**DESIGN CONCEPTS---------------------------------------------------------------**

*The Relationship Between the Elements and Principles*

The elements and principles of design are the building blocks used to create a digital product or digital solution.

The elements of design can be thought as the things that make digital products or digital solutions (websites, presentation, brochure, video, poster etc).

* Good or bad – all digital products and/or digital solutions will contain most of if not all elements of design.

The principles of design can be thought of as what we do to the elements of design.

* How we apply the principles of design determines how successful we are in creating a digital product or digital solution.

*Features of a user-interface*

* *Logical and hierarchical organisation of content*

Considering the Order of Your Content - Readers of a website will not read all of the content of a page. The order of elements placed on a page should be carefully considered to meet the usability needs of the user as well as the purpose of the business's website.

* *Relevant help features of a graphical UI*
* **usability;** people will be able to use the website more effectively with the following;
	+ search functions
	+ site maps
	+ breadcrumbs
* **inclusivity;**
	+ language choice,
	+ cultural sensitivity (images in one culture may not be liked in another culture),
	+ gender neutral or specific
* **accessibility;**
	+ font resizable,
	+ alternate text for images,
	+ screen readers (software that vision impaired people buy to be able to 'read' the screen)
	+ choose colour blind friendly colours (not red and green together)

**HARDWARE------------------------------------------------------------------------**

*Hardware components and their uses*

**Central Processing Unit (CPU)** - The brains of computer that processes and calculates information required by the operating system.

**Random Access Memory (RAM)** - Primary memory of a computer that stores short term information for programs that is currently in use and demanded by the operating system.

**Hard Disk Drive (HDD)** - Secondary memory of a computer that stores long term information that is not in use by the operating system. Typically has a larger storage capacity than RAM but has a slower access speed.

**Motherboard** - The body of the computer that connects all external and internal computers together. Most information of a computer passes through the motherboard.

**Graphics Card** - Processing unit for graphics that converts information to colour outputs on a display. Graphic cards often include a video output such as HDMI, VGA or DVI to connect to an external display.

**Network Interface Controller (NIC)** - The NIC provides a computer wired and wireless networking capabilities.

*Mobile trends*

*Fingerprint scanners* - are a new trend amongst mobile phones, used to provide a quick and secure unlocking mechanism for unlocking phones, entering passwords or even purchasing items**.**

*Near Field Communications (NFC)* - is a communication hardware that comes standard in phones nowadays, enabling a variety of features.

*Wearable Technology -* around mobile phones is diminishing with the latest features including the usual suspects of better cameras, processors and screens etc.

*Virtual reality* - Mobile technologies are now incorporating virtual reality, the mix of virtual elements in the real world.

**APPLICATION SKILLS-------------------------------------------------------------**

*online software tools*

**advantages:**

* workers can work from home as work software is available online
* no need to download and install any software
* no need for maintenance of the software on your local machine, upgrades etc.
* you can use pay as you go software, so no need to pay large amounts up front e.g. adobe
* creative suite.
* you can use free online software such as google apps, google docs, Photoshop free online
* collaboration with fellow workers, clients, friends, now global, using online communication software

**disadvantages:**

* poor internet connectivity will stop online work
* some online software doesn't have the same features as the locally installed software
* product quality may be inferior because the online software was developed by a one-man
* operation
* product may be insecure and lead to privacy issues.

*video application features*

* multi-layer track editing, titles, transitions, effects

*sound application features*

* volume, sound effects, high speed scrubbing, deletion/multiplication of audio

*publishing features*

* colour schemes, layers, frames, typography, templates, print/display option

*types of digital publications*

**ePUB advantages:**

* Delivered as one .zip file, Easy to unpack, very user friendly, Not owned by any large corporations

**ePUB disadvantages:**

* Creating is not easy to do, creating .zip for publishing is also, Difficult

**PDF advantages:**

* Can be opened by most computers, can be made on various programs, Reader software is free, Safe as it is difficult to modify

**PDF disadvantages:**

* Can sometimes not display correctly on smaller screens, not free to edit PDFs, Editing PDF is not easy

*how digital communication is used for educational purposes*

**teacher use**

* they provide learning to students via a portal 24/7, anywhere anytime
* this learning can be a list of knowledge to be learnt, games or activities, discussion forums or quizzes
* they provide learning pathways to web resources,
* they share collaborative documents e.g. google docs
* they provide upload of assignment locations to students
* they provide online assessments to students
* they communicate to parents and students via email or messaging
* they do reports and assessment online

**student use**

* students use digital technologies to socialise
* they also use digital technologies to access virtual learning environments
* they collect learning concepts from teachers
* they collaborate using online forums
* they submit assignments and other work through portals

**parent use**

* they communicate to teachers via email and messaging
* they observe student progress through school portals
* they receive text messages when students are absent
* they book parent / teacher interviews online

**Advantages of Digital Technologies in Education**

* lots of resources available to the classroom
* 24/7 availability of resources
* student input is greater via discussion forums
* it is possible to get education online e.g. certificates, diplomas, degrees

**Disadvantages of Digital Technologies in Education**

* an internet connection is essential, if it fails so does the learning
* students get distracted by game websites preventing learning
* health problems from too much computer use; e.g. eye strain, wrist and finger repetitive strain injuries (RSI)
* digital divide leads to lack of opportunity for students without computing resources

**IMPACTS OF TECHNNOLOGY--------------------------------------------------**

*the concept of intellectual property (IP)*

Intellectual Property is the proprietary knowledge in the form patents, registered designs, trademarks and/or copyright. Intellectual property in Australia is administered by IP Australia, a government organisation. Intellectual Property gives owners the right to:

* Exclusively exploit the product for commercial gain
* Prevent others from unauthorised copying and distribution
* Gives ground for legal compensation for unauthorised use

**Patents**

Patents are a legal document, under the Patents Act 1990, that grants the user exclusive commercial rights to exploit a new product or process for commercial gain.

**Registered Designs**

Registered designs are a legal document, under the Designs Act 2003, that grants the owner exclusive commercial rights to exploit a unique visual appearance of a product.

**Trademarks**

Trademarks are a legal document, under the Trade Marks Act 1995, that grants the owner exclusive commercial rights to a keyword or phrase of keywords. Trademarks cannot include common phrases or words.

**Copyright**

Under the copyright act 1968, copyright is applied automatically to all products and no legal application and approval is required. Copyright gives the owner exclusive rights for fair dealing, private use and moral rights to a product.

*the concept of online defamation in Australia*

Online defamation is the process of publishing untruths about someone on the internet with the purposes of intentionally causing harm and damage to a person's reputation.

*How to counteract online defamation*

**1. Record all evidence of online defamation** - Recording evidence of online defamation provides legal security in the event legal action is required to take place. Evidence can be used as grounds for legal action and demands for compensation.

**2. Block User** - Victims of online defamation should immediately block the user. However, blocking does remove the ability to record evidence of further online defamation.

**3. Report Content** - Online defamation victims should report the content to website administrators who should remove the content.

**4. Contact Legal Advice -** Victims can contact legal advice for further information on combating online defamation. Victims have the right to sue, and in some cases criminally charge, perpetrators under the Defamation Act 2005.

*the concept of freedom of information (FOI) in Australia*

The Freedom of Information Act 1982 is administered by the Office of the Information Commissioner (OAIC) and allows an individual the right to access personal documents or documents in the public interest held by government ministers and government agencies.

*Virtual collaboration*

Virtual Collaboration refers to using online technologies to allow for communication between two or more people in different geographical locations.

**Advantages of Online Collaboration (Business Perspective)**

* ​Reduced costs - managers do not have to rent meeting rooms
* Increased productivity - employees do not have to travel to meeting areas
* Delayed Communication - employees can start a conversation at one time, stop and resume it at another time

**Disadvantages of Online Collaboration**

* Misinterpretations - communication could be misinterpreted due to the limits on emotions and body language in virtual collaboration
* Security vulnerabilities - easier to record or hack virtual communication. A user of virtual collaboration could use a screen recorder to record meetings without knowledge of other users.
* Confusion over ownership of collaboration material - Who owns collaborated produced files?
* Communication is limited to internet speeds and bandwidths
* Additional training may be required to teach employees how to use virtual collaboration software and technology

**PROJECT MANAGEMENT-----------------------------------------------------**

*concept of service level agreements*

Service Level Agreements are a contract between a service provider and a user of the service (i.e. the customer), that defines the expected quality of services to be provided by the service provider.

*features of service level agreements:*

* **availability of service** - This section of the Service Level Agreement outlines the period of time the services will be provided and the quality of service to be provided, including outlining any downtimes such as those from routine maintenance, planned outages or unplanned outages.
* **type of services** - There are three main types of services for use under the Service Level Agreement:
* Customer Service Level Agreement - A customer service level agreement is a contract between a service provider and an external customer. An external customer is someone who receives services in exchange for money.
* Internal Service Level Agreement - An internal service level agreement is a contract for an internal customer, that is someone who works in a different department of the same organisation.
* Vendor Service Level Agreement - A vendor service level agreement is a contact between a service provider and a vendor. A vendor is someone who provides service to the company.

*advantages of local and global outsourcing*

* Reduced expenses. You get to enjoy significant cost savings when you outsource to a country with lower production costs: a lower cost of living for employees, meaning lower salaries, as well as lower infrastructure and operational costs.
* Access to a global talent pool. Outsourcing allows you to reach professionals that may be in short supply or unavailable locally.
* Significant time savings. When you partner with an outsourcing vendor, you don’t have to advertise for, interview, select, and train new in-house employees, all of which can be very time-consuming.
* Ability to upscale fast. You’ll be able to work with new clients and take on new projects without having to spend time on the processes described above.
* Uninterrupted workflow. Your business will function round the clock thanks to the time difference between the in-house team and the outsourcing vendor’s team.

*purpose of outsourcing data management*

Data management outsourcing results in more versatile service options to better address a business' needs. It also helps in the timely implementations of data-related tasks. This enables a business to focus on other valuable processes to ensure the company's growth.

*evaluation of software, including usability*

Surveying users on the page will give you the feedback you need to improve the user experience and usability for your audience and increase conversions for your business and allows you to self-reflect.

**NETWORKS------------------------------------------------------------------------**

*types and characteristics of communication protocols, including:*

* transmission control protocol/internet protocol (TCP/IP)

TCP/IP is a communication protocol that defines how data packets are communicated between different networks. For example, if you had two separate networks connected together by a router, the connection between the two routers would use TCP/IP to communicate with one another.

* hypertext transfer protocol (HTTP)

HTTP defines how data packets are communicated between a device and a web server and what actions a device and web server should take in response to the data packets.

* hypertext transfer protocol over secure socket layer (HTTPS)

Some URLs have HTTPS instead of HTTP. Hypertext Transfer Protocol Secure (HTTPS) simply means there's a secure channel where the regular HTTP process has taken place, but data packets are encrypted through public key infrastructure

* wireless application protocol (WAP)

WAP is a communications protocol that defines how data is transmitted securely between two wireless handheld devices such as pagers or two-way radios.

*types and characteristics of communication standards, including:*

* 802.11x (wireless)

Wireless 802.11.x is the Wireless standard to how two wireless devices use radio waves to communicate with one another.

* 802.3 (ethernet)

Ethernet 802.3 states that no device has control of data flow in a network and that devices send data packets when network communications become readily available. If a data collision occurs, then data packets are resent until it is successfully transferred.

*types of network security measures*

firewalls - A firewall is a system designed to prevent unauthorized access to or from a private network. You can implement a firewall in either hardware or software form, or a combination of both. Firewalls prevent unauthorized internet users from accessing private networks connected to the internet, especially intranets.

* can be a server that filters incoming data from blacklisted IP addresses
* can be a proxy server, the gatekeeper for what packets of data get in or out
* can be software on your computer to protect who accesses your computer
* you can ban certain protocols, e.g. File Transfer Protocol (FTP) which can upload dangerous
* files to computers

passwords- A Password is a set of secret characters or words utilized to gain access to a computer, web page, network resource, or data. You need a username and password to maintain the security of your account. It will ensure that no unauthorized parties can access your private information.

* is an access code to get into a computer or device
* better passwords are NOT just dictionary words e.g. 3nter
* better passwords are longer passwords, the longer the better, e.g. 15 characters or more will
* take a long time to crack
* if you have important data, use a strong password
* don't use a password that is a family member or pet

physical security - describes security measures that are designed to deny unauthorized access to facilities, equipment and resources and to protect personnel and property from damage or harm.

* stop anyone from getting into the building
* keep the doors locked
* stop anyone from taking the data
* physical security can include someone standing in front of a door

**MANAGING DATA---------------------------------------------------------------**

*security techniques for the management of data, including:*

disaster recovery plan - Disaster recovery plan is a written plan to restore business ICT equipment after a disaster has taken place.

audit trail - Audit trails are an electronic or paper log that records details about a user's access to a file. Audit trails record details about access to specific documents including:

* when the data was accessed
* who accessed it?
* what was accessed

*types of backup techniques and archiving of data*

Full Backup - A backup that makes a copy of the entire contents of a system onto an external source.

Advantages:

* Consolidated, central location for all backups

Disadvantages

* Backup process uses the largest volume of storage space
* Requires the longest time to complete the backup

Differential - A backup that makes a copy of all new or modified files since the last full backup.

Advantages:

* Uses less space than a full backup
* Faster to complete a differential backup than a full backup

Disadvantages

* Backup files are scattered amongst multiple locations

Incremental - A backup that makes a copy of all new or modified files since the last full back up or incremental backup.

Advantages:

* Uses less space than a full backup
* Faster to complete an incremental backup than a full backup

Disadvantages

* Backup files are scattered amongst multiple locations

Daily *-* A backup that makes a copy of all new or modified files on the day of the backup. Daily backups are performed each day.

Advantages

* Uses least amount of space
* Shortest backup time
* Regular backing up of files

Disadvantages

* Backup files are scattered amongst multiple locations

*Online Storage Methods*

Data Warehouses - the facilities that hold all data for the business. Data warehouses are comprised of hundreds of servers connected to provide users their specific data and the business a summary of that historical transaction data.

Data Mart - Data marts are a subsection of a data warehouse that hold data relating to a specific function or department of a business.

Data in the Cloud -Data in the cloud refers to online cloud storage, where data is stored offsite of business premises, onto internet connected servers located around the world. Security and privacy of the data is surrendered to the cloud storage provider and what they can or cannot do with the data is outlined in their license agreements. In addition, data stored around the world is subject to different privacy laws.

*Purpose of Data Mining*

Data mining is extracting patterns, trends or information from data sets. Almost everything you do online can be tracked and used to data analytical purposes. Some online methods of data mining include:

* Search engine queries - recording of recent internet searches
* Cookies
* Social media activity - voluntary information given when creating a profile (name, email, sex, interests, friends)
* Internet Tracking Software
* Online purchasing history

There are also offline ways to collect information, including:

* Credit card transactions
* Loyalty cards - Egg Flybuys, Woolworths Rewards, Myer One
* Information handed for surveys or competitions

*Processing of data considering security*

Firewalls -Works as a literal wall that filters out traffic and in traffic on a network and works to protect and block unauthorised data from harming data on the network

Biometrics - Uses unique biological characteristics such as eye and finger prints to completely authorise who is using the scanner

Anti-virus software - Prevents, detects and fix problems on the computer revolving specifically around malware and virus' and works to clean the computer of dangerous infections

Digital signatures - a virtual version of a person’s signature. This is used to show authenticity and authoritative as the signature should be unique and recognisable and associated with a person

Digital certificates - A digital certificate is a private key logged on a computer and require certification and acceptance before it is allowed access, this way certified confirms that both networks/computers are who they say they are

Encryption - Encoding and ciphering a message or information so that only trusted devices and computers can access the encrypted message with a key

*Concept of user-generated content*

Any form of content and media that was created by users of an online system or service, often made available via social media websites.

Positives

* Voice, upcoming trends, simple, marketing strategy, share stories and easily accessible

Negatives

* Bias, credibility, moderation and ownership problems

*Concept of hypertext mark-up language (.htm/.html)*

A programming language but instead of using syntax, it uses tags. Tags are used to tell a web browser where and how to display information

*Concept of Web 2.0 and Web 3.0*

Web 2.0

Allows for user interaction and participation by having a user-friendly interface where one can edit and publish the existing information. Web 2.0 has implemented: Collaborative, Group Participation, Two-Way Communication, Active Involvement, User-Generated Content & Blogging.

Web 3.0

Semantic Web describes sites where computers will be generating the raw data on their own and is the next evolution of the internet. This refers to devices being able to communicate and exchange data between one another that are connected to the web and even generate new information.

*Content management systems (CMS)*

A computer application that supports the creation and modifications of digital content using a simple interface to abstract away low-level details unless required, usually supports collaborating users.

*World wide web consortium (W3C)*

Main organisation behind placing global standards for the internet/world wide web, attempt to capitalise on the potential and full potential that the world wide web offers, enforces 9 conventions to install capability, compatibility and agreement, attempts to keep the world wide web consistent, Consortium implements set of core principles and components hand chosen by the W3C

*Purpose of W3C conventions*

HTML & CSS

All web pages must use HTML and CSS. Most current version is not necessary but must use a sort of html/CSS. W3C accepts the use of Web Fonts

*Graphics* - You must always use .png file format for any raster image for webpages. You must always use .svg file format for any vector image for webpages

*Audio and Video* - Recommended to use following formats for audio and visual: SMIL, Timed text media and media annotations

*Accessibility* - W3C request that you follow 4 sub-criteria to make the webpage most available for all, these criteria are: Perceivable, Operable, Understandable and Robust

*Internationalisation* - Easy for the information to be perceived by people of different cultures, background and language capabilities. Promotes the use of Unicode so that information can be easily translated through third party means. Easily convey to users which language is used in the website and which languages are available

*Validation techniques for online forms*

Check to see if the data is in the correct format e.g. for an email field; is an @ symbol and domain present

* check for duplication e.g. creating an account displays username availability
* check for completion of essential details e.g. some forms have an asterisk \* for essential fields
* for essential details, it is a good idea to put it in twice. e.g. choose password, re-type
* password - if validation fails, the user should be given clear help to identify the error. e.g. a red box around the mistake
* the error can also be a pop-up tool tip, or a change of colour of the field
* can occur once the submit button is clicked
* can occur in real-time, while the user is filling in the field