store information in long term memory in both visual and exact meanings
- Recall
    - Involves retrieving information from memory eg. Writing a short answer question
- Recognition
    - Involves selecting previously learned information from an array of options eg. Multiple choice
- We are better at recognition over recall ! HEURISTICS BOII

People are good at remembering visual queues rather than arbitrary data
Linux based on recall vs GUI on recognition
People who are experts can automate recall! Experts though eg. Writing command lines
Use retrieval cues for user
Meaningful naming convensions

Retrieval applications

- When training one should try to make context and cues similar to the real thing so it is a lot more easy to rmemeber
- Provide users with many ways of encoding information so that it can be easily rmemeber.

Organization of knowledge

- Schema
    - Cognitive structure in memory that allows us to organise information according to how it will be used
    - Used to filter,organise and process large amounts of information quickly and economically. Eg. Alphabet is a schema, 2 people hand writing different but we can recognise writing from the alphabet schema
    - Schemas aid learning, remembering, understanding and problem solving
    - Mental model
        - The idea people themselves have user expectations
        - People see SMS as instant, however network congestion could be xD
        - Bottleneck xD

Memory is a reconstruction

We need to activate right appropriate background knowledge when trying to identify unfamiliar material, eg. Titles
Incorrect mental model

- Smashing keyboard expecting something to go off xD

When users have a better mental model of application, they can interact much better with the system

Improving memory

- Elobaration
- Orgnaising materials
- Automating skills
- Chunking
- Imagery
- Summaries which help make key points more memorable
- Advanced organiser provider an introductory framework which users can use to interpret new information
- Other mnemonic devices eg.
    - ROY G BIV for spectrum acronyms
    - Stories

Termonology used during an interview can impact on the answers you are given
Eg. Using hit vs smash can effect ur perception of what is happening, don't rely on peoples recall too exactly

Summary -Cognitive Psychology

- What is cognitive psychology?
- Three major branches of contemporary cognitive psychology
- Relevance of cognitive psychology to human computer interaction (HCI)
- The information processing approach

Problem solving in HCI

- New users of an application solving problem of how to use application

We have an initial state
Goal state and operations to perform
Think of A* bro, think of different states! And different paths
Problem solving strategies

- Sub goals →functions design patterns etc.
- Diagrams
- Working backwards from goal to see how could we get to the goal
- Trial and error/hill climbing
- Hill climbing looks one move ahead
- Means end strategy – compare current state to goal state and reduce difference
- Using analogies or hints

Unintentional things may occur from problem solving!!
Riven wall jump was unintentional but it works and is good and omg I just realised!!!
People are normally also stuck in their ways, if it aint broke don't fix it

Well defined problems have clear-cut goals and solutions
Ill-defined problems have no one set answer no agreed upon answer

Other reasons why problems may be difficult to solve

- Problem solving space is too large
  - Too many options eg. choosing a career
  - Create subgoals to reduce search space size eg. want a career that involves helping others
- Lack of prior knowledge (specific to that domain)
  - Very common reason
- Memory limitations
  - Too much information that needs to be considered at once
  - Information not properly encoded into long-term memory

I think assignment 1 should have been free choice of website so fucking stupid to constrain us to bullshit boring ass recycling environment bull shit no student actually gives a fucking shit. People like relevant stuff

CLT (Cognitive Load Theory)

Our cognitive architecture
- Huge long term memory used to store information over long period of time
  - Information is stored in the form of schemas (our perceptions)
- Limited working memory used to process current information
  - Can only store few items for a short period of time (7+-2 items)
- Schemas allow us to bypass the limitations of working memory by chunking large amount of information together into a single unit (compression)
  - Allow us to ignore the huge amount of detail by filling in with our long term memory eg, solving algebra

- Automation also helps us reduce the burden on WM by allowing us to process information with minimal use of our working memory
    - Frees up capacity of our working memory
- Schema acquisition and automation are the two most components of learning
- Automated schemas are op af lets you see a solution just by seeing the problem
    - Allow us to store information into long term memory in an efficient form
    - Reduce the burden on our limited working memory
- Can use this knowledge of how people learn and acquire knowledge to design better instructions and learning experience for the interface

Means-ends analysis is useful for problem solving, it is a stratergy that focuses solely on reaching the goal rather than the steps on the way, it is efficient however awful for learning.
If all focus is on reaching the goal, we have no cognitive resources for learning. When we don't have knowledge on a domain, we spend all our resources on solving something rather than learning.

New users of a system should not be expected to learn through trial and error, it is better to have a worked-out example or a tutorial that demonstrates.

Worked out examples

- Go through the right order
- Highlight the importants
- Show all possible routes to solution

Split attention effect

When information is structured so that it requires people to mentally integrate information that is physically split, it puts an extra burden on our working memory, eg. Problem goes across 2 pages
Mutually referring sources of information should be physically integrated!

The layout of information can have a huge impact on the learning outcomes, don't split key information keep it all together.
APPLICATIONS OF THE SPLIT ATTENTION EFFECT

- Whenever we refer text to diagram, it should rather be integrated into the diagram
- Related text should be contained on the same screen or page
- Interfaces should not force users to recall information from one screen that they need to type into another screen
- Integrated training packages that do not split user's attention between the screen and the manual should be used. EG. CBT

Web navigation should not force users to split attention between where they are and where they want to be by forcing the users to look at unnecessary pages of information

The redundancy effect
If information is not essential it is just better to omit the information, keep it minimalistic and simple.
The more information we have to process the more load on the working memory
It directly leads to worse learning
We must know about users prior knowledge though
Applications of the redundancy effect

- Minimal computer manuals, from which all unnecessary information has stripped and superior to conventional manuals.
- Look at google, vs yahoo
- Try to omit extra information that will more likely overwhelm users
- Navigation information should only appear once on any screen.

- Giving lower amount of buttons/features will be better to not overwhelm users

Getting rid of redundancy improves design

Interaction between split attention and redundancy effect

- Whether information is essential or redundant dependants on both the nature of the materials AND the expertise of the users
- When the knowledge level of users is unknown it is better to assume less knowledge and physically integrate related materials rather than just omit it.

Expertise reversal effect

- What is a good presentation format for novices may not be ideal for experts
    - Novices need integrated materials to avoid split-attention effect, but experts need the redundant information removed
    - Novices need lots of worked out examples while experts benefit from being given many problems to solver

Reducing Search

- Searching for related information will waste cognitive resources
    - Not putting too much information on a single screen or page
    - Integrating related information
    - Using a consistent screen layout across all web pages
    - Highlighting (don't overdo with colours)
    - Making all pages accessible from the home page
- Don't overdo integration where users have to search a lot

Diagrams

- If the relationships between elements of information is complex and there is a meaningful diagram that is familiar and not too abstract it will be very beneficial
- They reduce the load on working memory because
    - Help to make relationship between problem elements more concrete and explicit
    - Help to reduce the search for related information
    - Act as an external memory so help us to visualise the problem
    - Help to represent complex relationships between elements of a problem in a less abstract form
    - Eliminate unnecessary information focusing our attention on the essentials

The modality effect

- Working memory has partially separate processors for handling visual and auditory information.
- Presenting information in both auditory and visual mode increases the capacity of working memory.

Applications of the modality effect

- Audio-visual materials are most useful as a method of eliminating the split attention effect
- In a computer interface environemtn, audio is a useful way of presenting error messages, however this can cause redundancy.

Auditory information is transient, gone within ~1s, so we should avoid an excessively large or complex in auditory component

Timing of audio is important

Redundancy can improve universal effect

Animations

- Can be distracting if they are redundant, don't over-use
- Are transitory and so may be difficult to learn from and overload working memory
- Often need to include user control and interactivity
- Most useful for more knowledgable users
- Good for depicting human movement based task
- Better if more realistic

Transient information effect

Information that is transient should be used sparingly online for learning

- Audio content must not be too long or complex
    - Segmentation improves performance
    - Or present it in a written format
- Animations can be used but do not overuse just like colours
    - Better for teaching human movement related content
    - Should not be too long

Gesture research

- Interested in whether a gesture can improve learning for human movement task of learning to write in a new language
- Including gesture improved learning for static graphic format bur redundant for animations.
- Gestures more useful for novices than experts unless content is very difficult

Different sources of cognitive load

- Three main sources
    - Extrinsic/extraneous cognitive load
        - Exisits as a result of instructional design, information layout
        - Can be modified
        - Want to keep at minimum
    - Intrinsic cognitive load
        - Exists as a result of the type of materials one is dealing with
        - Cannot be changed, based on your learning ability
    - Germane cognitive load
        - Exists as a result of instructional design
        - Is the load assosciated with the effort to learn
        - Results in resources beign devoted to schema acquisition and learning
        - Want to increase this so we can improve learning → automation

Intrinsic cognitive load

- Tasks that involve the simultaneous processing of large amounts of information are considered to be more complex intellectually than task where each element of information can be processed sequential

Interaction between format of instruction and task complexity

- For intellectually demanding tasks that require processing capacity, method of instructional presentation is critical, try to reduce working memory load
- For tasks that are not complex the format is not so important
- Task complexity is dependant on a persons prior knowledge and schemas, each user is different
- When presenting information to people you need to take into account
    - The complexity of the materials
    - The users level of knowledge
    - The format of information structure

Basic Statistics

Analysis of result
- Need to score or code the responses
- Need to find a way to summarise findings
    - Frequency distributions
    - Rating scales
    - Percentages (if sample not too small)

Validity of results
- Do respondents respond as they should or according to their beliefs
    - Do they water it down for u or devils advocate?

Misleading statistic
- 10% of males are heavy drinkers
    - No sample size given
    - No definition
    - No description of age range,
- 9/10 nutritionists recommend kids eat weetbrits
    - We don't know how many nutritionists
    - What is the quality of each nutritionists not consistent
    - What is a recommendation?
- Scale of an axes for a graph can be manipulated to emphasize results (misleading graphs)

Quantitative data vs qualitative data
- Quantitative data – expressed as numbers
    - Analysis look for size, magnitude, amounts
- Qualitative data – difficult to measure sensibly as number
    - Analysis look for the nature of elements and the themes, patterns and stories
- Be careful how we manipulative data and numbers

Graphical representation

Frequency distributions
- Useful for summarising the information in visual format if appropriate use catogeries to summarise

Pie chat
- Shows proportion of users who belong in a certain group

Tables
- Nice visual summary of percentage data when multiple categories
- Can be used to display multiple means (don't use tho when small sample size)
- BE CAREFUL WITH SMALL SAMPLE SIZE + PERCENTAGES

Mean, median, mode

Mean – average
- Can be misleading if there are outliers

Median – middle most score
- Allows one to ignore extremes

Mode – most common score
- Often not as useful however has niche uses, can be misleading

Variability within data
- Want an idea of how much participants differ from one another
- Range
    - Difference between highest and lowest scores

    - Misleading when there are outliers
- Standard deviation
    - The amount the average participant deviates from the mean of the sample

Standard deviation – reduces effect of outliers

- Gives idea of how spread out or clustered scores tend to be
    - High SD implies big spread
    - Low SD implies low spread

Simple qualitative analysis

- Recurring patterns or themes
    - Emergent from data, dependant on observation framework if used
- Categorizing data
- Looking for critical incidents to focus on key events

Visual design lecture!

Before we start visual design we need to

- Have requirements sorted
- Know who the users are and their needs
- Understand context of use (where and how it will be used) as well as which device/platform it will be used on

Process

- Define
    - Form factor (which device platform will it be viewed in)
    - Posture (how much user attention are we assuming and responses required
    - Input methods – accessibility

What screen users want

- A clean orderly clutter free appearance
- Intuitive to use
- Expected information is located where it is expected to be, eg login top right corner
- Simple language to user
- A simple way of finding out what's in the system and how to retrieve it
- A clear indication of when an action can make a permanent change in the data or system

Logical flow

- Avoid overlapping or overlapping task else it will complicate logical flow that is very hard to follow
- The logical flow changes depending on the medium, users, and the work flow

Layout considerations

- Layout must have a relationship to the workflow for the user
- Everything we place in our user's view creates something to think about increasing the cognitive load

Layout and tasks

- Understand the task the user will be doing
- Study the ordering of the tasks
- Group elements together which reduces cognitive load
- Order the user interface elements so it can match the workflow

Layout can have different forms

- Symmetric (balance)
- Asymetric (instability) (can highlight what is more important)
- Regularity (everything regular same size)
- Irregularity (spread)
- Sequential (left to right, top to bottom)

Don't put too much into interface, we need some white space

Some visual interface design principles

- Avoid visual noise and clutter
- Redundant information uses up limited processing capacity and cognitive load increases
- Keep things simple
- Too much clutter increases search times

Simplicity is key

Alignment

- Every element on the screen should be aligned with as much elements as possible
- This is to
    - Reduce visual noise
    - Make it easier to scan information on screen
    - Assists with visual orientation
    - Make the window visually pleasing

White space

- Space that provides a separation between elements
- Helps reduce visual clutter
- Used to organise and structure related items
- Can assist with balance and clarity

Group boxes

- A line drawn around a series of elements
- May have a label for the group
- Use this sparingly like colour as too much can add to visual nosie

Organising elements interface, group boxes are not the only way we also have

- Contrast, similarity and layering to distinguish and organise elements

This helps establish groupings, provide contrast between active manipulable elements of an interface vs passive non manipulable elements, can also use contrast of different group of elements to say what the function is
We can also use colour but use it sparingly

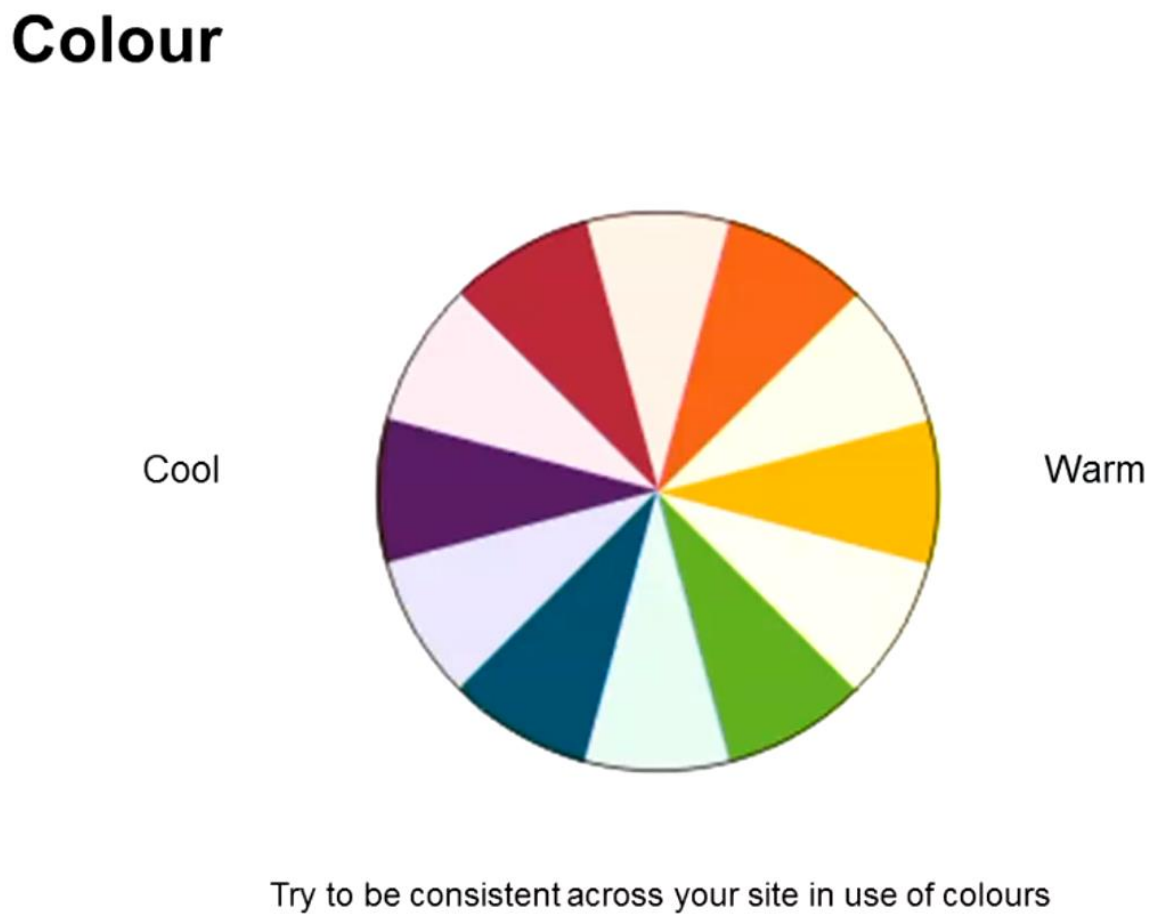
Github uses similarity using contrast, colours different sections, and also uses similarity that all blue text = links

Proximity can help with grouping, if elements are slightly separate extra, it can look like they are separate

Contrast is primary tool to grab user attention, helps separate sections and bring attention to the sections

Colour

- Important aspect of visual interfaces
- Should be used sparingly
- Should integrate well into other elements
- Can draw user attention to important items
- Indicate relationships
- Communicate status with colour



This is a good colour scheme for websites

We need colour harmony

- Engages the viewer
- Creates a balance in the visual experience
- Delivers visual interest and a sense of order

Basic formulas for colour harmony

- Analogous colours
- Complementary colours
- Colours found in nature
- Triadic colours

Complementary colours are colours that are opposite and go well together because of contrast

Analogous colours are hues that lie close together, i.e yellow-green, yellow-orange etc

Triadic colours are colours approximetly spaces around the colour wheel, it creates the most difference and it can be over-powering

Colour contrast

- Using opposite colours i.e light on dark or dark on light to make it easy to read and see
-

We can use colours to change the focus and what you perceive, eg. Hourglass/faces example

Colour

- Used to enhance a design rather than have the design depend on colour
- Design for monochrome first and then later add colour
- No more than four colours should be used
- Use colours found in nature (particularly lighter colours)
- Use distinct colours to show structure
- And similar colours imply a relationship
- Warm colours imply action, response required, spatial closeness
- Cool colours imply status, background information, spatial remoteness
- Use a neutral colour (light grey or beige) for background
- Colour can be used for redundancy with another cue to imply status

Menus grouping

- Order contents by frequency
- Group related commands within menu
- Seperators between logical groupings
- Group items related to function, then determine descriptive menu title
- Don't nest too deep
- Include ellipses (…) at the end of a menu item indicates that an application needs user input to execute commands eg. Save as…
- Use same verb tense across menu
- Make menu titles and commands consistent when used in multiple windows
- Disable non functions items by greying them
- In drop-down menus ensure the label of each menu items differ from the menu title

Menu styles

A number of menu interface styles

- Flat lists
- Drop down menus
- Pop up menus
- Contextual menus
- Expanding menus eg. Scrolling and cascading

Flat menus

- Good at displaying a small number of options at the same time and where the size of the display is small eg. Ipds
- Have to nest the list of options within each other which makes it more multi-stepped
- Moving backwards can be tedious

Expanding mensu such as cascading menu structures

- Enables to show more options on a single screen than in a flat menu
- More flexible navigation allowing for selecitons of options to be done in the same window
- Most popular are cascading menus
- Requires precise mouse control
- Nesting for less used options popular options should be as least nested as possible

Contextual menus

- Provide access to often used commands in the context of a current task
- Appear when user presses ctrl/right key on mouse on option
- Helps overcome some of the navigation problems that are in cascading menus

Hamburger Menus

- Mobile navigation
- Many arguments against
    - Hiding navigation behind an icon

Menu research and design issues

- What are best names/labels/phrases to use
- Placement in list is critical
- Save and quit shud be far apart
- Many international guildelines including ISO9241 for menus

Card Sorting

- Used to establish hierarchical groupings with users
- Identify the topics around 50 less than 100
- Write topics on index cards
- Blank cards for new categories
- Ask each participant to sort he cards and speak aloud
- Create groupings when appropriate
- Take notes and observe the process and try to understand the underlying reasons

If there are too many groupings in card sorting, we ask user to arrange the groups hierarchically
Ask for a name for each grouping that describes the members of the group
Using the numbers on the back record the groupings
Reshuffle for next session

Tabs are used to display different items in the same frame, allows separating different features, allows multiple different options to be displayed to users on same screen with option to go between

Windows also let us to overcome physical constraints of computer display allowing more info to be viewed and tasks to be performed
Need to organise windows to support tasks

- Put related info in same window
- Minimise number of windows need to accomplish a task

Windows can act as external memory and make it easier to switch between task
Make sure window is large enough to present all required information and not too crowded
Dialogue boxed for infrequently used/needed info

Icon design

- Icons are assumed to be easier to learn and remember than commands (pictures vs words)
- Can be designed to be compacted and variably positioned on screen

- Populate every application and operating system
- The mapping between the representation and underlying use can be
    - Similar – a picture of file to represent a file
    - Analogical – a picture of scissors to represent cut
    - Arbitrary – the use of X to represent delete already engrained in our memory

Place labels next to icon in order to get close proximity

Research and Design issues

- There is many existing resources
- Texts/labelling can be used to help for identification for icons
- For larger icon sets, we use rollovers

Human Interface Guidelines

- Available for most GUI environments
- Describe how to use controls and widgets to maintain consistency on platform
- Focus on look and feel and detailed down to the pixel dimension
- They are guidelines not laws, however used to maintain consistency
- If there is no good solution go to guidelines

Branding

- The interface is an important part of the brand a software represents
- Users quickly develop a first impression about software (Microsoft office)

Linking heuristics to CLT

Summary of different cognitive load effects

- Our architecture
- Worked out examples as an alternative learning strategy to means-ends analysis
- Split attention effect – split diagram and explanation need to mentally integrate both → increases cognitive load (for new learners)
- The redundancy effect – providing extra information that is not needed, increasing cognitive load
- Reduce search → automates processes (reduces burden on working memory)
- Diagrams → easier to understand than text
- Modality effect → presenting information in different modes (audio and visual), has its own place where suitable, however audio is all transient so we need to take pauses etc.
- Expertise reversal effect →
- Different sources of cognitive load

Different sources of cognitive load

- Extrinsic/extraneous cognitive load
    - Exists as a result of instructional design
    - Can be changed by better interface
    - Want to reduce to 0 since it is modifiable
- Intrinsic cognitive load
    - Exists as a result of the type of materials one is dealing with depends on users understanding
    - Cannot be modified
- Germane cognitive load
    - Load assosciated with effort to learn
    - Want to increase this load to improve learning!

Linking heuristic to CLT

- These rules are useful ways of improving design systems
- They reduce the load on our working memory and make information easier to process and make sense of

Heuristics

Visibility of system status

- Keep user informed of system status eg. A loading bar
- Effective and useful feedback increases chance users learn from their msitakes and learn how to use the system
- Link to CLT → reduces search and will automate tasks and makes more room for learning

Some examples link to more than 1 heuristic!

Match between system and real world

- Speaks the users language, using words phrases and concepts familiar to the user rather than system oriented terms
- CLT link: design a system that uses familiar terminology and concepts allows people to apply prior knowledge (reduces cognitive load)

We need to be careful with jargon as people have their own ideas

User control and freedom

- User should be in control and is able to control their interaction however limited some places for error preventation (emergency exits)
- CLT link, allows users to focus on what they want to do as it reduces Cognitive load by allowing them to focus less on making mistakes
- Too much ways to do same thing leads to redundancy and should be avoided
- Need to make sure we have efficiency so user can have a simple flow

Consistency and standards

- Consistency applies within website and across general scope, eg. Green = go red = stop
- CLT Link: once they are familiar with the consistent layout, allows users to acquire schemas and to automate tasks!

Help users recognise, diagnose and recover from errors

- Self explanatory
- Good error messages
- Use plain language to describe problem in laymans terms
- CLT Link: effective and useful feedback that users will learn from their mistake and will not expand cognitive load understanding the error

Error prevention

- Grey out invalid options as an example (this is self explanatory)
- Can inform users (however not really used that often)
- Block out invalid choices
- CLT Link: when a user makes error, cognitive resources are devoted to fixing and understand the problem rather than performing the task. This leads to faster learning

Recognition rather than recall

- Allow users to select from an option thay can recognise rather than recall exact details
- Make objects, actions and options visible
- CLT LINK: less information to remember reduces load on working memory

Flexibility and efficiency of use

- Allow different modes of performing things (some of which are faster eg. Ctrl c + ctrl v rather than copy and paste buttons)
- Clt links: accelerators require extra processing for novices who are still learning so abstract them. Allows experts to work more efficiently and automate tasks decreasing extrinsic load

Aesthetic and minimalist design

- Not over crowding, not using white space, no irrelevant information
- CLT LINK: reduces search needed to find relevant things. Search uses up working memory and decreases the cognitive load

Help and documentation

- Provide information that can be easily searched and followed
- CLT LINK: make it easy to use and understand and locate to increase learning for system

Heuristics lead to improved design as they reduce the load on our limited working memory, if we understand why they work we can easily apply them and they work because they make information easier to process and make sense of. Make it easier to create schemas and learn something

Experts vs novices
Novice – someone with very little knowledge or experience within a domain
Expert – someone who has a large amount of knowledge and experience within a domain

Faker vs bronze 4
Becoming an expert involves extensive practice normally we say 10 years
The distinguishing feature of expertise is a large and varied knowledge base, stored in the form of schemas that take many years to acquire. Expert has huge amount of automated schemas.

Problem solving

- Finding a path or solution that overcomes an obstacle permitting us to reach a desired goal state.

Means-ends analysis

- The problem solver compares the current problem state with the desired goal state and tries to find problem solving operators that bring us closer to the goal state.
- Used by novices since they have no schemas
- Search based stratergy (cognitive demanding)

Schemas

- Domain specific knowledge structure that allows people to categorize multiple elements of information as a single units (sort of like analogies)

Declarative knowledge

- Knowledge about facts or things eg. A orange is orange colour xD

Procedural knowledge

- Knowledge about how to perform various actions or cognitive activies eg. Playing piano or baking a cake.

Skill acquisition

1. Cognitive stage
    a. Facts are learnt, encoding of declarative knowledge
        i. Learning to drive a car

2. Assosciate stage
    a. Basic procedural knowledge is acquired
3. Autonomous stage
    a. Procedures become automated and rapid

Proceduralization

- Process of people switching from explicit use of declarative knowledge to direct application of procedural knowledge.

Difference between expert and novice problem solvers

- Three main bodies of research
    - Pattern learning and memory
    - Problem representation and categorisation
    - Problem solving strategies

Pattern learning and memory

- Experts can chunk large amounts of meaningful information into a single unit to have better memories of meaningful patterns
    - Done by De Groot 1965 with chess players, 5s flash of chess board and asked them to reproduce, experts could reproduce 90%, whereas novices only 40%
    - Experts can remember meaningful patterns, eg. Given A* search to expert vs novice, expert can recall very easy vs. giving random code to both expert novice same performance
- Experts have a huge domain specific knowledge base, which allow them to recognize a large number of familiar patterns or 'chunks', and thus exhibit outstanding memories for familiar problem states
- Experts chunking abilities allow them to more easily DESIGNING FOR EXPERTS
    - Navigate through deeper layered menu system
    - Remember shortcuts
    - Learn to use complicated interfaces similar to something they have previously used

Problem representation and categorisation

- Experts can instantly recognise and categorise a problem in terms of its solution
    - Chi, Glaser and Rees compared categorisation skills of experts and novices
    - Experts focused on more abstract general solution where novices focused more on surface level stuff eg. Specific values
    - Experts look at problems as "this is how I solve this and group off of tht"
    - Experts grouped code based on functionality whereas novices grouped based on syntax eg. Grouping making program vs grouping everything syntaxilly
    - Experts can use their huge store of domain specific knowledge to build a rich and detailed problem representation
    - One of the characteristics of good problem solving is the ability to form a representation of a problem in terms of the problem solution
    - Be careful to create categories that are meaningful to your user group

Problem solving stratergies

- Experts tend to use schema based stratergies to solve problems. This involves working forwards from the givens to the goal
    - Eg. Working forwards involves choosing equations that contain the given information, then calculating all unknowns until finally the goal is reached
    - Novices tend to use search based strategies

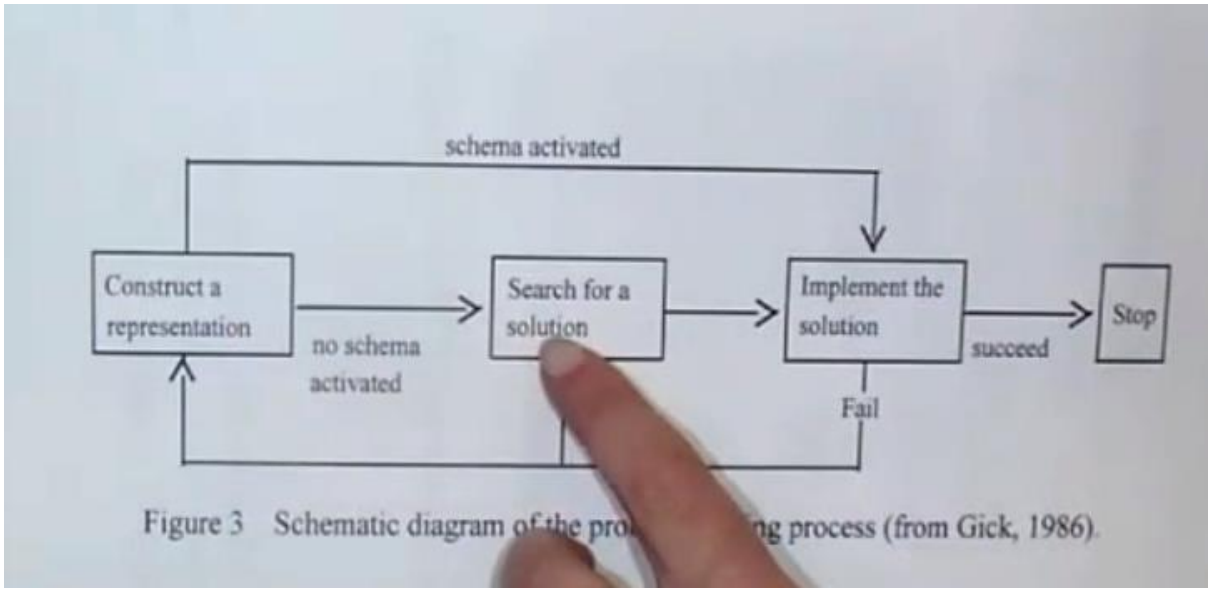


Figure 3 Schematic diagram of the pro ng process (from Gick, 1986).

Novices tend to use search based strategies, such as means ends analysis, to solve problems. This often involves working backwards to the given

- Working backwards involves selecting equations that contain the goal and then setting subgoals of finding all the unknowns in these equations. Once all the unknowns become subgoals activity can proceed in a forward direction
- CANCER and cognitively demanding
- Novice users have little prior knowledge or chemas in the area and tend to use means-ends-analysis(trial and error system) to navigate their way around. They need lot of meaningful cues and feedback, whereas experts will find this redundant and irritating
- Experts use their prior knowledge and schemas to easily navigate through the system

An expert in league will not be an expert in dota!!

Experts don't have better problem solving skills than novices, no literature to prove this. However they have more experience with domain specific problem solving skills. Expert in chess wont be able to be an expert in computing

Experts need less information – too much detail can be redundant
Novices need more details – these should be presented in an integrated format to avoid split attention effect
We need to know something about the learner's knowledge level to decide whether information is redundant or essential

Experts prefer split attention effect whereas novices prefer the "redundant effect"

In reality most people are intermediates

- Don't stay a beginner for too long
- High level of expertise in all aspects of system is unusual
- Most intermediates would like to learn more about the program but don't have the time
- Ski slope analogy

Intermediates

- Programmers who develop software are often experts
- Sales and marketing are people who generally demonstrate software to novices
- Intermediate users may then be forgotten

- Goal is to
    - Rapidly and painlessly get beginners to intermediacy
    - Avoid obstacles for intermediates who want to become experts
    - Keep perpetual intermediates happy
- We want to accommodate experts and novices but not disregard the intermediates
- If people can't use a system it is the system's fault and not the user (unless the user is like trolling)

Characteristics of novices
- Novices don't want to remain novices for too long
- Need help that goes away once redundant eg. Discords guided tour at start
- Need system features that rely on recognition and support learning
- Need simple tasks with small amount of option and informative feedback

Characteristics of experts
- Want fast access to regular tools (shortcuts)
- Want powerful featured regardless of complexity
- Expect rapid performance
- Rely on recall
- Need less informative feedback
- Seek efficiency by reducing keystrokes
- Their perception of a product will feed down to less experienced users so keep satisfied, eg. Most people look up to experts as the end goal eg. qT fanboying ahahha

Characteristics of intermediates
- Want access to tools, don't need scope and purpose explained
- Tooltips are useful
- Online help
- Want regularly used functions easily available
- Find it reassuring to know advanced features exist, given option to use it

Practical application of expert/novice differences
- Software can be designed with different modes or version for novices and experts
- Expert version have more options/features and shortcuts however may not be easy to learn
- Novice version would have limited options but it would be easier to learn
- Game software often takes level of expertise into account
    - As level of expertise increases, things speed up, less cues and often more information to deal with
    - Sometimes we create novice and expert level of same software

Creating complicated instructions, more rules to remember and unfamiliar names and contexts increases difficulty.

Evaluation testing

Aim
- Evaluation of current design state
- Answer questions that the design team has using real or representative users
- Not scientific in search of statistically validity but looking instead for trends or patterns
- Evaluation can and will take place at various points in lifecycle of project not just at the end
- Iterative

We test to ensure that our application is
- Usable
- Works as expected

- Meets criteria of product
- Productive

What we test

- Parts of application
- All the application
- Competing designs
- Icons/graphics
- Online help system

When we test

- Prototypes
    - Paper first
    - Electronic later
- Alpha/beta of product
- Deployed application

Ethical issues when testing

- Participants must be assured of the following
    - This is a test of the product and not of them
    - They can stop at any time
    - Their performance and opinions will be anonymous
    - Signed consent form must be obtained for both parties

Test preparation

- Set goals
- Determine what and how we will measure test goals
- Define scenarios and tasks
- Data collection how will we do it
- Select participants and define test roles
- Prepare materials
- Create a usability test plan
- Invite and brief users and observers
- Select environment and setup equipment
- Select and obtain software and hardware
- Conduct our dry run
    - Identify potential issues

Design to evaluate

- Team will have planend to have certain aspects of the design complete and ready for testing
- Prototype that will be tested needs to cover enough of the functions/tasks to be effective
- Paper prototype first
- Electronic mockup next
- Code based prototype finally

Setting goals

Defining goals tend to be

- Learnability
- Efficiency
- Memorability
- Minimal errors
- Satisfaction
- Safety

Has our goals measurable too! Eg. Number of errors per task or per hour, and the length of time to complete task in general

Now we can define what is acceptable, unacceptable or exceeding expectations

Want to also measure

- Initial reactions
- Users exploration
- Successful completion of tasks
- Timely completion of tasks
- How well tasks are supported
- User satisfaction
- Errors

Possible metrics for this include

- Time required to learn and complete tasks
- Number of errors, severity of errors
- Amount of assistance needed
- Ratings and comments

Determining what to test

- The 20% of functions used most the time
- Problematic or critical functions
- Functions difficult to design or document or teach

We need to come prepared with task scenarios to provide a context for usability testing. We give a user a end goal and a basic background and ask them to complete a task

Task scenarios

- Help put functions into a context
- Describe users and their goals, usage and context
- Include actions and artefacts used
- Make clear whether action is independent or part of another goal
- Include special processing conditions
- Has to be realistic
- Has to encourage users to interact with system
- Don't giveaway how the interact should be used leave that to user
- No clues don't describe steps
- Make the tasks actionable and realistic

Tasks

- Activities presented in a logical order derived from scenario

Who to test?

- Representative users from each category
- Wide rage of experience and usage
- Cross section of user population
- Try to select randomly to get a wider spread

How many users

- Be realistic about time and budget
- Four or five per category
- When trend emerges stop
- If no trend continue

Logging sheets

- Two basics kinds of manual logging sheets
    - Task specific log sheets with correct steps listed
    - General log sheets with space for errors accuracy and time
    - Allow room for comments

Create issues table from analysis

Stay in touch!

atlassian.design

https://medium.com/designing-atlassian/

https://www.atlassian.com/company/careers/students


www.linkedin.com/in/ashleigh-sterzenbach


www.linkedin.com/in/jamesrotanson/

Lecture 9
Internationalisation/localisation

What is different across languages
- Character set/keyboards
- Direction of text/alignment
- Language/words/phrases/spelling
- Size of words
- Sort order
- Metaphors
- Images/icons
- Date/time/currency
- Units of measurements
- Calendars
- Colours

Internationalisation is important to allow catering for a larger audience and brings larger marketbase

Can't we just do translation?
Text is used in a variety of places in software
- Labels/titles
- Menu items
- Error messages
- Help
- Manuals

Translation alone may not be enough because we need context
The translated menu item when tested as a static menu item appeared to be well understood
When placed into an interactive element user found to make more mistakes with direct translation
You require the expertise of someone familiar with the local customs and expressions of that culture
The person will also require a briefing of the design rationale to give them context

We should
- Avoid complicated language
- Avoid using examples overly dependant on our local culture
- Involve international representatives (users) in product design

Graphics
- Do icons/graphics have worldwide recognition
- No guarantee need to test
- 13% of Japanese people didn't know what red cross symbol means
- Ticks/crosses for check box, in japan the cross was considered no whereas in other cultures considered chosen

Calendars
- Seasons are different between north/south hemisphere
- Gregorian calendar used in US/AU/Europe
- Arabic/jewish/Chinese calendars refer to lunar cycles
- Japanese calendars reference the reign of specific emperors

Date
- D/M/Y
- D/M-Y
- M/D/Y
- Y.M.D

- Y-M-D
- 12/11/2001 does this mean exam is on December 11 or novemeber 11?

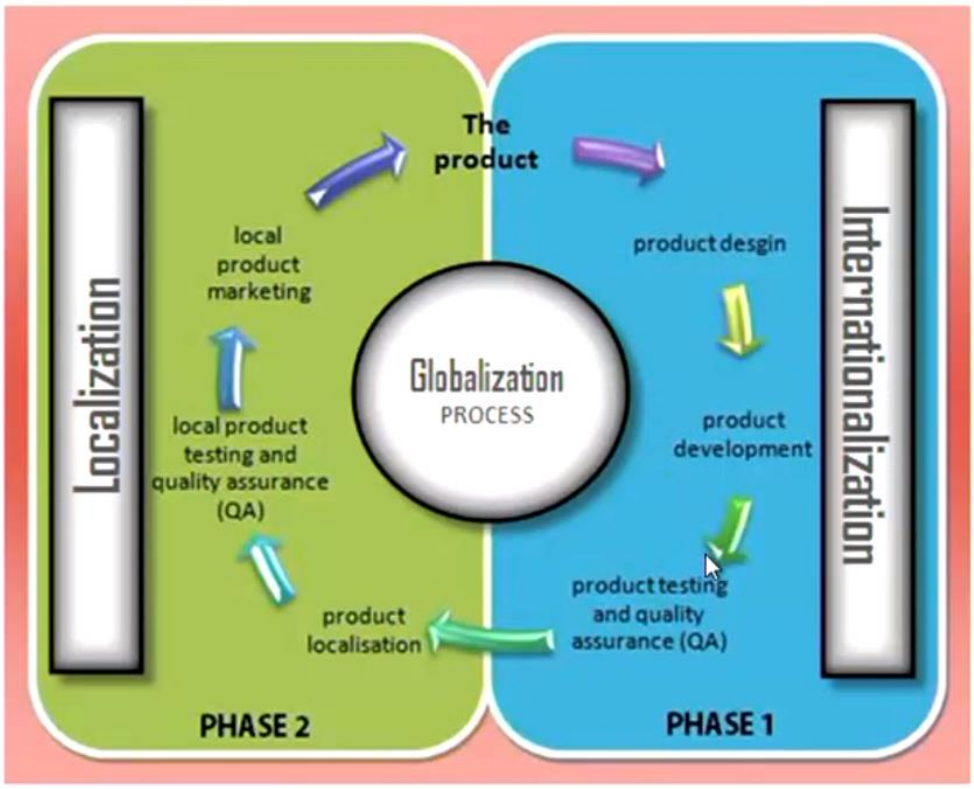
Units

- US uses cancer inches/ft/miles etc
- Rest of world uses metric km/m (metric)
- Celcius/Fahrenheit

Internationalisation is the process of designing/preparing and developing your application for localisation
Localisation is the process of adapting an internationalised application to local and cultural conditions

Internationalisation relates to the development of the infrastructure that will enable the creation of localised versions, it's a bare bone framework like a java interface

Internationalisation vs. Localisation

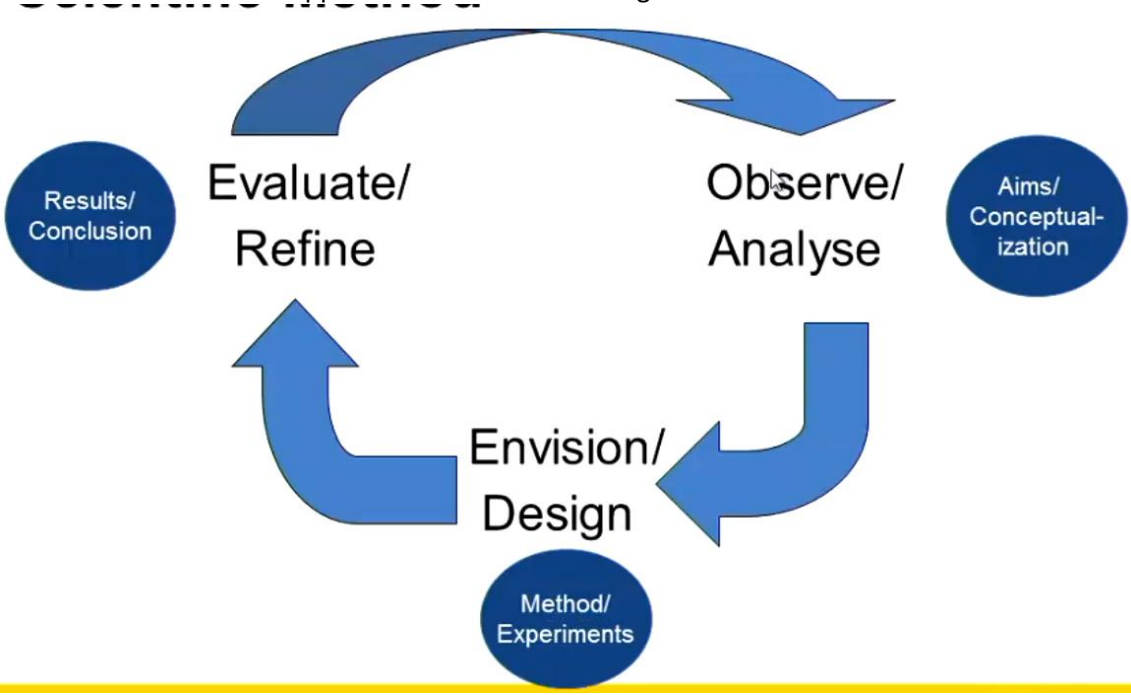


We have to design application and user interface with internationalisation in mind, we apply individual localisation further down, think of making a superclass and every other country gets a its own subclass

We need to treat the localised version as a new interface meaning we need to go through the UX design principle with the local audience.
For international usability engineering we need to

- Keep a design rationale explaining why translated phrases were adopted
- Maintain a glossary of translations – resuable design tool
- Work with specailists in the field for the specific locale
- Understand what the platform infrastructure will do for you

Evaluation of a new software application used within an organization



Experimental research versus user testing

- User testing
  - Aim: evaluate user performance in order to improve usability design
  - Measure time to complete tasks and number and type of errors
  - Conducted in real world environment
  - Improve products
  - Few participants
  - Results inform design
  - Usually not completely replicable
  - Conditions controlled as much as possible
  - Procedure is planned
  - Results reported to developers
- Experimental research
  - Aim: to discover new knowledge or answer a research question
  - Observer relationship between two variables
  - Controlled environment that can be replicated.
  - Discovering knowledge
  - Many participants that represent target population
  - Results validated statistically
  - Must be replicable
  - Strongly controlled conditions
  - Experimental design
  - Scientific results reported to scientific community

Steps of scientific method

- Observation
- Frame a hypothesis (expectations of findings)
- Methodology to test hypothesis (standardised set of tasks)
- Select participants and collect data
- Describe, analyse and summarise data
- Discuss data and draw conclusions

There are different types of research

- Laboratory experiments
    - High control but artificial environment
- Quasi-experiments
    - Partial control, no random assignment
- Non-experiments
    - Realistic settings, little control over extraneous effects (includes descriptive and correlation research).
- Listed above in decreasing order of scientific rigour and increase order of practicality

Hypothesis – tentative belief about the relationship between two or more variables
Variable – any phenomenon that can differ or vary from one situation to another or from one person to another. It is a characteristic that can take on different values
Generalizability – applicability of the findings to the entire population of interest

Factors to consider
Control of extraneous factors

- Users level of experience, hawthorne effect (people alter behaviour around others), ordering effect

Control of biases

- Sampling, experimenter (be consistent and neutral)
- Double blind setup can be useful where we pick blindly

Representative sample (or random)

- Generalisation from sample to population?
- Sample size

Reliability

- Can the same result be obtained over time with the same subjects?

Validity

- Are we measuring what we are trying to measure

Consistency

- Must be consistent

Significance level

- How certain we are results weren't just by luck

Electronic prototyping

- Understand the when to use electronic tools vs paper
- Understand the functionality of interface building tools, animation tools and their role in the design process
- See how human interface guidelines have been incorporated into the tools
- Sketching interfaces a possible scenario for future user interface design

Different stages require different fidelity

Visual fidelity
Sketch → style (low->high)
Functional fidelity
Static → interactive (low->high)
Content fidelity
Placeholders → real content (low -> high)

First paper

Paper pros

- Anyone can draw
- Focused user testing
- Easy iterations, fast
- 100% uptime
- Quick and inexpensive to produce and change
- Low intimidation level
- Low technology (low learning curve vs technology)
- Can establish terminology and logical flaws very early

Paper cons

- Less useful near end
- Cannot convey specifics as well as electronics
- Can't do timing measurements
- Don't account for the same level of interactivity as the final application
- We eventually need an electronic prototype (its rudimentary)
- May appear less professional during user testing

Electronic prototypes

- Develop proof of concept prototypes that explore interaction of a system
- Could be done as part of the software development process
- Should be considered to be an interim step towards a final design, it is not the final design
- Could be done with tools that can animate the future system
    - Closely related to the concept of storyboarding

Electronic pros

- Specific/realistic
- More valuable to developers than paper
- Realism can help project success
- Can incorporate technologies that paper cannot eg. Interaction.

Electronic cons

- Slower to iterate depending on toolset and competence
- Information overload if used too early
- Costly (skillsets, time – costs rise with precisions)
- Can be unreliable as interactivity is added.

Many people fall in love with their first design (this is bad)
Design is all about iteration and improvement!!!

Developing electronic prototypes

- Hand drawn scans placed into a viewing tool such as PowerPoint
- Photoshop, artwork to produce the look and feel
- Flash animations which use user actions to control the path through the animation
- User interface developer tools to prepare screenshots
- Actual code and user interface

When do we electronic prototype

- Has paper prototype phase finished
- Do we understand sequence of user's actions/ workflow?
- Which tasks are important to test
- Which activities require interaction
- Which activities are highly interactive?

Input, Output and Interaction and gameification

History of computer displays

1. Teletype monitor, paper output
2. Blinking indicator lights
3. Black and white text-based screens (kernels) using CRT as virtual paper, no graphics!
4. Monitors that support graphics, attatched video displays with a video terminal
5. First portable computers, really large and heavy expensive, larger than a suitcase. Cost 5000, which 15000 today, insanely priced. Only had <10mb of memory lol OMEGALUL
6. LCD screens, no more huge fat monitors, with hunchbacks
7. Curved screens (so sex) its so much better imo
8. Now foldable and flexible displays, can compact more into a screen by folding

Touch screen technology

Resisitive

- Can be touched by stylus and or gloved fingers

Optical

- Finger disrupts light ray of camera

Wave

- Works by sound waves made from touching surface

Most importantly capacitance (mostly used nowadays)

- Detects and measure anything conductive different from air

Multi-touch devices

- Single touch devices only supports singular inputs, so tap, move etc
- Multi-touch devices support multiple touch inputs, supports 10 finger input
- First multi-touch device (surface table (Microsoft 2007)) iphone first commercialised one

Touch screen technology is used in

- Monitors
- Tablets
- Phones
- Cameras
- Game consoles
- Atm machines
- Payment erminals
- Self serve kiosks
- Interactive video projectors
- Interactive displays
- Smart boards
- Interactive tables

Interactive displays can be used in classrooms, meetings,

New technology

- VR – purely virtual world
- Augmented Reality – shows real world and part of virtual world
- UX designers can design different controllers for VR

AR blends virtual world with real world and comes with the following benefits

- Solving the issues with the use of mouse
- Feeling material we are otuching

- Information can be seen everywhere
- Can see an object in its future location

Haptic feedback gloves helps us interact with virtual objects, to get a sense of the object

Important principles for AR and VR

- Discoverability
    - Give users enough freedom to discover all they can do with the platform.
- Scalability
    - Gestureal interactions should work on objects with different sizes

Motion sensing input devices
Ps4 motion thingy or wii, this device can detect changes in motion or movement or change in states, to interact with the system.
Can be used for

- High quality 3d scans
- Video games
- Translating sign language
- Select information without being at the screen
- Convert any surface to a touch screen display
- Control robots with body movement
- Virtual clothe fitting wtf

Brain computer interface, allows direct communication with brain to computer.

Wearable technology

- Smart watches
- Projector phones
- Foldable phones

Skin input, what the fuck, lets you use bio-acoustic sensing to localise finger taps on skin, lets us have a UI on the skin

Foldable phones

Smart devices

- Smart speakers
- Smart appliances
- Medical assistance
- Smart cars
- Alexa play despacito

Robotics

- Usages include
    - Medical surgery
    - War
    - Space
    - Manufacturing
    - Helping humans
- Can recognise
    - Images

- Speech interaction
- Walk
- Build/destroy
- Mimic human behaviours

In order to select appropriate input and output methods we should answer 4 questions

1. What input method is appropriate for target user considering their needs and limitations e.g. Keyboard for essays and writing, touch screen tap for text messages
2. Is the selected input method appropriate for the task?
3. If the selected input method is appropriate for the environment
4. What are the user experience goals

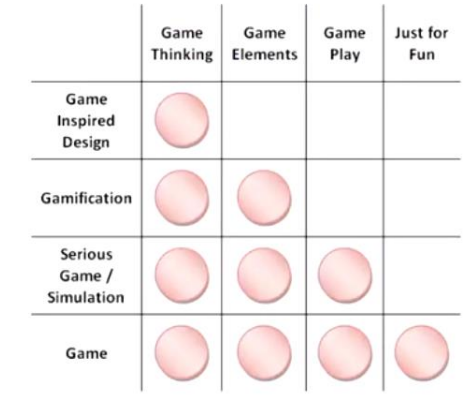
Special input methods to help users, its how we transfer user input to outputs that are useable for the user and how well we support natural input

Some of the inputs are transformable

- Speech recognition
- Face recognition
- Eye tracking
- Handwriting to text
- Text to speech
- Brain signal to command

How can we increase user's input and engagement

- Game inspired design
- Serious game
- Gamification



Uses for serious games/simulation

- Teaching
- Simulators
- Meaningful games
- Purposeful games
- Eg. Pilot training can be done in simulation

Gamification is useful for increasing motivation especially from monotonous tasks

Different areas for gamification

- Human resources
- Health care and sport
- E-learning
- Data collection
- Online community
- Software popularity
- Eg. A red notification gives users excitement
- Eg. E-learning with achievements, missions, badges, trophies etc.
- Eg. Gamification in learning to user interface

Based on user interaction with application and usages, we reward users motivating them to keep using the app for its purpose

WorkPlace Health and SAFTEY (WHS)

WHS is about

- Hazards and risks in the work place
- Duty of care to reduce risks
- Preventing repetition strain injury (RSI) or occupational overuse injury (OOS)
- Personal health and safety while using computers

Hazards and risks (hazards are events or objects that can cause risk to a user, risk is something that causes direct harm to a user, eg. A trip wire is a hazard because it has the risk of falling).

What is duty of care?

For employers

- Minimise and manage risks
- Prevent where possible any harm for workers

For workers

- To act with care to property, themselves and others

In order to avoid risks for computer use we need to minimise

- Improper or prolonges use of keyboard
- Overuse of mouse, trackball
- Viewing the display for extended periods of time
- Poor posture

In order to avoid risks for mobile use we need to minimise

- Cancer
- Health effects
- Electromagnetic interference with medical devices
- Traffic accidents
- Eye strain

RSI or OOS risk factors

- Repetition or overuse
- Static loading – holding one position too long
- Non neutral posture of limbs and joints

- Localised pressure
- Use of high force especially with small muscles

Personal health and safety while using computers
We should have
- Ergonomically sound workstation
- Proper working environments
- Ergonimcally sound work habits

Workstation design
- In order to have an appropriate workstation we should consider
- 1. Heights of desks and chairs
- 2. Layout of workspace
- 3. Environment

Liability for design
- It is mainly for consumer products with safety implications but covers defective goals
- Includes designers and programmers
- Sound software ergonomics now expected including
    - Interface
    - Cognitive load
- Safety is important for software especially for critical software

Performance measurement (Quantification)
- Used to evaluate usability without using real users

It is used when
- It is difficult to carry out testing with a real user
- In analytical approach to user interface design
- To develop predictive models of performance
- For comparative evaluation of different systems
- Solve problems such as the best placement and size of the objects

We assume our users have
- Appropriate cognitive skills
- Expert users

Models used in measuring performance
- Descriptive: key action model
- Predictive: keystroke-level model (KLM)
- Predictive: fitts laws

They are based on
1. Hierarchical task analysis (HTA)
    a. Break down things into hierarchical system
    b. subtasking
2. GOMS
    a. Provides a method to measure performance and compare different interface designs
    b. It breaks down tasks into
        i. A set of goals
        ii. A set of operators

iii. A set of methods for achieving the goals
iv. A set of selections rules for choosing among competing method

c. Goal based design analysis
d. Methods are sequence of operators to achieve a goal
e. Operators are cognitive actions and processes that must be performed in order to satisfy the goal (tools)
f. Selection rules, for determining which method to choose when there is an alternative

Goal: delete a word in a sentence

Method for accomplishing goal of deleting a word using menu option:

Step 1. Recall that word to be deleted has to be highlighted
Step 2. Recall that command is "cut"
Step 3. Recall that command "cut" is in edit menu
Step 4. Accomplish goal of selecting and executing the "cut" command
Step 5. Return with goal accomplished

Method for accomplishing goal of deleting a word using delete key:

Step 1. Recall where to position cursor in relation to word to be deleted
Step 2. Recall which key is delete key
Step 3. Press "delete" key to delete each letter
Step 4. Return with goal accomplished

Operators to use in above methods:

Click mouse
Drag cursor over text
Select menu
Move cursor to command
Press keyboard key

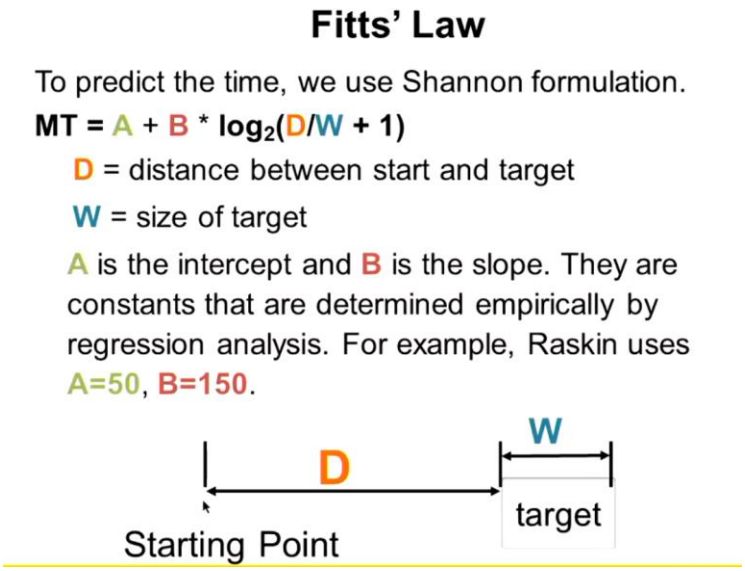
Selection Rules to decide which method to use:

1: Delete text using mouse and selecting from menu if large amount of text is to be deleted
2: Delete text using delete key if small number of letters is to be deleted

Preece 2002

Models used in measuring performance

- Key action model
  - Users interaction with keyboard and shortcut keys (keyboard buttons can be split into different types, symbol executive, modifiers)
  - Helps define appropriate shortcuts
- Keystroke level model
  - Practical design tool to predict time to accomplish a task using computer software assuming error-free task completion
  - First we define a task
  - Select the method for performing the task
  - Calculating the total time for user to complete overall task by summing time of sub-tasks

- Fitts law predicts the time required to move to a target area, allows us to predict times to reach certain aspects of the UI
    - We measure time from current cursor position to the goal cursor position
    -
    - 

Hints to decrease mouse movement duration
For standard object, distance has a exponential effect on time spent to reach
For double object size, distance has almost no effect!!!

- Doubling target size can decrease time spent to reach, however at cost of screen real-estate
- For large target objects, the distance to move from mouse is not really effected

Humans are social creatures by natures (idk im opposite)
Social interaction is the process by which we act and react to those around us

Social context

- The immediate physical and social setting in which people live or in which something happens and affect our social interaction eg.
    - Family
    - Friends
    - Education
    - Work

social status

- The relative rank that an individual holds, with attendant rights, duties and lifestyle in a social hierarchy based on honour or prestige, some are given, some we obtain

Social interaction: status/roles

- Roles are the behaviours expected of people in a certain status regardless of differences, if we are in a certain status we are all expected to behave in a way of the status, roles help us make social interactions smoother
    - Eg. Child and parent
    - Student teacher
    - Shopper cashier

Social interaction: norms

- Social normal are informal understandings that govern he behaviour of members of a society

    - Eg. Shaking hands
    - Eye contact with the person you talk to
    - Avoid racist comments
    - Go to back of queue

Social communication

- Verbal (converys the message of information through using language can be different inf orm of text)
    - Text
    - Voice
    - Audio visual
- Non verbal (conveys the message or information through non linguistic representation eg
    - Facial expressions
    - Body gestures
    - Postures
    - Eye gaze
    - Vocalization
    - Clothing

Social perception

- Forming impression about others dispositions and intentions
    - Emotions
    - Personality
    - Mood
    - Belief
    - Behaviour

Social personal characteristics

- Our personal and social characteristics
    - Personalitry
    - Mood
    - Emotions
    - Belief
    - Behaviour

Social cultural issues

- People speak with different languages
- Not all norms are universal
- People use different signs and signals in different cultures

Culture types

- Two types of cultures
    - High context cultures
        - Relies heavily on non verbal communication and deep cultural knowledge to convey meaning
    - Low-context cultures
        - Depends largely on words themselves

Social interaction

- As social beings we are sensitive and responsive to social cues

Studying social interactions

- We are dealing with complex mechanicsms
- It relates to HCL because social interactions are not limited to face-to-face, technology has introduced different mediums to connect people together, so we want to design for our users

Social computing emergence

- Pervasive computing devices
- Widespread internet access
- Portable computing devices
- Greater need for remote communication and collaboration

Social computing revolves around the ways that computing can be used to support social interactions, connecting people together, facilitating collborations and potentially predict social outcome

Field is multi-disciplanry

- Computing
- Social psychology
- Communication science

Social Computing Questions

How to develop technologies/systems that

- work in harmony with social norms?
- comprehend social context?
- recognize social roles/status?
- understand social communication?
- predict potential outcome(s)?

Solutions to social computing problems

- Emoticon (social cues) to help convery ur emotion more rather than text that can be mis-interpreted
- Natural language processing (communication)
- Hashtags (social context) to provide some context to what they are talking about
- Online/offline status (social norms) don't talk to offline, talk to online so we know whether we are there or not
- Automatic emotion recognition (social cues)
- Automatic sentiment analysis (social cues)
- Automatic mood recognition (social cues)
- Automatic personality recognition

Collaborative computing

- Focus is on group rather than individual
- Facilitate groupwork
- Increase efficiency/productivity
- Support informed decision making
- Benefits
    - Flesible working (time/place)
    - Leverage of distributed talent
    - Increasing productivity
- Challenges
    - Building trust
    - Quality
    - Coordination mechanisms
    - Social translucence (awareness)

Crowdsourcing

"Simply defined, crowdsourcing represents the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call.[1]"

Final Lecture