Coursebook: https://www.sciencedirect.com/book/9780128053423/the-ux-book

Week 1 | Lecture 1

L1.1 - Introduction to HCI and UX

Human-Computer Interaction: In 1963 Ivan Sutherland discovered a device that allows direct manipulation of virtual objects, building the "first ipad" called the "Sketchpad". This is described as "usable" as he was using a stylus, which comes with a precise tip, quite forward-thinking for a system in the 60s.

UX: More popular term for the practice of HCI in the field, focusing on the USABILITY of HCI.

Ease of use	Performance & productivity	Efficiency	Error avoidance	Learnability	Retainability

Components of UX:

1. Usability — Productivity, efficiency, ease of use, learnability
2. Usefulness — Ability to use system or product to accomplish goals of work
3. Emotional Impact — Affective component of user experience and feelings, satisfaction
4. Meaningfulness — Long-term personal relationship with product

L1.2 - Design Walkthrough

Design walkthrough example: Pawshake

1. Provive a channel for gathering early feedback from various stakeholders. Presenting key scenarios, storyboards and prototypes while showing functionality such as creating a user profile.
2. Explore the design from a user-centric perspective, simulating how pet owners might interact with the platform.
3. Try to foresee potential usability issues that a user might encounter. For example, what if there are no sitters available in an area? Or what if payment fails? Avoid infinite buffering or loading screens for example.
4. Use it as a communication tool. There is always a gap between engineers and designers, tending towards a clash. Hence, using personas and sketches explains what can be and cannot be done, streamlining a team. Ensure everyone is on the same page and encourage open discussions.
5. Finally, prepare to adjust a scenario to meet specific needs, keeping the design flexible and scalable so the platform can iterate quickly.

L1.3 - Understanding Persona

Robot example: Does not engage well with Alexa because it roleplays as someone with a specific personality and behaviour based on an observation of the real world (it is not a made-up persona). Creating a character that can roleplay a stakeholder as close as possible is ideal in design. A persona that is more representative with real life people, provides better feedback to hypothesise possible user interactions.

For example, Suzie is a Design Persona. Her primary goals are to find relevant and up-to-date university information, and needs to access it quickly. She stays in Timaru, has a family of 3 children, is a school care advisor, and has weak tech confidence. Hence, this persona was designed as if it was a real person, including hobbies, personal information, etc.

- Point to a direct one-to-one relation with an observed user behaviour
- Make them 3D, as though a real person
- It can be a synthesis observed over multiple users
- Pair a persona with a scenario (Goal, Conditions, Activities, Outcomes)

PACT Framework

People	Activities	Context	Technologies

Although personas can be difficult to create if target users are too diverse, having too many makes the work difficult, and there is the risk of incorporating unsupported designer assumptions.

Week 1 Reading: "The UX Book" Chapters 1, 2, 9.4 and 25.2

Chapter 1

1.1: The concept of 'Interaction' has expanded from how people use computers, to a wide variety of communication and collaboration between a human and an artifact in an ecology. The user experience refers to the totality of effects felt by the user as a result of interaction. Interaction = [Desktop, Smart car, Laptop, Smartphone, Smart devices, Smart watch].

1.2: "UI" means User Interface, while "UX" design includes the design of the interaction, conception design, the ecology, but NOT the UI software. HCI meaning "human-computer interaction" refers to the whole field of study, while UX is the more popular term for the practice of HCI in the field.

- UX is a result of interaction, whether direct or indirect
- UX is about the totality of the effects
- UX is felt internally by a user
- UC includes usage context and ecology

1.3: There is no longer a difference between business strategy and design of the user experience. UX has become a mission-critical consideration for companies in every industry. Bad UI/UX designs cost money and lives, for example, distractions due to bad UX design for operating cars can lead to traffic accidents, injuries and even death.

1.4: The components of UX

Usability	Components: [Ease of use, User performance and productivity, Efficiency, Error avoidance, Learnability, Retainability (ease of remembering)]. Usability is important but sometimes overlooked by the glamorous parts of UX. For example, the flat design looks and feels visually attractive but might make the screen hard to see which elements are clickable and which are not,
Usefulness	Is the power and functionality of backend software that provides the ability to get work done,
Emotional Impact	User experience is all experiences internally by the user, factors that are felt up close and personal during the usage of technology. Users are no longer satisfied with just the efficiency and effectiveness of usability; they are also looking for emotional satisfaction
Meaningfulness	A personal relationship that develops and endures over time between human users and a product that has become a part of the user's lifestyle

Chapter 2

2.1: Building usability into a system requires more than knowledge of what is good. Without guidance from a UX design process, practitioners are forced to make it up as they go along, and may be limited by their own experience using their own favorite ways to do things while other important process activities fall through the cracks. You should use a UX lifecycle that follows this framework:

1. Understand needs (of users)
2. Design Solutions
3. Prototype Candidates (for promoting designs)
4. Evaluate UX

Chapter 9.4 | User Personas

A persona is a narrative of a specific design target of a UX design for a user in one work role. A hypothetical character in a specific work role. As a technique for making users real to designers, a persona is a story and a description of a realistic individual who has a name, life and personality, allowing designers to limit design focus to something specific. The goal of Personas may be to help designers focus on the needs and goals of specific types of learners, creating a more tailored and effective learning experience. A team is designing a mobile app for managing personal finances may gather information on users' spending habits, financial goals, and attitudes towards budgeting, gathered through interviews and surveys

Chapter 25.2 | Design Walk-Throughs and Reviews

Walk-throughs are an informal way to get initial reactions to design concepts by scenarios, storyboards and screen sketches. Design reviews are more comprehensive, usually done with click-through prototypes to demo. The primary goal of a design walk-through may be: To simulate a cyclist using the app in various scenarios and identify potential usability issues or areas for improvement. The primary goal of a design review may be to: explain what the user will be doing, what the user might be thinking, and how the task fits in the work practice, workflow, and context

Week 2 | Lecture 2

L2.1 - Heuristic Evaluations

Augmented Reality Technology (AR Tech)

In electrical engineering, so much of what is built is invisible to us, such as electric plugs and cords behind walls. AR technology provides a greater ability to be accurate and undertake processes that would be difficult otherwise. AR is used with medicine as well, like an MRI, providing visibility of bones and organs. AR provides better ways of understanding what we cannot directly see.

Heuristic Evaluations

We take an expert in HCI (me) who understands usability, design and experience of a system, and guide the design of a system, providing feedback from an HCI expert point of view.

Nielsen's Heuristics

1. Visibility of System Status
2. Match between System and the Real World
3. User Control and Freedom
4. Consistency and Standards
5. Error Prevention
6. Recognition Rather Than Recall
7. Flexibility and Efficiency of Use
8. Aesthetic and Minimalist Design
9. Help Users to Recognise, Diagnose, and Recover from Errors
10. Help and Documentation

In an HCI report, we often write what the website does well, along with the issues

1. Visibility of System Status

We want people to know where they are in the system and what is happening in the system. Is the system doing a calculation and how do we know it's happening? Meaning we cannot do anything while the system is doing those calculations. Do we know we are logged in? Is it visible that we have a shopping basket? Do we know our assignment has been submitted successfully? Often the system knows, but it isn't made known to the user.

- Before an update, the UoA website did not signal whether a user was logged in as Staff or Student (same interface), this has changed where system status is made obvious. This is good!
- Breadcrumbs exist as they show us the path we have taken to get to a particular place. Without breadcrumbs, we cannot go back to where we were before, forcing the user to navigate back using the back button which isn't ideal as it breaks convention and makes navigation difficult. Not a major problem as it doesn't stop people from achieving functionality, but might be something to raise

2. Match between System and the Real World

Are we using language that is appropriate for the other users? For example, in hospitals, forms are completed on paper. If we were to replicate this, we would simply copy the form into a computer system, the same things in the same palace (name, ID, medication) in the same layout to what people are used to doing.

- Would a first year student know what a UPI is? It is NOT best practice to use acronyms. As someone who has never been to UoA, we don't want them to guess
- 'Velocity' is an entrepreneurial group that runs at the University. A Lot of people won't know what Velocity is. We want to understand everything from the title itself

3. User Control and Freedom

We want to ensure people know how to get out of a system (do not feel trapped in a system). Similarly, Undo/Redo buffers should be offered, allowing people to redo and undo what they have just done. As well as this, we want clearly marked exits.

- UoA applications look good in terms of telling us how many steps we have left and which steps we have done and system status. It saves the application as we go, and we can exit without losing anything.
- We can go back, so no pathway is forced, providing the user with a level of control, which is great.

4. Consistency and Standards

We know what shopping basket icons relate to, and we look for common symbols when we use our systems. We want systems to be understandable, follow platform conventions, and terminology that stays constant.

- Underlined items are clickable, making it easy to tell which things are clickable and which aren't. Although, some clickable items aren't underlined, hence we should ask why there is inconsistency with convention of what should and shouldn't be clickable.

5. Error Prevention

We don't want people to make mistakes as it may slow down a system. For example, drop down lists for birthdays for each month, day and year. We can type it faster than drop-down lists that may cause more errors.

6. Recognition Rather Than Recall

Is about giving people options to choose between putting things into lists, pull-downs, selections by making all sorts of actions visible. For example, if I can put the item on a dropdown list, that I should. Why make the user type it in and maybe choose an option that isn't available? Essentially, use menus and lists instead of relying on blanks.

- In The UoA application, we type in Romansh for the language (Swiss language), and the system seems happy about that. But going back to where it asked for language, it has 76 languages that it understands. Why does it allow Romansh if it deems it an unknown language? And what's going to happen with this input?

7. Flexibility and Efficiency of Use

Accelerators are mainly in developer environments, instead of using a mouse to click a menu and selecting something, we can use an accelerator for it, and we usually look for this in other platforms. Hence, websites should include this for expert users.

8. Aesthetic and Minimalist Design

How much information do we really need for a website? Back in the day, people never scrolled after the first screen, nowadays, people are happy to scroll. Remove irrelevant, or rarely needed, information.

9. Help Users to Recognise, Diagnose, and Recover from Errors

We don't put system eros up, we put in messages to users to help direct them to fix the issue instead. Errors should be in plain language, suggesting solutions.

10. Help and Documentation

A common convention is to include help pages at the bottom on websites. Easy to search, focussed on the task, details concrete steps to carry out

L2.2 - The human and Fitts law CS3

Fitts Law

Is the classic performance measure. Where the time to target depends on target width (W) and distance (D) to move the pointer. The wider the target is, the faster we can attain the target, and the thinner the target, the easier it is to overshoot, and ofcourse, if the target is further away, even with the same width, it takes longer to reach it. $T = a + b\,log2\,\frac{2D}{W}$

Obtaining a target is different when using a pen on paper, mouse on computer, and tapping a phone screen.

When planes crash, it's human error. Paul Fitts found, yes it was human error, but the design of the cockpit contributed to that error. Hence, when a pilot made a decision to choose to turn off an engine, where the switch is placed, contributed to how long it took for the pilot to respond. So human error is impacted by the design of the cockpit.

Log_2 component is the Index of Difficulty (ID); $ID = log2\,\frac{2D}{W}$ As ID increases, time to reach the target increases.

Prime Pixel Notion

Where the mouse is, is the prime pixel as it takes NO time to get to where the mouse is. Hence, right-clicking opens a menu, it's fast and efficient. Hence, if we know where the prime pixel is, we can take advantage of that.

- We can get to the corner and edges of a screen really fast because the mouse stops at the edge and doesn't keep going into infinity, hence we don't need to slow down to reach the edge.

Fitts Law's influences

- Drop down lists should be short; Long lists will take long times to traverse
- Rick-click pop-up menus should be at the prime pixel
- Pie menu rather than dropdown list. Hence, the same distance for every item in the menu. For example, in League of Legends pings
- Large targets: increase size until error rates drop off
- Adding labels to icons
- Related targets should be organised close together

Calculations [Which calculations can we do with Fitts Law?]

Maintaining the same time to a target but we want to change something on the screen, such as changing the button size. Hence, doubling the width of a button means doubling the distance to it. If we halve the width of the button, we should half the distance.

Hick-Hyman Law

The time it takes for a person to make a decision as a result of the n possible choices. $T = b * log2(n + 1)$

We don't make decisions in linear time! We make them in log time. This is particularly important for menus, although log2 only holds if the menu is sorted in a logical order (alphabetical) otherwise search time is linear! Other factors that may affect decision time include recognition time for an icon or a word.

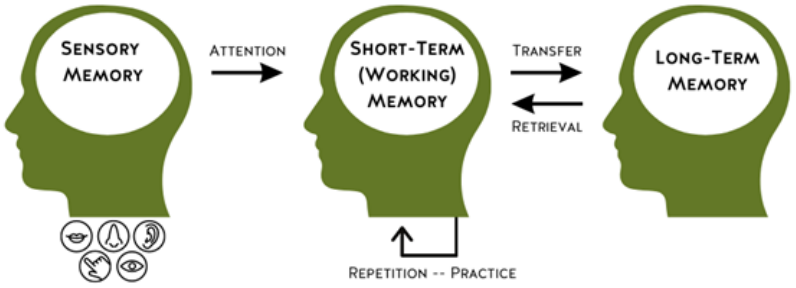
Log2 time	Linear time
Logically sorted items	Randomly sorted items

The Human [The Model Human Processor]

We have small and short working memory for processing. If we want to remember things forever, we have to move the information into long-term memory. Once we learn something, it's permanent. Long-term memory is also infinite. Getting people to fixate at different times comes with a cost. This is because the human eyes move very slowly relative to what the brain processes. The cost is a quarter of a second per fixation.

Human Memory

Sensory memory: is being overwritten all the time. If we want to use something from the sensory memory, we pay attention to what's in the sensory memory and store it in the short-term memory. Cognition occurs in the short-term memory, so we can rehearse and put it into the long-term memory, where it lasts forever.



Week 2 Reading: "The UX Book" Chapters 25.5, 32.3, 30.3.2.5 and 32.7.2

25.5. Heuristic Evaluation, a UX Inspection Method

Heuristic UX evaluation methods are based on expert UX inspection in which the evaluator compares aspects of the design against a set of heuristics (processes). Nielsen states the heuristic evaluation method is inexpensive, intuitive and easy to motivate practitioners to do.

Ten Heuristics

Visibility of system status	System should always inform users on what is going on through appropriate feedback within reasonable time.
Match between system and real world	Systems should use users' language (words, phrases, concepts) familiar to the user, following real world conventions to make information appear in a natural and logical order.
User control and freedom	When a user chooses system functions by mistake they need a clearly marked "emergency exit" to leave unwanted states without having to through an extended dialogue. Support undo/redo
Consistency and standards	Users should not have to guess what different words/situations/actions mean something
Error prevention	Even better than good error messages is designs that prevent problems from occurring in the first place. Eliminate error-prone conditions or check for them and present users with confirmation options before committing to the action.
Recognition rather than recall	Minimise the users memory load by making objects, actions, and options visible, the user should NOT have to remember information, and instructions should be visible / easily retrievable
Flexibility and efficiency of use	Accelerators (unseen by the novice user) should be available for expert users, hence catering a system for both experienced and inexperienced users.
Help users recognise, diagnose and recover from errors	Error messages should be expressed in plain language (no codes), indicate the problem precisely, and suggest a solution constructively.
Aesthetic and minimalist design	Dialogues should not contain irrelevant information.
Help and communication	Provide help documentation that is easy to search and not too large

32.3. Human Memory Limitations

Human memory is used in UX analysis because (1) it applied to most of the Interaction Cycle parts, and (2) its one of the new areas of psychology that has solid empirical data supporting knowledge that is directly usable in UX design.

Short-Term Memory / "Working Memory"

Has a duration of 30 seconds and is a buffer storage that carries information of immediate use in performing tasks, AKA "throw-away data" because it's only useful and desirable short term. The typical capacity of human short-term memory is about seven, plus or minus two items; often it’s less.

Chunking

Items in short-term / working memory are chunks of memory units containing one piece of data. Random strings of letters can be divided into groups which are remembered more easily. If the group is pronounceable, it’s even easier to remember, even if it has no meaning

051594737 → 0 515 9 4 737

M,P,E,L,S,H,A → S,H,A,M,P,E,L

30.3.2.5. Manual dexterity and Fitts’ law

A large object is obviously easier to click on than a tiny one. And location of the object can determine how easy it is to get at the object to manipulate it.

- Proportional to log2 of distance moved.
- Inversely proportional to log2 of target cross-section normal to the direction of motion.

32.7.2. Help User in Doing Physical Actions
The "Physical Actions" part of the Interaction Cycle is about making user interface object manipulation physically easy. Issues relevant to supporting physical actions include awkwardness and physical disabilities, manual dexterity and Fitts law.

Week 3 | Lecture 3

L3.1 - Contextual Inquiry and Brainstorming

Understanding what it is like to be the client to build something they can use (AR Dementia example).
Contextual inquiry: A form of usage research to understand how something is used. It is more about what they need rather than what they want, hence asking them "what do you require?" rather than "what do you want?". This happens at the beginning of the development cycle, when writing new software or when evaluating software products.

Data elicitation steps

1. Conduct a field visit
    - observe and interview people while they use the existing product
    - Log research notes as you encounter research data points, gather artefacts and make sketches.
2. Identify
    - Who is involved, things they use, processes involved, information required, constraints imposed, imputed required and outputs created
3. Model the information
    - Create descriptions of the people who do the work, document main use cases, create stories about how various aspects of work are done and create formal diagrams of the interaction.

BEFORE THE VISIT

- Learn about the subject domain, don't go into it being completely clueless. This includes understanding language, slang, jargon, environment, etc
- Domain exploration: Learn from other design solutions, assess the position and negative aspects, respect copyrighted material and don't build new systems when you can just buy one.

DATA COLLECTION

- Direct (interviews and focus groups)
- Indirect (logs and questionnaires)

DURING THE VISIT

- Set the stage, rapport with client, explain purpose and approach
- Observation vs interviewing
- Look for user work roles, user persona, work practices, and information flow

L3.2 Human Computer Interaction

Generative Design
Ideation: Spawning ideas out of nowhere
Sketching: Capturing ideas
Critiquing: Analysing ideas
Refining: Adopting, modifying or discarding ideas

Week 3 Reading: "The UX Book" Chapter 7, Section 8.7.1, and Chapter 14

Chapter 7 - Usage Research Data Elicitation
Usage research is not about asking users what they want, they often don't know what they want. Usage research is more about understanding user work practice and work activities and reducing needs.

7.2.1 - Concepts of Work, Work Practice, and Work Domain

User Work	Identify what users are trying to accomplish (work).
User Work Practice	Understand how they actually do it (work practice).
Work Domain	Consider the bigger environment they work in (work domain).

To understand people's work practice, we have to understand their needs, how they do their work so we can think of ways to improve effectiveness of that work, we need to know what is needed in a design to fit user needs, and finally, often details that drive work are hidden beneath the surface, hence intentions, strategies, motivations and policies should be considered, making barriers to problems less visible.

7.2.5 - Are We Studying an Existing Product/System or a New One?
Analysts and designers can become strongly biased toward thinking ahead to the new system, but almost everything we do in usage research starts with an existing system and work practice. For example, the iPod, when first released, was thought of as a unique innovation, but it started with the phonograph, essentially, reproducing recorded sound. Hence the iPod was already building on an existing product.

Chapter 14 - Generative Design: Ideation, Sketching, and Critiquing
The overarching objective of design creation is to formulate a plan for how the system will be structured to satisfy the ecological, interaction, and emotional needs of users.

Generative design is an intertwining of ideation (**brainstorming**), **sketching, critiquing** and **refining**.

1. **Ideation / brainstorming**: The activity where ideas are spawned
2. **Sketching**: An externalization activity that captures those ideas in concrete representations
3. **Critiquing**: An analysis activity to evaluate the emergent design ideas for tradeoffs
4. **Refining**: An activity (usually iterative) where ideas are adopted, modified, or discarded.

14.2 - Ideation
The process of creating various and innovative proposals for ecological, interaction and emotion designs, this is a hugely creative and fun phase. We can also get users and clients to participate too.

- **Ideation informers**: provide information on usage, requirements, targets and goals. You don't use them as building blocks though, raythe they inform by pointing to design-oriented aspects such as personas, to consider or take into account the design.
- **Ideation Catalysts**: Are design inspires which precipitates an event or change without itself being affected or changed
- **Ideation techniques**: Something a designer can do to foster the spawning of a design idea, such as brainstorming, framing and storytelling.

14.3 - Sketching
Is the rapid creation of freehand drawings and expressing preliminary design ideas, focusing on concepts rather than details. It is a conversation about user experience, not ART. They should be open to interpretation because if they are interpreted in different ways, they may foster different and new relationships to be seen within them.

14.4 - Critiquing
Is the activity where the design ideas are assessed to identify advantages, disadvantages and constraints and tradeoffs are evaluated for each idea. Users should be involved in this stage, and your job is to listen. Here are some critiquing questions

- Meets design goals?
- Fits well with the ecology? Communicates seamlessly with other devices in the environment?
- Supports the interaction needed with other devices?
- Provides good usability?
- Evokes positive emotional impact?
- Provides meaningfulness for users?

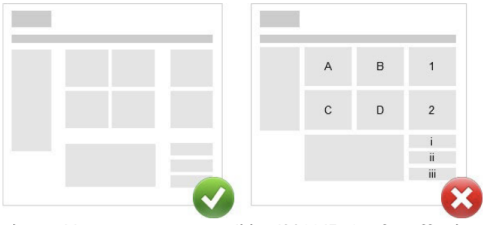
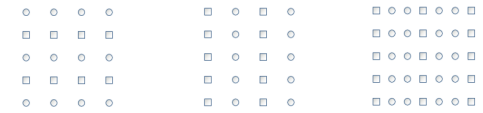
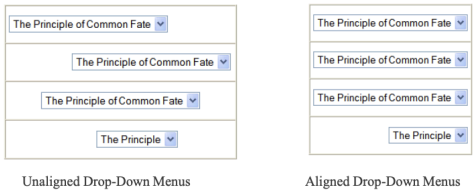
Week 4 | Lecture 4

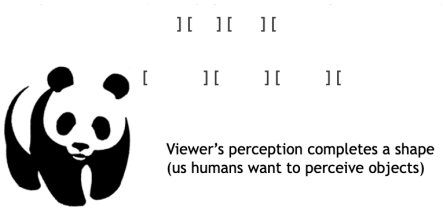
L4.1 - Visual Design (Perception and aesthetics)

At the foundation of visual design, is that our eyes have evolved with us as organisms to keep us alive. The eyes are designed to see motion and to see order in a visual confusion. We have a lot of automatic processing, from the eye to the brain, through all sorts of signal processing, before applying cognition.

Gestalt Principles of Perception

The example perceptions show three pacman converging, we notice a triangle even though there isn't a triangle drawn. Or that there is a sphere even though there isn't explicitly one present. Hence, the visual system has evolved to help us see certain objects. As designers, we should manipulate how humans see items, based on what we know.

Proximity principle	Objects that are close to each other will be seen as belonging together. We are programmed to see groups by proximity 
Similarity Principle	Picking differences and commonalities based on visual characteristics, such as size or color. 
Common Fate Principle	Objects that move together (sharing a beginning and/or a direction and/or an end) are seen as related. For example, information aligned on one side so they appear to be grouped. 
Continuity Principle	When we see lines that are all continuous but disrupt what we are able to see, then our eyes are programmed to complete the story even if it's visually not there. When we see a cross, we call it a cross and not four lines coming to meet in the middle. There is a real naturalness for continuity.
Closure Principle	The black splotches, has its body leaking into the page, but the black arcs cause us to close up shapes naturally. We tend to see things as complete objects even though there may be gaps in the shapes.

	
The Area Principle	We have images and text on screen. Smaller objects might be seen as a figure rather than the ground, also called the smallness principle. In the first image, the text on the images makes the image look like a background. Making something big enough, makes it no longer the figure, and rather the background. It is not meant to hold the same role as a figure.  
Symmetry Principle	Symmetrical figures tend to be complete figures that form around their middle. 
Surroundedness Principle	Objects we want users to focus on are in the center, surrounded by less interesting navigation controls.  
Prägnanz Principle	All together, the most concise solution is the joke below. We have the number 1 and dots and brackets on a yellow background to return a face. Implementing common fate is by the similar length of shadow. This makes it look like they're the same height off the yellow surface. The yellow surrounds the back object in the middle with a greater area. 

"What is beautiful is usable"

Whether we like it or not, aesthetically pleasing objects can be perceived as more error tollerations, more usable, and more trustworthy. For example, Apple is obsessed with ensuring artifacts are aesthetically pleasing.

Three principles from aesthetics

1. Balance

   It's a metaphor for the control of distribution of optical weight in an interface. Dark text is perceived as heavier than the light text, whether or not the pixel actually does. This also holds for larger objects, clusters of small objects, and objects with strong, intense colors. The balance on screen is achieved by providing equal weight of screen elements.

Balance can be formal or informal. Formal, when there is symmetry, or informal where there is no symmetry.

2. Emphasis/Dominance
   Emphasis asks for an easily recognisable focus. Such an object has dominance, others may have successive levels of emphasis to create a hierarchy. Emphasis can be manipulated in many ways, such as isolation, color, size and order.

   For dominance, objects of the same lightness create a static design with all objects equal in visual importance. If we have three dots, one dark, ones lighter, and one very light. We create an emphasis hierarchy, that the first is the darkest and the last and the lightest dots.
3. Unity
   All parts of our design have some commonality so that they are perceived as a whole. In an interface, aligning fonts and borders. For example, a curvy font with a box with curved edges, while serif fonts have more angles so unify them using smaller border radius.

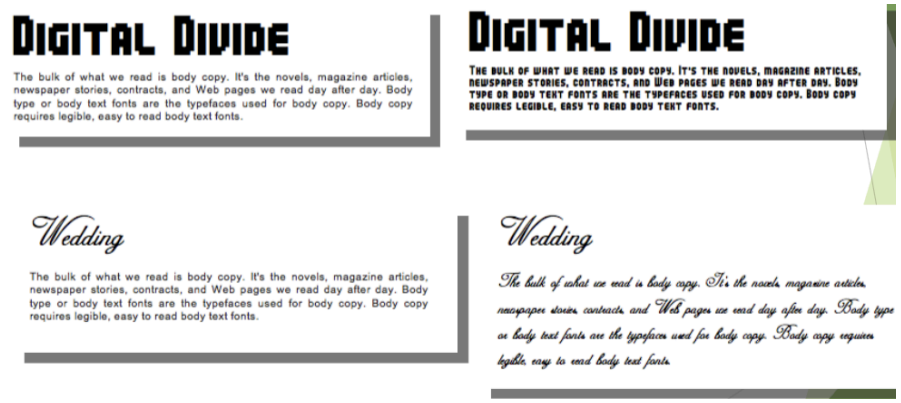
L4.2 - Visual Design - Typography and Reading

Eye movement: Saccades and Fixations

We read by having our visual focus 'jump' between spots, a very common practice in animal vision generally. As designers, we want to make text readable. So we can give clear emphasis signals, indicating to the users where to start reading, and by convention it should be at the top left, we can also make it bold or make use of colors. We also should give clear targets for big saccade jumps. Left centred text is best for this as opposed from middle-aligned.

Fonts for title vs. body

Putting the whole body copy into the same font creates a challenging situation, the font is using small caps rather than proper lowercase, making it less readable. For the wedding example, we see a contrast in title and paragraph, while if the text matches, we have existing expectations of wedding invitations, hence it doesn't have much to say. So it's okay for this specific case.



Font Size

Typically given in ('pt') which is about 1/72nd of an inch. It's rather small. The 'em-box' is the entire height of text in the font, from bottom of the descender to the top of a Cap or ascender. Otherwise, it can always give size in terms of pixels.

Visual Design and Interaction Design

Usually start with low-fidelity prototyping because it's fast and replaceable, as a conversation with stakeholders in the design process. High-fidelity prototypes show full appearances in terms of size, spacing, colors, fonts and images. These allow us to test whether we are on track and whether or not we will deliver a good user experience.

Low-fidelity: Hand-drawn on paper, sticky notes. Alternatively, use wireframing tools, tidier but a bit more work
High-fidelity:

Week 4 Reading: "The UX Book" Chapter 17 and Chapter 20

Chapter 17 - Designing the interaction

The interaction design is about how people use the system to perform tasks within the broader work practice and covers all points where the user interacts with the ecology. Different ecologies require different factors, for example, the interaction design for Android platforms would be different for those of iOS platforms.

17.3.4: Leverage existing designs, for example if you're creating an email interface, you might want to include three elements, one side bar, and email list, and a space for the email to show up. Leveraging designs with already established patterns should be embraced, except for if your goal is to set yourself apart in the market.

17.3.5: Establishing the information architecture for each device is also important, for each device, phone, laptop, tablet. You should consider the system and contextual data and envision a conceptual design in the interaction perspective. This can be communicated via Storyboards and wireframes.

Chapter 20 - Prototyping
The idea of prototypes is to provide fast and easily changed early views of an envisioned UX design. Because it can be easily and quickly changed.

20.2.1: Slicing a system's features and functionality by breadth, you get a horizontal prototype. It is very broad and offers depth of functionality. It provides a simple overview.
20.2.2: A vertical prototype contains more depth of detail for some functionality, but not all. Vertical prototypes are ideal for times when you need to represent completely the details of an isolated part of an individual workflow to understand how those details play out in actual usage.
20.2.4: "T" prototypes combine the advantages of both horizontal and vertical prototypes.

20.4.4: Wireframe prototypes focus on more detail into the user workflow and navigation. The flow model (a simple graphical representation) giving an overview of how information flows among user work roles, is a starting point.

Week 5 | Lecture 5

Week 5 Slide Pre-Reading

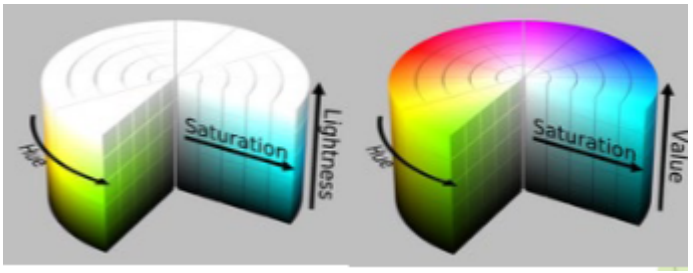
Color: Is a powerful design feature that controls energy and emphasis, impact legibility and expresses branding. Color can be broken down into a hue, saturation, and lightness.

Hue
Spectral color: Roy G Biv, frequency = 1 / wavelength
Color wheel: Our perception of color can be wrapped from 0 to 360 degrees, magenta is extra spectral as there is no such thing as pure magenta light, or our brain synthesized a perception of a color between red and violet in hue when the retina is stimulated by blue and red light without much green light.

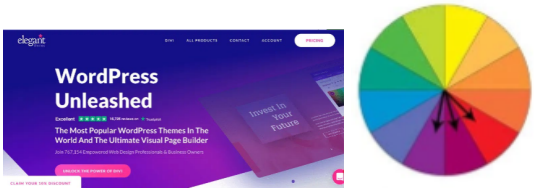
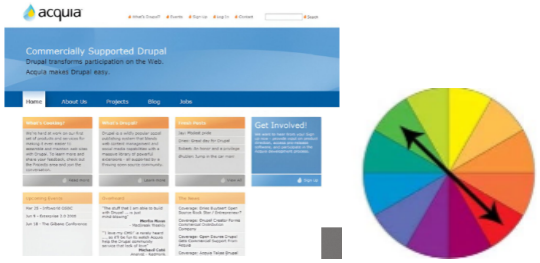
Making Color
Additive Color (RGB – Red, Green, Blue): Think of TV screens or phone displays. They create colours by mixing different amounts of red, green, and blue light. When all three are combined at full intensity, they turn white.
Subtractive Color (Pigments – Paint, Ink): This is how painting works. When you mix paints, each colour absorbs (subtracts) some light and reflects the rest—that's the colour you see. If you mix too many, they absorb too much light and turn black or muddy brown.

Physical Reception
The eye receives light and transforms it into electrical energy, while light reflects off objects or is produced from a light source (like a computer display). Humans have three types of cone cells in their retinas. Cones basically correspond to R,G and B with lots of overlap.

Controlling Saturation and Lightness
HSL and HSV cylinders give us much more relevant control than RGB



Colour Schemes

Monochromatic (one single hue)	
Analogous (colors that are adjacent on the color wheel)	
Complementary (Colours that are located opposite on the colour wheel)	

L5.1 - Visual Design - Color

Hue

We bend the colors into a wheel, it appears seamless. Although magenta is extra spectral, it's something we experience when we see both red and blue light. Which is our first hint, of our brain synthesising information.

As designers, we generally make use of additive color, because most display devices have light emitted diodes of red, green and blue light (RGB). Although, for most of history, we didn't have diodes, instead we had pigments. Printing on paper, we use cyan, magenta and yellow ink/toner, hence still works for painting and pigments, while the RGB color model is more new and relevant to technology.

Retina cells located closely to the brain, where color processing happens there. On the retina, we interpret images upside down, where the brain does the heavy lifting. Retina contains rods for low light vision and cones for color vision. We have three different color receptors, some respond most to green, others to red, and others to blue light. These receptors dont have a precise spectrum of how they respond to color, so our perception of yellow is when the red and green cones work. We also have less blue cones compared to red.

Computer colour pickers

Colours are usually 24-bit but some systems might add 32-bit colors to add transparency, which isn't adding or changing a color, but rather tinting or shading.

HSL & HSV
The RGB model makes sense, but isn't harmonial in terms of picking colors from a scheme. What is, is the HSL and HSV models.

- For HSL, at 0.5 lightness, we have a pure color, as we move lightness to the maximum, any hue turns to white, or any darkness moves towards black.
- HSV provides rainbow colors on the top where full saturation is at a value of 1.

Saturation
To increase the brightness of a color, all R,G,B should be turned to 255 when using a color picker that uses both HSL and RGB. The RGB can also tell us if a green, for example, is closer to red than to blue.

Lightness
Lightness can be manipulated to increase or decrease contrast. Using an inverse saturated photo as a small object on a screen might not be the best. Stretching dark colors to the entire screen might be better as the user can focus on the content rather than the boundaries of an object.

The more complex we make a color scheme, the harder the time the user will have to understand what you're trying to do with all those colors.

L5.2 - HSL with CSS

CSS Selectors: each HTML tag (body) gets one set of styling detectives, in each case, we get one or two attribute-value pairs, including a font size, background color, color, etc. In all these cases, we use HSL (hue, saturation, luminance) such that 210 gets a true blue, with a saturation of 100%, and a luminance directive of 20% to shade it down alot to get a darker blue background.

High fidelity prototypes
Should convey the entire look of the system, or is built out of materials of the final products. For example, for a mobile app, the prototype should be the size of a mobile phone. Look out for the idea that the stakeholder thinks it's the final complete system. Important to manage expectations

Low fidelity prototypes
Is there for the low development cost, takes less effort, time and resource than a high-fidelity prototype. Allowing us to more effectively explore and evaluate other design concepts, a useful communication device, stakeholders can see and immediately engage with feedback on post-it notes for example.

CSS Selectors
Selectors specify which HTML elements you want to style

CSS 'box' model: Padding, Border, Margin
The box model is the idea that content has a border, but padding specifies how much space there is between the border and the content, while the margin specifies how much space there is between the border and other HTML contents.

CSS Cascades
They are designed for you to override what you have initially imported.

Week 6 | Lecture 6

Week 6 Slides Pre-Reading

Inclusive design is methodology that enables and draws on the full range of human diversity, that is, including and learning from people of different perspectives. Naturally, as designers, we design for our own abilities and biases. Although we need

inclusive design to create products for the greatest number of people, it should reflect diversity and should NOT act as a barrier to participation.

- Accessible refers to an attribute, while inclusivity refers to a method, and is more focused on disability.
- Assistive refers to specific tools or devices for disability
- Usable refers to the ease of use of a product or service

Principles of Inclusive Design
Principle 1: Recognise Exclusion
Principle 2: Learn from Diversity
Principle 3: Solve for One, Extend to Many

L6.1 - Intro to Inclusive Design

Designers often design based on our own set of abilities and biases.

PS5 Example
The PS5, as we all know and love, is designed for people who have two hands. Ofcourse, we cannot make a single product accessible to absolutely everyone, that is, someone who is blind, would probably encounter more challenges with design accessibility, but take for example, the PS5 Access Controller, which was designed for people who only have one hand.

Our biases as Designers
Let's say we were tasked, as a designer, to create controllers for a game. At first, it is hard to imagine a case of an access controller. This leads to the creation of products that are great for some people, but inaccessible to others. This creates a narrow demographic for the product. Another example of companies designing outside of themselves as baselines, is Google Home which can detect a diverse range of accents in English, while their competitor, Alexa, could only detect two different accents.

Exclusion
We should understand that there is no such thing as a "normal" user, just like there is not one single "average" student. If we make certain assumptions, we would be ignoring a big range of humanity. We should customise products so more people can use that product or service.

Different terms: Universal, Assistive, Accessible, Usable
These terms are interchangeable, but have different contexts that may change their definitions

Universal	The design for everyone in the broadest concept. For example, stairs with ramps. Hence, wheelchair users, walkers, bikers, etc can all use the ramps.
Accessible	It is an attribute, it is focused more on disability. For example, having raised sidewalks for blind people to navigate easily.
Assistive	It is more so, specific tools or devices for disability. For example, a walking stick for someone who is blind. It is something the user uses.
Usable	Ease of use. How we modify to augment the product to make it easy to use.

Principles of Inclusive Design

1. **Principle 1: Recognise Exclusion**
   As a human being, we are naturally biased, however exclusion happens when we solve problems with biases. Exclusion can be temporary or a situation, either way, it still exists.
2. **Principle 2: Learn from Diversity**
   We should constantly evolve and adapt. People, agenda, perspectives and contexts always change, hence we should change with these. The key is empathy, not just in terms of understanding their current context, but also how they adapt.
3. **Principle 3: Solve for one, Extend to many**
   Start with a target user, and think about how to include others into our target user. For example, movie subtitles can be used for people with hearing disabilities. But, there are other use cases of subtitles, such as eating chips, or watching late at night.

Persona Spectrum
There is a continuum from permanent disabilities to situational impairments.

1. Permanent: long-term or lifelong impairment
2. Temporary: short-term for temporary limitation
3. Situational: From specific environment or context an individual is in

	Permanent	Temporary	Situational
Touch	One arm	Arm injury	New parent
See	Blind	Cataract	Distracted driver
Hear	Deaf	Ear infection	Bartender
Speak	Non-Verbal	Laryngitis	Heavy accent

Activity (In-Class)
1. Present a common product or digital interface for an everyday activity
   The notes app
2. Brainstorm potential points of exclusion for individuals with different permanent, temporary and situational limitations related to at least one sense.
   Permanent: People who are blind
   Temporary: People who have cataract infections
   Situational: Someone who has a heavy accent
3. Think about mismatches between the users ability and the design of the interface
   The notes app does not have a voice feature which can read out notes, or allow someone to speak into a microphone to create entries. Although there is a voice memo option under the keyboard, this option is very small and not easy to navigate to for someone who isn't familiar with the Apple Notes app interface.

L6.2 - Designing for Diversity of Participation

The "I-N-G"s at the Playground
Susan Goltsman proposed the "I-N-G"s framework, where she asks:
1. "What I-N-G is most important to this environment?" What actions are important, such as running, digging, swinging, climbing, sleeping.
2. Secondly, she asks, "how many ways can human beings engage in that activity?" Participation does not require a particular design. But a particulaR design can prohibit participation.

Designing for Interdependence
The blind marathon is where a blind person runs with another runner as an assistant, who has complementary skills. Hence, we design WITH people, not for people. This is the idea of co-design to acknowledge diversity. Of Course the main dilemma is that we cannot make a 100% foolproof design.

Benefits:
1. Increases access: More users can use your design
2. Reduced FrictionL Less barrier to entry for users
3. More emotional context: Your design can be empathised by many

Diversity vs Inclusion
It is like the difference between hearing and listening. For example, hearing is like your ex-boyfriend. Who would physically be there to hear your bare minimum wants and needs then goes to fuck off and overstep your boundreis anyway. Listening is what your ex-boyfriend could never be, that is, actually paying attention to your needs and wants, and understanding that and changing behaviour to create a sound relationship.

Diversity is a community of different people, while inclusion is the culture that creates a sense of belonging, particularly among diverse people. Inclusion implies a diverse group of people feeling they belong. Diversity means a group of different people, but not necessarily feeling like they belong.