

3.1. Information and data

Data	Raw facts and figures before they have been processed
Information	= data + [structure] + [context] + meaning
The relationship between data and information:	
<ul style="list-style-type: none"> Information is in context, while data has no context Information is data that has been coded/structured Data must be processed to become information 	
Example:	
Data	01/01/2023
Structure	NN/NN/NNNN
Context	A UK date
Meaning	New year's day in 2023



3.2. Data use: Data types

Alphanumeric	Any combination of letters, symbols, spaces or numbers. <i>E.g. Qw3r!y</i>
Boolean	There are only two choices. <i>E.g. 1 or 0</i>
Date	There are different formats of date that can be used. <i>E.g. 01/01/2023</i>
Currency	Shows data in a format of money. Can show currency signs and decimals. <i>E.g. £1.09</i>
Decimal	A number format that shows an exact number using a decimal point. <i>E.g. 1.1</i>
Integer	Whole numbers. <i>E.g. 2023</i>
Percentage	A number format that includes decimal places and a % sign and can include decimals. <i>E.g. 19%, 20.23%</i>
Real	Any number, with or without decimal places. <i>E.g. 1, 2.23</i>
Text	Any character. <i>E.g. Ab1£;</i>

3.2. Data use: Validation

<ul style="list-style-type: none"> Checks that the data being entered into a digital system is sensible and reasonable Does not check that the data is correct Checks the data against pre-set rules Is usually carried out by the digital system at the point at which the data is being entered Is usually set as part of the creation of a solution 	
Validation tools	
Data type check	Checks that the data entered is one of the required type. <i>E.g. Price is in currency format.</i>
Input mask Format check	Makes sure that the data is in a specific format. <i>E.g. UK postcode is in LLNN NLL format.</i>
Length check	Sets the length of the data entry. <i>E.g. Mobile number has to be 11 integers in length.</i>
Limited choice	Provides users with a limited choice to select for data entry. Includes drop-down lists, radio buttons and tick lists. <i>E.g. Drop-down list to select month.</i>
Lookup	Looks up acceptable values in a list. <i>E.g. Checks that a postcode is valid by looking up the data in a list.</i>
Presence check	Checks that the data has been entered into a specific field. <i>E.g. Checks that the postcode has been entered for delivery.</i>
Range check	Sets an upper and lower boundary for data entry. The entered data must be between these values. <i>E.g. Secondary school year group entered can only be between 7-11.</i>

3.2. Data use: Verification

<ul style="list-style-type: none"> Checks to see whether the data being entered into a digital system is identical to the source from which it came Can be carried out manually Can be carried out by the digital system 	
Verification tools	
Double entry	<ul style="list-style-type: none"> Entering the data twice Data entered is checked by comparing it with another set of data to make sure they are the same If any difference is found between two sets of data, then the user is alerted by an error message Comparison can be done manually by a person or through a check by the digital system <p><i>E.g. Setting or resetting a password as the password needs to be entered twice. The second entry is checked against the first entry to make sure they are the same.</i></p>
	<ul style="list-style-type: none"> Proofreading Visually comparing the source data with the data entered into the digital system Involves a person being able to follow two sets of data and identify any differences <p><i>E.g. Entering data from a paper-based survey</i></p>



3.3. Data collection methods

	Primary	Secondary	Email	Books and magazines
Meaning	Research that collects first-hand or fresh data for a specific purpose	Research that uses data and information that has already been collected	Advantage Can be sent to many people at the same time Disadvantage Can be diverted into spam/junk folders by the email provider	Advantage Can be used to collect historical data Disadvantage Can be biased to the viewpoint of the author(s) or contributors
Based on	Raw data and information	Analysed and processed data and information	Advantage Questions can be modified based on previous answers given Disadvantage Can be time consuming and costly to carry out	Advantage Readily available statistics from a trusted source Disadvantage Can be difficult to collect the exact data needed in large datasets
Carried out by	The researcher	Someone else	Advantage Cheaper than interviews for large number of people Disadvantage Technology and a stable connection is required to complete it	Advantage The data has already been collected, and possibly processed, and readily made available for the public Disadvantage It is not always possible to tell if the site is genuine or real
Data	Specific to the purpose	May not fully meet the specific needs		
Process	Very involved	Quick and easy		
Cost	High	Low		
Time	Long	Short		

3.4. Storage of collected data

Logical location		Physical (internal) location		Physical (external) location	
Cloud		Primary hard drive		Portable solid-state drive (SSD)	
Advantage	Can be accessed through a web browser or app	Advantage	Internal to the digital device so cannot be lost unless the device is lost	Advantage	Fast reading and writing of data times
Disadvantage	No or unstable/slow internet connection can make the files, softwares and apps inaccessible	Disadvantage	The disks can be damaged if suddenly moved	Disadvantage	More vulnerable to abrupt power loss and electromagnetic fields
		Network drive		Portable USB flash drive	
Advantage		Advantage	Data can be backed up from any digital device on the network	Advantage	Portable, small and lightweight
Disadvantage		Disadvantage	They can fail, which means that data can be lost if they are not backed up to a different location	Disadvantage	Constant plugging into a device can degrade the USB port or the connector
				Network-attached storage (NAS) device	
Advantage		Advantage		Advantage	Files can be between users and devices
Disadvantage		Disadvantage		Disadvantage	Requires some network knowledge to install and configure
				Portable wireless drive	
Advantage		Advantage		Advantage	Has own battery/power source
Disadvantage		Disadvantage		Disadvantage	Can be discoverable by other devices if security protection methods not used



3.5. Application of testing to a range of contexts: Testing and test data

Testing

- The process of checking that a solution, the final product, meets the needs of the end users and is fit for purpose
- There are two types of testing: Technical testing and User testing

Advantages

- The final solution will be fit for purpose
- The final solution will be of high quality
- Testing will have covered all functions and features so all errors should have been identified and rectified
- Technical testing means that the solution will have been tested on a range of digital devices and operating systems
- User testing will ensure the user journey is error free and intuitive to use
- Carrying out testing can ensure the reliability and robustness of the solution

Disadvantages

- Creating a full and complete test plan can be time consuming
- If the solution is complex then many people may need to test it, meaning a large number of resources in terms of time, people and money may be needed
- If the test plan is not full and complete then errors may not be identified if the tests are not specifically detailed
- The planned tests must cover all functions and features of the solution
- Full and complete testing can take a long time
- If testing does not identify errors at the testing stage, then the completion of the solution may be delayed as errors may be identified later in the process



Test Data

Extreme data

Definition

- A data value that is on the boundary between valid and invalid data
- This type of data will not cause an error

Examples

- A passenger can take between 0-3 suitcases.
Test data used: 3
- A new secondary pupil has joined the school and will be placed in a year group between 7 and 11.
Test data used: 7

Invalid (erroneous) data

Definition

- A data value that will cause an error
- This will be unacceptable but could also be incomplete or not meet the validation

Examples

- A password has been set as having 8 characters including 1 capital letter and 1 number and 1 symbol
Test data used: pa55w0rd
- A postcode has been set in the format LLNN NLL.
Test data used: 12QW E34

Valid data

Definition

- A data value that is acceptable, sensible and reasonable
- This type of data will not cause an error

Examples

- A postcode has been set in the format LLNN NLL.
Test data used: QW12 3ER
- A password has been set as having 8 characters including 1 capital letter and 1 number and 1 symbol
Test data used: P@55w0rd

3.5. Application of testing to a range of contexts: Types of testing

Technical testing	
Definition	Checking the functionality of the solution, including, on a range of digital devices, different OS and, if connectivity is needed, that it works on a range of connectivity methods
Test can cover:	<ul style="list-style-type: none"> – Links on a web page or a mobile app to take the user to the intended internal or external page – Testing an HCI to make sure the buttons and macros work as intended – How a solution loads on opening on a range of digital devices and operating systems – Calculations used in a spreadsheet solution – How an AR product loads on a range of digital devices – User interaction in an AR project – Output including the contents and layout – Data validation on a form
Advantages	<ul style="list-style-type: none"> – The solution will be fit-for-purpose and error free – The solution will have been tested on a range of digital devices – All functionalities will work as intended
Disadvantages	<ul style="list-style-type: none"> – It can be time consuming to carry out full and complete technical tests – If all functionality is not tested, the product will have errors on release – It may not be possible to test on a range of digital devices and operating systems – It can be expensive in terms of time and money



User testing	
Definition	User testing is carried out by a range of users who are likely to use the solution to identify errors or changes required which can be resolved before it is released
Test can cover:	<ul style="list-style-type: none"> – Data entry including validation – Whether it is intuitive with informative error messages – Different user interaction methods – Functionality of an HCI – Output format – Ease of use
Advantages	<ul style="list-style-type: none"> – The development team can observe where users get stuck or muddled – A range of user demographics can be used to test the product – An increased confidence in the product from users – Real users will interact with the product, following a complete user journey
Disadvantages	<ul style="list-style-type: none"> – Only a small group of users can test the product – If the incorrect demographic users are selected, their user journey may not be indicative of the actual or target demographic group – It can be expensive in terms of time and money