Multimedia design documentation

Target audience: The first part of the design stage is to state the purpose of the multimedia project. This will involve identifying the target audience for the product. Consider: Age range, Gender (if appropriate), Ethnicity/culture/language, Level of computer experience

User requirements: User requirements are a list of things the client wants the product to look like and do. After doing some fact finding by asking questions, interviewing the client and observing current working practises, the design team would provide exact details of what animals, sounds, videos, games and assessment the teacher may require.

Navigation structure design: This is used when there is potentially more than one way to navigate or move through your multimedia product. A navigation chart shows the possible pathways between screens. For example, the nursery teacher may want the children to be able to navigate around the farmyard selecting any pathway. In general, a navigation chart will contain less detail than a storyboard (see below) and provide more of an outline.

Storyboard: A storyboard shows each interface you want to have on screen, one after the other. You can include pictures, text and descriptions to explain what you are trying to achieve. You might want to describe some sound or music, or transitions between screens.

Image sources: To aid the product designers, the design plan will indicate: Filenames, Filetypes/Formats, Physical dimensions (height x width), Size (on disk).

Navigational structure diagram

Navigation structure diagrams are used in the design stage to provide an overview of how the entire system will link together and how the user is expected to navigate between different interfaces. Navigation structure diagrams are especially important when there is more than one way to navigate your database or website.

Graphical User Interface (GUI)

Graphical User Interface (GUI): At a glance: A Graphical User Interface (GUI) is not text-based and is described as a What You See Is What You Get (WYSIWYG) interface. A GUI uses Windows, Icons, Menus and Pointers (WIMP)

Main features of a GUI: They make use of many graphical features. These include: Icons, Pull-down menus, Toolbars, Scrollbars, Selection boxes and Dialogue boxes

Natural language interfaces (NLI)

Natural language interfaces allow the user to interact using written or spoken 'human' commands instead of computer language. Words are used to instigate functionality such as creating, selecting and modifying data. For example, Siri, Alexa, Google Assistant or Cortana are natural language interfaces that allows you to interact with your device's operating system using your own spoken language. Natural language interfaces can, however, be difficult to use effectively due to the unpredictable and ambiguous nature of human speech. Variation in tone and accent can lead to misinterpretation.

Accessibility

Plug-ins: A plug-in is a piece of software that enables an application or program to do something it couldn't do by itself. One of the more common plug-ins is Adobe Flash Player. Without flash player you won't, for example, be able to view many video players that are embedded into web pages. Numerous plug-ins are available to extend the functionality of web browsers, from Adobe Acrobat reader to Sun's Java, allowing us to view pdf files and run scripts written in Java. Due to security issues arising from third party plug-ins, many vendors no longer support them and prefer to use HTML 5. Often scammers will attempt to make malware look like legitimate plug-ins.

Portable Document Formats (PDFs): PDFs are a file format that captures all the elements of a printed document as an electronic file that you can view, navigate, print, forward or share. PDFs are created using specialised PDF software, for example Adobe Acrobat. PDFs improve cross platform compatibility as you can freely download the software required to view and use the file. PDF reading software is device independent and will work across all platforms. PDF files are especially useful for documents such as magazine articles, brochures or flyers in which you want to preserve the original appearance and layout online regardless of the platform that it is viewed on.

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Published 6th June, 2022.
Last updated 6th June, 2022.
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Mail merge and Macros

The five main steps in setting up a mail-merged letter are: Create a database with fields for the names and addresses of the people to send the letter to Write the letter using a word processing package and link the letter to the database Use a query to find a subset of relevant people and send a targeted letter to them Using the mail merge wizard, enter codes in the letter where the name and address of the customers should appear Merge-print, taking the data from the database and inserting it in the letters, producing one letter for each person in the subset of relevant people from the database

Macros A macro is a set of instructions within a program that carries out repeated tasks or procedures automatically.

Flat file and relational databases

The simplest databases store data in a single file, where each record is identified as a new line and each row can be separated by a comma. These are known as flat file databases. However, flat file databases have several undesirable features:

Data redundancy is created within a database when the same piece of data is held in several places. This leads to records with duplicated data. And data inconsistency.

Data consistency means that a attribute has only one value at a particular time/throughout the database. In a relational database, a change to a data value is implemented throughout the database because it is held in only one table.

Flat file and relational databases (cont)

Data lacks **integrity**, i.e. the quality by which information from the system can be trusted. Redundancy and inconsistency show that information can be out of date, can have different values in different parts of the system and can be inaccurate thus reducing data integrity.

Relational databases can be implemented to help reduce (but not remove) data redundancy, which improves data consistency and integrity. Relational database design attempts to achieve this by modelling data into appropriate entities and creating relations (links) between the entities.

Types of Testing

White box testing White box testing is a method of testing software that tests internal structures or workings of an application, as opposed to its functionality (i.e., black box testing). An example of white box testing would be testing to ensure the age form field only accepted an integer between 14 and 120.

Black box testing Black box testing examines the functionality of an application without peering into its internal structures or workings. For example: Does the reset button on the age from clear the data? Black box testing can be considered as testing from the end user's perspective.

System testing The purpose of a system test is to ensure that all the individually developed units of software work together as intended. One benefit of system testing is that it helps you discover problems or inconsistencies between software units that are intended to work together.

Types of Testing (cont)

Alpha testing Alpha testing is the in-house testing that takes place before software is released for beta testing. Alpha testing will be carried out by employees of the company making the software, usually by those not involved in its creation. Any necessary alterations are then made before beta testing. Alpha testing will follow a test plan using test data.

Beta testing Beta testing is the second phase of testing in which a sample group of end users try the application out. Beta testing is "pre-release" testing carried out in a live environment using real volumes of data. The aim of beta testing is to place an application in the hands of real users outside the software development team to discover any flaws or issues from the user's perspective.

A/B testing A/B testing is comparing two versions of a web page to see which one performs better. You compare two web pages by showing the two versions (let's call them A and B) to similar visitors at the same time. The one that gives receives the best feedback, wins!

Prototyping

Prototype: A prototype is a working model of a design that is presented to the users to test and then feedback on what they liked and disliked, what worked and what didn't.

Evolutionary Prototype: A prototype of a design in its entirety is provided to a user group for testing. Once feedback has been provided on this original prototype, suggestions for improvements are implemented by the developer in building another prototype.

Prototyping (cont)

Throwaway Prototype: Throwaway prototyping is when a small part of the system is developed and then given to the end user to try out. The user provides feedback which can quickly be incorporated into the development of the main system. The prototype is then discarded or thrown away. The aim of throwaway prototyping is to make sure that the system requirements are confirmed and are clearly understood.

Entity Relationship Diagram

One to One For example, a husband has one wife and a wife has one husband.

One to Many or Many to One A sports team can have many players, but each player can only represent one team.

Many to Many A product can have several suppliers, and a supplier will provide several products (many in this instance means more than one).

An ER diagram for an ordering system could be modelled as follows, this can be read as 'ONE customer can place MANY orders, and each order can have MANY products':

Entity Relationship Diagram

Customer	Orders	Products

Wire frame

GUI

Advantages	Disadvantages
Intuitive approach: GUI is easy to use, especially for a beginner than command line.	**System resources:** Graphical information, by nature, means greater demands are placed on a computer's resources (HDD space, processing power and memory).
Multitasking: GUI systems offer a simple means of multitasking. Users can maintain multiple open applications and transition between them with a click of the mouse.	**Control:** GUI systems provide the end-user with less control over the operating and file systems than a Command Line Interface.
Visuals: GUI systems provide a more pleasant visual environment with which to work on the computer. The interface is made up of standard objects and ensures a standard or a consistent look and feel.	

NLI

Advantages	Disadvantages
Users do not have to learn the syntax or principles of a particular language.	A voice interface might need training to get the software to recognise what the user is saying.
Suitable for users with physical disabilities/mobility issues.	Misinterpretation due to ambiguous or unclear input.
Can provide a safer interface in certain environments - Example: Driving a car.	

MTI

Advantages	Disadvantages
Enables user to explore realistic worlds, from virtual field trips to computer games.	Hardware (headset, cameras, motion controllers) are expensive and software is limited at the moment, due to the complexity of creating virtual worlds.
Users can interact with artificial environments in a safe and controlled setting, from virtual heart surgery to flight simulation.	Movement is still restricted in virtual worlds unlike our own. VR is restricted to a small area or room.
Can help you save on cost. Training resources can be limited or expensive. Using virtual reality gives a wider variety of training resources as and when required.	Training in a VR world using motion tracking does not have the same accuracy as training in the real world.

TSI

Advantages	Disadvantages
Ease of use – they are intuitive so they require limited training.	Not suitable for inputting large amounts of data.
Can be used without additional peripherals such as keyboard or mouse.	Loss of accuracy due to selecting options/items with fingers.
Switches and buttons are not physically required. Software designers can make and modify various input interfaces for different situations.	Easily damaged – touch screens, partly due to their portability, can be fragile.
With capacitive multi-touch function, various operations/inputs (eg: zoom-in/zoom-out, rotation) are possible.	Expense – Large touch screens can be a lot more expensive than using traditional keyboard and mouse solutions.
Hygiene – Easy to wipe clean, unlike traditional keyboard.	

File Formats

File format	Use
MPEG – Motion Picture Electronics Group	Compressing video and audio
MP3 – MPEG audio layer 3	Compressing audio
GIF – Graphics Interchange Format	Compressing images and animations
Jpeg – Joint Picture Electronics Group	Compressing images
PDF – Portable Document Format	Compressing printed files (books and documents)

Hyper Text Markup Language (HTML) basic tags

Tag	Description
<html></html>	Creates an HTML document
<head></head>	Sets the title (which appears in the browser window) and other information that isn't displayed on the web page itself – defines the section of code that contains metadata about the HTML document itself
<body></body>	Sets off the visible portion of the document
<body bgcolor="pink">	Sets the background colour, using name or hex value
	Creates the largest headline
	Creates bold text
	Creates a hyperlink
	Creates a new paragraph
<img src="name">	Inserts an image

Reports

Reports are a mechanism for presenting Information taken from a database. Queries created using SQL or QBE will return the results in a table structure. Reports have the advantage of preparing the data in a format that can be printed and allow sorting and filtering

Information is displayed simply and efficiently. Reports can be printed from the database to view information quickly and easily. If the user updates information in the database, the report can be recreated to contain the new information. Reports can contain subtotals, counts and other powerful formulas that save time and allow greater analysis. Graphical information including charts and graphs can collate, aggregate and summarise complex data sets.

What makes an effective test plan?

Type of test data	Explanation
Normal	Refers to normal data that should be accepted by the form field
Erroneous	Refers to data that the form field should not accept
Extreme	Refers to data that will fall on the edge, or boundary, of any ranges or limits that have been set on the form field

To avoid bias, a test plan should be created by a member of the design team not involved in the programming or authoring of the project. The plan should be created prior to the creation of the code or application.

An effective test plan for the form field input would look like:

Test ID	Test description	Test data	Test type	Expected outcome
1	Testing the input for the age accepts an integer data type	16, 18, 20	Normal	Data will be accepted
2	Testing the input for the age rejects a decimal number	15.7, 16.2, -7.7	Erroneous	Data will be rejected
3	Testing the input for the age rejects a character that is a letter	A	Erroneous	Data will be rejected
4	Testing the input for the age rejects a string of characters	'test'	Erroneous	Data will be rejected
5	Testing the input for the age accepts an integer at the boundary	120	Extreme - Valid	Data will be accepted
6	Testing the input for the age rejects an integer at the boundary	121	Extreme - Invalid	Data will be rejected

Types of evaluation

Formative Formative evaluation is done as a continuous process in the development of a multimedia product. It is a method for evaluating the worth of a program while the program is being developed.

A wireframe is an outline or diagram of an interface. It shows where all the components of the interface will be located, without creating all the graphics and elements that will appear in the final product. When designing a database application, it is necessary to plan how input and output interfaces will appear and how they will function. Database designers will use form design plans (wireframes) to plan input and output interfaces. These wireframes will provide detail of what data will be accepted as input, what form fields will be used and what colours, fonts and layout will be employed. Like a data dictionary, there is no standard, yet it is generally accepted that there should be enough detail to allow a third party to develop the appropriate forms and reports needed.

Types of evaluation (cont)

Summative A summative evaluation is a method of judging the worth of a multimedia product at the end of the product design (summation). The focus is on the outcome.

Test Plan

Test plan: A test plan should be created which tests the following: *Navigation testing:* Do all links work? *Multimedia testing:* Are the media (image, video, sound) assets appropriate for the target audience and subject matter? *Asset operation:* Are all multimedia assets operational? *Load times:* Do multimedia assets load within an appropriate time window? *Script testing:* Have all scripts been tested for functionality and logic errors? Do they add value to the project?

Movie timeline

A multimedia movie will contain many elements including soundtracks, voice--overs, still images, animation and video. A timeline or schedule will provide an overview of when and what assets will be used. It is important that a plan like this is created to help in editing, as well as with the final delivery of the product.

Movie timeline (cont)

Scripted elements and script source: Multimedia storyboards will show where coded elements will be placed and how the user will interact with the coded scripts. In the design stage the source of the script will be indicated, but it is not important that the script is coded at this stage. For example, a JavaScript quiz may be needed to ask the user five questions. This will be outlined on the storyboard, but will not be coded until near completion, when other elements have been agreed by the client and production company.

Data Dictionary

Data dictionary is like a database about a database. Data dictionaries are used by system designers to plan information. They describe: Contents, Format, Structure of a database, Relationship between its entities or objects. Typically, a data dictionary will: Include the names and descriptions and the fields contained in each table, Record information about the data type, length of each field Validation to be used. The purpose of a data dictionary is to provide the implementation team with enough information to allow them to develop the system.

Navigational structure diagram
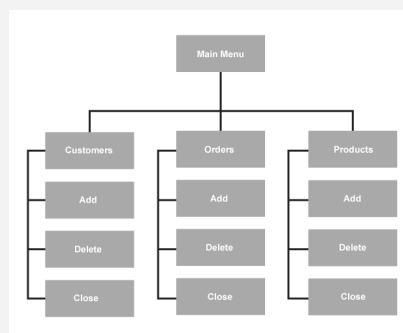
Motion Tracking Interfaces (MTI)

With the introduction of motion tracking interfaces in the gaming community through releases such as the Nintendo Wii, xBox Kinect and Ubisoft motion tracking camera, the benefits of interacting with a computer program by using concepts and gestures we are familiar with is clear. Very little, if any, training is required to interact with these software systems. Developments in virtual reality (VR), with technologies such as Oculus Rift, Gear VR, Playstation VR, Daydream etc., are bringing motion tracking interfaces into mainstream computing. Virtual reality applications are programs that transports the user to a simulated, three--dimensional world of sight, touch and movement. Here, the user can interact in a virtual world.

Touch screen interfaces (TSI)

A touch screen works as both an input and an output device. You view the options available to you on the screen (output) and use your finger to touch the option you want (input). A touch-sensitive screen uses resistive or capacitive technology to detect touch. Many mobile phones use touch screens and do away with a keypad entirely. They are often used on cash machines and in shopping centres too. Touch screens are robust, easy to operate and easy to reprogram.

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Published 6th June, 2022.
Last updated 6th June, 2022.
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Touch screen interfaces (TSI) (cont)

Resistive: When considering smartphone touch screens, resistive touch screen is the older of the two technologies. The surface is made of flexible plastic with a thin film of conductive material printed onto its underside. Beneath it is a second layer – usually made of glass, but sometimes of hard plastic – also with a coating of conductive material. The two layers are kept apart by tiny bumps (or spacers) placed at regular intervals. When the screen is touched, the plastic deforms so the two conductive films meet and, by measuring the resistance of both layers at their point of contact, it's possible to get an accurate measurement of the touch position.

Capacitive: A capacitor consists of two plates separated by an insulating material, which may of course be air. A capacitive touch screen consists of two spaced layers of glass, coated with a conductive material. As your finger comes close to a capacitor it changes the local electrostatic field, and the system constantly monitors each tiny capacitor to discover exactly where the finger touched the screen. Because the measurement points are discrete, it is possible to tell whether several fingers are touching the screen at once, unlike with a resistive unit.

Queries

Queries are a method used for requesting information from a database which matches set criteria. Queries are designed using a programming language called SQL (Structured Query Language).

Queries (cont)

An SQL Query could be used to find customers who live in Belfast: SELECT First name, Last name FROM Customer ID WHERE Address = 'Belfast'.

Complex Queries A simple query searches records in a database using one parameter value (see above). Whereas, a complex query searches records using more than one parameter value, therefore on two or more search criteria.

AND Query AND logic allows the creation of complex queries. Only the results that match all the criteria will be returned. For example: Searching for customers who are female AND live in Belfast.

OR Query Complex queries can be created using OR logic. If one criteria evaluates to true, the results will be returned. For Example: Searching for Customers who are female AND live in Lisburn OR Newry.

Software testing

Software testing involves testing a program under various conditions to make sure it works. Even the best programmers make mistakes, so it is important these are identified as soon as possible in the development stage so errors can be fixed.

Logic errors: The program will compile and run but it will not work as the programmer intended.

Syntax error: This occurs when the translator does not understand the text we have typed. The most common type of syntax error is a variable or a command that is spelt incorrectly.

Appropriate evaluation methods and techniques

Evaluation as a continuous process If multimedia software and websites are not continuously updated, they may be rated poorly after even only a few months. Technological developments are also an important issue. As multimedia technologies evolve and others are developed, it is important that programs are current, and that popular new multimedia features are incorporated.

Access and navigation: As a first time user, how accessible is the product? Often multimedia designers will create products that look great, but are too difficult to operate.

Target audience and ICT skills: The product needs to be suitable for the end user. If the product is for children, it should be simple, with only a low level of ICT skills required.

Appropriateness of content: Content should be suitably engaging, informative or relevant for the target audience.

Use of colour: Colour should add value to the product, not be a distraction.

Balance and mix of components: There should be a good balance between text, graphics, sound, video, and animation

Interactivity: Interactive elements must add value to the content, without distracting the user, and should be used appropriately throughout.

Interoperability: Will the product work with existing software applications? Can you share/export data from it to existing third party apps?

Operating systems and browsers: Can users on different operating systems and/or web browsers access all the content?