



# Synoptic Project Report

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## Role Description Bias Detector

**Abstract:** IT consultancy project to formulate and evaluate technical alternatives to the current diversity operational strategy in the 'Early Professionals' sector of IBM.

**Specialism:** IT Consultancy

**Supervisor:** Dr. Vladimir Ryabov

**Word Count:** 10,997

**Candidate** 680063670

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## 1. Executive Summary

IBM, a global technology company, has a reputation for being at the forefront of technological change and innovation, but it is also a forward-thinking company in other ways. “Diversity and inclusion” is listed as one of IBM’s four core values (Mission Statement n.d.), and this is reflected in many aspects of the way the company operates its business. I have been working at IBM since before the start of my apprenticeship. I work within IBM consulting, a newly rebranded version of Global Business Services that embraces an open way of working by bringing a diverse set of voices and technologies together. (IBM n.d.) I chose to carry out my synoptic project internally with IBM because of the uncertainty of the length of time for which I would be working with my current external client. The internal team I worked with throughout the project is the Talent Acquisition team, which is the recruitment team that hires all early professionals in IBM UK.

IBM UK has four schemes that target early professionals: Interns (university students), Graduates, Apprentices, and Futures (gap year students). To attract candidates to these roles, the Talent Acquisition Team uses their social media presence, as well as a myriad of different software that links together to form the application process.

Once an Early Professional joins IBM, they are put in a ‘resource pool’ (informally known as being ‘on the bench’) until they find a project that suits their skills and the needs of the business. The goal is to make this ‘bench period’ as short as possible and to get candidates in projects efficiently. This is dependent on many factors, but mainly the following:

- > What projects are available
- > If the candidate has an up to date resumé
- > If a project matches the candidate’s skillset
- > Which roles the candidate applies for, and if they see themselves fit for the role

The purpose of the synoptic project was to **analyse the current internal business environment relating to the experience of the applications process for professionals new to IBM and develop a recommendation for how technology can improve this experience while fostering diversity.**

Because the internal roles process is so similar to applying for a job outside of IBM, the research I’ve done on job applications applies to this scenario; this is due to the fact a candidate still must find the role, apply, potentially interview, and only then can they be offered the position. Often, candidates applying for any job will only apply for roles that are ‘safe bets’, which means they only apply if they meet 100% of the criteria described. Based on my research, these individuals tend to be minorities, especially women. I am making the assumption that the internal roles application process is no exception to this statistic.

The anticipated value for the synoptic project includes:

- More productive hours billed
- Increased diversity in teams
- Higher morale for early professionals
- Lower turnover in teams

After an interview with Rosemary Clunie, the lead of the talent acquisition team and my main stakeholder, I created an as-is BPMN process flow. I then wrote a problem statement to better define the problem I was trying to solve. Once the current model was analysed, along with requirements and a root cause analysis, I identified the most feasible and highest impact solution: **A web application that allows users to input their role descriptions and displays any biases found along with an IBM Watson analysis of the sentiment of the text.** I created a prototype for a web-based solution that allows users to input their role descriptions and be given an analysis of any biased language highlighted for them to check based on the context. I also developed a FLASK API to create a function that uses IBM Watson to analyse the sentiment of the text, so that the user knows what kind of subconscious emotions a candidate may feel when reading the description. Technology improves the process by giving an instant analysis of the role description for people who do not have experience or training with accessibility best practices.

Development then began, and I started by designing the system. I used this design to begin front-end development, coding in HTML and CSS. I developed a one-page service, with four vertical sections for the user to navigate downwards, with an automated soft scrolling function when the user completes a task, to limit the number of clicks needed to complete the journey. I developed the back end using a mixture of Python and FLASK. FLASK is a Python web framework that allowed me to create an API to pass information between the front and back-end.

Once the prototype was complete and working sufficiently on my machine locally, I began usability testing with a range of users with differing IT literacy levels. This resulted in multiple changes required for the prototype to be as usable as possible. Once the next iteration was finished, I presented the final recommendation to my supervisor for the project, and the verbal feedback she gave was positive - acknowledging the benefits along with the rest of her team.

Once the prototype was approved, I created a demonstration video to not only be used as a user guide on how to use the service but also to launch the product into the internal recruitment community. Results from the launch were largely positive, with 84% of users strongly agreeing that it would bring value to IBM if implemented.

Soon, I plan on making this tool available for consumption for the entire internal recruitment community. I have also reached out to our Workforce Management Leader to enquire about how this can make the most impact not only colloquially on Slack, but formally in the role matching process.

## 2. Purpose and Anticipated Value

### a. Motivation

In 2020, McKinsey released a report that suggests the business case for diversity in the workplace is stronger than ever (Dixon-Fyle, et al. 2020). There have been considerable and extensive studies on the effect of diverse teams, and over the years it has become apparent that the relationship between diversity on executive teams and the likelihood of financial outperformance has **only strengthened over time** (Dixon-Fyle, et al. 2020). Diverse talent breeds varied thinking and has been proven to boost innovation in business, resulting in the organisation having a “competitive edge over their peers”. (Forbes 2020). The business need for these benefits is only compounded by the COVID-19 crisis, where leveraging diversity and inclusion is imperative for an organisation to ensure future prosperity and efficient recovery. (Dolan 2020)

Many companies today state the same objectives of prioritising diversity and inclusion, however, it's important to question what tangible actions they are taking to ensure their workforce is truly diverse. Most diversity-related activities start from the top with engagement from leadership (Watkins 2012), pledging to create a company culture that promotes inclusivity. However, studies show that another effective way to ensure diversity is with a 'bottom up' approach. (Equality Magazines n.d.) This way, organisations would hire diverse talent early in their careers, who end up progressing into potentially senior positions – therefore snowballing the impact of the organisational benefits.

### b. Project Purpose

After initial conversations with the Talent Acquisitions team, I realised it was not viable to have a successful project by finding an area of opportunity in the *external* recruitment space. This is because the team use many third-party software products that are not only difficult to access or integrate with, but they are IBM confidential. Consequently, the purpose of the synoptic project is **to analyse the current internal business environment relating to the applications process for professionals new to IBM, and how we can utilise technology to close the gap between the offer stage and the role acceptance stage in a manner that fosters diversity.**

Because of the tight 6-month deadline, success was to be measured based on the results of user testing rounds, and a survey sent to senior management, evaluating if they believe the project will bring value to IBM once implemented. Below is the simple plan for how the project would run, which I created before I knew exactly what the deliverable would be. A more refined plan will follow in the 'Timescale' section:

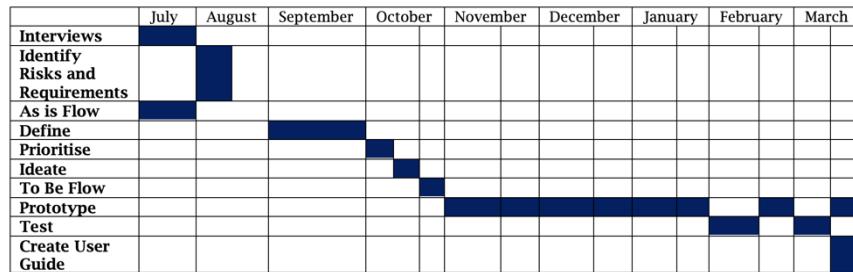


Figure 1 - Simple Gantt Chart

### c. Features and Functions

The synoptic project delivers both a product and a service, each with its own characteristics:

Service: IT Consulting
<p><b>An analysis of the current business environment and recommendation made</b></p> <ul style="list-style-type: none"> <li>- <b>Interview stakeholders:</b> An initial flexible interview took place to identify the business problem, areas for improvement and the current business process.</li> <li>- <b>Identify project risks and requirements:</b> A risk assessment took place along with an analysis of the requirements for the solution.</li> <li>- <b>Analyse the business process:</b> An as-is process flow was created to ensure all aspects of the current process were identified.</li> <li>- <b>Define the business problem:</b> A problem statement was written to ensure there was a single point of truth throughout the project.</li> <li>- <b>Prioritise the areas for improvement:</b> Once the business problem was defined, the areas for improvement were prioritised in order to decide what the solution addresses.</li> <li>- <b>Ideate recommendations:</b> The solution was defined, and recommendations presented.</li> <li>- <b>Analyse the 'to-be' business process:</b> A to-be process flow was created to define and analyse how the process flow will look if the stakeholders implement the recommended prototype.</li> </ul>

Product: Bias Detector Prototype
<p><b>A working prototype of the recommendation to present to stakeholders and test with the current journey.</b></p>

- **Biased word check:** The service checks the role description against a list of biased words compiled after extensive research.
- **Sentiment Analysis:** The service passes the role description to an IBM Watson Natural Language understanding API that will return values for different emotions that the role description contains.
- **Word Count:** The service provides a word count of the role description and compares it to the best performing word count range for role descriptions.
- **Best practice:** The service provides the best practices to teach the user what unconscious biases they should keep in mind when going through the process.
- **Copy to clipboard:** The service contains a button that copies the analysed text back to the user's clipboard for them to easily paste it elsewhere.

#### d. Anticipated Value

##### IBM

According to the results of a small user group of apprentices I questioned, the average apprentice spends about a month on the bench before finding their first role. This adds up to approximately 1,920 non-billable hours per intake of new apprentices. The anticipated value of this synoptic project for the whole of IBM UK is to get early professionals into productive roles faster, therefore increasing IBM's profitable hours. I predict that if my recommendations were implemented, the number of non-billable hours per intake of new apprentices could be significantly reduced. This is because early professionals would apply for additional roles when joining IBM, as they will be less likely to subconsciously deliberate whether they are fit for the role.

##### Early Professionals

As an early professional, being 'on the bench' is not ideal. Not only because you aren't in the occupation that you enjoy yet, but also because it can affect statistics such as your utilisation rate, which can inhibit the rate in which an individual may get promoted. My objective is to find a technical solution that helps reduce bench time, therefore benefiting graduates and apprentices who are keen to get straight onto a productive role.

## Managers

The proposed solution has also set out to improve the diversity of teams. If a workplace isn't diverse or promoting D&I activities, it has the potential to be perceived as a hostile work environment which may result in increased turnover of teams. If an employee feels as though their teams value and respect their differences, they're less likely to look for a role elsewhere. According to one study, organisations with inclusive cultures have higher rates of employee retention and find it easier to recruit new employees than those without, and also have 22% lower rates of turnover than organisation without inclusive cultures. (Deloitte n.d.) Keeping turnover low and morale high is in the interest of managers, and my synoptic project can address this and improve the current landscape by fostering diverse teams, thereby decreasing turnover rates.

## Personal Development

I chose this project to further my consulting and technical skills by choosing a project that would result in an alternative to existing processes, where I could partake in rapid prototyping. I anticipate that the skills I gain from this project will bring value to IBM as I will be able to integrate them into my future roles. This is relevant in the current business landscape because *Global Business Services*, my sector of IBM, has recently rebranded to *IBM Consulting*, where they are more focused than ever on IT Consulting projects that deliver value through technical alternatives.

### e. Requirements Gathering

Gathering accurate requirements is an essential part of ideating a solution. Below are the requirements for the idea I came up with that had the highest feasibility and impact: A bias detector application for hiring managers to use to ensure their role descriptions are accessible and foster a diverse workforce.

#### General Requirements

Business Constraints:	
Requirement	Measure of Success
1. The project must be completed in the allotted time.	Success is measured by how soon the project finishes. If it finishes in a 6-month period, this requirement is met.
Business Policies:	
Requirement	Measure of Success
2. Must align with IBM's <i>BeEqual</i> ethos.	I have completed periodical checks of the project against IBM's BeEqual ethos and how I, as a representative of IBM, should adhere to these.
Branding:	
Requirement	Measure of Success
3. Any output should match IBM's branding.	IBM's branding guidelines were checked against the final output, which adhered to these guidelines.
4. Any output should include IBM logo.	Output includes IBM approved logo with transparent background that adheres to IBM's brand guidelines

## Technical Requirements

Hardware:	
Requirement	Measure of Success
5. All users should have a PC or laptop.	All IBMers by default have access to personal computers and therefore this requirement is met.
Software:	
Requirement	Measure of Success
3. All users should have an up-to-date operating system.	4 Talent Acquisition managers and any other users identified later in the project have the latest operating system installed on their devices.
4. All users should have Slack installed.	4 Talent Acquisition managers and any other users identified later in the project have Slack accounts and the Slack application installed on their devices.
Interoperability:	
Requirement	Measure of Success
5. The solution should integrate with the existing journey for a talent acquisition manager.	4 Talent Acquisition managers and any other users identified later in the project are happy with the level of integration the final product provides and rates the new journey well via user testing and a survey. The as-is process flow defines the current journey and the to-be process flow defines how the solution will integrate.
Internet:	
Requirement	Measure of Success
6. All users should have access to internet to access the solution.	4 Talent Acquisition managers and any other users identified later in the project can access the service via a stable internet connection either from home or the IBM offices.

## Functional Requirements

Data Entry:	
Requirement	Measure of Success
7. Users will be able to enter a role description.	The final product includes a text area that allows a user to type in or paste a body of text, along with a button that submits it to an API to be analysed.
Data Maintenance:	
Requirement	Measure of Success
8. The solution will be able to analyse data entered by the user.	The final solution contains an input that allows the user to enter their role description. It includes an API that passes the entered text (role description) into a function that analyses the text.
Procedure:	
Requirement	Measure of Success
9. A user should be able to see flagged words that may be biased.	The final solution includes a function returns the result of the analysis back to the API that passes the results back to the front-end to be read by the user.
Retrieval:	
Requirement	Measure of Success
10. Users should be able to edit their role description and then retrieve it from the system.	The final solution contains a button that allows a user to go back and edit the body of text in the text area, and then pass it back into the function once edited. It also includes a function that copies the text area to the user's clipboard for them to paste it elsewhere.

## Non-Functional Requirements

Speed:	
Requirement	Measure of Success
11. The service should take no longer than 5 seconds to analyse the text, to ensure an adequate user experience.	Success was measured via a user testing session in which the functions are timed.
12. There should be only a limited number of clicks (less than 5) to achieve the purpose.	Success was measured via a user testing session in which clicks were measured (on average 3)
Security:	
Requirement	Measure of Success
13. The solution will comply with IBM security standards.	Success was measured when the security standards of IBM were reviewed and checked against the use of the recommendation.
Access Permissions:	
Requirement	Measure of Success
14. All hiring managers should have access to this service.	Success was measured after a conversation with Rosemary to discuss the feasibility of managers all having access, and Rosemary approved that this would not be an issue should it remain a web-based application in which the link can be shared amongst IBM management.
User Capacity:	
Requirement	Measure of Success
15. The application should be able to handle over 100 users at a time. In order to keep up with the number of roles being posted internally and externally in IBM daily.	I recommend success is measured via load testing, which is out of scope for the 6-month period but can be done once the client decides to move forward with the recommendation.

### 3. Stakeholders

	Stakeholder	Role	Description
IBM	Rosemary Clunie	Talent Acquisition Partner	Rosemary acted as my project sponsor and supervisor. She is who I met with weekly, and who mentored me through the process and facilitated conversations with talent acquisition partners. She was extremely helpful and generous with her time.
	Talent Acquisition Team		The Talent Acquisition Management Team is the first round of users that would implement this solution. I conducted 4 rounds of user testing with them, and they provided valuable feedback. This team is where I conducted the consulting project. Rosemary Clunie is the manager of this team.
	Kashif Taj	Foundation Manager	Kashif Taj is my Early Professionals Manager and therefore takes interest in my synoptic project and its outcomes and success.
	Charlotte Fisher Morecroft	Foundation Manager	My manager recently changed from Charlotte Fisher Morecroft, who signed off this project idea and pointed me in the right direction of who to speak to about next steps.
University of Exeter	Vladimir Ryabov	Project Supervisor and Module Lead	Vladimir supported the project throughout, including regular reviews and advice given.
	Huw Evans	Programme Lead	Huw provided guidance on the Synoptic Project process.

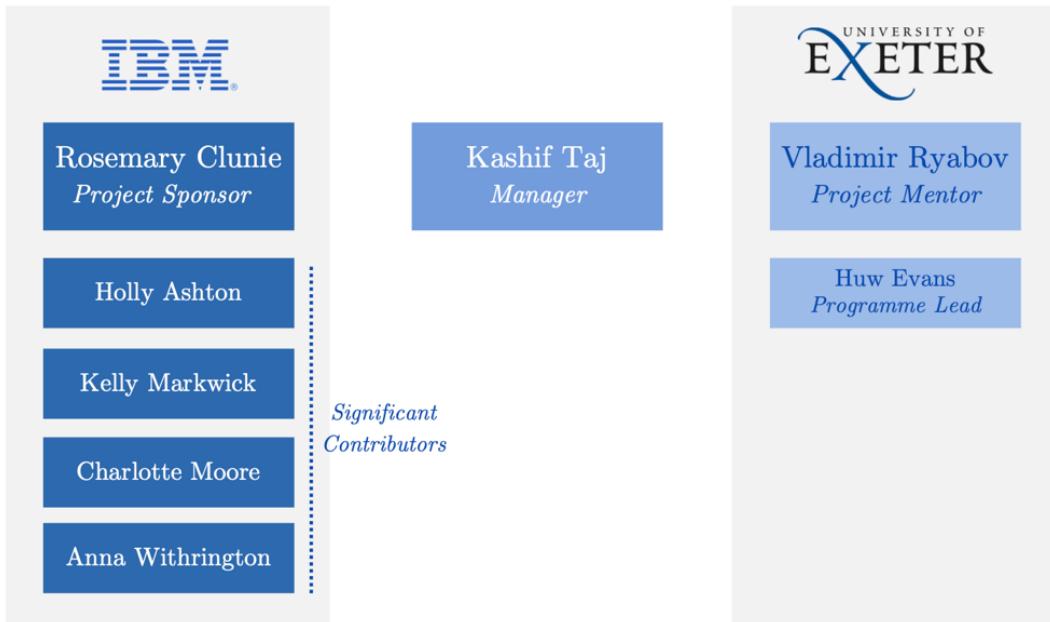


Figure 2 - Project Stakeholders

I created a power-interest grid. The power map allowed me to visualise the relationships between stakeholders. I have mapped them as follows:

**Rosemary: A**

**Talent Acquisition Team: B**

**Early Professionals: C**

**Huw Evans and Vladimir Ryabov: D**

**Kashif Taj: E**

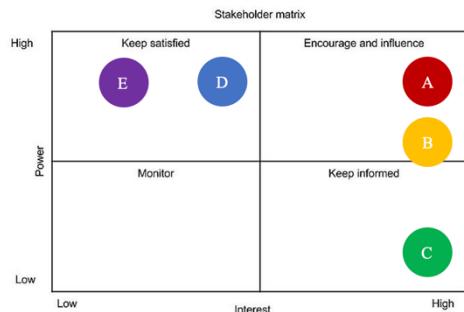


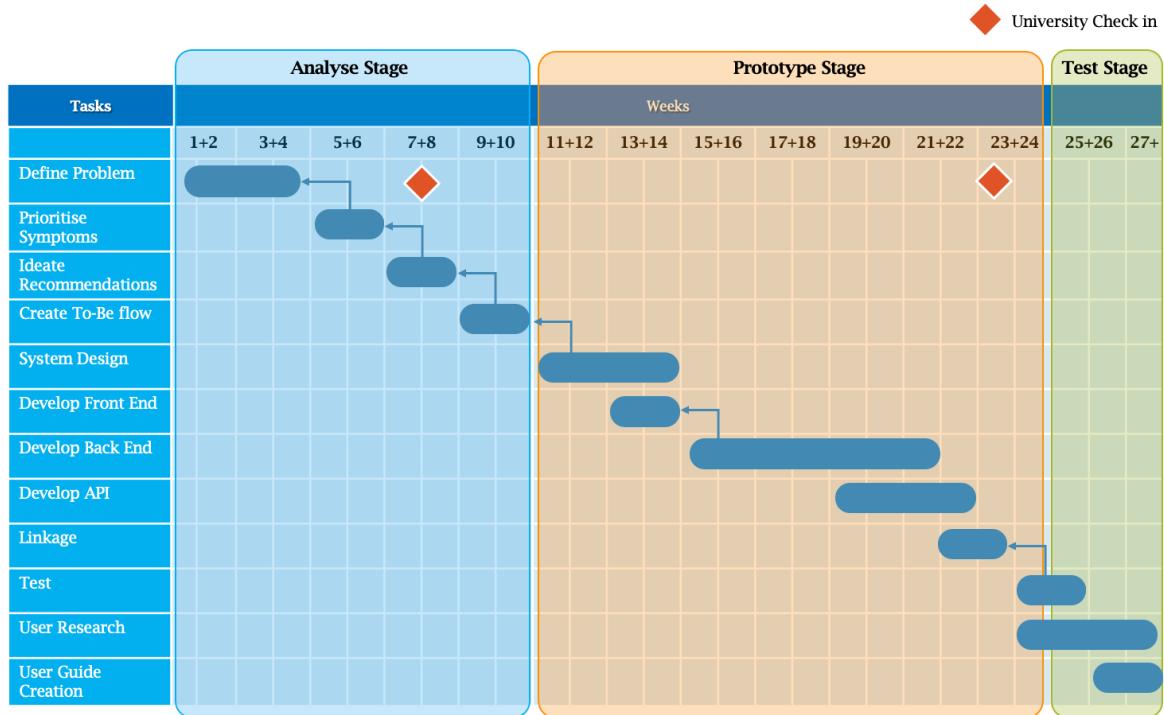
Figure 3 - Power Interest Grid

Rosemary has the most interest and also the most power as she is my main project stakeholder and client. The second most powerful and interested stakeholder is the rest of her team. I am building recommendations that they will be using and therefore they have interest in regard what it will be and how it will affect them. Early professionals new to IBM have an interest in the outcome as it may affect their experience if the team implements the recommendations. The stakeholders from Exeter University have a high level of power, however, they have many other students to monitor and therefore only have time for a few check-ins throughout the process. My manager, Kash, has high power but also has low bandwidth to take interest in the day to day of this project.

## 4. Project Planning

### a. Timescale

Once the idea was proposed to Rosemary, she gave the green light to start production.



#### Analysis Stage

In this stage, I planned to complete all the initial IT consulting to begin defining the problem and what the user needed. This started with a flexible interview with the Talent Acquisition lead, and I used the information gained from the interview to use an empathy mapping technique to record all the pain points and areas of opportunity in the journey. I then prioritised them based on what would bring the most value to the business and make the most impact. Once the issues have been defined, I wrote a formal problem statement to use as a single point of truth throughout the project. I ideated potential recommendations for the client, and once chosen, created a To-Be BPMN flowchart to visualise what the journey would look like if they implemented the solution. This was then presented to the main stakeholder of the project for approval.

#### Prototype Stage

Using the information gathered from the analysis stage, I began designing the system and addressing all the user's pain points, considering risks and requirements. Once the system was designed, and the design was approved by Rosemary, development could begin. I

started with the front-end, coding in HTML and CSS. Once the front-end was complete and I knew the functions that needed to be created to make the front-end work, I developed the back end using Python. While I developed the back end, the API that links the two was created to pass the information from the front-end to the back end. Once all code was complete, there was a final check to make sure it is all linked and working as expected.

#### **Test Stage**

Once the prototype was working, usability testing took place with participants with varying backgrounds and IT literacy levels. The results of this testing was analysed, and appropriate iterations were made to the prototype. A presentation will be made about the prototype and shared along with a survey asking whether a user would find the application useful and whether they believe it will bring value to IBM and its diversity strategy. Finally, a user guide video will be made to launch the service into the recruitment community at IBM and demo how to use the service.

#### **b. Costs**

There were no costs associated with this project, other than the time I spent on it. All the materials that were required I already had, for example, my computer and all software required to carry out this project, listed below. I also had verbal permission for where I will be billing my time to within IBM. This is an internal project for IBM Consulting.

Software I used under an IBM or personal license with no additional cost included:

- > Trello
- > Visual Studio Code
- > PyCharm
- > Adobe Animator
- > Microsoft PowerPoint
- > WebEx
- > GitHub Desktop

## 5. Project Execution

### a. Approach and progress management

I used an Agile methodology for the synoptic project, which allowed me to adapt and pivot to changing requirements. The Agile approach focuses on functional software as a measure of success, with parts of the working software being delivered regularly and in a short period of time; this resulted in the project seeing constant improvement which was aligned with the needs of the business.

I chose to use Agile methodology because it allows for a direct relationship with the client throughout the project, and constant updates as each feature is implemented. Because my communication with Rosemary occurred regularly, Agile allowed me to show her incremental progress which gave her a sense of transparency in regard to where I was in the process.

To manage the progress of the project, I used Trello, a project management software, as a Kanban board to track each feature. At first glance, the Trello software was able to easily visualise what tasks need to be done, what tasks I am working on, and what tasks are completed. The columns in Trello were as follows:

- > Not started: Tasks I have not completed or begun to complete yet
- > Doing: Tasks that were in progress
- > Blocked: Tasks that were on hold because of issues or challenges
- > Testing: Tasks that were finished but still being tested
- > Sign off: Tasks that were finished and tested but needed to be signed off by Rosemary
- > Done: Tasks that were signed off and complete

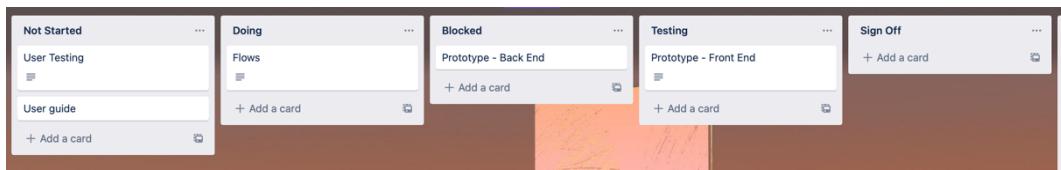


Figure 4 - An example state of my Trello board

Testing is essential for any successful application and allows stakeholders to be assured that it is both fully functional and ready for use. By scrutinising the code produced, it will help ensure the application is working as planned and has a narrow scope for potentially code-breaking bugs. The testing that is feasible and in scope for this process is unit testing. Unit tests will be done as features are implemented, because of the project being developed using Agile methodology. Testing each unit of functionality as and when it is being added to the code works best for Agile methodology because it delivers value to

the project sooner and in smaller work packages. The testing will be weaved throughout the entire project as the application gets developed, and therefore is not represented on the timeline. I will be manually unit testing the features as they are added to ensure that they align with the project purpose and plan and operate well in unison with the existing project, achieving a very elementary form of integration testing.

### b. Business Problem Analysis

Rosemary Clunie is the Talent Acquisition Manager for IBM UK and Ireland. She oversees all recruitment activities once the talent is attracted to IBM. Rosemary was highly interested in the topic, and she was enthusiastic for me to analyse the processes.

In early October, I sat down with Rosemary to conduct a flexible interview as an investigation technique in order to get an adequate idea of the current process and ensure there were no 'blind spots' that had not been discovered yet. As well as collecting information, facts, opinions, and requirements, it also helped me better understand the stakeholder's pain points and frustrations with the current model.

She explained that the current process, if the applicant is successful, is as follows:

1. *Talent Acquisition partners work with hiring managers to define what roles are required for the current business landscape*
2. *Foundation writes a job description which is broad - only explaining that the role is either for a tech or business intern/grad/apprentice*
3. *Once approved, sent to talent acquisition partner to share externally*
4. *They are posted on the careers website and to the talent partners (LinkedIn, for example, but exact partners are IBM confidential)*
5. *Applicant goes through application process: CV, Online Assessment, Interview, Offer*
6. *Hiring manager provides more in-depth job description to be shared once applicant is in the 'resource pool'*
7. *Applicant reviews job description and applies for role internally*
8. *Applicant interviews if necessary*
9. *Role is offered to applicant*

### c. Challenges

Activity	Description	Issues	Mitigation
Analysis			
Define Problem	Defining the problem is the most important step in any project and involves diagnosing the current process to ensure that the synoptic project focusses on the real problem and not its symptoms.	During this process, I had conflicting stakeholders who had completely different pain points. For example, one of the talent acquisition team members was more adamant that the issue was that the current external software does not integrate well, where another thought the integration was fine but there was no internal process for role matching.	I listed the user's pain points in an empathy map ( <i>appendix B</i> ) to visualise them, and then prioritised the symptoms (next activity) before returning to this activity to iterate a problem statement.
Prioritise Symptoms	Once I put the pain points into an empathy map, I listed out the various symptoms of the root cause and decided to prioritise them in order to make the most impact.	It was difficult to prioritise the issues when I haven't dealt with them first hand and have to rely on interviews.	I used the empathy map to make sure there were no blind spots or pain points that got ignored and ended up prioritising the lack of diversity strategy in the team.
Ideate Recommendations	Once I defined the problem, I could begin coming up with ideas for a solution.	It was a challenge to come up with something that could be used across IBM and not only applicable to one team, but also solved the problem that the Talent Acquisition team had.	I used an as-is process flow to identify parts of the process that could be made more efficient and could bring value outside of the team.
Create To Be flow	Once I came up with the idea, I created a flowchart to show how the process would look if the team implemented my recommendation.	N/A	N/A

Prototype			
System Design	I created a system diagram ( <i>appendix C</i> ) to explain how I visualised the system working, how the components will interact, and how data will be passed between them.	I've never developed an API before so I had to rely on research to decide how the system would work.	I carried out extensive research and took an online course in FLASK, a framework that would allow me to build an API using Python.
Develop Front End	This was the implementation of HTML and CSS to create the part of the application that users will interact with.	Because the application is so simple, I didn't go into this stage with much of a plan of how the application would look from a UX perspective, and therefore began coding inefficiently.	I quickly realised the benefits of wireframing and designed the page on adobe illustrator before continuing development. Once I had a design to adhere to, this became much easier.
Develop Back End	This was the implementation of Python and JavaScript to create the function that checks the user's input against a list of biased or gender coded words. It also checks for the word count, and the emotion ratings using Watson analytics.	It has been 2 years since I coded in Python, and therefore needed a bit of extra time to remember how it works and what it allows.	I used Stack Overflow and W3 Schools for examples on how to take advantage of what Python has to offer.
Develop API	I developed an API using FLASK that allowed the user's input to be passed to the functions I created in the back end, and then passed back to the user via the front end.	I have never done this before and found it extremely difficult. It took 33% more time than I had planned in order to learn how to use it and debug the code as I went along.	I carried out my user testing in two weeks instead of four in order to finish the project in time. The users were fine with this, and it actually worked out well.
Linking and final unit test	Once the code was all implemented, I did a final unit test to make sure the front end, back end, and API were all linked correctly and functioned as it was meant to.	I found that for some reason, once I implemented the API, the CSS was no longer working at all for the prototype, meaning none of the components on the front end were styled.	I spent a few hours trying to debug this, but after a computer restart, it started working again.

Test			
User Research	I did test amongst users and also carried out a survey of potential users outside of the Talent Acquisition team.	The user testing went very well however it was difficult to motivate the outside users to complete the survey, I only had two responses at first.	I reached out to some senior members of staff that encouraged people they knew who this service would benefit to fill out the survey. I now have 19 responses.
User Guide Creation	I created a demo video for the service that also acts as a user guide to show users how the product functions. I do animation in my daily role and found this to be a fun way to get users excited about the anticipated value of the product.	N/A	N/A

#### d. Post project activities

Within the next few weeks, I plan on making this tool available for consumption for the entire internal recruitment community. I have also reached out to our Workforce Management Leader via Slack to enquire about how this can make the most impact not only colloquially on Slack, but formally in the role matching process. (*Appendix D*)

### 6. Project Deliverables

#### a. Analyse Stage

##### i. As - is Process Analysis

During the interview I asked probing questions to try and fill any gaps in my existing knowledge. Following this, I translated my notes into a UML flowchart with swim lanes, as seen in *Appendix A*. This was done to gain a better understanding of how the process works currently, as well as helping identify weaknesses and opportunities for improvement. I decided to focus on the second-half of the process (shown in *Appendix A* within the red outline), in which a hiring manager writes the specific role description for the role. I did this because this is the part of the journey that is not standardised and has no guidelines for managers. I also assessed the pain points alongside any other information and put this into an empathy map for Rosemary and Kelly's interviews (*Appendix B*). This was a direct result from the initial flexible interviews.

## ii. Root Cause Analysis

The root causes of the existing problems are the underlying processes and system problems that allowed the contributing factors to culminate in a harmful event (API n.d.). To ensure I will be solving the root cause and not just a symptom, I conducted a root cause analysis of the issue. I used a fishbone diagram to illustrate these symptoms and how they stem from the root cause:

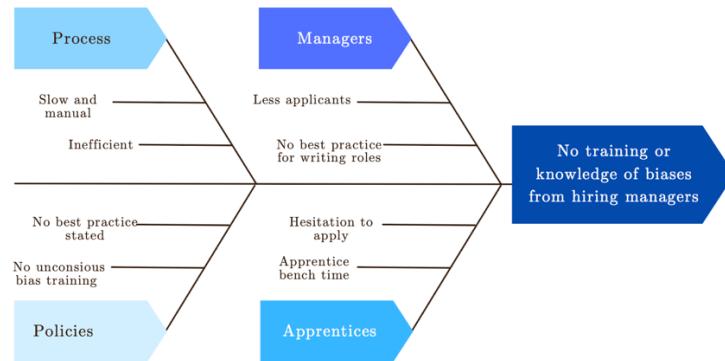


Figure 5 - Root Cause Analysis

## iii. Define the Problem

A problem statement would be an appropriate method of keeping focus on the issue throughout the project. After getting a clear and complete view of the current process, and the root cause, my time was spent defining the business problem. After flexible interviews, I wrote a problem statement so there was a single point of truth for what the focus of the synoptic project would be:

**Context:** After applying for IBM, apprentices periodically end up 'on the bench' whilst applying for available roles.

**Issue:** There is no training done for hiring managers to educate them how to be inclusive and non-biased in the hiring process.

**Relevance:** Training is not feasible as there are so many hiring managers at IBM. There needs to be a quick and user-friendly solution.

**Objective:** In this project, I will investigate options for creating unbiased and accessible role descriptions that will result in more apprentices applying for roles. This solution could also be used and benefitted from by the Talent Acquisition team in the external hires process.

#### iv. Risk Analysis

In this risk assessment, I will base the **severity** of each risk on the below Risk Matrix, based on the risk's **likelihood** and **impact**:

	Negligible [1]	Marginal [2]	Serious [3]	Critical [4]	Catastrophic [5]
Rare [1]	Very Low	Low	Low	Medium	Medium
Unlikely [2]	Low	Low	Medium	Medium	High
Possible [3]	Low	Medium	Medium	High	High
Likely [4]	Medium	Medium	High	High	Severe
Certain [5]	Medium	High	High	Severe	Severe

Risk	Likelihood	Impact	Severity	Mitigating solution
Wrong estimation of time and cost for the project, leading to scope creep or timeline issues.	Possible – estimation issues and inaccuracies are a common risk in IT consultancy projects.	Critical	High	I will use Trello, a Kanban software, to track the project closely against its goals and problem statement, to identify any timeline issues or scope creep quickly.
Gathering requirements incorrectly which will lead to oversights in system design.	Possible – This is a common issue in IT consultancy projects.	Serious	Medium	I will construct accurate requirements for the solution by working with end users before the prototype stage.
Lack of communication with client causing confusion or lack of clarity.	Possible - The client's workload may change and this project may change in their priorities.	Serious	Medium	Back up stakeholders will be identified if the project supervisor has a change of priority. (Other talent acquisition managers). A communications plan is in place with original project sponsor (Bi-weekly WebEx calls).
Delay in earlier project phases	Likely – Blockers are likely to arise	Marginal	Medium	Any technical aspects of the project I have not

endangers ability to meet project deadline.	which may alter the timeline of delivery.			done before, I have padded slightly to account for time it will take to learn.
---	---	--	--	--

## b. Prototype Stage

### i. System Design

*Appendix C* shows a high-level view of how the components of the system will interact, and what data will move between them. There are two main components to the system – the front end, where the user will interact with the system, and the back end and API, which will analyse the user's input and provide them with a response.

### ii. Front End

I developed the front end first in order to create the user inputs that would provide the data for the back end; this allowed me to have input elements to refer to in the functions I would be creating. I coded the interface using HTML and CSS. I wanted to design the system to be a satisfying and engaging experience for the end-users. In theory, the core functionality of the system could be stand-alone and use the command line for input and output, however, this is not what I wanted to achieve with the system. By enveloping the system in a well-designed website, I was able to provide a start-to-finish journey that has a hugely positive impact on the user experience and is user friendly for all users regardless of IT literacy.

The website was designed as a one-page journey, that self-scrolls based on where the user is in the experience. I designed the website in vertical sections on the same page, with each section being 100% of the user's screen width and height. Every button that follows a user input smooth scrolls to the next section, avoiding the need for the user to scroll. I included the IBM approved logo, fonts, and colours in a non-intrusive way that supports the user experience while adhering to the brand guidelines. I also included progress dots at the bottom of each page, so the user knows how far into the journey they are. The code to create section one is found in *figure 6*, along with the outcome in *figure 7*.

```

57 <!--First section - Introductory screen-->
58 <div class="main" id="section1">
59   <div class="header" id="myHeader">
60     
61     
62     <div class="content">
63       <h1 style="font-size:51px; text-align: center; font-weight:100;
64         font-family: 'IBM Plex Sans'; color:white;">Talent Acquisition Bias Detector</h1>
65       <h1 align=center style="font-size:18px;font-family: 'IBM Plex Sans', sans-serif; font-style: light;
66         font-weight:100; margin-bottom: 2em; color:white;">Find subtle bias in your job descriptions to keep IBM an
67           equal opportunities employer for early professionals.</h1>
68     </div>
69     <div class="btndiv">
70       <a class="btn" href="#section2" style="text-decoration:none;font-weight:100; margin: 0px;
71         font-family: 'Roboto'; color:#2986c4; font-size:20px">
72         Let's get started!
73       </a>
74     </div>
75   </div>
76   <div class="dotscontain" style="width:100%; display: flex; justify-content: center; position: absolute; bottom: 50px;">
77     <div class="dot1"></div>
78     <div class="dot2"></div>
79     <div class="dot3"></div>
80   </div>
81 </div>

```

Figure 6 - Code showing Section 1

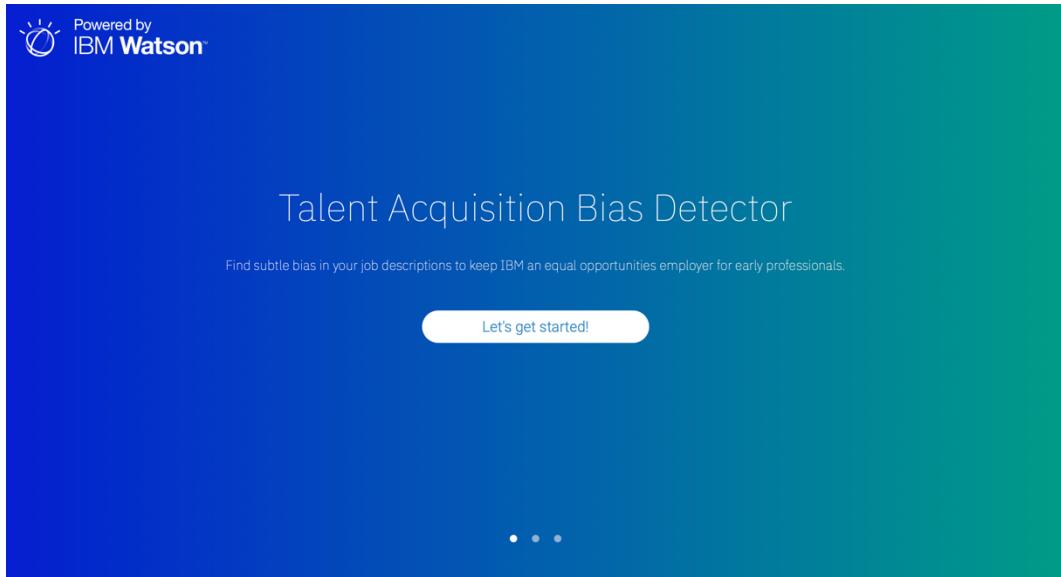


Figure 7 – Screenshot of results of code shown above

After the user clicks 'Let's get started!', the page scrolls section two into view, where the user can input their role description. The role description is called by the functions using the id *jobdesc*. When the user clicks 'Let's Analyse!' the code runs a function that scrolls the next section into view, called *scrollIntoView.js*. I added placeholder text to the *input* and *textarea* elements, so that the user can immediately know what to input without additional instructions polluting the page.

```

83 <div class="main" id="section2">
84   <h1 style="font-size:30px; text-align: center;
85   font-family: 'IBM Plex Sans'; color:white;font-weight:100;">Enter your role description:</h1>
86   <div class="textarea">
87     <textarea class="jobdesc" id="jobdesc" name="jobdesc" placeholder= "Paste your role description here...">
88   </div>
89   <h1 align=center style="...">Or, check an existing role description:</h1>
90   <div class="urldiv">
91     <input type="text" class="url" placeholder= "Paste the URL here..." name="url"> <br><br>
92   </div>
93   <input onclick="analyse();section3();replaceText();" id=analyse value="Let's Analyse!" class="btn3"
94     style="text-decoration:none; font-family:'Roboto'; margin-bottom: 60px; margin-top:50px; color:#2986c4;
95     font-size:20px">
96   <script src="scrollIntoView.js"></script>
97   <script...>
98 </div>
99 <div class="dotscontain2">
100   <div class="dot21"></div>
101   <div class="dot22"></div>
102   <div class="dot23"></div>
103 </div>
104 </div>
105 </div>
106 </div>
107 </div>
108 </div>
109 </div>
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150 </div>
151 </div>
152 </div>
153 </div>
154 </div>
155 </div>
156 </div>
157 </div>

```

Figure 8 - Code showing the HTML for Section 2

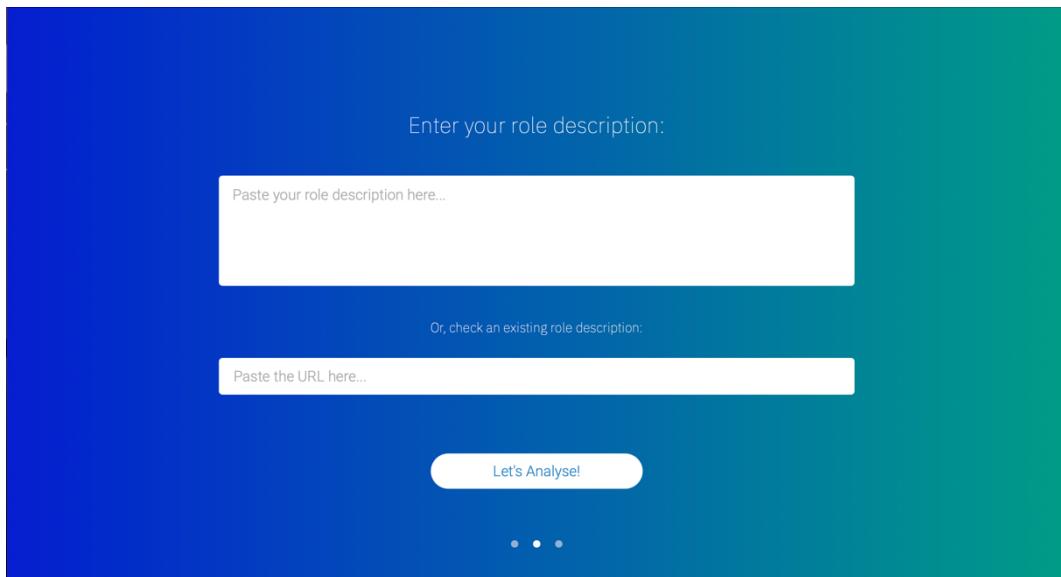


Figure 9 - Screenshot of results of code shown above

Section 3 is the most complex and is made up of three vertical sections, labelled *left*, *middle*, and *right*.

The left section is made up of the results of the analysis. This includes a textarea element that returns the result of the analysis (the original role description text with words highlighted that match the list of biased language), along with a button that says, ‘Analyse Again’ that scrolls the user back up to the previous section so that they can edit their role description before analysing it again. There is also a link beneath the button that takes the user to a research page explaining why certain words are biased. More information on the

research I did for this is explained in the next section. Below is what this screen looks like without the back end passing the results of the analysis into the textarea:

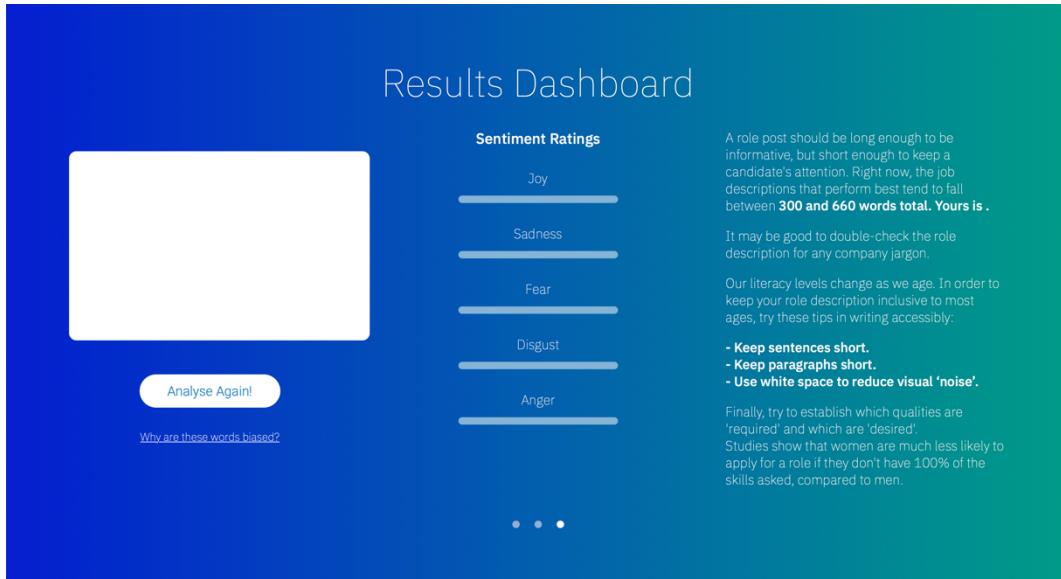


Figure 10 - Screenshot of blank analysis page

```

163 <div class="main" id="section3">
164   <p class="results" ...>
165   <div class="section3contain">
166     <div class="left" style="...">
167       <h1 id="result" style="..."></h1>
168       <div class="textarea">
169         <p class="jobdesc2" id=jobdesc2> </p>
170       </div>
171       <div class="inline">
172         <input onclick="section2()" id=analyse2 value="Analyse Again!" class="btn2" style="...">
173         <button class="btn4" onclick="copyToClipboard()">
174           <span class="material-icons" style="color:white; display:inline; margin: 15px; font-size:25px; opacity:.9;">
175             content_copy
176           </span>
177         </button>
178       </div>
179       <div class="link" style="...">
180         <a style="..." href="#section4">
181           Why are these words biased?
182         </a>
183       </div>
184     </div>
185   </div>
186 </div>
187 </div>
188 </div>

```

Figure 11 - Code used to create left div

In the middle section, there is a div called *emotionRating*, that includes progress bars that I created using rounded, styled divs. Once the front end receives the analysis from the back end, it will be able to use the sentiment data to fill the progress bars based on the sentiment value between zero and one. Below is an example of the code for the first emotions, joy, and sadness.

```

115     .emotionProgressBar {
116         width: 100%;
117         background-color: #85b4d6;
118         border-radius: 10px;
119     }
120
121     .emotionProgressBarInner {
122         width: 0%;
123         height: 10px;
124         background-color: #fff;
125         text-align: center;
126         border-radius: 10px;
127         line-height: 30px;
128         color: #85b4d6;
129     }

```

Figure 12 - CSS used to style the emotion bars

```

211 <div class="middle" style="margin:0; width:17%; display: inline-block; text-align: center;">
212     <h1 class="emotionTitle"
213         style="font-size:20px; display:inline; text-align: center; font-weight:500; font-family:
214             'IBM Plex Sans'; color:white;">
215         Sentiment Ratings
216     </h1>
217     <div class="emotionRating">
218         <h1 class="emotionTitle" style="font-size:18px; text-align: center; font-weight:100;
219             font-family: 'IBM Plex Sans'; color:white;">
220             Joy
221         </h1>
222         <div class="emotionProgressBar">
223             <div class="emotionProgressBarInner" id="joybar"></div>
224         </div>
225     </div>
226     <div class="emotionRating">
227         <h1 class="emotionTitle" style="font-size:18px; text-align: center; font-weight:100;
228             font-family: 'IBM Plex Sans'; color:white;">
229             Sadness
230         </h1>
231         <div class="emotionProgressBar">
232             <div class="emotionProgressBarInner" id="sadnessbar"></div>
233         </div>
234     </div>

```

Figure 13 - HTML used to create the emotion ratings

The div on the right of the page displays text that explains some best practice to keep in mind during the role description writing process. These are `<p>` tags that are styled, but also include a word count of the role descriptions, which is a span with the id `jobDescLength`.

```

265 <div class="right" style="margin:0; width:30%; display: inline-block; text-align: left;">
266   <div class="text" style="font-size:18px; font-weight:100; text-align: left;
267     font-family: 'IBM Plex Sans'; color:white;">
268     <span class="para" style="font-weight:100;">A role post should be long enough to be informative, but short
269       enough to keep a candidate's attention. Right now, the job descriptions that perform best tend to fall
270       between</span><span style="font-weight:500"> 300 and 660 words total. Yours is
271     <span id="jobDescLength"></span><span>.</span>
272   </span>
273 </div>
274   <p class="para" style="font-weight:100;">It may be good to double-check the role description for any company jargon.</p>
275   <p class="para" style="font-weight:100;">Our literacy levels change as we age. In order to keep your role description
276     inclusive to most ages, try these tips in writing accessibility: <br>
277     <span style="..."> - Keep sentences short.</span> <br>
278     <span style="..."> - Keep paragraphs short. </span><br>
279     <span style="font-weight:500;"> - Use white space to reduce visual 'noise'. </span>
280   <p class="para" style="font-weight:100;">Finally, try to establish which qualities are
281     'required' and which are 'desired'. <br> Studies show that women are much less
282     likely to apply for a role if they don't have 100% of the skills asked, compared to men.</p>
283 </div>
284 </div>

```

Figure 14 - HTML code used for right div

### iii. Biased Language

I carried out extensive research before finishing the front end of the website and starting the back end, in order to make sure I had a completed understanding of what makes a bias word. A study carried out in 2011 suggests that gendered wording (i.e., masculine and feminine-themed words, such as those associated with gender stereotypes) may be a previously unacknowledged, institutional-level mechanism of inequality maintenance. Utilising both archival and empirical investigations, the present research demonstrates that gendered wording commonly employed in job recruitment materials can maintain gender inequality in traditionally male-dominated occupations. (Gaucher, Friesen and Kay 2011) Technical pathways are traditionally male-dominated, and there is evidence that female apprentices at IBM have struggled to get into these roles. (*Appendix E*) I found a few different lists of masculine words and added them to the list of biased language. (*Appendix F*)

The next research I did was around people of colour and what words could be biased against them in the role searching process. I found a few different words that may have hidden or subconscious biases. For example, the word 'blacklist' or 'blacklisting' is a term used in cybersecurity job descriptions, but could subconsciously deter black candidates from applying for the role. Terms such as 'reject list' should be used instead. (ONGIG n.d.) I collected all similar words and added them to the master list.

I also did some research on biased language against those with physical and mental disabilities. Words and phrases like 'climbing to the top' may subconsciously deter people in a wheelchair, for example, from applying for the role. Also, phrases like 'type up reports' are biased because they assume that the applicant has hands and can type, and don't rely on speech to text software. In terms of mental disabilities and neurodiversity, I did research on how to make blocks of text more user friendly and accessible. I added my findings to the prototype as best practice for users to check against. For example, *if you use overly complicated or dense vocabulary, you could subconsciously exclude applicants who are qualified for the role but struggle with reading.*

#### iv. Back-End

The back end of the prototype was created using Python. I chose to develop in Python over other similar programming languages, as it can conduct an expansive scope of tasks across the whole software development suite. Combining its versatility with an easy-to-learn syntax and plethora of useful libraries, Python was an easy choice to use for this project. It also works with FLASK, a Python API framework that I utilised for this project.

I used **PyCharm** as the IDE for the development of the prototype as it provides straightforward project management and enables Python code to be run directly in the editor interface. This meant that I could develop and test my code at a far more rapid pace than would otherwise have been possible. For example, without using PyCharm I would have had to compile and run the code from the command line every time I wanted to make a change. It also allowed unit testing to be completed more efficiently.

The back end of the prototype is a file called *main.py* and it includes all the Python script. The file starts with defining the list of biased words, myList. (Appendix F). The next few lines of the file are defining the authentication to use Watson Natural Language Understanding to gauge the sentiment rating from the user input. Watson Natural Language Understanding can detect anger, disgust, fear, joy, or sadness that is conveyed in the content or by the context around target phrases specified in the target's parameter. (IBM n.d.) The emotion is rated on a scale between -1 and 1. I defined the results of the analysis as response.

```

58 authenticator = IAMAuthenticator('KCj30y9BiViSobYMH_wzVkJRejqivEMOZZvRgqyBaU_y')
59 natural_language_understanding = NaturalLanguageUnderstandingV1(
60     version='2021-08-01',
61     authenticator=authenticator
62 )
63
64 natural_language_understanding.set_service_url(
65     'https://api.eu-gb.natural-language-understanding.watson.cloud.ibm.com')
66
67
68 response = natural_language_understanding.analyze(
69     text=jobdesc,
70     features=Features(emotion=EmotionOptions()).get_result()
71
72     # print(json.dumps(response, indent=2))
73     emotionRatings = response['emotion']['document']['emotion']
74

```

Figure 15 - The Python code used for sentiment rating

My next priority was splitting the user input into a list of individual words, so that I could create a function that matches those words against myList. In order to do this, I ran the following code:

```

75     wordList = jobdesc.lower().strip().split(' ')
76     matches = list(set(wordList).intersection(myList))

```

I then wrote an IF statement to display a message dependant on whether the list had any matches against the job description that the user inputted. For example, if a user used the word ‘type’ in their role description, the following message appears: “*We've found a match to some words which may be bias or subconsciously gender-coded, and you may want to consider replacing them based on their context.*” If there are no biased words found, then it displays “*Looks good! There is no biased language detected.*” I used **jsonify** to sterilise the data to JavaScript Object Notation (JSON) format and wrap it in a Response object with the application/json mimetype in order to be used by the FLASK API. (Full Stack Python n.d.)

```

78     if matches:
79         return jsonify(
80             message="We've found a match to some words which may be bias or subconsciously gender-coded, "
81             "and you may want to consider replacing them based on their context:",
82             matches=matches,
83             jobdesc=len(jobdesc),
84             emotionRating=emotionRatings
85         )
86     else:
87         return jsonify(
88             message="Looks good! There is no biased language detected.",
89             matches=matches,
90             jobdesc=len(jobdesc),
91             emotionRating=emotionRatings
92         )

```

Figure 16 - Code used for IF statement messaging

## v. API

The final activity of the build stage was to create an API that would feed the user input into the functions I built and then feed the results back to the user. I installed Flask and imported it into the Python code to easily wrap my Python functionality into an API that could be interfaced with from the front end.

```

7     from flask import Flask, render_template, jsonify
8     from flask_restful import Resource, Api, request
9     app = Flask(__name__)
10    api = Api(app)

```

Figure 17 - Code written for IF statement messaging

I then used the FLASK plug in to create a web application to run the front end on.

```
7      from flask import Flask, render_template, jsonify
8      from flask_restful import Resource, Api, request
9
10     app = Flask(__name__)
11     api = Api(app)
12
13     @app.route('/')
14     def index():
15         return render_template('index.html')
16
17     @app.route('/train/', methods=['POST']) #define API method
18     def train():
19         if request.method == "POST":
20             print(request.get_json())
21             result = biasdetect(request.get_json())
22             print(result)
23             return result
```

I imported the FLASK object from the FLASK package in the code fragment above. I used it to create my FLASK application instance with the name *app*. I passed the special variable *name* that holds the name of the current Python module. It's used to tell the instance where it's located. I did this because Flask sets up some paths behind the scenes.

Once I created the app instance, I could use it to handle incoming web requests and send responses to the end-user. *@app.route* is used as a ‘decorator’ that converts a standard Python function into a FLASK view function, which turns the function’s ‘return value’ into an HTTP response to be revealed by an HTTP client, in this instance, a web browser. I passed the value ‘/’ to *@app.route()* to signify that this function will respond to web requests for the URL /, which is the main URL. (Dyouri 2020) The *train()* view function returns the list of biased words in the role description as a response.

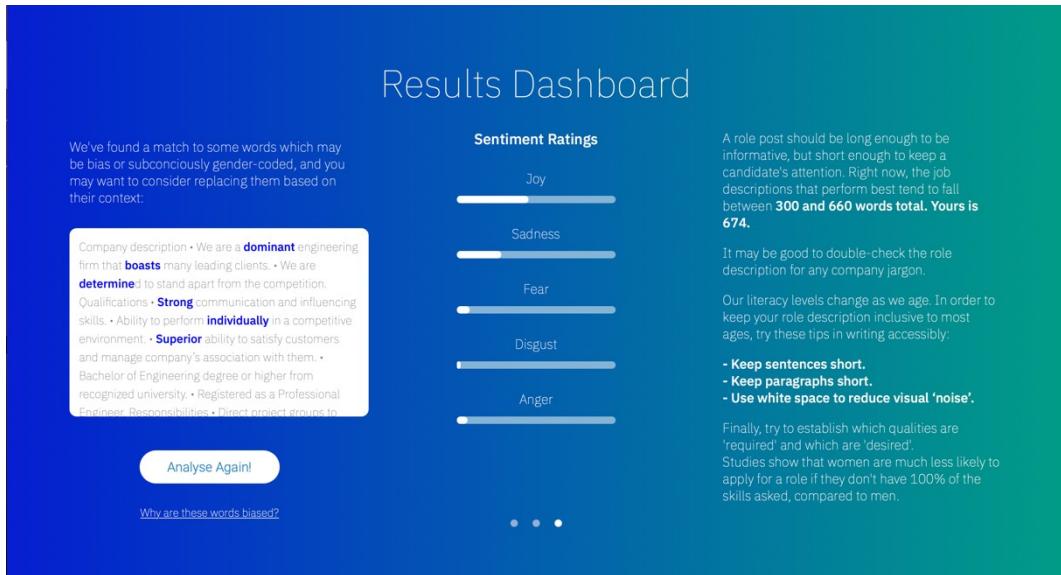


Figure 18 - Screenshot of the working web application

Once the web application was up and running with the front and back end, I could do some final unit testing to ensure that it was functioning well and as intended. Below is how the front end looked after the API was created, and with test data used in place of a role description.

### c. Test Stage

#### User Research

Once the web application was up and running, I introduced the service to the talent acquisition team. I couldn't deploy the product to their personal machines as it was a prototype running locally on my computer, so I instead scheduled individual WebEx sessions with each of the team members. During these sessions, I shared my screen and went through the potential journey of a user and how it would work.

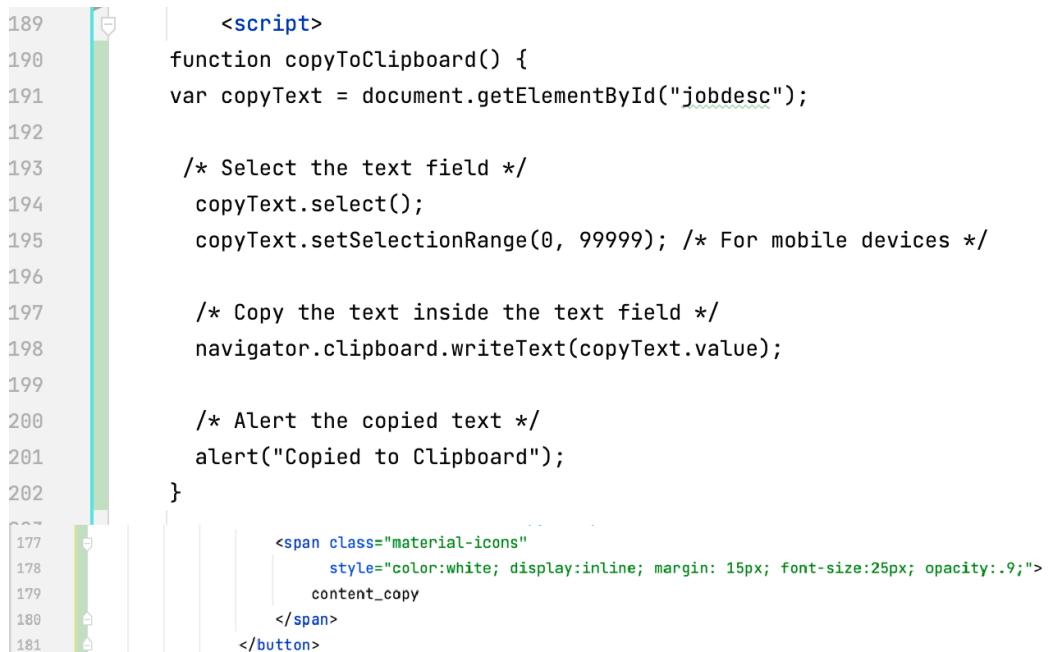
After the live demo, I opened up to questions and comments. The most notable ones were as follows:

- > How do I find out what parts of my role description are affecting the sentiment analysis, so that, for example, I can get rid of anything that makes the sadness scale go up?
- > Is there a way to get synonyms for the biased words so that we know what to replace them with?
- > Do I just copy this text manually to paste into Slack?
- > Where does the link in the bottom left take me?

Some of these had simple answers. For example, Watson analyses the block of text as a whole, and how each word influences the rest of the description. There are no single words or phrases that make the sentiment analysis change. Also, I couldn't make the service give the user synonyms for the words that are less biased, because that was simply out of scope for this project.

### Project Iterations

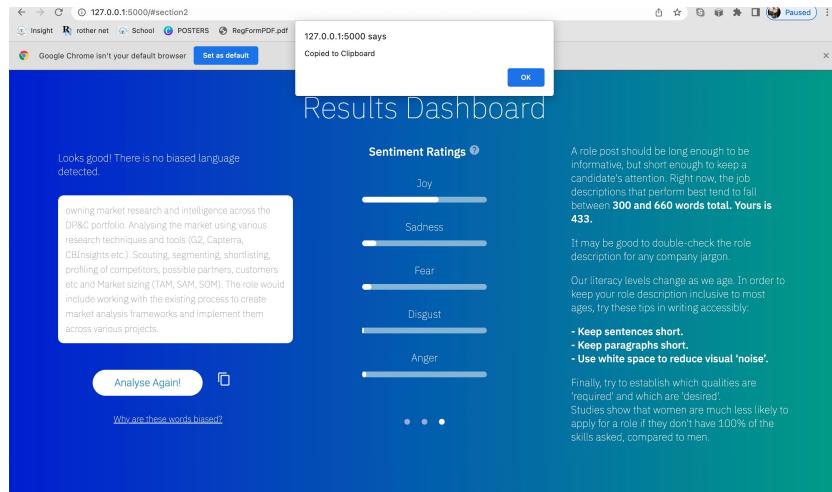
Based on the results of the user research, I made a few iterations to the product. The first one is a button that allows the user to copy the analysed text to their clipboard, so that they don't have to select it manually. I did this by writing a function, *copyToClipboard*, that selects the text in the text field with id *jobdesc*, and writes that text to the user's clipboard, and then sends a confirmation to the user.



The screenshot shows a code editor with a vertical scrollbar on the left. The code is written in JavaScript and includes CSS styles for a button icon. The code is as follows:

```
189     <script>
190         function copyToClipboard() {
191             var copyText = document.getElementById("jobdesc");
192
193             /* Select the text field */
194             copyText.select();
195             copyText.setSelectionRange(0, 99999); /* For mobile devices */
196
197             /* Copy the text inside the text field */
198             navigator.clipboard.writeText(copyText.value);
199
200             /* Alert the copied text */
201             alert("Copied to Clipboard");
202         }
203
204         <span class="material-icons"
205             style="color:white; display:inline; margin: 15px; font-size:25px; opacity:.9;">
206             content_copy
207         </span>
208     </button>
209
210     <!-- More code below -->
```

Figure 19 - Code used for *copyToClipboard* Function



The next change I made to the prototype was to address the questions I received around how the Watson analysis works and whether or not it could tell the user what words affect it. I decided a simple tool tip telling the user that it is an analysis of the entire block of text, would be an efficient way of addressing this.

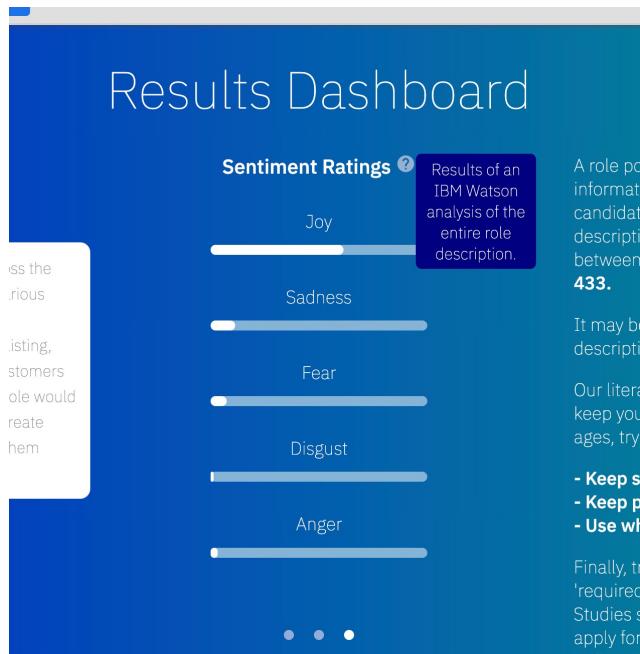


Figure 20- Screenshot of the prototype with a hover-over tooltip



Figure 21 - Screenshot of the code used to create the tooltip

This is a user friendly and non-intrusive way of letting the user know that it is a holistic analysis of the user's input.

The final change I made to the second iteration of the prototype is a fourth section of the webpage. The reason for this is that the link on the screen labelled 'Why are these words biased?' took the user to an external page of research which was not my own or IBM branded and was not user friendly as it was a PDF with small writing. I replaced this with a smooth-scrolling link to the next section, which was detailed with research on why some of the words would be flagged, as shown in the screenshot below:

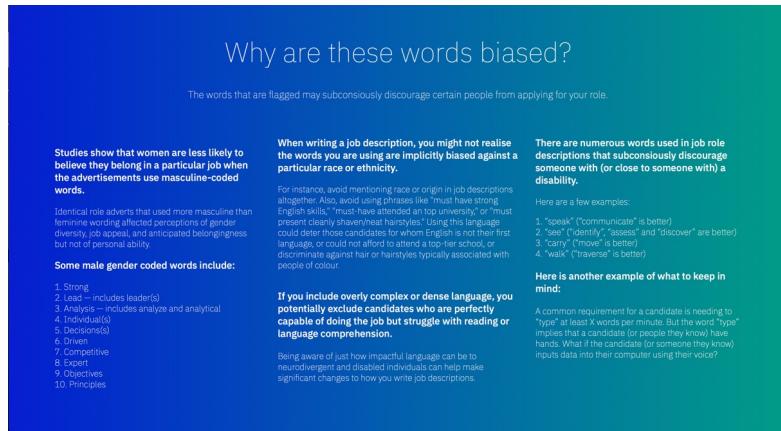


Figure 22- Screenshot of the page of research

## User Guide

After the user research and final iteration of the prototype, I created an animated video on Adobe Animate that illustrates to the user the purpose of the project and also a screen-recorded demonstration of how it works. This video can be found in Appendix H.

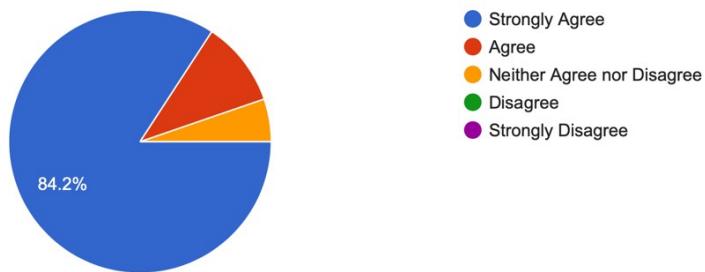
## Final Feedback

The final method I utilised to collect feedback on the project is a survey. I sent out the user guide video along with a link to a Google Form and received 19 anonymous responses from those who watched the video. I sent this out primarily on Slack, where the most potential users can be found. I also sent this out to my manager and a few other people who I thought would be able to give useful feedback. I decided to only include three questions, because I thought I would get more responses if the survey was short and took less than a few minutes to complete. My findings are as follows:

**Question 1: Do you think this would bring value to IBM?**

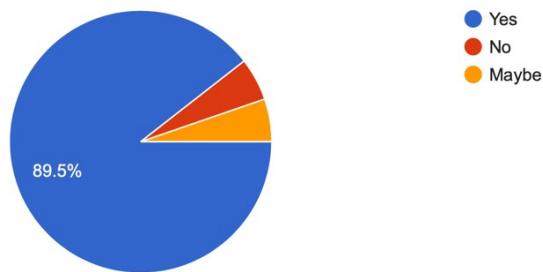
Do you think this would bring value to IBM?

19 responses

**Question 2: Would you use this tool?**

Would you use this tool?

19 responses

**Question 3: Any other thoughts?**

- > *I think this is a great project that you have been working on as it is very valuable in helping not only IBM, but all businesses become more inclusive. This will also help others develop inclusive communications elsewhere if they are using this tool regularly. Looks like a fantastic piece of work, well done!*
- > *Love it!! Will definitely increase the amount of people applying for roles...*
- > *Well designed and easy to use! Very useful tool*
- > *Fantastic and smooth presentation very useful*
- > *In addition to the AI checks, I wonder if it would be worth checking the wording of job descriptions with focus groups too?*
- > *What an amazing idea, you could patent this!*
- > *Could we deploy as a bot in the 'roles' channels*
- > *This sounds like a great tool, especially for people like me who always struggle to word things in the best way.*
- > *People would forget to use it, because it's not mandatory.*
- > *Brilliant idea! Never seen anything like it!*

- > *Love this as some role posts are far too long and I think this could help people make them more clear & concise, in turn potentially getting more people putting themselves forward :)*
- > *What an amazing idea! This will bring an incredible amount of value. Neurodivergent people will be able to more easily understand role descriptions and therefore apply!*
- > *Streamlined and easy to use tool allowing users to complete a complex task in only a limited number of clicks !!*
- > *Amazing idea and very well presented! I think people will get a lot of value out of this and will bring real good into IBM!*
- > *Love it and would definitely use it! I hate writing role descriptions, so something like this that helps make them more accessible to the audience gets a vote from me.*

I am extremely pleased with the feedback I have received and am glad that some of the responses include future improvements that I can implement to further scale and refine the product.

## 7. Project Evaluation and Conclusion

Once the prototype was complete, I had my final meeting with Rosemary to present the recommendation. She was very pleased with how it works and signed it off as a product that could bring great value to IBM and her team.

Based on the feedback I received for the service, I am pleased with how the business value of the service is estimated by potential users and how that compares to my original anticipation. 84.2% of potential users said that they strongly agree that this product will bring value to IBM, with comments such as “*It's an amazing tool. And look, it's nice, as well, not having an additional, 'cause you know as much as we love to get involved in these things, having like an additional tool when we've got so many already [doesn't work]. But having something where you can just stick something in really quickly and then get the result so instant, it will just help us because we're not having to put a lot of legwork in to get results out of it. We can quite easily just copy and paste!*” from a Talent Acquisition manager after the live demonstration of the finished product. Comments from Rosemary Clunie, taken from my EPA gateway form, include that the realisation of benefits was “*Absolutely confirmed by members of my team from survey results and comments.*” A senior lead at IBM has also realised the benefits of the tool, as evidenced by his message to 934 IBMers on Slack sharing my demonstration video. (*Appendix I*) There are some issues with how the product will be launched, because as someone said in their survey response, “*People would forget to use it, because it's not mandatory.*” It would therefore be the responsibility of the organisation that implements the solution to put procedures in place to ensure that the

system is used consistently so they should gain the anticipated benefits from the implementation of the system.

I learned a great deal from my experience on this project. Before this, I had never completed an IT consulting project from start to finish. It was a great experience, especially as the sole consultant on the team, as I got full autonomy on how the project would run and its timeline. I also got full rein on how I would scope the project and meet the end-users, as well as how I would build the prototype and develop recommendations. Not only did my knowledge of IT consultancy increase throughout the last six months, but I have expanded my network and gained skills in other areas, such as software development.

Conducting my synoptic project outside of my regular role was a big risk in terms of conflicting interests. It could have negatively impacted my career as a designer if I focussed too much on the synoptic project, and I could have missed synoptic project deadlines or had lower quality work if my normal role leaked outside of its agreed hours. This risk was a necessary risk for me to take because I was unsure how steady and long term my normal role was, and therefore it was too risky to do a synoptic project with the external client my role is with. I was also able to complete a project that fits with the ILOs set for my specialism.

If I were to do a project similar to this one in the future, I would do it in a group setting. Having a project where I was the only consultant was very useful as a learning experience, but I think to ideate efficiently, there needs to be a diverse team to create innovative designs. It also would have helped to have been able to shadow a member of the talent acquisition team in the office, but because of COVID-19 restrictions, that was not possible. I had to get all of the information I needed from interviews on Webex.

## 8. ILO Progress Table

Below is my ILO progress table. Evidence from my portfolio can be found here, where the evidence is split by each ILO in order **using the same reference as the ILO number**.

<https://ibm.box.com/s/jur2w2yyyz0jvupuhfbx7dfwu2mqdxtz>

IT Consultant ILOs			
Ref	ILO Description	How I met this ILO with my project	How I've met this ILO outside of my project
IC1	Perform technical process improvement tasks in a range of environments to solve business problems.	I have carried out process analysis and improvement tasks to solve the problem of how Foundation can get more diverse applicants, including as-is and to-be process flows. ( <i>Appendix A and G</i> )	In my role in DWP Residency, I create prototypes and then they go into user research sessions. Once the user research session is complete, I analyse the results and then make iterations to the prototype to improve it.
IC2	Present optimised solutions to improve business process and workflows through improved technology.	Once I came up with my to-be solution diagram, I presented these to the relevant stakeholders. I also presented the final product to the stakeholders via live demo sessions. ( <i>Appendix J</i> )	We offered Matalan a solution they can use internally to automatically tag keywords to items on their website, so that the search function works better. Before this, they were manually typing in each key word. I presented this solution to them in a client meeting.
IC3	Recommend options based upon risks, costs vs benefits, and impact on other business processes.	The solutions I presented were based on research and business analysis, along with a risk analysis and 'to be' process flow to analyse the impact on the rest of the journey. ( <i>Appendix G</i> )	In Digital Skills Academy, we were given the context of a business that had an issue - and asked to recommend solutions for the client to pick from. I recommended the above solution for Matalan based on their budget and business environment.
IC4	Participate in walk-throughs for IT, to identify and document key risks within a client's organisation.	Kelly Markwick walked me through their current technology and software so that I can analyse the processes and identify areas of opportunity.	N/A

IC5	Support training of end-users in preparation for system activation.	I did individual walkthroughs for each of the team in order to show them how to use the tool and also ask for feedback. ( <i>Appendix J</i> )	I worked in a team of three to create a roadmap to showcase how the client can make full use of the solution IBM is providing. In this instance, it was the HMRC Video Conferencing software. I did this by designing an 'as-is' roadmap and a 'to-be' roadmap to demonstrate how the process will differ once the client implements our solution, and how we can support them in these changes while sustaining our client relationship.
IC6	Evaluate the success of a new system, process, initiative, etc.	After the project was finished, I evaluated the success of the launch and gained feedback from the team and compared this to the anticipated value and requirements of the solution. ( <i>Evidence in evaluation section of this report</i> )	While I was at Nationwide, I sent out a community survey and used the website analytics to evaluate which part of the website is visited the most and when, in order to evaluate the success of the newsletter system I created.

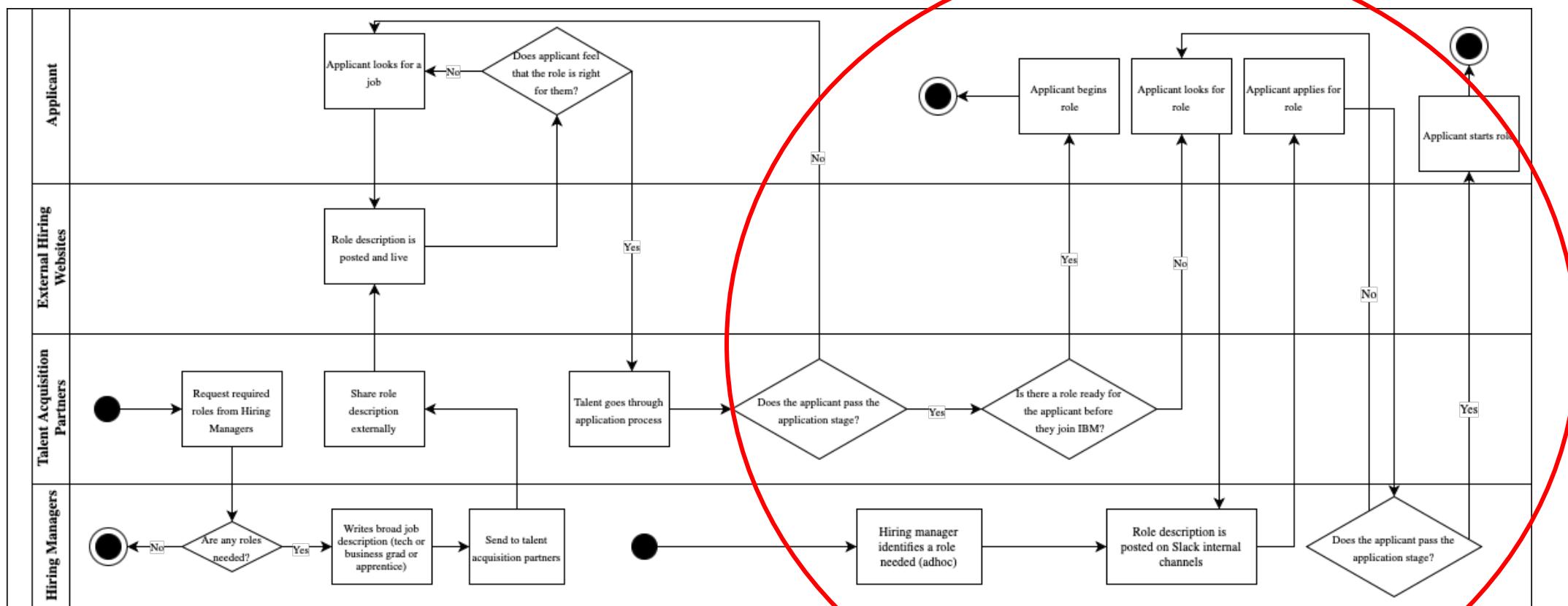
		<p>I was able to experience how this consulting project ties into what I've learned already about project management, business analysis and business management in my degree. I applied project management and business analysis techniques to my IT consultancy project.</p>	<p>For International Women's Day last year I decided to produce a mini podcast series where I interviewed various women in the account group. It took a lot of project management to get these podcasts out because of the amount of planning that goes into it. Aspiring Allies started with a project charter, essentially a survey, which is a consultancy technique and essential in project management and business analysis. We firstly have conception and initiation of ideas, then definition and planning, launch, performance, and control, and finally the project close (post-mortem, etc.).</p>
IC7	How consulting ties into project management, business analysis and business management.		

IC8	The barriers to solving problems or maximizing opportunities.	<p>I came across barriers while trying to solve the problems and maximized opportunities to get around these blockers. (<i>Evidence found in challenges section of this report</i>)</p>	<p>This year I was the internal comms lead for IBM's National Apprenticeship Week activities. This involved a lot of planning and also the production and design of the NAW microsite. The team was considerable with 9 people in total, and we worked using Agile methodologies. We used walls of work to track progress and blockers for each task. Blockers in Agile are barriers to solving problems or maximising opportunities. It is good to track these in order to look for patterns that can be avoided, and all team members can help tackle them.</p>
IC9	How to present recommendations and influence action.	<p>Once I came up with recommendations, I presented these to the relevant stakeholders in a professional and engaging manner. (<i>Appendix L</i>)</p>	<p>I take part in many bids and proposals where we try to secure client commitment and win work for IBM. We need to create documents and presentations to give to the client responding to their brief, and the client can then tell us if they want our suggested implementations. I do this a lot for my role, and my most recent would be the HMRC Multi Tech bid. I created over 20 diagrams for this, because it is so important that everything is easily digestible and pre-visualised for the client.</p>

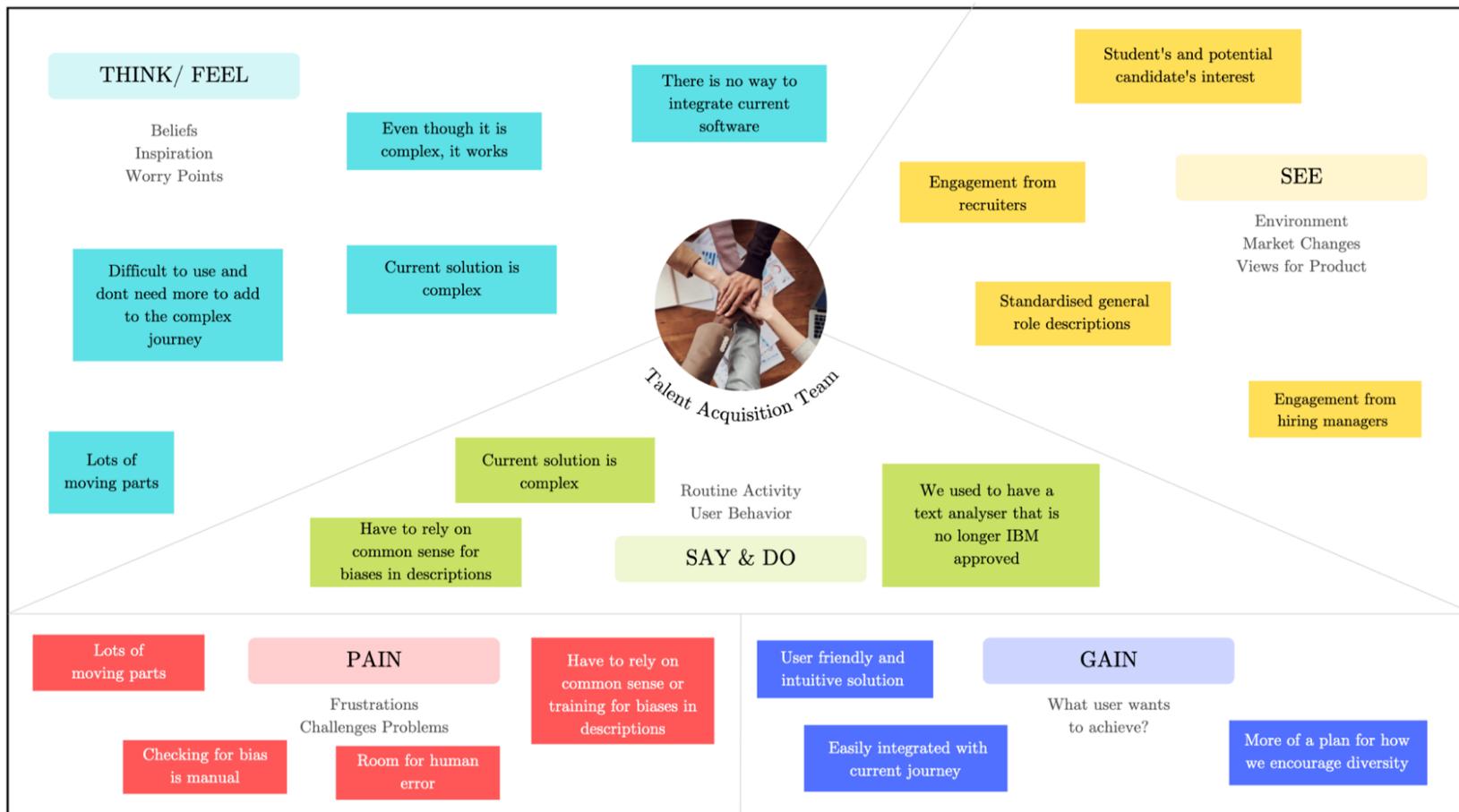
IC10	The different structured process approaches for digital technology consulting.	While preparing for the start of my project, I researched the different approaches I can take to digital technology consulting. I also utilised what I've already learned in this module.	In order to complete my IT consulting module assignment, I needed to carry out extensive research on the different approaches of IT consulting, and I also had to pick one that was most suitable for the fictional client. In order to pick a suitable methodology, I had to have an understanding of all structured process approaches for IT Consulting.
IC11	How to frame/define business problems objectively before solving them.	A large part of my project is analysis and defining the problem. I spent a lot of time framing the problem before I attempted to come up with a recommendation. <i>(Evidence found in Define section of this report)</i>	Before we started on the RFP for the Virtual Demo app, we needed to define the objectives for the solution. This meant design thinking workshops, brainstorming sessions, and more.
IC12	How to discover hidden requirements using probing techniques to establish trust, using open and closed questions effectively, and avoiding leading questions	I used probing techniques to discover hidden requirements and establish trust. I used design thinking empathy approaches to discover hidden requirements and understand the pain points of my client. <i>(Appendix B)</i>	In Business Analysis module, we were taught how to use probing techniques to discover requirements that the client might not even know they have. I was able to use this in practice during our coursework, when our module lead acted as the client and we were able to ask him probing questions to form a route cause analysis, for example, the 5 whys.

## 9. Appendix

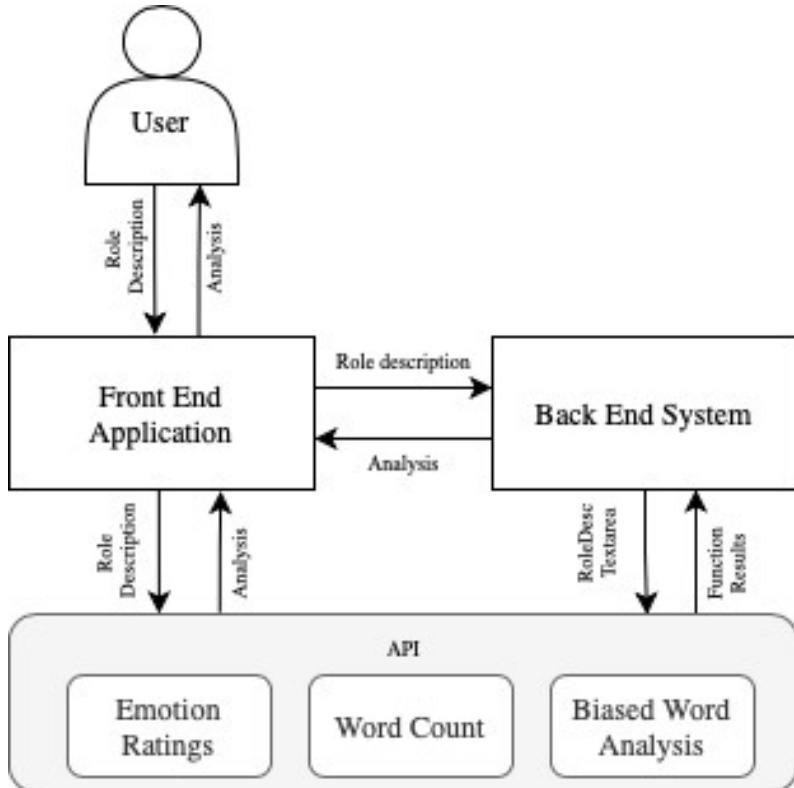
### a. As - is Diagram



### b. Empathy Map



### c. System Design



### d. Workforce Manager

Phillip Lewton 21 days ago  
Have you also thought about talking to the Workforce Management team, as I could see this being just as applicable and potentially having even more impact if it was used to review Open Seat descriptions in Professional Market Place?

Phillip Lewton 21 days ago  
Have you spoken to Jon Popowicz - he is the UKI Workforce Mgmt Leader?

Kate Cheshire 19 days ago  
I actually haven't! Great idea thank you!

Kate Cheshire 11:20 AM  
Hi Jon, my name is Kate Cheshire and I am a 4th year Degree Apprentice at Exeter University. For my dissertation, I decided to create a web app to help people in IBM create accessible and unbiased role descriptions. I created a video to explain in more detail, attached 😊 I was wondering if you had a spare few minutes, if you might be able to give me feedback on this idea. I'd love to hear from you from the workforce management lens, and how this might have potential to be used for the role descriptions on open seats. You can either respond here in slack, or if you have an extra minute or so spare, leave feedback on this survey. Thanks so much in advance!  
2SRSE1RQMQU0G2MK.mp4

Jon Popowicz 11:31 AM  
Hi Kate - I'll try to have a look a little later, thanks for sharing  
can I suggest you contact Nazreen Subhan who is our Apprentice focal initially and talk through we're just in the middle of quarter close, so time limited at the moment

### e. Females in technical roles

**Lori French** 2 years ago

I was in the exact same position as you for two years before I managed to get myself a development role - it's a big problem. Thank you for raising this to Jez, this is awesome Khadija! (edited)



2

**Jemima Holzer** 2 years ago

This is so important!! I was so surprised upon joining the graduate scheme how difficult it was to get a technical role and how little there was in place to help me find one. I wasn't even allowed to join DSA after my induction because I hadn't come from a STEM degree - they filled up all the places with STEM grads 😞 thanks for raising this!

**Khadija Al-Selini** 2 years ago

I can't believe that's happened [@Jemima Holzer](#). Completely understand your frustration!

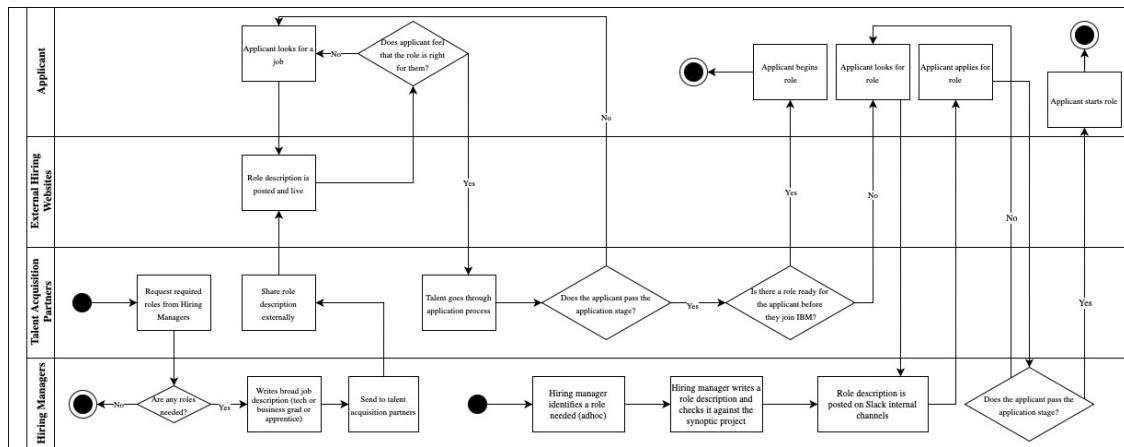
**Sian Brannan** 2 years ago

I also found it incredibly difficult when I started - I'm a STEM grad with no specific technical skill, but my practice wanted me to be technical, they just had no idea what to do with me. I found it difficult to find a role too. I feel sometimes when a grad comes in and they're technical they want them to have loads of experience which is almost always not the case!

### f. Biased Word List

```
34 myList = ['brown bags', 'cakewalk', 'latino', 'oriental', 'native', 'english speaker', 'local', 'russel group',
35     'native', 'illegal', 'immigrant', 'migrant', 'clean-shaven', 'hair', 'illegal', 'illegals', 'eskimo',
36     'top university', 'top school', 'walk', 'kneel', 'run', 'bend', 'carry', 'carrying', 'lift', 'athletic',
37     'climbing', 'fast', 'able-bodied', 'strong', 'upright', 'stationary', 'recent grad', 'young', 'active',
38     'autonomously', 'courageously', 'headstrong', 'lead', 'self-sufficient', 'adventurous', 'boast', 'decide',
39     'hierarchy', 'leads', 'type', 'types', 'wrote', 'writes', 'self-sufficiently', 'aggressive', 'boasts',
40     'decisive', 'hierarchical', 'leader',
41     'self-reliant', 'aggressively', 'boasting', 'decision', 'hostile', 'leading', 'self-reliance',
42     'aggressiveness', 'boastful', 'hostiles', 'logic', 'aggression', 'boastfully', 'decisional', 'hostility',
43     'masculine', 'ambition', 'challenge', 'determine', 'hostilely', 'objective', 'ambitious', 'he', 'she', 'him',
44     'her', 'challenging', 'determines', 'impulsive', 'opinion', 'ambitiously', 'challenged', 'determined',
45     'independent', 'outspoken', 'ambitiousness', 'challenges', 'determining', 'independents', 'persist',
46     'analytical', 'challengingly', 'dominant', 'independence', 'principle', 'analytic', 'challengingly',
47     'dominate', 'independence', 'principles', 'analyst', 'competition', 'dominates', 'independency', 'principled',
48     'athlete', 'competitive', 'dominated', 'independently', 'reckless', 'athletic', 'competitiveness',
49     'dominating', 'individual', 'stubborn', 'athletically', 'competitiveness', 'force', 'individuals', 'superior',
50     'athletes', 'competitively', 'forces', 'individually', 'superior', 'athletics', 'confident', 'forcible',
51     'intellect', 'self-confident', 'autonomy', 'courage', 'force', 'intellectually', 'self-confidence',
52     'autonomous', 'courageous', 'greedy', 'intellectual', 'self-confidently']
```

### g. To be flow



### h. User Guide Video

<https://ibm.box.com/s/zek3s5wp3599o7ixx9f2bqpgz33qcbi8>

#### i. Message from senior lead



**Phillip Lewton** 9:56 AM

@channel Apologies for the channel blast and I am happy to take any burn fallout - but I really loved Kate's post above ↗ and the work she is describing in it, so if people can leave her some more feedback on it I think it would be great!



#### j. Interview transcript highlight

"It's an amazing tool. And look, it's nice, as well, not having an additional, 'cause you know as much as we love to get involved in these things, having like an additional tool

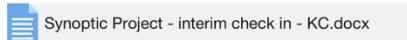
when we've got so many already [doesn't work]. But having something where you can just stick something in really quickly and then get the result so instant, it will just help us because we're not having to put a lot of legwork in to get results out of it. We can quite easily just copy and paste!"

#### **k. Email from Rosemary replying to my interim report**

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Re: Project Interim Check in Report

Rosemary M Clunie to me



Synoptic Project - interim check in - KC.docx

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Hi Kate

It looks good! Enjoy the weekend,

(See attached file: *Synoptic Project - interim check in - KC.docx*)

best wishes

---

Rosemary Clunie  
Talent Acquisition Manager - UK and Ireland  
Early Professional Hires  
IBM Human Resources

Tel: +44 7738 313957

#### **l. Quotes from EPA gateway form**

Kate has been highly professional during the project, both in terms of update calls with me and also when demonstrating the product to the wider team. Kate also produced a video to sit alongside the product – this was great!

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