QUEEN'S UNIVERSITY BELFAST

ESTD 1845

Personal Journal

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Contents

Week Commencing 23rd January.

Entry Number: 1	Date: 24/01/2023

Work completed:
We had our first meeting with our project champion Charles Gillian. This meeting involved a brainstorming session where we talked about the scope of the project, thought about the different technologies that we might need to use and how to approach the problem. This also helped us further break down the problem into different sections.

What went well:
Identified key technologies that might be of some use during the creation of the project.

What went poorly:
When coming up with different ideas for the solution of the problem, we only considered our 4 perspectives from picking modules and didn't ask other students.

Future improvements:
Do further research into the problem before meetings and come better prepared.

Week Commencing 30th January.

Entry Number: 2	Date: 31/01/2023

Work completed:
Throughout this week we had conversation with other students within EEECS to gain a better understanding of what challenges they face when choosing modules. This also allowed us to find out more about the current solutions that are out there to help students.

What went well:
Talked to a lot of students that allowed us to get a deeper insight into the challenges they face and how our solution may improve this.

What went poorly:
This could have been helpful to do earlier on in the process.

Future improvements:
Continuous gain user feedback throughout development.

Entry Number: 3	Date: 3/02/2023

Work completed:
Completed individual research into the different solutions throughout development.

What went well:
Talked to a lot of students that allowed us to get a deeper insight into the challenges they face and how our solution may improve this.

What went poorly:
This could have been done before talking to other students.

Future improvements:
Continuously gain user feedback throughout development.

Week Commencing 6th February.

Entry Number: 4	Date: 8/02/2023

Work completed:
We had a meeting to discuss the submission for the first report and what we are planning on creating for the prototype in the first semester. From here I created a Gantt chart for our roadmap. This was for both semesters 1 & 2, while creating the roadmap I identified the success criteria for the prototype and the complete system.

What went well:
Productive team meeting.

What went poorly:
Could have started this sooner, poor time management.

Future improvements:
Create roadmap sooner in the process to help with time management.

Entry Number: 5	Date: 10/02/2023

Work completed:
Reviewed everyone's work on the report so far and made suggestions to each of the team members on elements that they could improve. Also read through various academic papers on chatbots[1][2][3][4] and web scraping[5] to gain a better understanding on how these are currently implemented in other solutions.

What went well:
Review process within the team went smoothly, everyone understood the feedback that was being given and it was all delivered constructively.

What went poorly:
Struggled to find academic papers that were relevant and contained useful information.

Future improvements:
Refine search requirements for academic papers and use other search engineers other than Google Scholar, possibly ask some people for recommendations on what papers to read.

Week Commencing 13th February.

Entry Number: 6	Date: 15/02/2023

Work completed:
Completed research into various development techniques and software to assist in the development process. Read through various academic papers, articles and asked developers on the advantages and disadvantages of the different methodologies around software development[6][7], then used this to complete part of the sprint plan. I also set up a Jira environment and created a backlog of issues for the development of the prototype.

What went well:
Finding academic papers on this topic went better than previous making it easier to complete research into the topic.

What went poorly:
Had some difficulty setting up Jira.

Future improvements:
Pay more attention to the walk through/documentation.

Entry Number: 7	Date: 17/02/2023

Work completed:
Created a table for the sprint plan containing the different features we plan to implement for the prototype, the risks associated with these features and a mitigation plan. I also done research into the best ways to assess risk and created a critical path diagram. Once this was done everything was compiled into the sprint plan.

What went well:
From previous meetings it was easy to figure out what features we would like to try and implement for the prototype as we have discussed them in previous meetings.

What went poorly:
It was fairly difficult to find examples of a critical path diagram to follow.

Future improvements:
Get some help from team members to do more research.

Week Commencing 20th February.

Entry Number: 8	Date: 23/02/2023

Work completed:
Had a team meeting to do a final review of the report. After this I helped Conor refine the requirements for the High-Level Specification and included screenshots of the issues that were created in Jira for the appendix. I also started a tutorial for Tensorflow [8].

What went well:
Productive team meeting.

What went poorly:
N/A

Future improvements:
N/A

Week Commencing 27th February.

Entry Number: 9	Date: 28/02/2023

Work completed:
Completed research into the best ways of forming requirements for a product[9], then using this knowledge created a first draft of the full requirements for the final product using the Volere template[10].

What went well:
Easy to follow layout.

What went poorly:
More communication with the team on the different things they want from the requirements, for this draft the requirements may include too much technical detail.

Future improvements:
Instead of making an entire draft to share with the team, only write out a few requirements at a time and ask them for feedback sooner.

Entry Number: 10	Date: 1/03/2023

Work completed:
We had a meeting with our project champion Charles Gillian, this meeting allowed us to get access to the server and Charles showed us how to use the server as well. We also had a further discussion on what technologies we will be using. After the meeting with Charles, we had a "debrief" session where we discussed in further detail the suggestions Charles gave, once this was done, we also further divided the design documentation and we all agreed to get Docker setup and working on our own machines.

What went well:
Had an effective debrief after the initial meeting with Charles.

What went poorly:
N/A

Future improvements:
N/A

Week Commencing 6th March.

Entry Number: 11	Date: 8/03/2023

Work completed:
Completed some research into how docker works[11][12]. Created the basics for the frontend of the homepage based on the wireframes included in SDP1 report. This involved creating the sidebar menu, an area for the conversation to be displayed, and a place for user input. I also added in a button to change the theme of the website (toggle between light and dark mode) and added a typing effect for the website. I used HTML, SCSS, and JavaScript to achieve this.

What went well:
Learning how to use docker went well as there are plenty of resources online, also creating the basics of the website was smooth due to previous web development experiences.

What went poorly:
There were some issues with the input field, could not find a way to remove the suggests when using chrome (this issue only affected chrome).

Future improvements:
Do further investigation into the different features the various web browsers support (or don't support)

Entry Number: 12	Date: 10/03/2023

Work completed:
Had a meeting with team members to discuss the ER model and use case diagrams to further decide what is required for the database and what functions are needed of the system. Also added the ability for the sidebar/navbar to be shrunk and expanded.

What went well:
Further development on the website's frontend.

What went poorly:
Some discrepancy within the team on what is needed for the ER model and what tables are needed for the system.

Future improvements:
Improve communication before work is started.

Week Commencing 13th March.

Entry Number: 13	Date: 16/03/2023

Work completed:
Further improved the requirements for the project, and started a ML tensorflow Python course on freecodecamp to learn more about creating models within python and how this could be used in the project to generate responses for the chatbot. Tried to pull Django project from Github and set up a virtual python environment.

What went well:
Looking back on the requirements and making adjustments to them based on discussions with the team.

What went poorly:
The course on freecodecamp was more focused on the basics of machine learning, covering topics that I have already learnt about, with a smaller portion of it dedicated to response generation and NLP.

Future improvements:
Look more into the learning resources to try and find a clearer syllables to avoid wasting time on recovering topics.

Entry Number: 14	Date: 18/03/2023

Work completed:
Created wireframes for the website using draw.io.

What went well:
I've used draw.io to create wireframes before so this process was familiar to me, after discussions with the team it was clear on what to deliver once again making the process of creating the wireframes easier.

What went poorly:
N/A

Future improvements:
N/A

Week Commencing 20th March.

Entry Number: 15	Date: 22/03/2023

Work completed:
Created the sidebar navigation menu which includes links to all the other pages, this also has a hover animation which changes the position of the background depending on what link the user is hovering over.
In addition to this I also created the frontend for the login pop-up.

What went well:
Creating the animation for the sidebar as I've had experience with this before.

What went poorly:
Spent too long trying to debug a problem with the background blur for whenever the login pop-up appeared. There was a simple solution to the problem, just took too long to find it.

Future improvements:
Take some time away from a problem to clear my head before attempting to solve it again.

Entry Number: 16	Date: 24/03/2023

Work completed:
Made it so that whenever a user enters text, the text will appear in a chat bubble, then the chatbots response will also appear in a different chat bubble. There is also an animation that plays whenever each bubble appears.

What went well:
Making the design for the bubble (colour theme, size, spacing, etc).

What went poorly:
When trying to implement the animation for the chat bubbles, I encountered a problem where whenever a new chat has been sent the animation plays for all chat bubbles on the page, rather than just the newest one. This happened because I was accessing the bubble elements using HTML DOM, rather than through jQuery.

Future improvements:
Learn more about all the different features that are available within JavaScript (specifically jQuery), so when approaching a problem, it can be solved faster.

Week Commencing 27th March.

Entry Number: 17	Date: 28/03/2023

Work completed:
Had a meeting with the team to catch up Ross and Conor on the work that me and Kyle completed while they had a break for their other modules. Created the other html pages needed for the website and added them to the URL list within the Django project. Debugged an issue where the file path to my_corpus.yml was not being found as Kyle used an absolute path instead of a relative file path.

What went well:
Creating the different URLs within the Django project.

What went poorly:
The gap between the meeting was too long, even though Ross and Conor said they needed a break to focus on other modules. Kyle pushed code that worked on his machine but not anyone else's as explained above.

Future improvements:
Have more frequent meetings regardless of work for other modules, as this will reduce the time of having 1 big "catch up meeting". Improve communication between members so whenever there is a bug in the code it can be traced to who wrote it and how it can be fixed.

Entry Number: 18	Date: 30/03/2023

Work completed:
Finished creating the frontend for the settings page based on the wireframes and added functionality for the accessibility options (being able to change from dark mode, light mode, and high contrast mode along with adjustable font sizing which includes a small, medium, and large sizes). Also made progress on module information page (created the styling to display the information for the modules).

What went well:
Creating the accessibility options as I was able to draw upon previous experiences to make this feature. Whenever I encountered a problem with the styling I was using (see what went poorly below) I was scrolling through mdn web docs and stumbled upon the white-space property[13] which allowed me to improve various aspects whenever it came to resizing.

What went poorly:
When creating the styling for how the information for each of the modules will be displayed, I used display:grid which I have used in the past for styling somewhat similar formats. However, it has been a while since I have used grids, so when first implementing the module information it had various resizing issues which caused confusion as I was not sure what was causing them. After far too long struggling on the problem trying to find answers on websites like stackoverflow, I then went to the documentation[14] which after reading through allowed me to gain a deeper understanding on how grid works.

Future improvements:
Even when using concepts or tools that I have used in the past, it is always helpful to revisit the projects that I have used them on before or the documentation to refresh my memory on the topic to avoid any bugs. Also, always helpful to revisit the documentation before trying to find the answers on websites like stackoverflow no matter how useful they may be at times.

Week Commencing 3rd April.

Entry Number: 19	Date: 4/04/2023

Work completed:
Added UI elements for the search bar and dropdown menu for the filter that contains a mixture of checkboxes and radio buttons for the user to select when filtering.
Once this was completed, I then started working on the grade dashboard frontend. To do this I spent some time researching into different ways to display data on the webpage and found chart.js, after some time reading the documentation[15] and following the walkthrough on w3schools[16]. After this research I implemented the basics for a bar chart that once the database is implemented by Ross, will display the data for a student's grade.
After this I created UI elements that will show the student some statics about their performance, an area that will show the student's assessment grades for each module and a dropdown that will display a radio button allowing the user to toggle between the different stages.
On the 3rd of April we also had a team meeting, this was to discuss recent announcements around the changing of the format for the demo (from video to in person and the change of date), where we discussed what was needed for the demo (how the work was going to be divided), progress Kyle made on the implantation section of the report and the progress Ross made with the ER diagram along with some changes to the module table.

What went well:
The creation of the bar chart went well due to the time spent researching Chart.js and reading the documentation, it made implantation much easier.

What went poorly:
Implementing the dropdown with the radio buttons turned out to be more difficult than expected, even though that I just implemented this feature into the module information page a few days ago due to the hover effect on the stats within the module page the z-index wasn't being applied properly, this was fixed by wrapping the stat items into another div.

Future improvements:
Take more time to carefully read the code and how it might differ from previous implementations.

Entry Number: 20	Date: 8/04/2023

Work completed:
Finished the front end for the grade dashboard page by implementing the progress bar that's used to display the students overall degree mark.
Once this was completed, I created the frontend for the sign-up page which acts as a pop up in the same fashion as the login page.

What went well:
Approach to creating the progress bar, this was first done by reading about the progress bar tag in html[17], then adding this to the project, after adding markers across the bar for the different degree classifications, then testing to see how it appears after resizing. Once this happened, I discovered changed the approach to the progress bar. Now it is a paragraph tag that contains a span tag that will change its width depending on the users' grade, the grade will also be displayed within the span tag. Now when resizing the page, the progression of the degree stays inline with the classification markers.
The reason the approach to creating the progress bar went well was because even though I hit a road block in using the progress bar tag, I quickly came up with a solution that not only fixed the resizing problem, but overall looks better than the original implantation using the progress bar tag.

What went poorly:
N/A

Future improvements:
N/A

Week Commencing 10th April.

Entry Number: 21	Date: 11/04/2023

Work completed:
Over the weekend I completed research into how a login system in Django might work and I discovered the in-built authentication system within Django[18], I then found a useful tutorial on login systems using Django[19].
Then on 10th Ross pushed the code that created the database, this allowed me to create user accounts and implement the backend for the login system to Django, where I created an admin account and student account for testing.
Along with this I also created the backend for the module information page, now the information for all the modules are taken from the database and displayed on the web page along with a working filtering system and search. As we are using an ORM model in Django, I looked at some of the documentation relating to getting information from a ORM database programmatically[20].

What went well:
Due to the research on how authentication and authorization works in Django completed over the weekend, it made implementing the login system a lot smoother.

What went poorly:
The search for the modules was difficult to create, as the web page gets all the information on the modules on page load then adds them to the HTML through JavaScript. This meant to get the search to work I added the name for the module as an id for that div element, this means that whenever a user searches for a module the JavaScript can check for all the divs with an id that contains the users search term. This is a poor implantation of search and was a very "hacky" work around for a poor implantation.– This will be refactored later.

Future improvements:
Improve time management to avoid creating features that are poorly coded that effect other aspects of the project.

Entry Number: 22	Date: 14/04/2023

Work completed:
Added additional student accounts for testing login system (and that correct information is displayed per student). Then I completed the backend for the grade dashboard page, this involved getting all the students' information from the various tables and formatting it into a JSON object that is then returned to the JavaScript where the web page is updated accordingly. This involves updating the bar chart, resizing the progress bar based on the students' grade and adding ensuring the student can't select a stage they are not currently in.
Also updated the UI for the filter on the module information page so instead of the pathways being hard coded into the HTML page, it will now get this information from the database, I also overhauled the search functionality for the module information page so now it will send a request every time a user searches for a module and filters the data based on the search term[21].
Along with all of this I had some further discussions with Ross on the structure of our database and we decided a new linker table was needed to show the relationship between the StudentModule table and the Assessment table, this linker table is needed to store student grades for each assessment. So once this was decided I wrote code to add the StudentModuleAssessment table to the database.

What went well:
The discussion with Ross about restructuring the database was very productive, he also explained how the ORM works and the best way to add test data to this new table.
Adding the backend for the grade dashboard page was easy to implement as after the work on the module information page I have become very familiar with how accessing the data from the database works using Django.

What went poorly:
While testing the new search for the module information page I noticed whenever a filter was applied before the search was entered, the page would then ignore this filter was the user searched for a module name, even though the filter was already applied. After a lot of testing I realised that the reason why this was happening was because the filtering system is still using the HTML class approach while the search was now sending a request, the filter was being checked before the result of the search was returned to the webpage. To fix this I added a delay to when the filter was being applied so that the search request will have returned a result before the filters were applied.
This error took quite a while to identify as I was too focused on there being a typo or something similar to that within the code rather than a flaw in the logical design of the code itself.

Future improvements:
Whenever something doesn't work as expected, make sure not to focus on the code itself but also reconsider the logic of what is trying to be implanted and the steps in which the logic takes place

Entry Number: 23	Date: 16/04/2023

Work completed:
Researched into ways to send emails using python[22][23], and then completed the backend for the sign up page which involved implementing this research.

What went well:
Researching into the problem before implementation once again was very useful and made development of the larger feature much smoother.

What went poorly:
Some of the resources I found on sending emails in python were outdated. This was a problem as I would get an authentication error when trying to send an email when there wasn't a bug in the code, google just updated their security policies requiring some additional steps before an account can be used to send emails within python.

Future improvements:
Make sure to be looking at the most recent resources when completing research into a problem.

Week Commencing 17th April.

Entry Number: 24	Date: 18/04/2023

Work completed:
Completed work on the presentation for the upcoming demo.
While Conor was creating the DockerFile for the project he was coming across an issue where the pip install for the English language model spacy would crash and not install. This was a problem that Kyle came across and fixed when first installing spacy, the problem was that in the packages for chatterbot there is a file called tagging.py that needed to be changed to reference the English language model for spacy before trying to download said language model. The problem here is that as a docker image is being composed you can't manual go in and change the tagging.py file.
So Conor reached out for help regarding this issue, after I completed some research I managed to find a stackoverflow page with the solution[24]. We made a copy of the corrected tagging.py file in the same directory of the DockerFile then using the ADD command, added this file in place of the tagging.py file that is in the chatterbot packages.
The next day the entire team got in a call to figure out another problem with Docker where the static files were not loaded when a container was being ran, after a while Kyle was able to find a solution[25].
During this time I also completed research into customising admin panel[26], then using this research to implement customisations, in the team meeting we also discussed about removing the StudentInfo table and combining it with the Student table, which I then implemented.

What went well:
The team came together and worked really well together to solve the problem around docker.

What went poorly:
Due to my lack of understanding of how Docker images are formed it took a while to find the directory of the packages for chatterbot to replace the tagging.py file.
Even though the problem is now fixed with the static files not loading, none of us managed to find the reason the problem was happening, there was more of a trial-and-error approach taken to fixing the problem. While we all did research into trying to identify the actual cause of the problem there wasn't any success, Kyle just managed to find another way to run the "runserver" command in the DockerFile and it so happened to work.

Future improvements:
Complete research into all technologies used for the system even if it is not my role to work with those technologies.

Entry Number: 25	Date: 21/04/2023

Work completed:
We had a team meeting on the 19th April to complete more prep work for the demo on the 20th April, we also met early in the morning on the 20th before the demo to continue prep work and practice for the demo.

What went well:
Worked together well while prepping for the demo where during practice everyone delivered feedback to each other in a respectful way.

What went poorly:
N/A

Future improvements:
N/A

Week Commencing 24th April.

---------- Week off to focus on other modules ----------

Week Commencing 1st May.

Entry Number: 26	Date: 5/05/2023

Work completed:
Had a team meeting to discuss what we plan on doing in the next sprint (taken place on the 28th of April). Then from the 1st May to the 4th May I polished off the requirement section for the report and the wireframe diagrams, and completed the roadmap for the next sprint. Then on the 5th May our team had another meeting where we gave feedback on the work completed by other team members, and finalised the report for submission.

What went well:
Everyone delivered feedback to each other in a respectful way.

What went poorly:
N/A

Future improvements:
N/A

Summary of Work Completed.

Report 1:

- Roadmap section.
- Sprint Plan section.

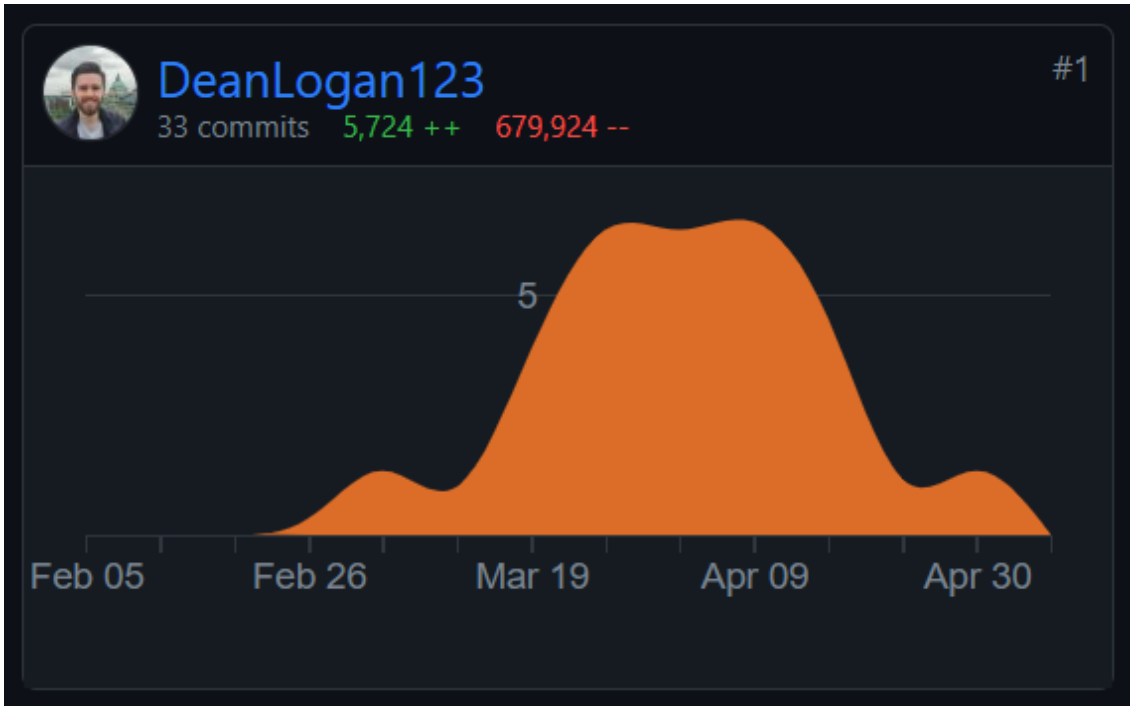
Report 2:

- Requirements section.
- Wireframes (featured in the design section).
- Roadmap (featured in the sprint plan section).

Prototype Development:

- All frontend development of website including animations and graphs (chatbot page, grade dashboard page, module information page, settings page, admin panel, login pop up and sign-up pop up, including the different views depending on if a student or admin is logged in).
- Created all accessibility options for the website which gets applied to all pages (changing the font size between small, medium, and large, and changing the theme between dark, light, and high contrast modes).
- Backend for login system (authenticating a user's credentials then authorizing the correct information for the user, includes limiting the pages the user can see and changing UI elements based on the logged in user).
- Backend for module information page (retrieving the required module information from the database, the ability to search for modules, and the ability to filter the modules displayed based on semester, stage, and pathway)
- Backend for grade dashboard (checking which user is viewing the page then retrieving the correct grade information for the user, and ability to filter which stage is being shown to the user, along with calculations for the statistics shown).
- Backend for sign-up system (automatically sending a formatted email to the admin which includes the information filled out by the user in the sign-up pop up).
- Creation of StudentModuleAssessment table and adding test data for this table.
- Creating all user accounts (along with the corresponding records within the student table) and user groups.
- Customisation of admin panel (adding search functionality to all admin pages along with filters and including links to the corresponding record where a foreign key is within the database).

Taken from the GitHub insight page for the prototype repository (https://github.com/KyleMcComb/CSC3068-Pathfinder/graphs/contributors):



(Note: The -679,924 was largely from removing a virtual environment which Kyle mistakenly pushed to GitHub)

General Reflection of Project Development.

As seen throughout my journal entries, I tried to learn different concepts using academic papers and books. However, I discovered that this method of learning didn't really suit me. Often, these resources caused more confusion than help. Another thing I discovered was that relying solely on websites like Stack Overflow wasn't always the best resource when trying to find the solution to a bug.

One resource that I had previously neglected but will now use more in the future is the documentation. In the past, I found it difficult to gain the relevant information I needed within the documentation. However, throughout the making of the prototype, I sharpened my searching skills within the documentation to find the necessary information.

In the future, I do not plan to ignore resources like Stack Overflow or academic papers, but I will use them less in favour of browsing the documentation.

One thing that could be improved upon is the way our team communicates with each other. Throughout development, we often used text channels to communicate with each other instead of team meetings. This was often because finding times when all team members were free for a call became difficult. This problem was exacerbated by a larger issue of time management within the team. Often, team members took weeks off to focus on their other coursework, which isn't necessarily a problem as the work for this project was still being completed. However, the issue is that often this time off didn't align with other team members, meaning that occasionally some team members got "blocked" waiting for someone else's piece of work to be finished.

This also contributed to a messier file structure because there weren't too many meetings where it was explained what each person's code was doing. This led to confusion about what files could be deleted or not.

To fix this, it might be best to organize regular meetings rather than only having meetings whenever there is a big issue to discuss. This makes it easier for team members to know what others are doing and encourages a more consistent working pattern rather than working in "bursts" on the project. It also opens the opportunity for regular code reviews and better code documentation as they can be done more regularly. This can also help team members recognise the contribution made by each other throughout the project instead of some team members feeling like they contributed more/less than they actually did.

Although this didn't have a significant impact on development, it's a minor change that could improve our work, especially as the focus moves more towards development within the next sprint.

References

Below is a list of resources used for research and help solving problems throughout development. This includes academic papers, videos, articles, and documentation.

[1] "Chatbot for university related FAQs," 2017 International Conference on Advances in Computing, Communications and Informatics (ICACCI), Udupi, India, 2017 - B. R. Ranoliya, N. Raghuwanshi and S. Singh.
[2] https://www.qub.ac.uk/Study/Undergraduate/ - Qubot (Queen's University Belfast Chatbot).
[3] Intro to AI chatbots – Aishwarya Gupta, Divya Hathwar & Anupama Vijayakuma.
[4] A Platform for Human-Chatbot Interaction Using Python – Bhaumik Kohli, Tanupriya Choudhury, Shilipi Sharma & Praveen Kumar.
[5] Data analysis by web scraping using Python - David Matthew Thomas & Sandeep Mathur
[6] WATEERFALLVs V-MODEL Vs AGILE: A COMPARATIVE STUDY ON SDLC – S.Balalji & Dr.M. Sundararajan Murugaiyan.
[7] The Waterfall Model and the Agile Methodologies: A comparison by project characteristics – Wilfred Van Casteren.
[8] Machine Learning with Python course – Free Code Camp
[9] Software engineering 10th Edition, Pearson Education, 2016. - I. Sommerville
[10] Volere Requirements Specification Template Edition 16—2012 - James Robertson & Suzanne Robertson
[11] Docker in Practice, Second Edition - Ian Miell, Aidan Sayers
[12] Docker in Action, Second Edition - Jeffrey Nickoloff, Stephen Kuenzli
[13] MDN Web Docs CSS white-space – MDN docs
[14] MDN Web Docs CSS Gride-Layout – MDN docs
[15] Chart.js Getting Started – Chart.js docs
[16] Graphs Chart.js – w3schools
[17] Progress Bar in HTML - Muthu Annamalai Venkatachalam
[18] Using the Django authentication system – Django docs

[19] Login With User Authentication Django Wednesdays #21 – Codemy.com YouTube channel
[20] Making queries – Django docs
[21] Search – Django docs
[22] Smtplib, SMTP protocol client – Python docs
[23] Sending Emails With Python - Joska de Langen
[24] How to edit library package inside docker image – Daz Wilkin on stackoverflow
[25] Docker With Django Tutorial | How To Dockerize A Django Application (Beginners Guide) – Code with Tomi Youtube channel
[26] Customize the Django Admin With Python - Christopher Trudeau