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**Unit 15 Task 1 Doc 2 – Web Development**

**Principles of website development**

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| M1 | Analyse how the principles of website design are used to produce creative, high-performance websites which meet client requirements. |
| D1 | Evaluate how the principles of website design are used to produced creative, high-performance websites which meet client requirements |

**Principles of website development**

The process of building and deploying websites online is referred to as website development. Tools for testing and debugging websites help developers build better websites.

Websites were originally intended mostly to be used for the exchange of text and ideas. Hyperlinks allowed websites to be shared across the internet. In its early days, the internet was hugely used by scientists and doctors who would share their knowledge.

We have used links to raise awareness of your website. These links should be able to be redirected and searched for. Despite having links/hyperlinks today, we still use them to share content with others. Suppose somebody likes a product but cannot purchase it online, they may send a link/hyperlink to someone else who will buy it on their behalf.

**Purpose of modern websites**

A modern website design must focus on creating a tidy, little, and user-friendly experience while having all the functionality which are required to increase conversions. A long time ago, all websites were simply text. However, with the progress of modern technology, increased websites have images, videos, GIFS, and sounds.

Business owners are increasingly embracing modern websites because they are easy to use for promoting their products, since they can show customers what their product looks like.

**Web 2.0**

Web 2.0 is where users can create and share online information and materials using a variety of websites and applications.

Although initially designed to only provide information, web 2.0 introduced a content-based technology that lets users interact and add their own content to websites.

The following are just a few examples: Wikipedia, Twitter, blogs, Facebook, and many more

**Social Media:**

With social media, the program allows users to be able to interact with other accounts by creating their own unique accounts. The direct message option enables users to communicate with each other directly via messages and pictures. The most common sources of social media are: Facebook, WhatsApp, YouTube, Tiktok and Instagram.

**Application Software:**

Software such as Microsoft Word, spreadsheets, VLC media player, and Firefox are examples of application software. In order to get these applications,

**Audio and Visual media services:**

It is possible for websites to stream media for users. Music and podcasts can be listened to over and over on applications like YouTube music and Spotify. However, these include subscriptions which may put off some users, but they are also beneficial.

Product and service-based websites

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| **Service:** | **Examples:** | **Target Audience:** | **Benefits:** |
| **Commerce** | * Ebay * Amazon | consumers | Convenient transactions from any device. |
| **Real time information** | * Weather report * Travel info | reporters | Provides current information that is immediate. |
| **Communication** | * Email * Blogs * facetime | Colleges,  Reporters,  businessmen | Keep up to date, allows you to contact others. |
| **Software Download Services** | * Movies * Games * Sky player | Gamers,  Streamers,  Teenagers | Great form of entertainment of all. |
| **Virtual learning environments (VLEs)** | * Teams * Zoom * Google classroom | Students,  Teachers | Allows teachers and students to interact with chat and voice. |

**Problems with security and privacy**

In addition to making the internet more useful and interactive, user-based websites also increase security. The use of increased security is better for us as it reduces cybercrime.

People increasingly rely on the internet for their day-to-day lives, putting their safety at risk without knowing. A major example is online shopping. In this case, you are giving out all your credit and debit card information along with your personal information that could lead to frauds. Those services can be compromised by hackers who are able to leak confidential information to the public. Several factors can determine whether this information is public or confidential, such as a first name or credit card information.

**Benefits of buying products and services online:**

**Convenience:**

By purchasing a product or service online, a user can save time because they do not have to go to a store or place of business to conduct their business, instead, all of that is done online.

**Accessibility:**

When a user decides to purchase a product in a traditional manner, there are several factors to take into consideration. These factors include whether the item can be found in local shops, if it is in stock, and how it will be transported. Users can check multiple retailers via an ecommerce site to determine whether the item is in stock, and the ecommerce website handles all shipping and delivery for the user.

**Time:**

An online consumer can save time since they do not have to wait in lines and enter their details as they do so instead of visiting a physical store. For customers to buy a product at a shop, they must drive, walk, or use public transportation from their home to the store. This process, depending on how far the shop is, can take a significant amount of time.

**Risks of buying products and services online:**

**Account Security:**

Users of an online service might keep their credit card information on an account if they use this service frequently to buy products. A user might save their confidential information like credit card details on an account when they frequently use an online service to buy products.

**Key requirements of websites**

**User-Friendly:**

User-friendly websites focus on ensuring that visitors understand and use your website in terms of layout, design, and content. An understanding of how to produce such a website will significantly improve your ability to produce one that is user-friendly.

**Consistent:**

Maintaining consistency, or having things remain the same, is a core principle of website design. Consistency can apply to many distinct aspects of website design. An inconsistent approach to website design will frustrate site visitors because inconsistent colour schemes, fonts, typography, and placement of links on pages will result in an unusable website.

**Navigational:**

A website's navigation should be as simple and easy to use as possible for users to navigate and find the information they are searching for. Think of the navigation as a map to all the different areas and content on the site. The consistency of the navigation system will help users find the information they desire more quickly, while keeping unnecessary navigation levels to a minimum.

**Customizable:**

Technology has enabled customizing website interfaces for website users, which facilitates the attraction of inexperienced users and keeps existing ones engaged.

**Responsive:**

These sites are built to automatically adjust their layout according to the browser being used, no matter if it is on a PC (Personal Computer) or phone, without requiring resizing or scrolling excessively.

**Quantum Computing**

A computing method based on quantum states exploits collective properties to produce computations. Computing quantum computations is the function of a quantum computer.

Advantages:

* Collects data faster.
* Can predict before the process is done.
* Useful on big data

The use of quantum computing is also applicable to artificial intelligence, which has a variety of possibilities in digital services and e-commerce, including making more accurate suggestions for users. By utilizing artificial intelligence, an online shop can make the best recommended items for users browsing the shop.

**Principles of website design**

Website design is incredibly competitive, and the best web design can lead to the most successful websites. However, for a website to be successful, it must abide by superior design principles.

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| **Usability** | An easy-to-use website has good usability. In terms of usability, it refers to the ease with which visitors can interact with a website. |
| **White space/spacing** | The distance between the elements in a composition. This refers to the space between graphics, columns, images, text, and margins. |
| **Site layout** | The layout of a website defines its structure (or framework). Both the website's owner and users rely on it to structure the information present on the site |
| **Accessibility** | An accessible website is one that is designed so anyone can use it, even people with disabilities. |
| **Navigation** | This allows movement from one page to another. Links to other web pages are organized in a navigation menu |
| **Typography** | Typography comprises 95% of website design. The main task is to make letters and numbers readable and clear. |
| **Alignment** | Text alignment refers to the positioning of the text on the screen. For example, left align / right align. |
| **Clarity** | In website design, clarity is how clear and useful something is. |
| **Consistency** | Consistency makes your work look good by using different elements: headers, footers, sidebars, and navigation bars. |
| **Accuracy** | Accuracy is how reliable a webpage is and if it is trusted. Also refers to error free and tidy websites. |
| **Content** | Content in web design is the process of generating support and for promoting. |
| **Media and objects** | Media and objects can refer to by links and URL hyperlinks. |
| **Simplicity** | Simplicity on website design allows search engines to link to your website. |

**Features**

Zoom feature - Various web browsers allow users to zoom in or out of the content, making it larger or smaller based on their preference. This is particularly useful for people who have poor vision.

Text to speech - The text-to-speech (TTS) software is particularly useful for visually impaired people since it creates a spoken sound version of the text on a webpage.

Alternative tag - As an alternative to the image itself, an alt tag provides a text alternative for its display on a web page (see next slide). If the image cannot be displayed, the alt tag takes its place. It will be read and understood by screen readers and other website viewers.

**Media and objects**

Objects such as videos, audio, and interactive content are embedded into web pages to attract and engage website visitors. As mentioned above, media includes videos, audio, and interactive content. Furthermore, applets, PDFs, and Flash can also be embedded into web pages.

**Implementation of media and objects:**

**Position:**

Is there a logical place to put media or objects on a web page? In order to grab the attention of users, both objects and media must be visible, but you need to consider how prominently they should be positioned.

**Size:**

In site development, a web page's screen size is a big consideration. Media objects are employed to attract attention. On the other hand, when you import a video on your website that occupies most of the screen, it will impact where your other content will appear, and users will need to scroll to see it.

**Colour:**

In web design, colour plays a vital role, as well as whenembedding object elements such as Flash, a form of animated content that attracts users' attention. A high number of vibrant colours can be overwhelming to users. Additionally, those who are sensitive to light should be considered.

**Contrast:**

When you use two elements on a web page, it is useful to distinguish between them. For instance, if you embedded a Flash image on your web page, and the background was one of the key colours from the Flash image, the Flash image would be difficult to tell apart.

**Appropriateness:**

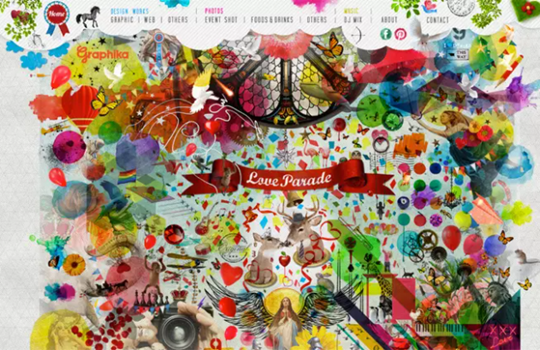
You need to decide whether the media and objects truly add anything to your website's effectiveness. Besides attracting users' attention, media and objects can also make websites load more slowly, which can slow down traffic. the feature might not be available on all browsers, particularly on mobile devices.

**Creativity and innovation**

Due to the abundance of websites being developed every day, as well as the fact that most businesses are heavily reliant on websites, it is imperative that websites are creative and innovative to attract customers. Even though websites must be different, they should not be different solely for the sake of being different.

**Unconventional layouts:**

Many websites follow a standard layout template, So, they do follow some web design principles, which is acceptable. It is still necessary to allow for creativity and innovation. Thousands of websites are created every day so new ones must be unique. Designing a website is continuing to grow, and it is still possible to produce new, clever ideas.



**Sources of Information compared to the Internet**

When gathering information, the internet and paper-based documents are the most reliable sources of information. Nevertheless, there are other sources available.

**News:**

News is available in a variety of formats, though live news on television is the most popular. It is possible for news to provide updates on any situation that is happening right now. Because news is updated in real time, it can be trusted

**Golden ratio**

The golden ratio dates back over 2000 years, unfortunately we do not know who discovered it. It is also possible to apply it to website design. A simple mathematical equation produces the golden ratio.

The special number produced by this method is equal to 1.618 and is found by dividing a line into two segments so that the longer section is divided by the smaller segment. The smaller segment is equal to the entire length divided by the long segment: a/b = (a + b)/a

**Examples of the golden ratio**

**Science:**

Physics has utilized the golden ratio in their work. Astronomy uses the golden ratio as well. A spectrum of distances can be seen in the Solar System and throughout the Universe, from the distance between the planets to the structure of Saturn's rings to the shape of the Universe as a whole. Discoveries in quantum mechanics and atomic structure reveal that it exists in molecular structures.

**Art:**

It is common for artists to work with the golden ratio. Here are a few examples:

* Typography
* Grids of Texts
* Website Design
* Logo Development
* Cropping and Resizing of Images
* Nature

**Architecture:**

Many diverse types of architecture use the golden ratio. Pyramids such as Giza's are among the earliest known examples. There is a similar relationship between the height and width of the pyramid that is like the golden ratio.

**Nature:**

Golden ratios can also be found in human faces, the geometrical arrangement of the faces often follows the golden ratio Natural examples of the golden ratio occur on flowers with a symmetrical number of petals.

**Search Engines, SEO, and web crawling**

**Search engine optimization (SEO):**

In search engine optimization, a developer can optimize their website to appear high in search engine results for related keywords. Optimizing the number of visitors to a website is one way SEO helps increase traffic to a website. Website developers optimise their websites for search engines by using a variety of techniques. Outlined in the subsequent slides are several of the ways that they do this.

**Web crawling:**

In web crawlers, web pages are routinely and systematically crawled by Internet bots. They are usually operated by search engines for the purpose of indexing web pages.

**Disadvantage of web crawling:**

In some cases, crawlers provide too much information, making them difficult to use, easy to trick. Websites have hidden data that can be manipulated to make them appear as something they are not.

Often, crawlers will attempt to spider your website aggressively, which can result in a server overload. Crawling should thus be kept to a minimum.

**Indexing (Meta tags):**

All website developers need to include meta tags on their web pages to make a web crawler work properly. This text is not necessarily displayed on the webpage; it merely tells search engines what information a website contains. Meta tags are embedded into a page's <head> section to provide information about a website to search engines.

**Keywords:**

An electronic search engine returns matching and relevant results when a word or phrase is entered into the engine. If the web designer wants to use keywords appropriately, there are a few steps they should take:

* Ensure your keyword descriptions are relevant to your business, products, or services.
* Search engines are dominated by words and phrases that people type into them when looking for information on the web.

**Updates**

The frequency with which your website is updated is a determining factor in whether it is relevant. Your website's update frequency can be determined by search engines. Search engine's view websites that are updated regularly as sources of fresh content. Thus, the website will be ranked higher in search results.

**Website Performance:**

A successful website relies on its performance. Performance of a website is influenced by a variety of factors. Depending on the performance of the server, websites may load slowly or not at all. Providing a slow response time to your website could result in users leaving for more responsive sites.

**Running Scripts client-side or server-side:**

Server-side scripting is used to run interactive features and create databases on the web server; client-side scripting is used on the client machine. It is the server that interprets the script in the page so that it is suitable for the unique needs of the device, and then it is sent to the device. A disadvantage of server-side scripting is that it may slow down the user experience when a user makes a request to the server and increase the load (strain) on the server. This involves scripts that run on a user's computer, rather than on a server, and provide extra interactivity within websites without the need to connect to a server. Client-side scripting is useful since it prevents a user from connecting to a remote server.

**Browser compliance:**

The rendering of code will differ between web browsers. A web browser can interpret your website's code in an unusual way from how it would be interpreted by another browser when it is loaded in a web browser. A website must also be compatible with two or three web browsers, but some elements of webpages may not be supported. In this case, your role is to build a website that appears consistently across these browsers.

**Server-side factors**

Server-side performance factors affect websites because they talk about the capabilities and capability of the web servers in use and whether they have been bought or rented.

**Bandwidth availability:**

An amount of traffic that a web server can handle; specifically, the number of pieces of content that can be uploaded at once.

**File types:**

Website developers should balance quality and file size when choosing which file types to use for a website. A website will be quicker to download if it uses smaller file types.

**Client-side factors:**

The performance of websites can also be affected by client-side factors: that is, the computer system of the user. Users with systems that do not meet the system's capabilities can have trouble accessing some websites, especially those that have poor server-side performance.

**Internet connection (Upload/Download speed):**

For web pages to be downloaded or uploaded quickly, the speed of an internet connection is crucial.

**Computer speed (Processor):**

Like the download speed is determined by the connection speed, the display speed and interaction speed of the user are determined by the computer components. Website developers must decide between high user specifications and a high number of visitors based upon the fact that the user's device may not have a fast processor or large capacity.

**Internet connection and methods**

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| **Types of connection:** | **Connection Method:** | **Description:** | **Typical Speed:** |
| **Fixed line narrowband** | Dail in call | Dail calls use analogue telephone lines that exist. This method of connection was traditional. | Around 56 Kbps |
| ISDN (Integrated Services Digital Network) | A method of getting faster speeds than dial-up. Faster connections are gradually replacing ISDN. | 128 Kbps |
| **Fixed line broadband** | Fibre Optic | Visible light is used for the transition process in fibre optics | Range from 1Mbps to 8Mbps |
| Broadband | Faster speeds are being researched and developed constantly for this connection method. | 100Mbps |
| DSL (Digital Subscriber Line) | Providers of broadband services typically use this method. DLS is common. | Preceding to 1000 Mbps |
| **Wireless broadband** | Hotspot {Wireless} | Cafes and shops often feature wireless hotspots. Nevertheless, you may need some assistance in obtaining the password | Increase from 384Kbps → 30Mbps |
| Mobile data | A mobile phone generates internet via this method. This method is widely accessible anywhere. | Dependant on broadband and amount of interactions |

**FTTH and FTTB:**

**What is FTTH?**

Fibre to the home is also referred to as FFTH. Our houses are connected to fibre optic cables via this location. Typical speed of this can vary from 1 – 10 Gbit

**Advantages of FTTH:**

* Exceptionally large medium and speed.
* The network has low losses.
* Improved reliability of broadband transmissions when compared to current and future networks.

**Disadvantages of FTTH:**

* Expensive to set up.
* Hard to set up.

**What is FTTB?**

Fiber-optic transport by fibre is a delivery method for fibre-optic signals applicable to only those properties that contain multiple living or working areas. The connection most often travels along copper lines to the respective customers.

**Advantages of FTTB:**

* A limitless amount of traffic on the Internet
* An IP-telephone and TV can be connected through one cable.
* Featuring speeds up to 100 Mbit/sec, you can easily download movies, join online conferences, and play on the network in minutes.

**Disadvantages of FTTB:**

* Fiber optic cable and the hub are expensive to install and hold in the house.
* Fiber optics can transmit information at speeds up to 1 Gbit/sec, but with twisted pair distribution, it can only transmit 10 times the speed.
* Streams

**Cache Memory**

Your computer's cache memory is the memory that it has. The bigger the cache, the faster your computer will be. By reducing average access time to memory, cashe memory becomes more efficient. A computer with more RAM will respond faster to websites that you are accessing. Cached data may be located on the hard drive as well as within the system's RAM.

**Browsers**

The speed at which a web page loads depends on the web browser. Not all web browsers load pages at the same speed. The older a Brower is the more likely they are to being slower. This is because modern technology is always updating to make sure everything is up to date. For example, Mozilla Firefox was first released in 2004 therefor it does not have all the up to date connect speed, where as Microsoft edge was first released in 2019 making it more effective

**Interactivity**

A website's loading speed can be affected when interactive elements are incorporated, such as high-quality images and embedded games. As your computer system downloads all the information on an interactive website, it will take more time. Thanks to modern technologies such as 4G, 5G, and fibre optics, this is less of an issue. Users now expect interactivity from websites, and interactivity has become standard.

**how the principles of website design are used to produce creative, high-performance websites which meet client requirements**

One of the major requirements I was asked to add by my client was a navigation bar to make my website more accessible and navigable. Therefore, I will create 4 subpages which are home, products, contact us and login page.

Adding a product page was prompted by the fact that I was told by my client that they wanted a convenient way for customers to view all their products and their prices. Therefor I am going to created, as my client asked, a subpage which can be accessed from the hyperlink on the homepage or from the navigation bar.

The back to top button was also one of the features that were highly recommended to my website. When this button is clicked, the page will automatically scroll to the top. This is particularly useful with online websites which have many pages. It makes sense for me to add this feature to each of my subpages so that my entire website remains consistent.

In response to my client's request, I am going to include at least one form on my contact us page and on my login page.