Digital Technology

**AS 3.3, 3.4 and 3.8**

Context: Farm Management System

Stakeholder: Portadown Farms

Advisor: Mr P Adams

Purpose: The purpose of this site is to provide an easy to use and effective farm management system for the stakeholder Portadown Farms. The site will need to be able to upload information to a database and display this back to the user in a tidy and readable manner.

End-User Requirements:

End users should be able to:

* Log in to the website
* Load stock weights into a database
* Remove stock
* Make notes about stock (adding in during development at the stakeholders request)
* Log irrigation runs into a database
* Log paddock grazing history into a database
* View all logged data in a range of effective ways i.e. graphs and tables

Relevant Implication – End User Considerations:

The implication of end-user considerations is about providing what the user wants in an appropriate context and in a viewable manner. This includes suitable font colour and size. This implication is very important for this site For this site, the context needs to be suitable for farmers. This could mean using farming lingo and easily readable font sizes as a lot of data is being presented. The site must meet the needs of the stakeholder Portadown Farms, therefore a lot of dialogue will need to take place both before and throughout the development process. To comply with the appropriate content part of this implication, all information deemed unnecessary should not be put upfront where more relevant information such as weights could be. To comply with the viewable manner, I will use a minimalistic design to highlight key information to the user.

Relevant Implication – Usability:

The implication of usability is about designing the site in an easy to use way. Content should be able to resize for different device sizes, fonts should be readable, their should be a simple navigation system to easily find desired information and all pages should be styled the same way. This implication is very important to this project as the site will be storing a lot of valuable information which the stakeholder needs to be able to easily locate, upload, edit or remove. To meet this heuristic I need to use a consistent, easy to use style across all the pages so the stakeholder can use the site to its full potential. I will need to consult with the stakeholder frequently during the design process to make sure that they are happy with the layout and to make any touch ups that they feel will make it more usable for them.

Relevant Implication – Functionality: The implication of functionality is about making sure the website meets its purpose and delivers what the stakeholder needs. To meet this implication the site needs to get the basic stuff right such as making sure all images and links work, having links to the main parts of the site in the navigation bar and using ALT text. This implication is very important to this site as the site will play an important role in the stakeholders business. It needs to deliver to the needs of the stakeholder, e.g. being able to upload and view cattle weights. Links in the navigation bar should be to the main sections such as Stock Weights, Grazing History and Irrigation History.

Research:

Similar Sites:

* TruTest
* Dairy NZ
* Watermetrics

TruTest:

A screenshot of a cell phone

Description automatically generatedTruTest are a farm software company that provide equipment to weigh stock. Examples of this include ear tag scanners, digital scales, weighing platforms and an online platform called Datamars that provides similar functionality to the site I am programming. Datamars costs $25 a month or free with some of TruTest’s hardware. This can be very expensive to farmers which is part of the reason I am producing this farm management system.

A screenshot of a cell phone

Description automatically generated

TruTest used a colour scheme consisting of light grey, white, and yellow paired with multi-coloured graphs. This colour scheme stood out as very readable and worked well with the text which was mostly black or dark grey. Headers stood out as they were in bold and navigation links changed colour when hovered over. One thing I noticed was that TruTest used a sidebar for their navigation instead of the more common horizontal navigation bar. I felt that this works well with the rest of their design but takes up more screen space than a regular navigation bar. The feature of their site that I liked the most was the graphs. They were easy to read, colourful and well presented. My site will be including graphs as well so it is good to see how other sites have presented theirs.

Features I liked:

* Sidebar
* Graphs
* Colour scheme

Dairy NZ:

A screenshot of a cell phone

Description automatically generatedDairy NZ are a site that provides farmers with relevant information about cattle, raising calves and general farming practise. Although they do not provide similar functionality required by my stakeholder, they are a well-known rural website therefore I have decided to see what sort of design they have used for their site.

A screenshot of a cell phone

Description automatically generatedDairy NZ use a lot of images for their site to go with links. They also use a large image banner behind their navigation links. This takes up a lot of screen space and would not be practical on my site, but as they are an informative page it works well for them. The navbar also reduces in size and stays at the top of the page when scrolling, a feature I seek to implement. Their navigation links expand into a panel of additional links to pages relevant to that option, e.g. Animal offers links to pages such as Animal Welfare which then opens another panel of links to pages such as Animal Welfare Regulations. Although this feature is helpful in providing access to different pages, it isn’t very user friendly or practical. One thing I noted was that the website did not make good use of screen space. Images took up a lot of room which meant more scrolling than nessesary was required

Features I liked:

* Sticky Nav

A screenshot of a social media post

Description automatically generatedA screenshot of a social media post

Description automatically generatedWatermetrics:

Watermetrics is a site that informs its users of how much water usage they have built up from irrigation. Environmental councils such as ECan set strict limits on how much water a farm can use, so many farmers use Watermetrics to make sure they do not exceed their limit. I chose to look at this site as it is one my stakeholder uses to meet environmental regulations with regards to irrigation. This loosely relates to my site as my stakeholder would like to be able to store a log of all his irrigation runs on the site. I liked this sites graphs as they were easy to read, however I found the table to be very lengthy and it contained a lot of useless information. The sites design is easy to use but I did find that the sidebar took up a lot of room.

What I liked:

* Simplistic graphs

What I did not like:

A screenshot of a social media post

Description automatically generated

* Lengthy table
* Table logs every 15 minutes, makes data hard to locate

Design:

Colour Scheme:

During my research I noticed that the nicest colour schemes were very simplistic and only consisted of one main colour, greys and whites. For this site I have chosen to use blue as the main colour, grey as the background and white as the background to elements of the site such as text boxes or graphs. The following colours will be used:

**#042D57 – Primary Colour**

**#117ECE – Secondary colour**

**#F2F2F2 - Background**

+ white (#FFFFFF)

I will also need to colour graphs and tables. Graphs will use a medium blue with low opacity to show measurement lines behind them and tables will switch between white and grey for each row.

Font:

It is important that a readable font is used to meet the implication of usability. Because of this, I have decided to use sans-serif fonts across the site. The following fonts will be used:

**Headings – Ariel Bold**

**Subheadings – Ariel Bold (smaller size)**

Body – Ariel Regular

Initial Designs:

A screenshot of a cell phone

Description automatically generatedA screenshot of a cell phone

Description automatically generatedA screenshot of a social media post

Description automatically generatedA screenshot of a cell phone

Description automatically generated

The first designs included two different concepts of a horizontal navbar or a sidebar. A mock-up of both a potential index page and a potential stock weight page were made. I met with the stakeholder to discuss which concept they preferred and any changes they would like to make. The stakeholder preferred the horizontal navigation design as they found it more visibly appealing. They liked the colour used in both designs and found that the fonts were very readable. They commented that they would like to use images of their own farm rather than stock photos which they were happy to provide. We agreed on minor changes including making the navigation links bold, making the stock link a dropdown link and adding

I consulted with Mr Adams for feedback on the first round of designs. His main comments were that it was that the first design had a better use of screen space. He also noted that if I were to use the second design it would be best to use a burger navigation function to show and hide the sidebar as it takes up a lot of screen space.

A sign on the side of a building

Description automatically generatedA screenshot of a cell phone

Description automatically generatedUpdated Designs:

A screenshot of a social media post

Description automatically generated

Feedback #2:

The key changes in these updated designs were:

* Grey background
* Mock-up of the Login page
* Inclusion of graphs

I met with the stakeholder to go over the updated designs. They liked the new drop down menu for Stock. They commented that the designs were very simplistic and looked easy to use. We discussed the functionality of the Herd page and they noted that they would like the ability to click on a cow’s number to view it’s information and a graph of its progress. They also commented that they would like to be able to view data for specific breeds separately to the data for the whole herd. Overall they were pleased with the designs.

Mr Adams liked the change in background colour from white to grey as it made elements stand out more. He recommended adding a Forgot My Password option and an Enter button on the Login Page. He also liked the idea of the Stock drop down menu.

Potential End Users said that they liked the new footer.

Final Designs:

Desktop:

A screenshot of a social media post

Description automatically generated

Phone:

A screenshot of a social media post

Description automatically generated

The final designs were done for both desktop and phone sized screens. No major changes were made from the last set of designs as the stakeholder and other potential end users had no major feedback. A forgot my password option was added to the login screens as per Mr Adams feedback. The stock page allows for viewing of individual breeds as per feedback from the stakeholder.

I consulted with the stakeholder over these designs and they said they were satisfied and had no changes to make.

Database Design:

Implication: Future Proofing

The implication of future proofing is about making sure the site is able to function properly into the future. This is important for my site as it will be holding a lot of important information for the stakeholder, and the stakeholder should not have to maintain the site. To meet this heuristic I need to design my database to be self-sufficient and not need any maintenance. For example, I need to allow the user to enter large amounts of data without error such as stock weights. I will achieve this by designing my database and site in a manner to allow for user error such as filtering input and detecting any invalid input to prevent the database from needing to be directly accessed.

Implication: Functionality

The implication of functionality is about making sure the database functions efficiently and to the needs of the end user. This is important in the database as it will hold a lot of information that will be constantly updating and needs to be displayed in a readable manner. I will need to design the site and database to filter all the entered information so that invalid input does not impact on the functionality of the site. This can be done through filtering form inputs and using SQL functions to get information such as dates when weights are entered. I will also link tables to allow the database to function more efficiently. To make sure the database functions to the needs of the end user, I will meet often with the stakeholder during the development process.

Database Name: Portadown

Database Tables:

* Irrigation
* Herd
* Stock
* Paddocks
* Users
* Grazing
* Breed

|  |  |  |  |
| --- | --- | --- | --- |
| Table name: | herd | | |
| Column Names: | Datatype: | Length: | Comments: |
| herdID | Int | 5 | Primary key |
| herd\_year | Char | 4 | The year the cattle belong to e.g. 2019 |

|  |  |  |  |
| --- | --- | --- | --- |
| Table name: | stock | | |
| Column Names: | Datatype: | Length: | Comments: |
| stockID | Int | 5 | Primary key |
| herdID | Int | 5 | Links the stock to the herd it belongs to |
| breedID | Int | 5 | Links to the herd table. Allows stock to be compared by breed |
| notes | Varchar | 500 | Notes about the cattle. To be managed by the user thru an update query |

|  |  |  |  |
| --- | --- | --- | --- |
| Table name: | breed | | |
| Column Names: | Datatype: | Length: | Comments: |
| breedID | Int | 5 | Primary key |
| breed\_name | Var | 25 | 3 different breeds |

|  |  |  |  |
| --- | --- | --- | --- |
| Table name: | weight | | |
| Column Names: | Datatype: | Length: | Comments: |
| weightID | Int | 5 | Primary key |
| stockID | Int | 5 | Links to the stock being weighed |
| date | date | N/A | The date the stock got weighed on |
| weight | Int | 3 | The weight of the stock. Int as it is a three digit integer, weights will never exceed 1000 as it would be firstly unlikely, and they are sold at 500 |

|  |  |  |  |
| --- | --- | --- | --- |
| Table name: | irrigation | | |
| Column Names: | Datatype: | Length: | Comments: |
| irrigationID | Int | 5 | Primary key |
| date | date | N/A | The date of the irrigation run |
| time | time | N/A | The time the irrigation run started |
| volume | Char | 6 | The volume displayed on the meter |
| hours | Char | 5 | The hour displayed on the hour meter |
| run | Varchar | 2 | The run the irrigator is in |

|  |  |  |  |
| --- | --- | --- | --- |
| Table name: | paddock | | |
| Column Names: | Datatype: | Length: | Comments: |
| paddockID | Int | 5 | Primary key |
| Paddock\_name | varchar | 2 | The date of the irrigation run |
| time | time | N/A | The time the irrigation run started |
| volume | Char | 6 | The volume displayed on the meter |
| hours | Char | 5 | The hour displayed on the hour meter |
| run | Varchar | 2 | The run the irrigator is in |

|  |  |  |  |
| --- | --- | --- | --- |
| Table name: | sowing | | |
| Column Names: | Datatype: | Length: | Comments: |
| paddockID | Int | 5 | The ID of the paddock |
| sowingID | Int | 5 | The id of the sowing, primary key |
| date | date | N/A | The date the sowing took place |
| Seed\_type | varchar | 50 | The type of seed sown |

|  |  |  |  |
| --- | --- | --- | --- |
| Table name: | grazing | | |
| Column Names: | Datatype: | Length: | Comments: |
| grazingID | Int | 5 | The ID of the paddock |
| paddockID | Int | 5 | The id of the paddock |
| herdID | Int | 5 | The ID of the herd |
| breedID | Int | 5 | The ID of the breed |
| Start\_date | date | N/A | The date the stock are entered into the paddock |
| End\_date | date | 50 | The date the stock are logged as having moved to a new paddock |

|  |  |  |  |
| --- | --- | --- | --- |
| Table name: | users | | |
| Column Names: | Datatype: | Length: | Comments: |
| userID | Int | 5 | Primary Key |
| username | varchar | 50 | Username |
| password | varchar | 50 | The password |

Notes On Database (Post Completion):

My database consistently functioned as expected during the development process and user testing.

I was consistent in the column names within tables such as the IDs all being named with the exact same naming conventions.

During the design process I ended up adding a “notes” column to the stock table at the request of the end user. For future developers to understand what this column is for, I added a comment in the database with a brief explaination.

Database Updates:

06/06/20:

During the development process the stakeholder mentioned that they would like the option to be able to record notes for individual cattle. As a result of this, a “notes” field was added to the stock table.

Development Progress Notes & Use Of Trello:

To keep track of development, I will use Trello. Trello will help me break up the larger task into a range of smaller tasks to help me work efficiently and manage by project well.

During my project I found Trello helpful as if I ran into issues with development I was able to identify another thing I could do in the meantime to stay productive.

Overall, Trello was very useful in acting as a project management tool

Trello Updates (random basis):

A cat that is looking at the camera

Description automatically generated

31st March: Planning stage near completion. Adobe XD designs to begin soon

A grey and white cat sitting in front of a screen

Description automatically generated

9th April: Second update of Adobe XD designs under development to meet user feedback

A screenshot of a cell phone

Description automatically generated

10th May: Designs all completed and approved by stakeholder. HTML mockup being created. Minor work on database occurring

A screenshot of a cell phone

Description automatically generated

12 May: Front end pages under development. Minor work on database

A picture containing cat, white

Description automatically generated

19th May: Insert & Delete queries both under development. Afterwards a user authentication system is to be developed.

A screenshot of a social media post

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6th June: Update query under development

A screenshot of a social media post

Description automatically generated

7th June: Check in with stakeholder for user testing, 8th June: Final testing

Testing:

Testing during development:

*Note: Successful tests were not logged due to the sheer quantity of them.*

**11/05/20 – Index Page:**

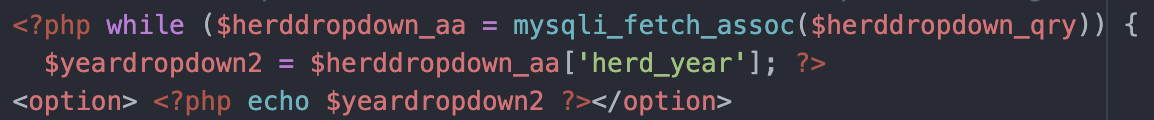
I ran into an issue displaying the cards inline. This was achieved using a bootstrap row div.

A close up of a screen

Description automatically generated**15/05/20 – Stock Page - Forms:**

I decided to use the same query that selected the herds for two dropdown forms. This initially did not work because I was not resetting the pointer back to zero. To resolve this, I added code to set the pointer back to zero after its first use.

**15/05/20 – Stock Page – Do While Loop:**

After setting the pointer to zero, the second do while loop for the second drop down form had a blank entry. This meant that users could enter nothing as an input which would break the site. To solve this, I switched to using a while loop as this did not loop through row 0, but instead started at row one and did not return the blank entry.

**19/05/20 – Weight Display Table:**

Initial testing of the queries for the weight display table found that it just displayed the average for the herd on the selected dates instead of the individual animals. I trialled a range of new queries and found one that was able to get the monthly average for each animal individually.

**21/05/20 – Insert Query:**

I ran into an issue with the insert query where nothing was being input to the database. This was due to the lack of brackets around the variables I was wanting entered.

**22/05/20 – Insert Query:**

The query for adding weights could be executed without having any input. This was remedied by making all fields “required”

**30/05/20 – Login System**

An initial test of the login system found that I was not hashing the passwords therefore they did not match the database. This was remedied promptly.

**31/05/20 – Login System Incorrect Password Alert**

A picture containing drawing

Description automatically generatedAttempts to instate an incorrect password system proved unsuccessful. The page was unable to define the GET array variable when the page was accessed prior to an incorrect password attempt. To remedy this, I used a conditional statement to see if the GET array was set, if so an incorrect details message will be displayed.

**06/06/20 – Update Notes:**

Initial testing of the update notes feature was unsuccessful. This was a basic error through my failure to add “mysqli\_query” before the variables.

**07/06/20 – Invalid Tag Numbers:**

See user testing.

**08/06/20 – Weight Limits:**

Final testing found that any weight could be entered. To prevent this, I added a filter to make the maximum weight to be entered 999.

**09/06/20 – Table**

The weight table was being displayed backwards which meant weights did not line up with the dates they were entered. This was resolved.

User Testing:

On the 7th of June, I met with the stakeholder to conduct user testing. Prior to this, most elements of the website had been tested to try rid the site of any errors. One additional error was found during the user testing.

Test Log:

User Logs In – Successful

A screenshot of a social media post

Description automatically generatedUser Views Weights – Successful

The weights load as expected. The scrolling on the table works.

User Enters Weights – Unsuccessful:

The user entered a weight for an invalid tag number, and the database accepted the input. This error was addressed by the adding of a feature to check if the stockID variable requested by the query was empty. If this was the case, the user was redirected to the stock.php page with a basic error message displayed.

A screenshot of a social media post

Description automatically generatedUser makes notes – Successful

The notes are successfully updated. A success message is displayed.

A screenshot of a cell phone

Description automatically generatedUser deletes stock – Successful

An “are you sure” message is displayed successfully. The stock is removed one the user clicks “OK”

A sign on the side of a building

Description automatically generatedUser logs out - Successful

Clicking the logout button works successfully. The user is logged out and cannot access other pages of the site any more.

Overall:

All of the site functionality worked successfully bar the error with weight entries. This error was patched up as noted above.

The user noted that they liked the aesthetics and minimalistic design of the site. They were able to easily navigate the site unassisted. They trialled all the current functionality of the site and commented that it all worked as expected and that they were happy with how it was done. This shows that the site meets the implication of functionality. Furthermore, the user used the site entirely unassisted which shows that the site is very useable as per the implication of usability. Overall, the user was very satisfied with the site and was able to confidently use it without any issues or assistance. The one error uncovered in user testing was patched up promptly and the site now functions without issue.

Use of Photoshop:

I used photoshop to resize images. The stakeholder supplied a number of images to be used on the site. These included the four images on the index page and the image used on the login page. To make the images fit the website, I used photoshop to size the banner image to be a shorter, wider resolution. This meant that I could include it as a banner and not end up displaying it as its original size and have to resize it with CSS. I also resized the photo on the login page to fit the height of desktops. The photo initially was not large enough and was too wide, I used photoshop to resize this.

I also used photoshop to design a custom logo at the request of the stakeholder.

A picture containing drawing

Description automatically generated

Overall, using photoshop helped me improve the aesthetics of my site by allowing me to resize images to fit the site properly and to create a logo for the stakeholder.

Evaluation:

A relevant implication for this site was usability. To meet this implication, it was noted that the site needed to be designed to be straight forward and easy to use. Factors needed to meet this included using readable fonts, having a simple navigation system and being consistent with styles across all pages. My site met this implication. This is because all pages used the exact same colour scheme and fonts to maintain a consistent style, similar layouts were also used where possible. The site has a navbar fixed to the top of all pages bar the login page which allows users to always be within reach of links to the main areas of the site. All aspects of an area of the page are available through the main pages for those areas. For example, users can find all functionality available for the stock area of the page on the stock page. Furthermore, this site also uses drop down menus on forms to ensure that the user only enters valid information as well as to make the forms more useable. Forms where dropdowns were not possible have got filters on input to ensure that the user does not accidentally enter invalid input. I am confident that I have met this implication because the stakeholder was able to use the site on their own without requiring any assistance from myself. Overall, through decisions made before and during the design process, my site was able to meet the implication of usability.

Another relevant implication of this site was end-user considerations. I met this implication by using a minimalistic design style across all pages to make sure that the key information the stakeholder was most interested in was easy to find and displayed in a viewable banner. This was further achieved through the use of a clear, readable font mixed with contrasting colours to make text easy to read. Lesser relevant data such as data for individual cattle was further back in the site, while more prominently featured on the index page were links directly to the main three sections of the page. The stakeholder noted while using the site that everything was easy to find and that they liked the way it was laid out. Overall, through the use of the more prominent display of data of higher relevance, contrasting colours, readable fonts and minimalistic design I achieved the implication of end-user considerations.

My site meets the implication of functionality. This is because I designed the site to meet its purpose and catered to the needs of the stakeholder. I met with the stakeholder often to consult on designs and any changes to the site they would like made during development. For example, the stakeholder requested the ability to be able to make notes on cattle, this was promptly developed. The stakeholder is able to use the site for its purpose of providing an easy to use farm management system through the functionality of adding weights, removing stock and so forth. While testing the site, the stakeholder noted that everything functioned as expected and that they were satisfied with the methods used to achieve this. The stakeholder did not require my assistance when using the site and did not run into issues with functionality. All images and links currently able to be used work as expected. Pages cannot be directly accessed either. Error messages are displayed when invalid input is entered or a page is accessed directly by the user. Success messages are displayed to inform the user of successful actions they have taken i.e. removing stock. Images have ALT text. The navbar only includes links to the main areas of the site. I am confident that through frequent consultation with the stakeholder and the designing of the site to meet its purpose that I have met the implication of functionality.

My database meets the implication of future proofing. To meet this implication I needed to design the database to work effectively into the future without the need to be updated or accessed by the user. I have met this because I have designed the database to work effectively in allowing the user to input weights, update notes on stock and remove animals from the database through the site without needed to access the database directly. The database manages dates on its own so the user would never need to try correct incorrectly entered dates. The use of weightIDs and stockIDs in the weight table also means that infinite weights can be logged without the need to create new columns or tables. I added comments in the database to allow people who edit it in the future to figure out what the notes column was for and how the dates were entered. I used appropriate variable names so that if I or somebody else needed to edit the database they were able to easily identify what columns were for. The names used also matched those used for variables on the website. Overall, the database has been created in a manner that meets the implication of future proofing as it can function well into the future without the user needing to access it to make any changes and has been designed in a way to allow other developers to easily recognize which columns did what.

My database meets the implication of functionality. This is because the database has been built to function to the needs of the stakeholder including logging cattle weights, removing cattle and editing notes about cattle. The end user is able to log weights for cattle currently within the database, the ability to create new herds and add new cattle is set to be developed in the near future and the database has been designed to accommodate for this through the use of the herd and stock tables. The stakeholder is also able to remove cattle that have for example have passed away through illness, as well as being able to make notes through the “notes” column of the stock table. All of this is possible directly through the website thanks to the design of the database to be able to take user input and input some relevant data i.e. dates on its own. I have also been consistent with variable names across all tables to make queries consistent so that the database is easier to use.

Interlinked tables also allow for the database to function more efficiently. For example, stock information is stored across the stock, weight, herd and breed tables to allow for efficient interlinking across the website. This has allowed stock to be efficiently filtered by their herd, and in future they will be able to be filtered by their breed. Weights are also assigned to the individual cattle’s stockID which can then link through to the breed of the stock and allow for effective displaying of data on the website. Overall, the database has been effectively designed to meet and function efficiently to the needs of the stakeholder.

My site meets numerous web design heuristics. For example, my site meets the heuristic of consistency and standards as it has an image link in the top left corner of the site which acts as a link back to the index page, the stakeholder instinctively clicked this image logo link when testing out the site which shows how I have achieved this heuristic

My site meets the heuristic of error prevention as I added filtering on the web forms to prevent invalid input as well as error catching to make sure GET and POST arrays were set by the user. Initially the stakeholder was able to enter invalid input while testing, however after fixing this the stakeholder received an error message.

My site meets the heuristic of recognition instead of recall by creating titles out of user input. If the user selects “2019”, the next page will display “2019” so the user does not have to recall what they selected. The stakeholder commented while using the site that they liked that the site featured the selected herd as titles.

My site meets the heuristic of minimalistic design as I only displayed relevant information that the user requested, nothing unneeded was displayed. My site meets the heuristic of aesthetics, I know this because the end user noted that they liked the look of the site when they tested it out. They commented that the site was easy to use and they were able to easily identify what they were after as there was no clutter or irrelevant information being displayed.

End-User Requirements:

The end-user requirements were:

* Log in to the website
* Load stock weights into a database
* Remove stock
* Make notes about stock (adding in during development at the stakeholders request)
* Log irrigation runs into a database
* Log paddock grazing history into a database
* View all logged data in a range of effective ways i.e. graphs and tables

I have met the end user requirement of being able to log into the website. This is because all sections of the website are protected by sessions. All pages redirect to the login page until a session is set. This means that only verified people are able to access the website. I used a login system because the content of the site needs to only be accessible by the stakeholder and other approved people. The stakeholder was able to easily use the login page without assistance, and they liked the design of it and the error message if the login was incorrectly entered.

I have met the end user requirement of being able to enter weights into the database. Users can enter weights into the database through the weights.php page. The page submits the form to the submitweights.php page where it is verified and entered if valid, if not it is rejected and the user receives an error message. I will expand on this functionality in the near future through the ability to add in new cattle, at the moment only the pre-loaded 2018 and 2019 herds are available. I added the data validation because without it, users could accidently load weights for cattle that do not exist which would require going into the database to fix. The end user should not have to interact with the database through phpMyAdmin. I can say that I have met this end user requirement as the end user was able to successfully add weights to the database without any help. The user located and used the enter weight feature unassisted, therefore I can say that I have met this end user requirement.

I have met the end user requirement of being able to remove stock and make notes. Users are able to remove stock through the manageherd page by selecting the tag number. On this page they are able to make notes and delete the individual cattle from the database. An “are you sure” warning is displayed to make sure the user does not do this on accident. I used the are you sure warning because without it, the user could accidently delete an animal and this action is not reversable. When testing the site, the end user was able to use this functionality without issue therefore I can say that I met this end user requirement.

I have **not** met the end user requirement of being able to log irrigation runs and paddock grazing history through the site. Time constraints are behind this, however these features will be under development in the near future as this is an ongoing project.

I have **not** met the end user requirement of being able to view data in a range of ways. Currently, data is currently only displayed in tables. I have acquired a license to use graphing software which I will begin implementing into the site shortly.