Agile Management Report

Managing a Project to Meet Client Specifications

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BSc (Hons) in Computer Science

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Abstract

This report documents the various stages managed and worked through in order to create a demo of an application based on a client's specifications. The client was a secondary school science teacher, who wanted an educational game that would aid them in teaching their Key Stage 3 students in a fun and interactive way. Relevant skills such as researching, agile planning and coding have been utilised in order to produce a game that educates this demographic about nutrition and digestion.

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Sprint Meeting #1

Recorded Minutes

Preliminary meeting on 4th February 2019.

Jay arrives at 9am, leaves at 6pm.
Connor arrives at 9am, leaves at 6pm.
Ava arrives at 9am, leaves at 6pm.

We decided collectively to set Monday as our weekly meeting day, in order to discuss what work has been completed in the previous sprint, and what still needs completing for the following meeting. The recorded minutes for each week are listed at the start of every meeting in the report, rounded to the nearest 15 minutes. We defined the beginning of a meeting to be when two people were present to work on the project and ends when there is no longer at least two people present.

Topics Discussed

At the start of our first meeting, we decided to come up with a list of ideas for games that we could develop for the project in order to meet the requirements set by our client. Possible ideas included:

- KS3 Biology: Top Down Surgery Game / Nutritionist Diagnosing Game.
- KS3 Chemistry: VR Science Experiments Game / RPG Elements Game.
- KS3 Physics: Turn Based Circuit Board Game / Rocket Projection Game.

After a couple of hours, we came up with our current game possibility, a KS3 Biology game that centres around a doctor's office, where the player has up to 10 minutes in order to try and treat the symptoms of their patients. We all decided we would like to expand upon this idea further in the next meeting, as we believed this would be a unique idea to develop as a learning-based game.

Role Assignment

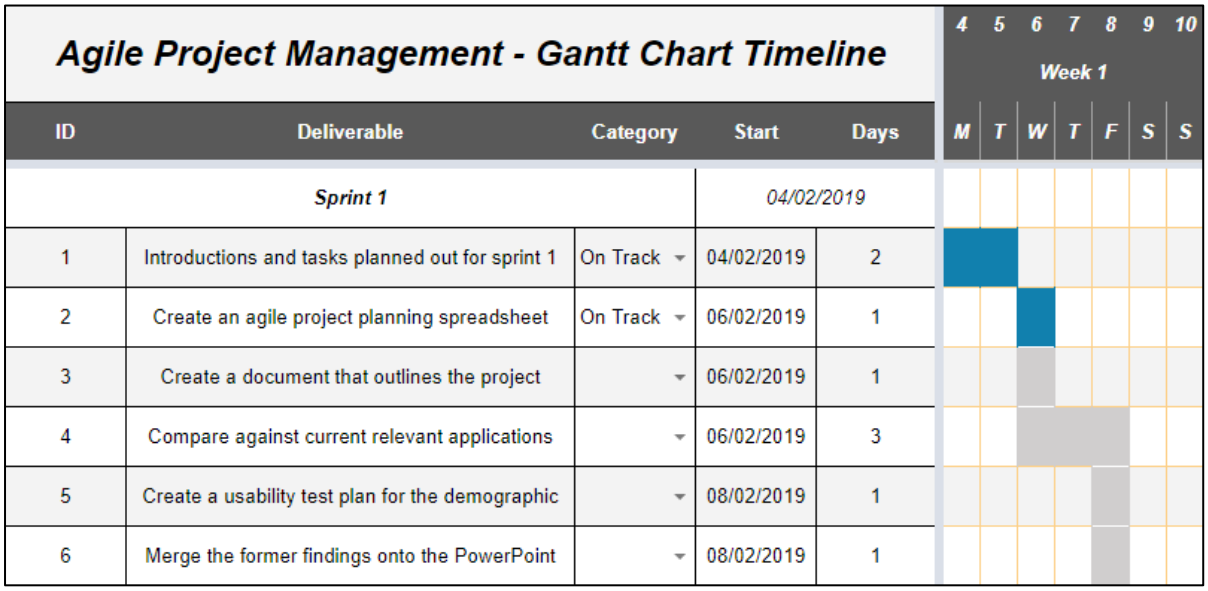
Finally, we allocated the list of jobs between ourselves based on our individual strengths. We did this so that we could produce the best product possible. Our main roles for the project are listed below:

- Jay as *Project Manager:* Overseeing the team, researching, and producing the project report.
- Connor as *Lead Programmer:* The predominant coder, working on all things related to code.
- Ava as *Artist and UX Designer:* Focused on anything art, user experience or interface related.

While we decided that these would be our key roles, we also acknowledged the fact that we will need to help one another with various roles at times, due to the nature of our small team size. Once everyone was happy with their allocated roles, we started organising all of the current progress into this report. Once this was done, we downloaded an agile sprint spreadsheet to effectively manage the teams progress, redesigning it with more features to fit the needs of the project. This included adding a Gantt chart that everyone in the group could access in order to know what tasks need working on and in what order based on their allotted priority. Shown below is an example of how the agile management spreadsheet was utilised to organise each sprint.

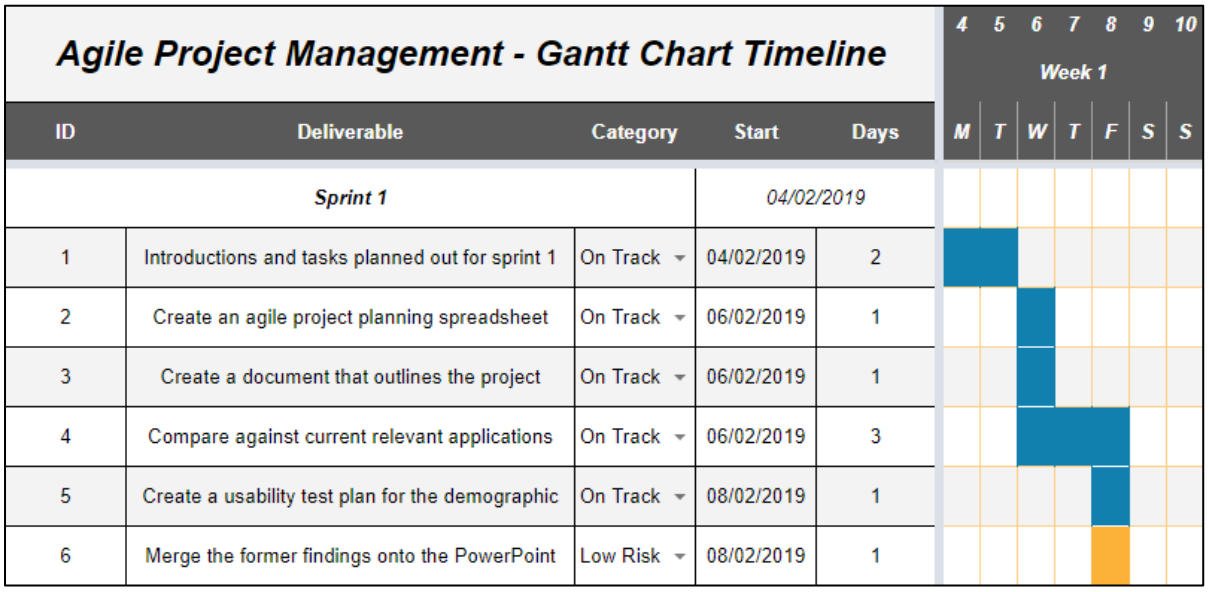
Project Management

The Gantt Chart



Agile Project Management - Gantt Chart Timeline					4	5	6	7	8	9	10
					Week 1						
ID	Deliverable	Category	Start	Days	M	T	W	T	F	S	S
Sprint 1			*04/02/2019*								
1	Introductions and tasks planned out for sprint 1	On Track	04/02/2019	2							
2	Create an agile project planning spreadsheet	On Track	06/02/2019	1							
3	Create a document that outlines the project		06/02/2019	1							
4	Compare against current relevant applications		06/02/2019	3							
5	Create a usability test plan for the demographic		08/02/2019	1							
6	Merge the former findings onto the PowerPoint		08/02/2019	1							

Figure 1: *This is the Gantt chart located in the Agile Project Management spreadsheet in progress.*



Agile Project Management - Gantt Chart Timeline					4	5	6	7	8	9	10
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1	Introductions and tasks planned out for sprint 1	On Track	04/02/2019	2							
2	Create an agile project planning spreadsheet	On Track	06/02/2019	1							
3	Create a document that outlines the project	On Track	06/02/2019	1							
4	Compare against current relevant applications	On Track	06/02/2019	3							
5	Create a usability test plan for the demographic	On Track	08/02/2019	1							
6	Merge the former findings onto the PowerPoint	Low Risk	08/02/2019	1							

Figure 2: *This is how the first sprint in the Gantt chart looked once the working week had finished.*

As you can see in **Figure 2**, the final deliverable in Sprint 1 is orange instead of the standard blue. This is because the deliverable ended up ticking past the initial estimated hours. The resulting time needed was only 1 extra hour, and as such the final task for the sprint was still able to be completed. In the follow pages on the spreadsheet, the deliverables listed above were split into subtasks, where each individual task was assigned to a group member and given a weighted priority. The tasks were split evenly between everyone, with some tasks assigned to certain people, if their specific skillset was expected to result in a better output of the task. Shown below is a screenshot of the first sprint.

The Sprint Sheets

The two figures below are an overall summary. For a more readable version, see the Appendices.

Sprint 1 - 04/02/2019 to 10/02/2019																	
Breakdown of Deliverables								Hours Spent Working							Total Hours	
Deliverable		Individual Tasks		Priorities	Assigned	Progress	Est. Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Actual Hours	Difference in Hours
1	Introductions and tasks planned out for sprint 1	1.1	Read the brief set by the client in order to identify the requirements	Must	All (x3)	Done	3	3	-	-	-	-	-	-	3	0
		1.2	Brainstorm a variety of initial ideas that could be developed	Must	All (x3)	Done	21	21	-	-	-	-	-	-	21	0
		1.3	Eliminate any ideas too short or too long for the time allocated	Should	All (x3)	Done	3	-	3	-	-	-	-	-	3	0
		1.4	Further develop the remaining proposals that could be chosen	Should	All (x3)	Done	18	-	18	-	-	-	-	-	18	0
		1.5	Conclude the selected project idea that will be worked on	Must	All (x3)	Done	3	-	3	-	-	-	-	-	3	0
2	Create an agile project planning spreadsheet	2.1	Begin organising ideas and initial progress into a project report	Must	Jay	Done	4	-	-	4	-	-	-	-	4	0
		2.2	Download a sprint planner to keep track of the project progress	Must	Jay	Done	1	-	-	1	-	-	-	-	1	0
		2.3	Redesign the layout of the sheet for easier access to project data	Should	Jay	Done	3	-	-	3	-	-	-	-	3	0
3	Create a document that outlines the project	3.1	Begin creating an initial proposal document with product details	Must	Ava	Done	4	-	-	4	-	-	-	-	4	0
		3.2	Make a PowerPoint to showcase project focus to the projects client	Must	Ava	In Progress	4	-	-	-	-	-	-	-	-	-
4	Compare against current relevant applications	4.1	Research relevant competition currently available in the market	Must	Connor	In Progress	8	-	-	-	-	-	-	-	-	-
		4.2	Test the relevant applications currently available in the market	Should	All (x3)	Not Started	24	-	-	-	-	-	-	-	-	-
		4.3	Record relevant findings of each application tested in detail	Should	Connor	Not Started	4	-	-	-	-	-	-	-	-	-
		4.4	Add to the previous PowerPoint our findings and improvements	Should	Connor	Not Started	4	-	-	-	-	-	-	-	-	-
5	Create a usability test plan for the demographic	5.1	Research relevant requirements needed for a usability test plan	Should	Jay	Not Started	4	-	-	-	-	-	-	-	-	-
		5.2	Create and add the usability test plan to the project document	Should	Jay	Not Started	4	-	-	-	-	-	-	-	-	-
6	Merge the former findings onto the PowerPoint	6.1	Research and add the technical specifications to the PowerPoint	Should	Ava	Not Started	4	-	-	-	-	-	-	-	-	-
		6.2	Create a diagram of features to include in the project deliverable	Should	Ava	Not Started	2	-	-	-	-	-	-	-	-	-
		6.3	Consolidate all of the previous findings onto the PowerPoint	Must	Ava	Not Started	2	-	-	-	-	-	-	-	-	-
Ideal Effort Hours Left							120	96	72	48	24	0	0	0	This sprint is currently in progress. This will update automatically when the sprint ends in 4 days.	
Actual Effort Hours Left							120	96	72	48	48	48	48	48		

Figure 3: *This is the first sprint located in the Agile Project Management spreadsheet in progress.*

Sprint 1 - 04/02/2019 to 10/02/2019																	
Breakdown of Deliverables								Hours Spent Working							Total Hours	
Deliverable		Individual Tasks		Priorities	Assigned	Progress	Est. Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Actual Hours	Difference in Hours
1	Introductions and tasks planned out for sprint 1	1.1	Read the assignment brief to identify the requirements	Must	All (x3)	Done	3	3	-	-	-	-	-	-	3	0
		1.2	Brainstorm a variety of initial ideas that could be developed	Must	All (x3)	Done	21	21	-	-	-	-	-	-	21	0
		1.3	Eliminate any ideas too short or too long for the time allocated	Should	All (x3)	Done	3	-	3	-	-	-	-	-	3	0
		1.4	Further develop the remaining proposals that could be chosen	Should	All (x3)	Done	18	-	18	-	-	-	-	-	18	0
		1.5	Conclude the selected project idea that will be worked on	Must	All (x3)	Done	3	-	3	-	-	-	-	-	3	0
2	Create an agile project planning spreadsheet	2.1	Begin organising ideas and initial progress into a project report	Must	Jay	Done	4	-	-	4	-	-	-	-	4	0
		2.2	Download a sprint planner to keep track of the project progress	Must	Jay	Done	1	-	-	1	-	-	-	-	1	0
		2.3	Redesign the layout of the sheet for easier access to project data	Should	Jay	Done	3	-	-	3	-	-	-	-	3	0
3	Create a document that outlines the project	3.1	Begin creating an initial proposal document with product details	Must	Ava	Done	4	-	-	4	-	-	-	-	4	0
		3.2	Make a PowerPoint to showcase project focus to the projects client	Must	Ava	Done	4	-	-	4	-	-	-	-	4	0
4	Compare against current relevant applications	4.1	Research relevant competition currently available in the market	Must	Connor	Done	8	-	-	8	-	-	-	-	8	0
		4.2	Test the relevant applications currently available in the market	Should	All (x3)	Done	24	-	-	-	24	-	-	-	24	0
		4.3	Record relevant findings of each application tested in detail	Should	Connor	Done	4	-	-	-	-	4	-	-	4	0
		4.4	Add to the previous PowerPoint our findings and improvements	Should	Connor	Done	4	-	-	-	-	4	-	-	4	0
5	Create a usability test plan for the demographic	5.1	Research relevant requirements needed for a usability test plan	Should	Jay	Done	4	-	-	-	-	4	-	-	4	0
		5.2	Create and add the usability test plan to the project document	Should	Jay	Done	4	-	-	-	-	4	-	-	4	0
6	Merge the former findings onto the PowerPoint	6.1	Research and add the technical specifications to the PowerPoint	Should	Ava	Done	4	-	-	-	-	4	-	-	4	0
		6.2	Create a diagram of features to include in the project deliverable	Should	Ava	Done	2	-	-	-	-	2	-	-	2	0
		6.3	Consolidate all of the previous findings onto the PowerPoint	Must	Ava	Done	2	-	-	-	-	3	-	-	3	1
Ideal Effort Hours Left							120	96	72	48	24	0	0	0	This sprint lasted 1 hour longer than predicted.	
Actual Effort Hours Left							120	96	72	48	24	-1	-1	-1		

Figure 4: *This is how the first sprint spreadsheet page looked once the working week had finished.*

Initial Proposal Document

Whilst the project management files were being worked on, we started writing the initial proposal document, where we discussed various different aspects of our KS3 Biology game. This included topics such as the premise, the learning outcome for the player and the target demographic.

Game Details

- Title: Doctor's Orders
- Genre: Simulation
- Platform: PC

Game Premise

"Students play the role of a doctor advising patients of the best way to tackle a variety of health-related problems. Each patient has a history, and you have a list of all previous cases you have learned from, in order to correctly diagnose future patients with similar issues."

Overall Purpose

Through playing the game, the player's understanding of the importance of nutrition and exercise will increase. Our main priority is to create a game containing information that the target audience can learn; however, the game must be engaging enough for them to want to play in order for them to learn about various health problems and how to fix them.

Target Demographic

- Targeted Gender: N/A
- Targeted Age Range: KS3 students (11-14)
- Gaming Experience: No prior experience required.
- Current Market: No matching games currently exist.

Player Mode

The game will be single player.

Game Goal

The player must correctly offer the best advice to each patient in order to improve their diet and nutrition in order to fix ongoing issues that the patient may currently have.

Setting

The game will have a 2D perspective, taking place in a doctor's office. Patients will come into the screen from the left side of the screen and exit out on the right.

Storyline

You are a doctor in charge of overseeing patients' problems, making sure to address any issues that any patient may have when they enter the doctor's office.

Characters

The player will help patients by giving them relevant information based on their symptoms. The patients will be a static image moving across the screen, similar to the style found in RPG's and choose your own adventure games. Once the patient is in the room, they will then talk about their issues and relevant symptoms, and it will be up to the player to determine the issue and to give the corresponding solution.

Structure

The levels will be randomised based on which patient is randomly picked to walk into your office first. To give players a sense of clear progression in the game, the potential of a progress bar or an added extra description directly tied to the patient's general opinion of you is something that will be looked into if time permits. With every good decision you would make it goes up, and with every bad decision you make it goes down. We could also add additional metrics like getting correct answers or answering a patient's queries within a set time limit, which can be used to assess how much a player has learned over the course of the game. This is turn could be linked to player achievements, in order to use gamification to aid developing what the player is learning.

Main Character

The character that the player plays as will not be textured, due to the game being in first person.

Control Devices

The player will not move during the game. The patients will be the only people moving, which they will do automatically once the player has prescribed them something.

Video

Given our time frame, photo-realistic environments may prove too demanding to create and implement. A cartoon look may prove more engaging for our target audience, but given the subject matter, they may retain the information better if we used photo-realistic environments. This is something we will have to consider further on down the line, but our initial decision is that we will initially choose a cartoon look for both time and target demographic reasons.

Audio

The dialogue can be fully voiced, but in this case, we will have to be conservative with how much dialogue we choose to add. It is tempting to add voiced dialogue options in order to give a more immersive experience by engaging more of the user's senses, so it is something that merits further consideration. BGM and SFX can go one of three ways, either we create it ourselves, look for non-copyrighted tracks or forego its inclusion altogether. For the moment, we have decided that we will only add fully voiced audio dialogue if we have enough time, as we believe it is a better to focus our efforts on the rest of the game first.

Presenting Our Proposal

Once the initial proposal had been produced, we began working on the PowerPoint that would be presented to the client in the following Monday meeting in the next sprint. This included taking the information from the report collected so far to produce an initial group pitch for our game.

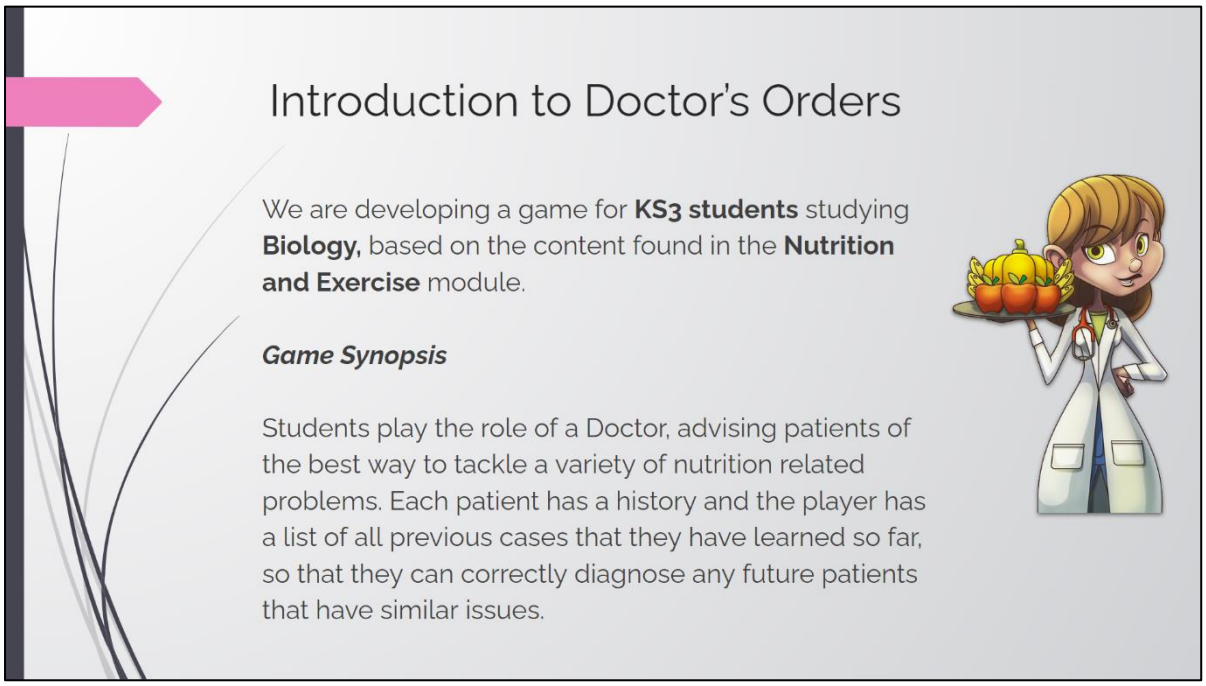


Figure 5: *The introduction slide that was produced for our client, explaining the synopsis of our game.*

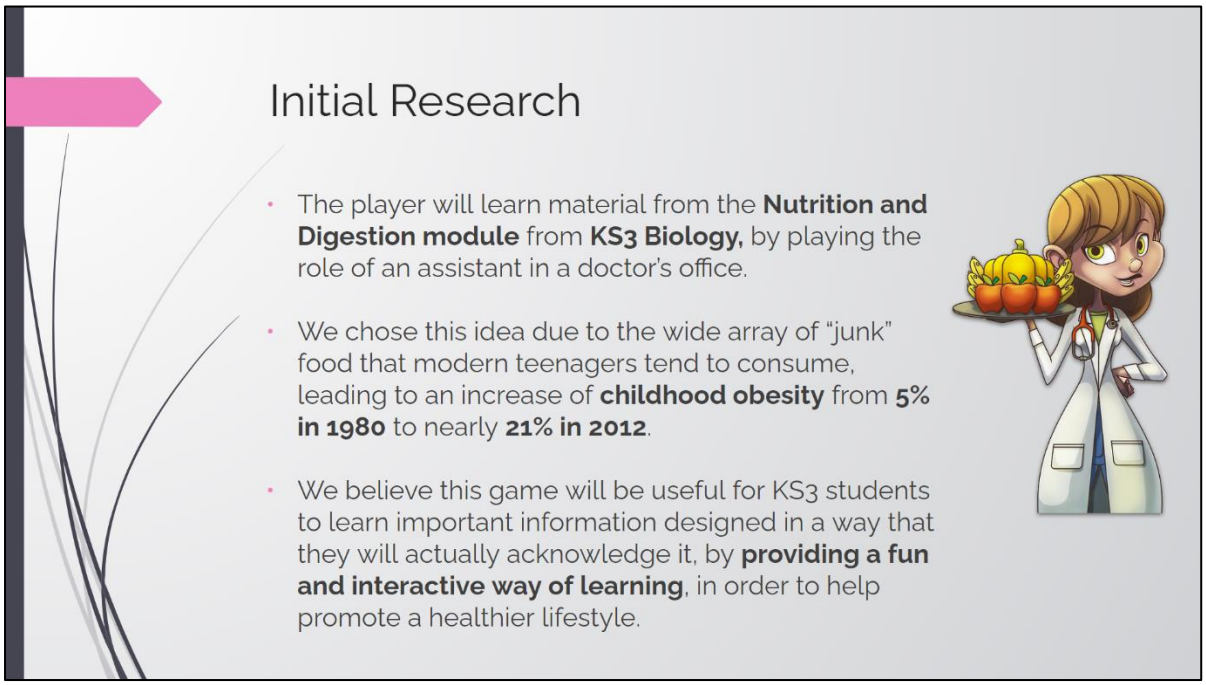


Figure 6: *Another example slide shown to the client, analysing our findings from our initial research.*

Testing Relevant Competition

Whilst the PowerPoint was being produced, we researched online to find a variety of existing games with a similar premise, in order to see what works well and what we should avoid when creating our own game. After examining the competition currently available on the market, a list was produced of the games we as a group would play test for further analysis. A link to each game can be found at the end of this report in the References section.

Game Testing #1: Patient Zero

The first game we looked at was a game created for Ludum Dare called Patient Zero, a 2D strategy simulation game based around keeping a varying number of households based on the difficulty. Right from the start we were not impressed, as the tutorial contained far too much text, making us simply not want to play any further. The art style was very simplistic, which although was appealing, visually it did not convey any of its core gameplay mechanics in an obvious and effective way. We unanimously decided we needed to make our game as fun as possible in order to keep the player's interest. We each took down any notes we thought worthy and moved on to the next game.

Game Testing #2: Rations, Please

The next game we tested was a 2D puzzle game called Rations, Please, which was much more effective at conveying the options it outlines to the player in comparison. Your role as the player is to decide who gets feed the limited rations you have been provided by your country during a war until the army arrives. The clear end goal of surviving for 25 days gave us an incentive to plan our rations accordingly. There were three pictures displayed at the bottom of the screen, including a full ration box, an empty ration box and a loaded gun, all of which provided clear context to the choices provided without any words. This enabled us to jump straight into the game without feeling lost or unguided. It also allows the game to be played by people in various countries other than the UK; this gives the game the potential to gain more exposure if it were to be developed further.

Game Testing #3: Papers, Please

We decided to move onto the game it was inspired by, a 2D puzzle game called Papers, Please. The player takes the role of an immigration officer on the border of a fictional dystopian country known as Arstotzka, where you have to review each individual coming through the border against the paperwork they provide. You are taught through a basic level of the game told to accept those who have the correct paperwork and reject any that do not match. At the end of each in-game day, the player earns money based on how many people have been successfully processed. If the player makes three mistakes, they are then forced to go home to take the rest of the day off, resulting in a lower profit. This adds weight to each decision made, engaging the player by forcing them to face the consequences of their mistakes. The game leaves the player to wait several seconds as they watch the individual walk across the border before a mistake message is displayed, successfully leaving the player in suspense whilst they await to see if they have made a mistake or not. The levels are split into days, and each day introduces a new mechanic alongside the previous ones. This was a great way of presenting multiple mechanics to the user without them feeling overwhelmed.

Game Testing #4: Doctor Know

Continuing on with the 2D cartoon-styled theme, the next game we play tested was Doctor Know. This game starts with an impressive introduction with a simple but engaging cinematic, that tells the user how the science of medicine has changed over time. At first, this game in particular seemed to be really promising, since it was closest in scope to our initial game idea but aimed at a different age range. Unfortunately, the actual game play felt far too clunky for us, as too much information was thrown at the user at once. We as a group struggled to play the game correctly during our testing, so we knew that our target audience of Key Stage 3 children would definitely struggle to play it to. We really liked the art style used, however, and we were keen to do some research into how we could also utilise a similar cartoon style in our game, as we believed this would work well with our target audience. Overall, we felt that game could do with some scaling back and the beginning though due to there being too much information, making the user not want to continue playing the game.

Game Testing #5: Mitosis Mover

After testing the previous biology game, we then moved onto Mitosis Mover, a biology game that teaches the user about DNA replicates itself before mitosis can occur. The graphics for this game were okay but subpar to the previous entries, but the main thing missing was the in-game music. After playtesting the previous game, it felt jarring to play this game that had no music to keep the user engaged, so we made a note to include this in our own game. The way the game checked to understand if the user had learned the correct information was also not particularly interesting, feeling more like an online quiz application than a biology based game. We made a note of this to make sure that we did not make the same mistake in our own game. The actual content however was pretty solid, and it did refresh our memory of topics that we had covered ourselves previously back when we were being taught Key Stage 3 material. Overall, the game did cover and convey the information it was trying to teach, however it did so in an uninteresting and unengaging way.

Game Testing #6: Civilization V

The final game we reviewed was Civilization V, a turn-based strategy game where each player controls one of 43 civilizations over thousands of years. The player starts with a small settlement, allowing them to start progressing through multiple eras as the game goes on; each new era allows the player to unlock more advanced technologies in order to focus on one of five ways to win the game. Although there are multiple paths to winning the game, each one boils down to outgrowing the other civilizations in various different ways. Due to the vast amount of options available to the player, the game offers immense replayability, one of the key components we wanted to include in our own game. Everyone in the group already owned the game and had each played for hundreds of hours, so we all had quite a lot of experience when it came to reviewing this game. One thing we noticed when looking at Civilization V for ideas for our own game, however, was that some of the mechanics are not intuitive for a beginner. There are various tool tips that come up when new mechanics are unlocked by the player, but the explanations are geared towards what you should do next, without a clear explanation of why you should do so. The game does contain a tutorial for new players to help combat this, but it is buried inside an obscure route that is not obvious for someone who is new to the series, meaning most players never actually play it. In order to avoid these pitfalls ourselves, we will make our game convey each new mechanic clearly and concisely as the players progresses to avoid the same mistakes.

Findings and Results

Once we all play tested the above games, we made a list of everything we wanted to include (and avoid) when making our own game, which includes the following:

- A tutorial level that does not contain too much text.
- Players learn more through demonstration instead.
- Introducing each brand-new mechanics individually.
- Gradually layer up each new mechanic presented.
- Creating a clear end goal for the player to reach.
- Separating the final goal into manageable steps.
- Explaining why something works, not just how.

Technical Specifications

After concluding on what we should aim to include in our game, we then sourced the technical specifications required for our own game.

Screen Resolution

The game will be designed to play on a variety of monitors up to 1080p. We based our decision on the fact that this is the most common resolution that our target audience will be playing the game on. This is backed up by the fact that over 62% of people played games on the largest PC gaming platform using the same resolution throughout January 2019.

ITEM	MOST POPULAR	PERCENTAGE	CHANGE
OS Version	Windows 10 64 bit	67.18%	+0.26%
System RAM	8 GB	37.73%	+0.16%
Primary Display Resolution	1920 x 1080	62.65%	+1.46%
Language	English	37.02%	-0.08%
Free Hard Drive Space	250 GB to 499 GB	24.46%	+0.21%
Total Hard Drive Space	Above 1 TB	50.74%	+1.56%

Figure 7: *The current and most popular hardware that the average person owns* (Steam, 2019).

Bandwidth

Most schools come equipped with generous bandwidth allocations, so this should not be a concern for our game, as our game Is expected to easily clock under 1 gigabyte.

Use of Related Media

To produce our game, we will make use of Unity as our game Engine. We will produce our scripts for the game in Microsoft Visual Studio. We also aim to utilise both Adobe Illustrator and Photoshop to create and edit our own art assets.

Operating Systems

We will develop our game for Windows operating systems, due to the fact that Microsoft have a dominant share of over 39% on the desktop computing market. This includes the majority of schools and educational facilities, which tend to have Windows as their main OS.

Figure 8: *The current market share of all major operating systems worldwide* (StatCounter, 2019).

Game Dimensions

After considering bandwidth requirements, time allocated and the skills of our team members, we have decided to make the game 2D so as to make it less demanding to produce (for our team) and less demanding to run (for a school network).

Providing a Downloadable Version

We have considered producing a downloadable version of the game, so as to provide an alternative means of playing it for those with slow or no internet connection. However, this possibility leaves us open to having the game reuploaded to various malware-infected sites that may try to profit off of hosting the game, or even potentially infecting our client's computers.

Game Localization

We have considered the possibility to translate the game into different languages if we desired to expand our audience. However, one must consider the costs of hiring professional translators to work on such a project. As an alternative, there exist various AI based translators that can translate between a limited pair of languages with surprising accuracy. In the future, we may consider this for international releases, but for now we will stick to just producing the game in English.

Control Devices

We have decided to stick to a simple keyboard and mouse setup, since this is what the majority of educational facilities have. The user will only use the mouse during the actual game.

Audio

In order to add some life to the game, we have decided to add some sound effects to it, including a heartbeat and a simple theme song that will play throughout. This will be done in order to increase the cartoon feel of our game, in order create a more engaging atmosphere for our target audience of KS3 students.

Usability Test Plan

After playtesting all of the previous mentioned games to identify their strengths and weaknesses, Jay then created a usability test plan to make sure our game was able to utilise our findings and results.

Scope

The player will operate as a doctor whose job it is to provide relevant nutritional advice to their patients, based on a range of symptoms that they have provided. Through playing the game, it will aim to improve upon the player's current understanding of the importance of nutrition and exercise.

Purpose

The purpose of this test will be to see what works, what the users like, what they do not like, general opinions and overall feedback on the game.

Sessions

A total of three 2-hour session hosted at the University of Brighton during a weekday.

Participants

We want to have a variety of male and female students who have a wide range of experience with gaming, from everyday usage to never gamed before. We want an even ratio of the different kinds of people we expect to encounter the game, so we are looking at 3 sessions each with 16 people.

Metrics

We will measure the success by the knowledge acquired during the game, as well as their general enjoyment of it. After testing out the game, we will ask the participants the following questions:

Q1: What was your knowledge of the topic before?

- Poor, Bad, Acceptable, Good, Excellent.

Q2: What was your knowledge of the topic after:

- Worse, No Change, Better.

Q3: What would you rate the story?

- Good, Moderate, Bad.

Q4: What would you rate the gameplay?

- Good, Moderate, Bad.

Q5: Would you play the game again?

- Yes, No.

Q6: Would you recommend the game to a friend?

- Yes, No.

Q7: What would you change about the game? (Open-ended question)

Roles

Each member of the group will take on the following roles.

- Jay as *Lead Facilitator.*
- Connor as *Observer.*
- Ava as *Note Taker.*

Identifying Test Metrics

There are several metrics we would also want to collect during the course of our testing.

Successful Task Completion

Each stage that the user participates in will require them to make use of specific data available to them, in order to evaluate the condition of each patient they see and provide the best advice they can based on that information. The scenario ends when the timer runs out, which will be displayed via a clock on the wall. An evaluation of the user's progress is made based on how many patients they were able to see and how much money they made as a result. The total amount of money is shown to the player, as well as the total cost for rent. If the user has made enough to pay their rent by giving correct advice to their patients, then they will have successfully completed the stage; any left-over money is then added to the player's running total.

Critical Errors

Such things are defined as deviations from the standard course of gameplay that obstructs the player's ability to complete the stage and progress within the game. An example of this could be patients refusing to leave until a specific piece of information is given. Players may not be aware that the goal is unattainable as a result, up until the player reaches the end of day screen and are told their total earnings.

Non-Critical Errors

These errors have minimal effects on gameplay and have well documented and established workarounds if occurred via a bug or glitch in the game. An example is a click event opening the wrong menu (so the user may see their money when they click on a clock rather than the time) or avatars briefly disappearing.

Error-Free Rate

The percentage of test participants who complete the task without any errors (either critical or non-critical). We are hoping to have this percentage within the upper 90's, though this is optimistic as this usually requires a large sample size and multiple testing phases, which we may not be able to achieve in our given time frame.

Time on Task

We currently have each stage set to last 2 minutes, as we believe the game will be better suited for multiple fast pace stages. This is something we will collect feedback for, as we want to check to see if our test subjects also agree with this idea.

Subjective Measures

We will use a 7-Point Likert scale to check how strongly our test subjects agree or disagree with certain design choices we have made about our game.

Likes, Dislikes and Recommendations

At the bottom of the questionnaire sheets that we will provide to the test subjects, we will have a large box for them to write down any additional comments and recommendations. For example, some users may have liked the art style, but disliked how the story was presented. It is essential that we collect user feedback so that we can make improvements to our game catering to our audience.

Consolidating Our Data

After all of the previous work from this sprint had been completed, we combined all of our current work onto the previously mentioned PowerPoint, ready to show our client at the start of the next sprint. We ended the PowerPoint on a graphic displaying our current progress with the project.

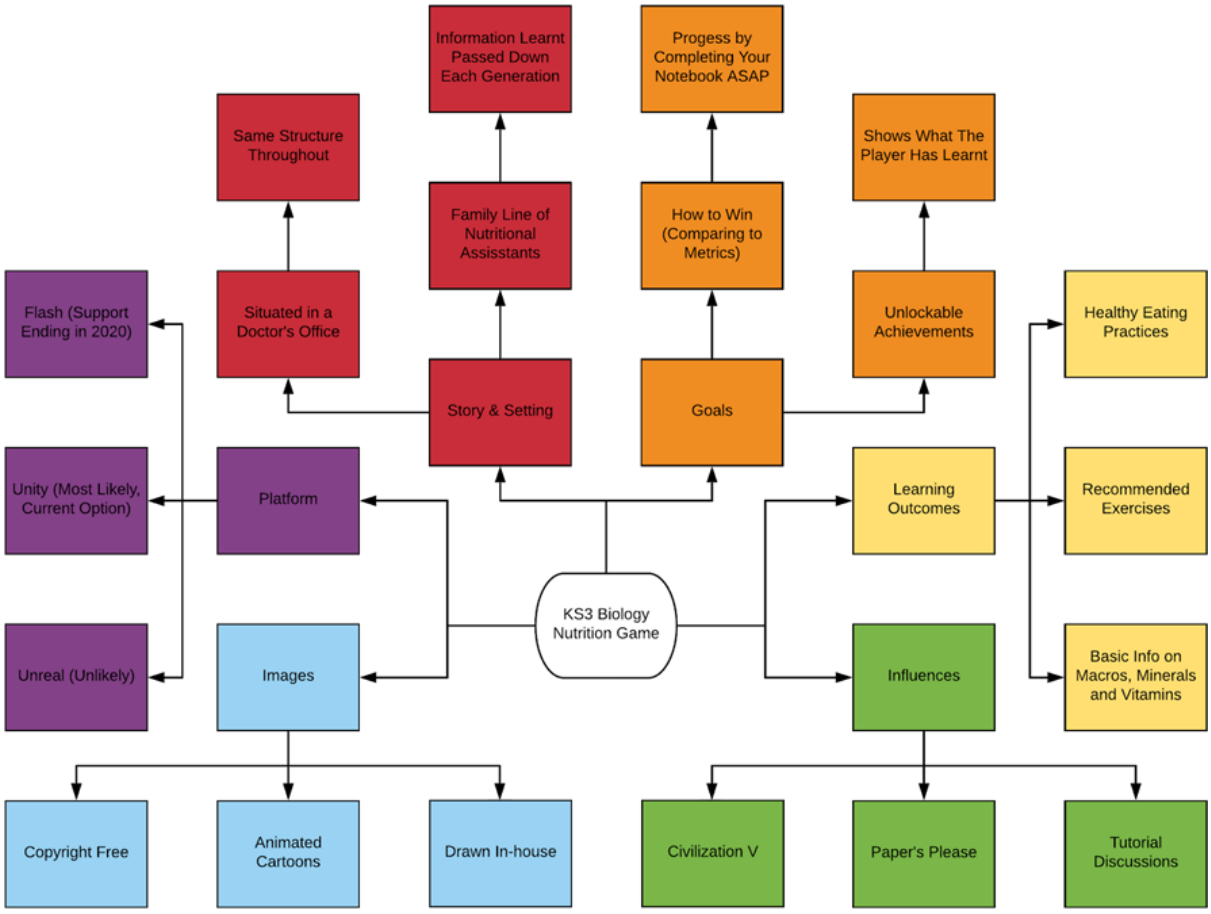


Figure 9: *A summary of all the individual items focused on so far during the project development.*

Sprint Meeting #2

Recorded Minutes

Preliminary meeting on 11th February 2019.

Jay arrives at 9am, leaves at 6pm.
Connor arrives at 9am, leaves at 6pm.
Ava arrives at 9am, leaves at 6pm.

The team meets the client at 4pm for 2 hours.

Topics Discussed

At the start of our second sprint, we reviewed our previous sprint work as a team in order to decide what we would all work on next. Once all the tasks had been decided, we updated the management spreadsheet with our allocated roles and priories for each task, so that the team could keep each other up to date on their current progress. Before everyone started working on their separate tasks, we presented our PowerPoint to the client. The main aim for this presentation was to showcase a clear outline for all the features in the game, as well as receive feedback from the client.

Client Feedback

After pitching our game idea, we asked for feedback and possible ideas that we could utilise in making our game better. The main response we got from the client was to research further the types of illnesses we would be identifying in our game, to make sure they align with the clients learning outcomes set for the KS3 students. Another suggestion introduced by the client was the idea of making the game in the style of a tycoon game, potentially adding additional gameplay without sacrificing any of the KS3 learning outcomes. The client in particular really liked the cartoon artwork style, as they felt that the quirky cartoon feel would give the game a fun and positive vibe. Once the presentation was finished, we wrote up a list of ideas that we would like to add to our game based on the client's feedback, ranked in the order of importance via the use of MoSCoW requirements.

MoSCoW Requirements		
Must	**Should**	**Could**
Have the required KS3 learning outcomes be achieved whilst playing through the product.	Have a clear and concise user interface that utilises the main requirement design principles.	Have an opening cutscene that sets the tone and overall feel of the resulting gameplay.
Be engaging for a KS3 student to desire to play the game via the mechanics and art style.	Be designed in a way that the code could easily be extended should the client desire.	Be extended with other extra mechanics should all the other requirements be met in time.

Updated Lesson Plan

Once we listed the different requirements, we decided to make a more detailed lesson plan based on our client feedback.

Subject and Topic

The specific KS3 Biology topic we aimed to cover was *Nutrition and Digestion*.

Learning Objectives

To understand consequences of imbalance in a diet, such as obesity and deficiency disease.

What Content Will Be Learned

Students will learn about the different diseases that are associated with various imbalances found in the diet. These include (but are not limited to) the following:

- Coeliac Disease
- Constipation
- Diabetes
- Heart Disease
- High Blood Pressure
- Kidney Disease
- Obesity
- Osteoporosis
- Stomach Ulcers

How Content Will Be Learned

Students will learn by playing the game, where they will be given symptoms of common disease associated with imbalances in the diet and will have the diagnose the right one.

Resources

The game requires a computer, a keyboard, and a mouse.

Success Criteria

Students should be able to correctly identify all the symptoms to the correct illness by learning about each illness using the in game medical dictionary.

Differentiation

The game has no difficulty setting, so the students with the most knowledge will be able to diagnose all of the different illnesses in the game correctly the first time around.

Students with adequate knowledge will recognise some of the more common illnesses but may struggle with some of the lesser known illnesses. After guessing the first time around, will then use the in game medical dictionary to education themselves on aspects they are unsure about. When playing the game again, these students will be able to retain the knowledge they have learned in order to increase the number of answers they get right.

Students that struggle with their knowledge of biology will correctly diagnose one or two of the illnesses but will require more guidance from the medical dictionary. They may also require guidance from a teacher in the room. As they continue to play the game, their confidence and knowledge of the various illnesses will start to increase.

Timeline of Learning Outcomes		
Timing	**Activity**	**Learning Assessment**
2 Minutes	The game starts with the rules. Students are expected to read the rules first before playing.	Students are now able to play the game.
20 Minutes	Students will play the game, diagnosing patients based on what they are saying. If they are not familiar will an illness, they can use the medical dictionary to look up various possible symptoms.	Students will be able to progress through the game to test their knowledge of KS2 learning requirements.
1 Minute	Students are able to see how well they have done by seeing how many total diagnoses they have gotten correct.	Students reflect on the result of the game.

Personal Learning & Thinking Skills (PLTS)

- Independent Enquiries: Assessing their own knowledge of illnesses.
- Creative Thinking: Learning whilst diagnosing the patients during the game.
- Reflective Learning: Gauging strengths and weaknesses based on diagnoses.
- Self-Managing: Playing without needing constant help from teachers.
- Effective Participants: Playing until they achieve a perfect score.

Key Vocabulary

- Coeliac Disease
- Constipation
- Deficiency
- Diabetes
- Diagnosis
- Heart Disease
- Kidney Disease
- Obesity
- Osteoporosis
- Scurvy
- Stomach Ulcers
- Vitamins

Display for Learning

A score is displayed at the end to see how many patients they diagnosed correctly.

High-Level Design Architecture

Overview of the Goal

Our game is designed to teach students the consequences of imbalances in the diet. Players move through a sequence of different stages. The game contains various patients that the player can interact with. After the opening sequence is completed, a patient will arrive in front of the player citing a range of possible symptoms. It is then up to the player to diagnose the patient's condition, using the in-game tools at their disposal.

User Interface

The user stands behind a desk facing the patients from a 2D perspective. The art style is simplistic and cartoony, specifically designed to cater of the KS3 audience for the client. A rules section and tutorial are both offered to inform the user what features of the game perform what functions.

Inputs and Outputs

The user will use a mouse to interact with the game. The game will display a "Round Won" or "Round Lost" screen, depending on whether the user got their diagnosis of the patient correct.

Flow of the Product

The player goes through a series of 'infinite rounds', where a patient with a medical condition is chosen at random. The player must use their medical book to correctly diagnose the patient's condition by taking note of their symptoms. The player can cross refence the symptoms with the information provided in the medical book. After the round result has been provided, the current patient will leave, and the next randomly selected patient will make their entrance. At any point, the player can click on the exit button to return back to the main menu and end the game.

Requirements

Functional

- The game must achieve an educational purpose for KS3 students.
- The game must be implemented using scripts, aided by the Unity Engine.
- The game must run on the Windows OS with a resolution of 1920x1080.
- The game must have the capacity to also display lower resolutions.
- The game must feature both background music and sound effects.
- The game should have an exit feature for when the player is finished.
- The game could have some level of animation to its characters.

Non-Functional

- Localization capabilities, game text must be easily found to edit if needed.
- Time based animations should be included to circumvent unexpected frame drops.
- Background music should play immediately once a new scene is loaded.
- SFX should only activate when the required click event condition is met.
- All click events and scene changes must occur as result of the code.

Use Case Diagram

In order to streamline the coding process, we created a few diagrams that would help us visualise the layout of our game. Below is a use case diagram that we produced in order to make sure our group knew exactly how the game would function when it was time to finalise the code in Unity.

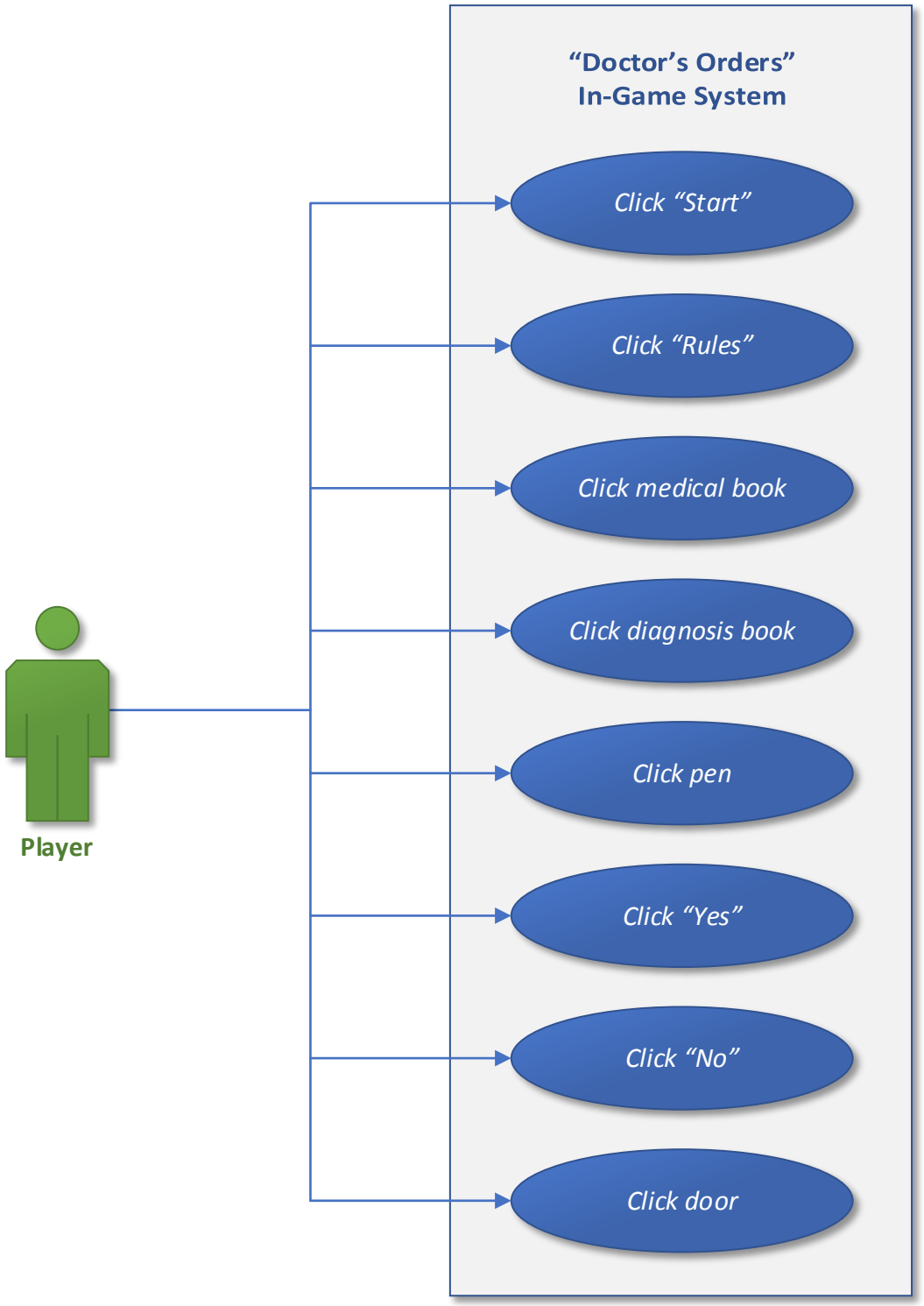


Figure 10: *A use case diagram to represent the user interface of the game during the main gameplay.*

User Interface – Draft Stage

Now that the framework for the user interface was in place, we were able to produce a draft of the physical layout, as seen in **Figure 11**. The first thing that she did was create a basic layout of the core game using only simple shapes, allowing her to make sure there was no wasted white space on the screen during the gameplay. Once this was done, a more developed version of the interface was then created, as seen in **Figure 13**, detailing more about each individual aspect of the interface.

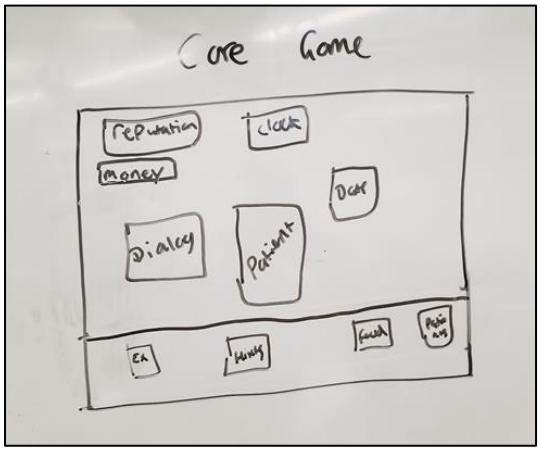


Figure 11: *A basic UI during the core game.*

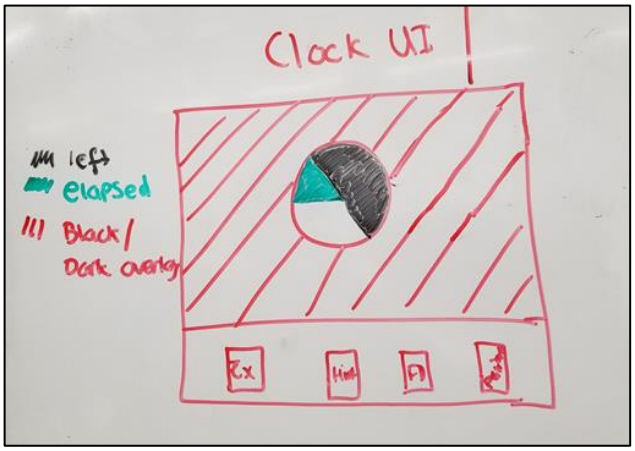


Figure 12: *A possible clock UI for the in-game timer.*

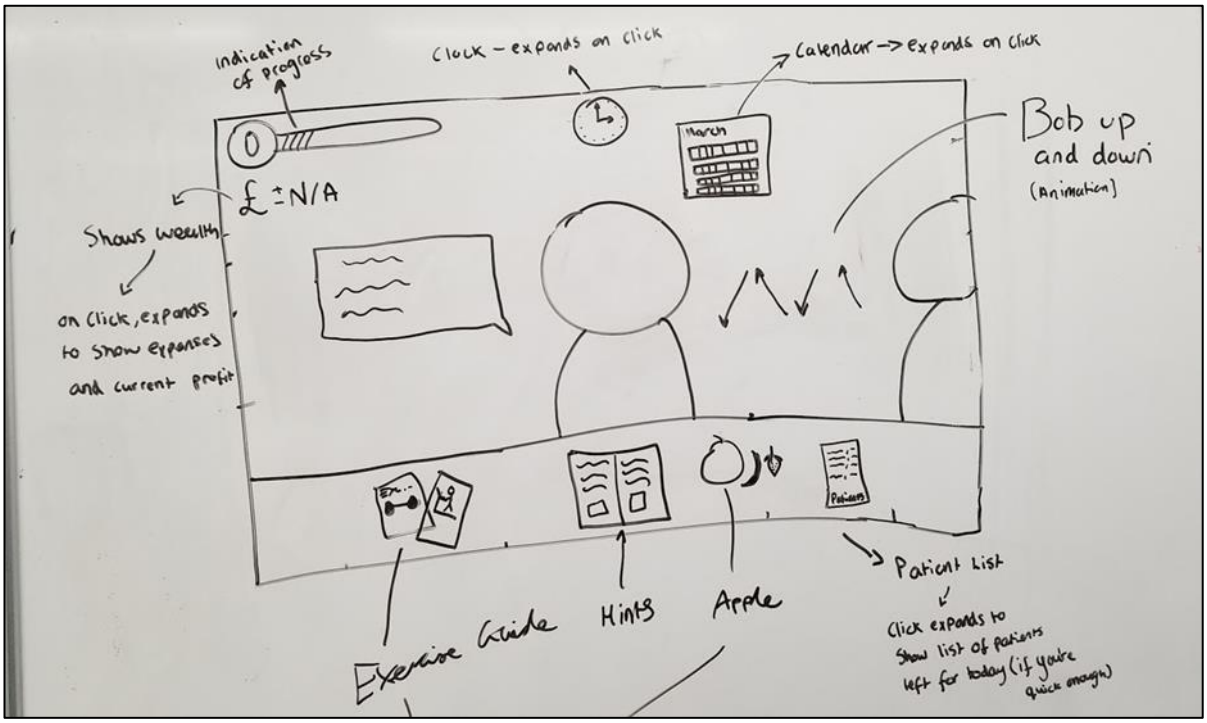


Figure 13: *A more detailed version of the previously basic user interface during the core gameplay.*

Storyboard

As the user interface was being created, we designed and digitised a storyboard for an introduction for our game, outlining a basic story for the user, via a small cutscene that would play at the start of the game. This would be used to make the game more engaging, however it is not a major priority for us, as it does not add any learning aspects to the game. Due to this, we all agreed that if we ended up ahead of schedule, we would add more of a story aspect to the game.

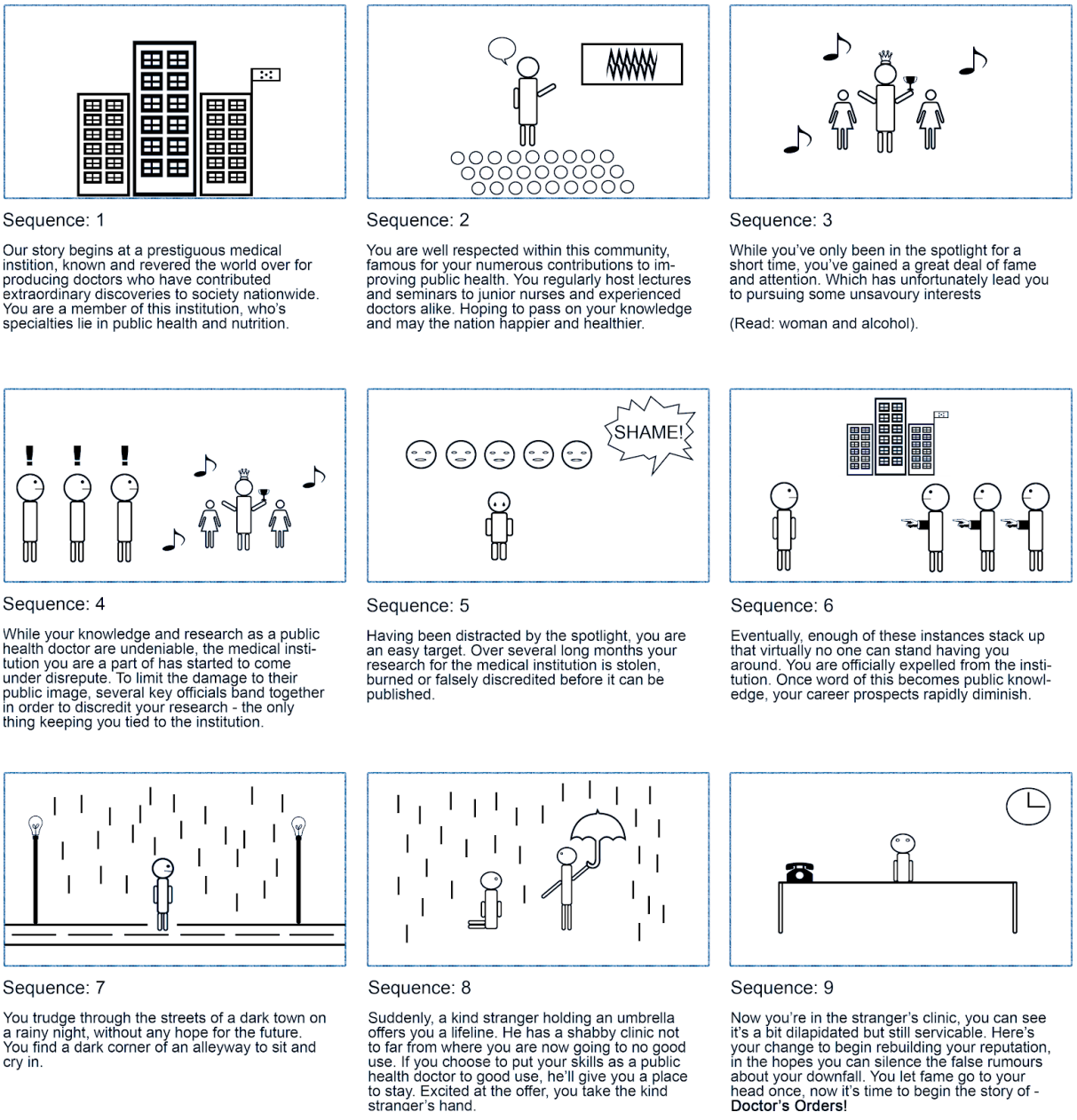


Figure 14: *A digitalised storyboard for an introductory cutscene to play at the beginning of our game.*

Once we had a basic user interface designs ready to be imported into Photoshop, we were almost ready to lead the way in coding the game. Before this could happen, we researched various technical aspects related to the project. This was done in order to make sure that the game was being created and aimed at our initially target audience of Key Stage 3 student correctly.

Target Audience Research

As young children, we use cartoons to learn about new sounds, shapes, and colours. It helps us improve both our speech and vocabulary, even though we do not actively notice this. As children get older, they continue to learn through cartoons to learn how things function in real life, about feelings and relationships. Cartoons portray things in a fun and understandable way, which is why we have decided to go with this style of art to teach KS3 students.

Furthermore, cartoons have been shown to draw people into their world more effectively than real-life pictures, which is why over 80% of fortune 500 companies have a designed image presenting their brand (Matsil, 2015). The reason why cartoons are so popular is because we associate them with innocence and youth. When you watch an animated character in an advertisement, you trust it more than an actor saying the same thing. This is because, the actor, makes the viewer focus on the viewer's weaknesses and inadequacies. Cartoons do the opposite; they take you away from the stress. This is why logos of companies like Starbucks have cartoon characters, as seen in **Figure 15**.

Figure 15: *The pre-2011 cartoon Starbucks logo* (Starbucks, 2019).

A study conducted at the Neonatal Intensive Care Unit at Le Scatter Clinic of the University of Siena showed how cartoons produce happiness, whilst blood samples were taken three groups of young children. One was given no distraction, the second was distracted by their mothers, whilst the third could watch a cartoon during the procedure. The happiest and most relaxed children were the group that watched the cartoons (Naranjo-Bock, 2011).

After conducting this research, we were certain that cartoons were the way to go with our target audience of KS3 students. We discovered that our target audience (11 to 14 years old) are at the age where they feel they are too old for edgy, heavy, and extremely immersive layouts, as instead they prefer strong, high-chroma colours and sharp contrasts.

Design Criteria

In general, the design criteria we will be following includes:

- Detailed graphics and animations.
- Calm, cool colours that produce a stylish effect.
- Graphics that let them feel part of a large community.
- Designs that focus on content or spatial interpretation.
- Designs that engage users with specific interests in a fun but effective way.

Examples Used by KS3 Students

Genius is a popular website that is used by KS3 student to revise. It features the simplistic design that KS3 students are attracted to as well as being designed with a content focus. It has basic and simplistic graphics, alongside colours that are gender neutral. The purpose of this website is to provide revision resources, which is why they find it appealing. Due to this, we have decided to use a similar look for our game when designing various aspects for it.

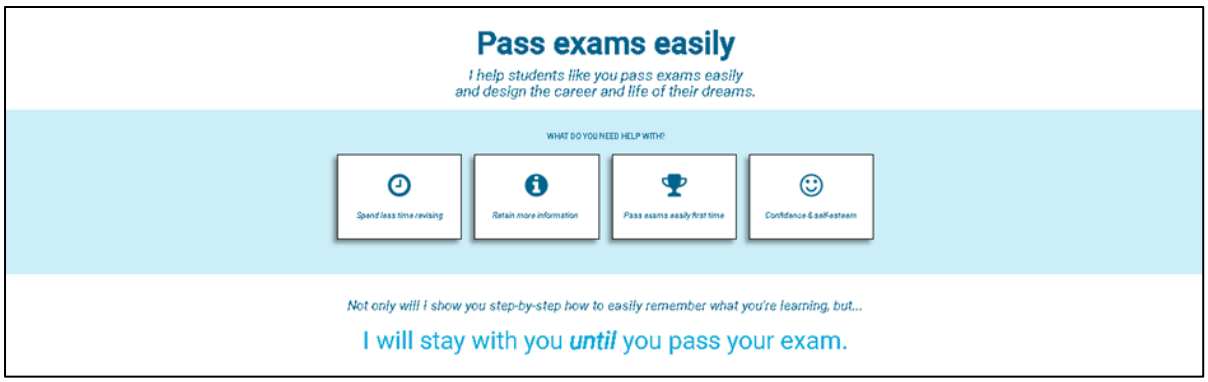
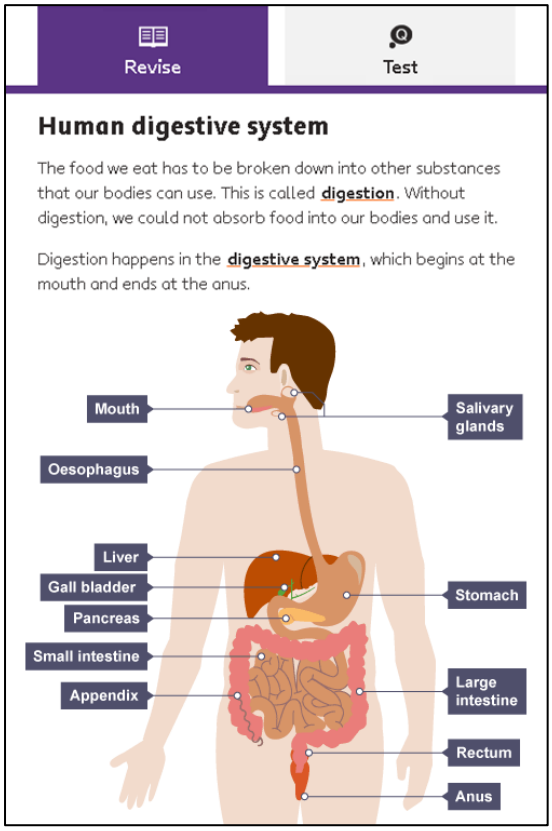


Figure 16: *A website with a simplistic design in order to target KS3 students* (Genius Material, 2019).

Coolmath Games is another website aimed primarily at KS3 students. This website uses a fair amount of graphics and animation to make it look appealing. Although the colour scheme works, it would not be appropriate for Doctor's Orders as the colours are very boy-orientated, and we would prefer the game to be appealing to as many students as possible. One good thing about this website is that it encourages being part of a community though the use of leaderboards and comment sections. We could incorporate a leaderboard into our game to give it more competitive feeling. We would not be able to add a comment section, although a forum could be a good idea as it would allow students to discuss questions about nutrition.

Coolmath Games allows students to engage in their interests in a fun and engaging way. Most of the games on this website are maths based even though they do not directly teach school maths. This is a great way to teach concepts that seem difficult and boring. We intend to do this in Doctor's Orders by allowing the students to play as the nutritionist and learn information as they come across a particular illness, as opposed to simply teaching them about nutrition-based illnesses in a traditional and less interesting manner.

Figure 17: *Another website using a variety of colours to appease KS3 students* (Coolmath LLC, 2019).

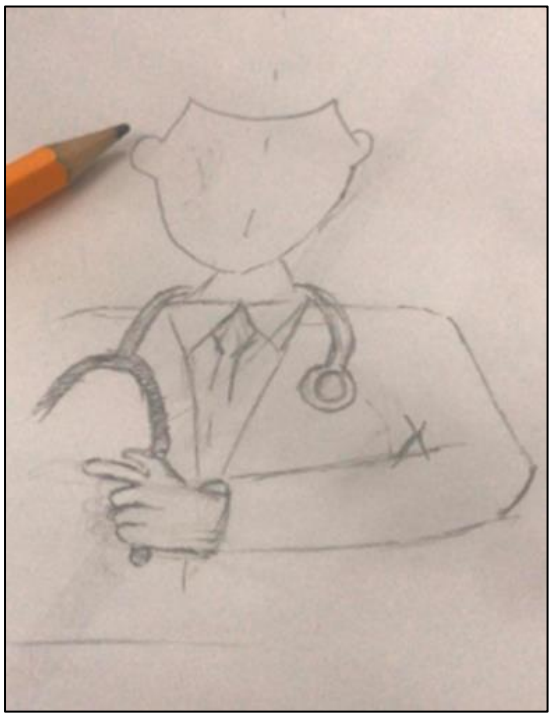


Bitesize is another extremely popular tool used by KS3 students, with a specific section just for them. For each subject and topic, Bitesize has comprehensive diagrams and animations. The simple graphics make it clearer for the reader to digest the material, which would otherwise be a boring read for many students. We intend to use a similar approach in Doctor's Orders. Not all students learn by reading text, so we intend to add video and sound to our game, in order to allow as many students as possible to learn.

Furthermore, the colours used by Bitesize are minimalistic and contrasting, appealing to the target audience once again. The design of the websites also shows that it is content specific. The aim of the website is to provide revision resources for students through text, diagrams, videos, and quizzes. In conclusion, most students prefer to go for games that condense their revision rather than games that require in-depth subject knowledge. We will keep this in mind when designing our game.

Figure 18: *An example cartoon-styled diagram used to help KS3 students' study* (BBC Bitesize, 2019).

Designing a Draft Splash Screen



We knew it was vital for the game to start off with a strong splash screen that sets the right tone and mood for the player's mind to ease into, including to make sure that all the art fits within the theme. Initially we started off by drawing a few sketches of what we wanted the splash screen / main menu to look like. We went for quite simplistic designs as we did not want to overwhelm the player before they had even started the game, whilst still setting the scene for the rest of the game effectively.

After sketching a few ideas, we developed a few ideas that we could develop on Photoshop. One of these was a cartoon styled doctor that appears over the title of the game. We choose to go this direction as we wanted to showcase what the game would be about even before the user begins playing. We also choose to include the subtitle "Become the Ultimate Life-Saver!" to further convey this message.

Figure 19: *An extract of a few initial designs created of the doctor that appears in the splash screen.*

For the first design, we initially picked red because it is a colour used very frequently in marketing to attract attention. We decided the buttons should be green because it contrasts well with red, whilst also symbolling 'go' so that the user would be eager to start the game. The font used is called the Supercell Magic Font, which is also used in the popular mobile game Clash of Clans. The reason we opted for this font is because this game is very popular amongst our target audience, and we would aim to use this familiarly to draw even more users towards wanting to play Doctors Orders.

Figure 20: *The initial splash screen for the game, building upon the previously drawn doctor design.*

Understanding Colour Preferences

In order to make sure we had the correct colour scheme for our game, we researched the most common colours used in popular company logos. This was done by looking at data about the Fortune 500 companies. We learnt that when it comes to colour, 51% of Fortune 500 companies prefer to use the colour blue, a clear majority over all the other possible colours (O'Connor, 2017). We also wanted to make sure that this still held true when split further between men and women, which is important as our game will be played not just by males, but by an equal split of both genders.

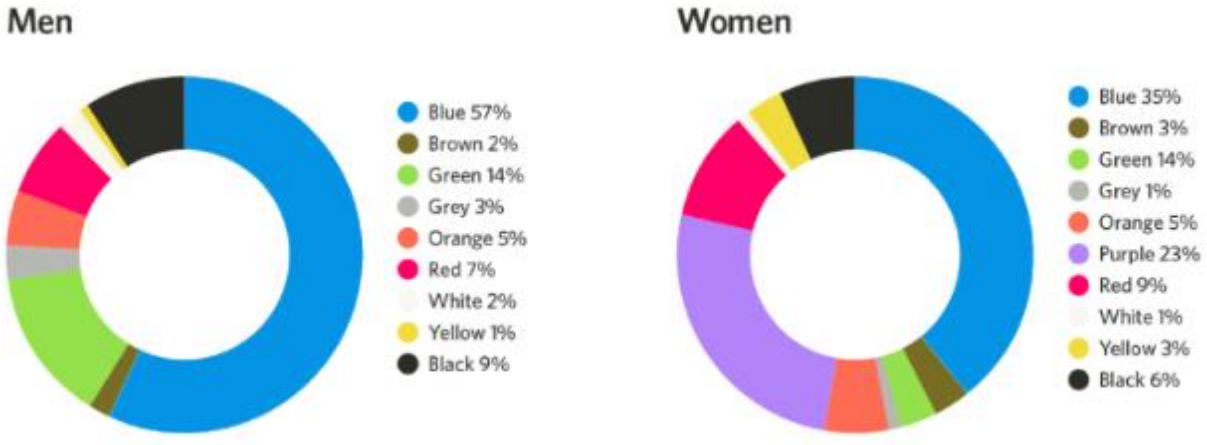


Figure 21: *A further breakdown of preferred colours separated by men and women* (Allen, 2016).

When looking at medical logos in particular, the majority increases even further, with blue appearing in nearly 85% of all healthcare logos, as seen in **Figure 22**. There are a number of reasons that the colour blue is the predominate colour in healthcare logos, which include the following:

- It is associated with both technology and innovation.
- It also represents nature and relays pleasant emotions.
- It makes people feel familiar and safe when looked at.
- The majority of colour-blind people can still see blue.

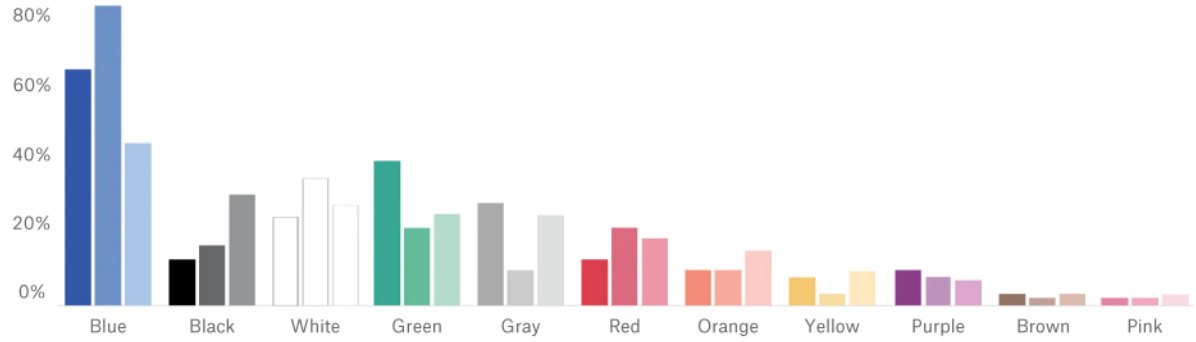


Figure 22: *An additional chart of colour in companies, specifically in healthcare* (Pinch Studio, 2019).

Utilising Market Research

After consulting as a group, we were happy with the digitalised splash screen that we had created in Photoshop but felt that we should the background to blue based on our market research. We were happy with our cartoon logo as we knew it would appeal to our audience, alongside our chosen font due to its familiarity and overall presence on the screen.

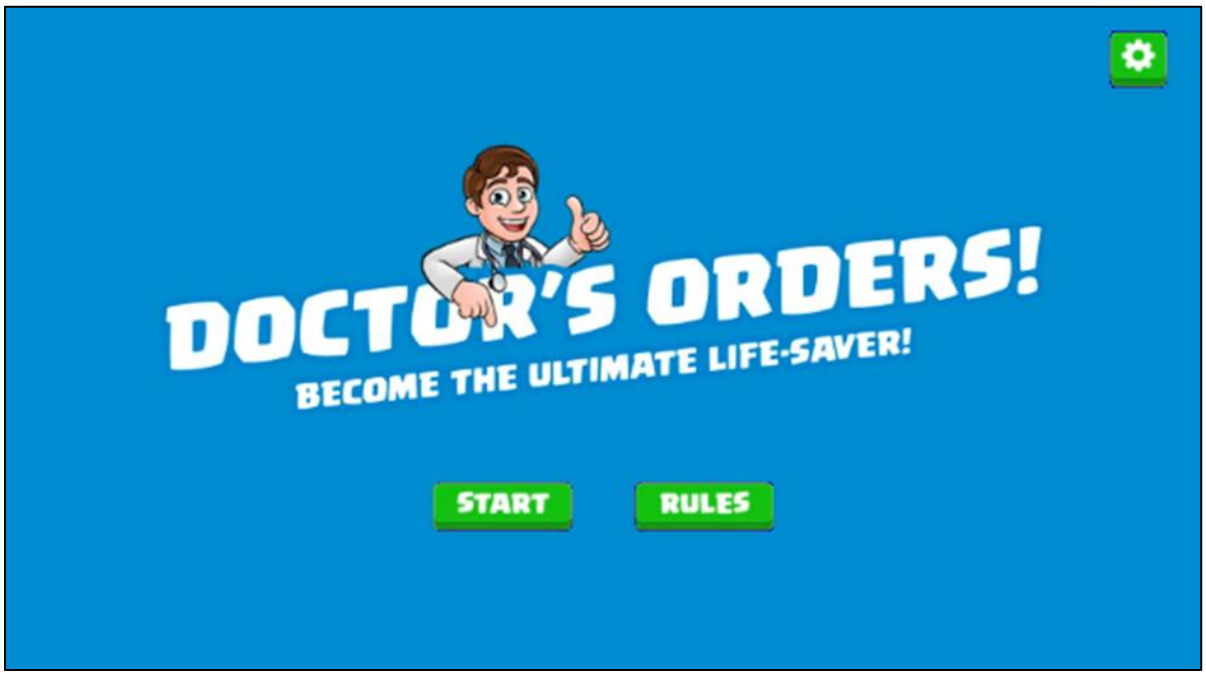


Figure 23: *An updated splash screen for the game, utilising the data found from our market research.*

Immediately, this design had a much friendlier and fun feel to it in comparison to the red. The only issue we had with this version was that the green icons were not as appealing as before as they no longer popped out. To resolve this, we changed the icons to yellow, as it contrasts well with blue.

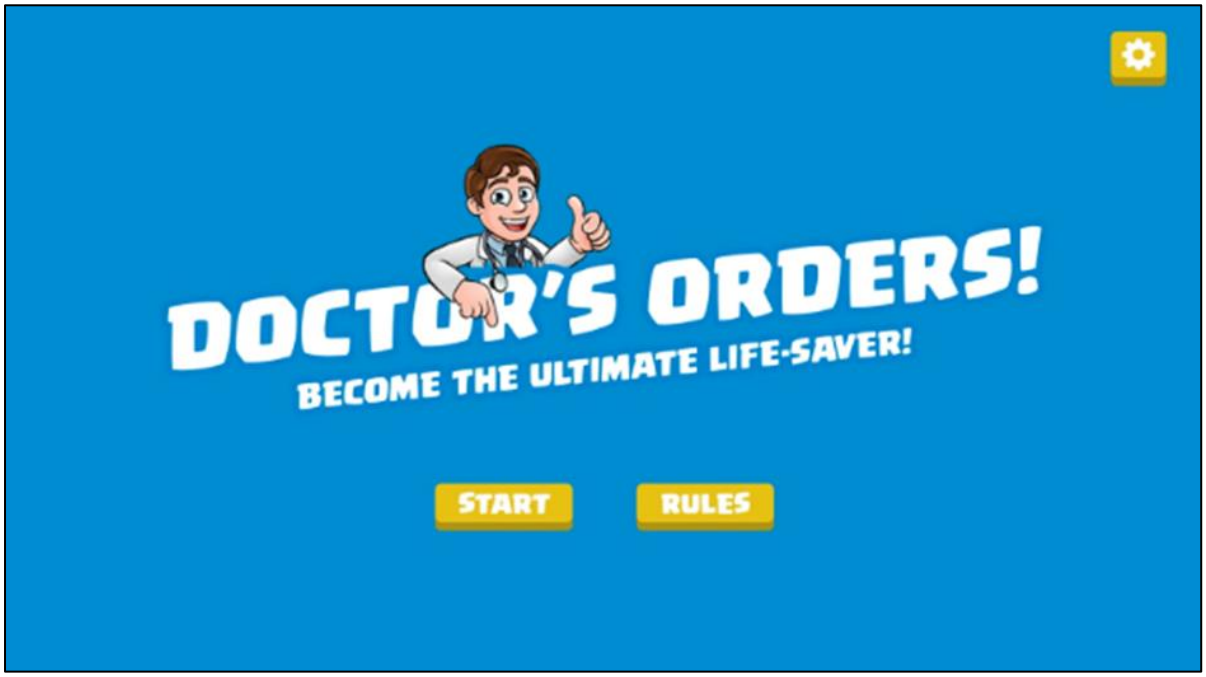


Figure 24: *The subsequent version of our splash screen, tweaking the buttons for better contrast.*

Designing Characters

The next design aspect we focused on was the patients that would appear in the game. We wanted to keep the cartoon aspect that we currently have, but we also wanted to give the player visual clues on what could be wrong with the patient. Below are the improved patients that we developed, using the previous drafts as templates for these new characters.

Figure 25: *Two examples of characters that can appear as patients in our game Doctor's Orders.*

Typography

In order for our game to look more professional than some of the previous Key Stage 3 examples we previously tested, we knew we had to have consistent typography. To achieve this, we researched a small collection of fonts that could potentially be used, a font for the patients, a font for the doctor's handwriting, and a font for the in-game menus. After searching the internet for suitable fonts that could be used in our game commercially for free, we settled on the following fonts below.

ITIM Regular

This font will be used for the speech of the patients. We opted for this font as it has a friendly feel and conveyed a young, innocent vibe to the game that would complement the art style.

The quick brown fox jumps over the lazy dog

Figure 26: *All of the characters in the ITIM font, used for the patient's speeches* (Google Fonts, 2019).

The Doctor

This font will be used for the doctor's signature, as it resembles one's typical handwriting. This was perfect as it was messy just like a typical doctor's signature, but still eligible enough to be read.

The quick brown fox jumps over the lazy dog

Figure 27: *An example of the Doctor font, used for the doctors handwriting* (PutraCetol Studio, 2019).

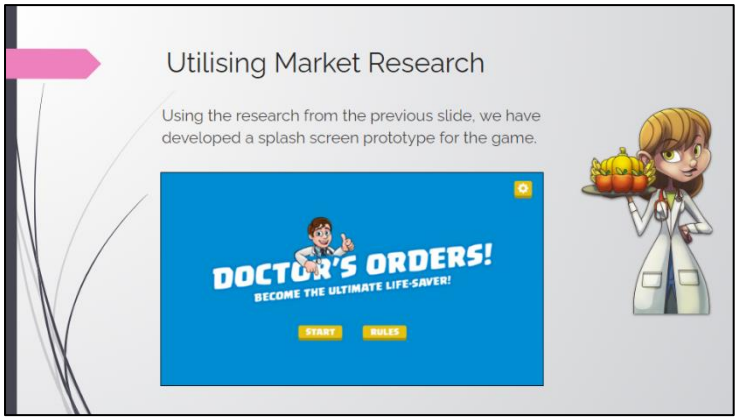
Monoid

This font will be used in various menu screens, as it has a clean and crisp feel to it that makes it look professional and easy to read, without feeling out of place with the previous font selections.

The quick brown fox jumps over the lazy dog

Figure 28: *An example of the Monoid font, used for the various in-game menu screens* (Larsen, 2019).

Preparing the Second Presentation



Whilst all of the work from the sprint was coming to an end, we compiled our efforts into another PowerPoint. This PowerPoint would be presented at the start of the following sprint to the client, to keep them up to date on our progress. The PowerPoint is a summary of each topic listed above in this report. An example page can be seen to the left, styled in a similar format to our first presentation.

Figure 29: *An example slide produced for our client in order to showcase our current project progress.*

Sprint Meeting #3

Recorded Minutes

Preliminary meeting on 18th February 2019.

Jay arrives at 9am, leaves at 6pm.
Connor arrives at 9am, leaves at 6pm.
Ava arrives at 9am, leaves at 6pm.

The team meets the client at 4pm for 2 hours.

Topics Discussed

At the start of our third sprint, we reviewed our previous sprint work as a team, similar to the first two sprints. Before everyone in the group started working on the separate tasks, we presented our second PowerPoint to the client. The main aim for this presentation was to showcase our current progress on the project of our game so far, as well as receive valuable feedback from the client.

Client Feedback

After showcasing our current progress, we asked for feedback from our client, who loved our current progress and was keen to see how it would develop in our next sprint. They did request, however, to change the splash screen so that it contained more patients, and to replace the doctor so that it was clear that this was not the character was playing. Since the user never sees their in-game self as they play in first person, the user can be male or female and so is more inclusive due to this change.

Finalising the Splash Screen

Figure 30: *An updated splash screen for Doctor's Orders based on the feedback taken from our client.*

Designing the Rule Screen

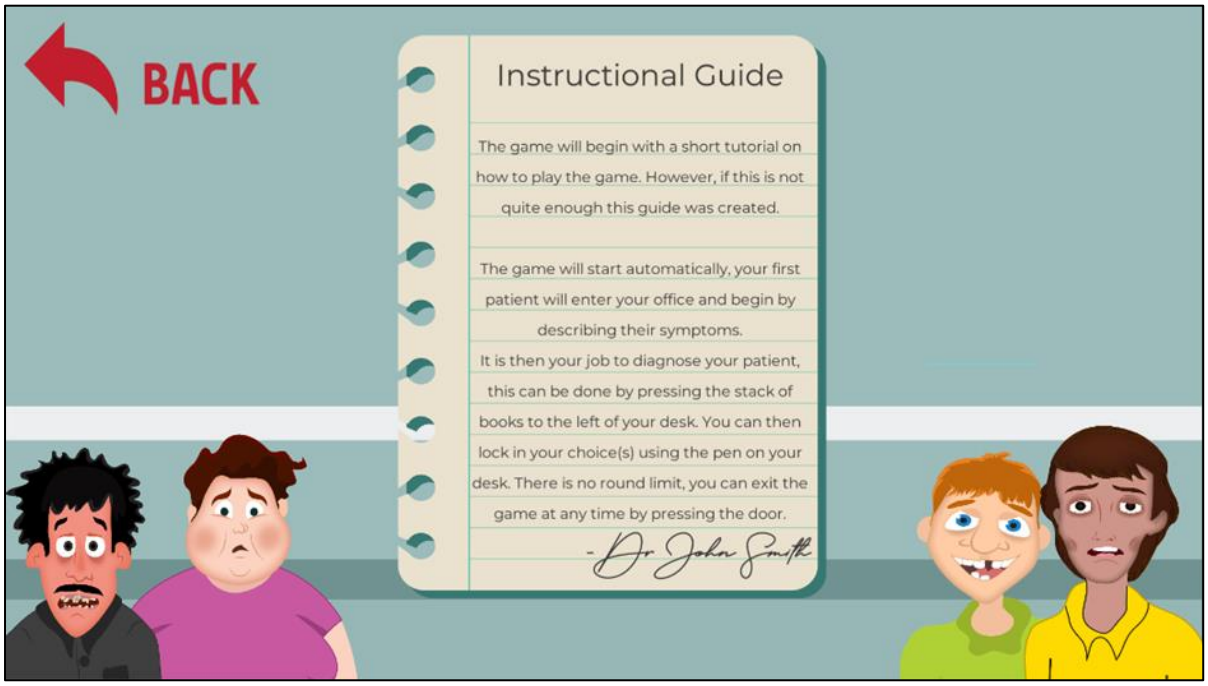


Figure 31: *An instructional guide for Doctor's Orders, displaying the rules of the game when clicked.*

Now that our splash screen had been finalised, we were able to move onto developing art for the main sections of the game. When people play games, reading the rules is usually the most boring bit, and as such, many people often just glance over them. This is why we decided to limit the text used to a single page. We chose to present the rules on a notepad as it fits with the theme of the game.

Designing the Setting

Figure 32: *The initial design of the user's office based on client feedback received for Doctor's Orders.*

Finalising the Setting

Initially, we were envisioning the player to appear and have a speech bubble next to them, however we found this was not as aesthetically pleasing. Due to this, we changed the table so that the player would be sitting at the table and added the items that we previously outlined to include in the game such as the diagnoses book and exercise books, which later become simplified to the medical book.

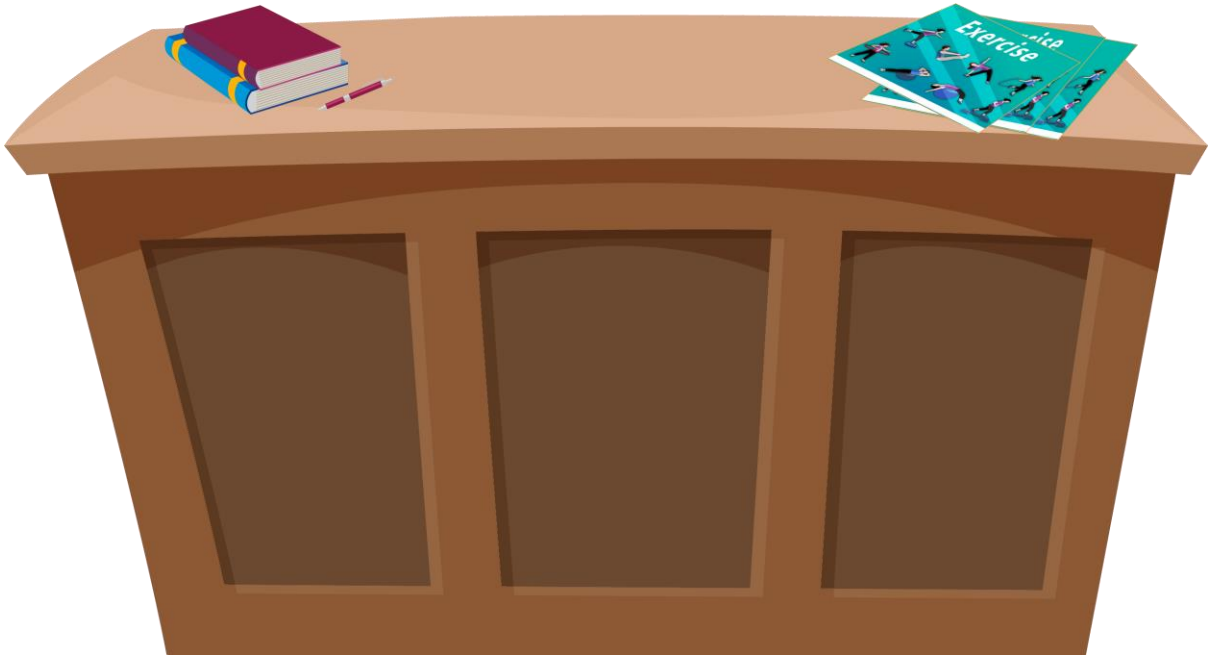


Figure 33: *The near-finalised design of the doctor's desk based on adjustments for Doctor's Orders.*

Designing the Tutorial

Figure 34: *The beginning of the in-game tutorial that plays when the user first plays Doctor's Orders.*

This is the final design of the room the game takes place in. As you can see in **Figure 34**, the desk has been made bigger so that the player is sitting at it. The stacked books to the left are now interactive, so when the player clicks these, they can diagnose the patient. The pen is also an interactive feature; when the player selects this, they can confirm that they want to go through with their diagnosis. The medical dictionary on the right is so the player can learn about the illnesses that are being presented on this level. For this alpha demonstration, we have created 10 illnesses, but the user interface has been specifically designed so that this can be increased in further versions of the game. The patient is placed on the chair in the middle once they walk on screen from the left, facing the player once they come to a stop. The various awards and decorations in the background have been created to add atmosphere to the game as a whole, making the room feel more like a real doctor's surgery.

Designing the Diagnosis Book

Figure 35: *The in-game dietary diagnosis book, where you select what you believe the patient has.*

The diagnosis book is where the player selects the illness that they believe the patient has, based on the symptoms presented to them. We kept the design fairly simple, so it is clear exactly which illness the patient has selected. The book uses relatively large text size with limited information elsewhere on the page, so that the player is not overwhelmed by information. The red border of the book helps define it as the main element. The 'close' button located at the bottom of the screen is of a different transparency and colour compared to the rest of the book above, which makes it stand out as a call to action for the user to interact with. Due to these decisions that we have made, it is easy for users to navigate through as they know once they have selected an illness, they need to click close.

Designing the Medical Book

Figure 36: *The in-game dietary diagnosis book, where you select what you believe the patient has.*

The medical dictionary is where the player researches the symptoms of the patient. We have written simple definitions for each illness with a few symptoms that could potentially be mentioned by the patient. One example of this is the patient with Coeliac disease; the patient mentions that they have eaten cake and now feel poorly with other symptoms. They player can read through the definitions and symptoms to deduce which illness it is if they are unaware of what the diagnosis could be.

Designing the Confirmation Screen

Figure 37: *The in-game pen that the user clicks to confirm their patient diagnosis in Doctor's Orders.*

The purpose of the pen is for the player to confirm their answer. As the player progresses through the game, they will have the option to prescribe a suitable treatment for patient as well as diagnose them. The reason we chose to use a pen for this is because it represents the player picking up the pen and actually writing a diagnosis with a prescription. When the player clicks the pen, an option that checks the players decision pops up, to make sure they are certain in their decision.

Finalising the Confirmation Screen

Figure 38: *The confirmation screen that appears in-game whenever the pen is clicked by the user.*

Creating Animations

Animations are responsible for the movement and behaviour in games, which are important as they add life to the game. Our game is primarily based on animations created in Unity. One example of animation we have used is when the player enters and exits the doctor's office. The characters enter through the door and sits in front of the player. The character then takes their diagnosis and leaves through the same door. We chose to do our animations in unity as this was the easiest way. We could have animated this using Adobe After Effects, but it would not have the same effect and we would be limited. Initially, we also planned to include cutscenes with Adobe After Effects and Adobe Premiere Pro. However, we decided the previously designed storyboard would not be used further in development, as it would not aid in any of the Key Stage 3 students learning objectives.

Creating Sounds

Sound has the potential to create powerful reactions in the listener and can make any product more immersive. For our game in particular, this allows the user to be fully absorbed in being a doctor that diagnoses patients. Due to this, we decided to add a variety of sounds to the game.

Background Music

The purpose of background music is to "enhance a sense of immersion, cue narrative or plot changes". Games are becoming more reliant on music to immerse their players and it has become an integral part of the overall experience. We wanted to create a fun, light-hearted atmosphere in the game. We opted for a royalty-free happy soundtrack that we found on YouTube. When we played the game without the music, it did not feel very fun and the game felt quite slow paced. Once we added the music, the atmosphere of the game immediately improved without having to change any of the gameplay. Our target audience is children who often enjoy watching cartoons with happy, bubbly music which is similar to the background music we have included in the game.

Main Screen Sound

We opted for a different sound in the main screen. The sound we chose to use is a heart-beat with a low pitch. This is because the heart-beat sound adds an intense feeling to the game and would send a hypothetical rush of adrenaline, encouraging the player to start the game.

In Game Sounds

We chose to add a limited number of sounds within the game itself. This is because we already have the background music and we do not want the sound to overstimulate the user. We opted for the 'page flip' sound as it is a fairly quiet track so it would not distract the player too much. It also adds to the atmosphere as it makes the player feel as if they are actually turning pages in a book. The other sound we opted for was the 'door opening' sound. This is because it alerts the player that a new patient is coming in and also when the old patient is leaving. It helps pace the game as then the player is ready for the new patient without it feeling overwhelming.

User Friendliness

The term user friendly describes a software interface that is easy to use. Features include:

- Simple: A user interface that is not complex but instead straight forward, providing quick access to common features and commands. Doctor's Orders does this by providing two simple buttons on the main screen, which makes it obvious what it is that the user needs to click in order to manoeuvre around the game's menus.
- Clean: An interface must be well organised, making it easy to locate tools and options. Doctor's Orders does this by having limited interactive features so the player can focus on gameplay rather than complicated game mechanics.
- Intuitive: an interface must make sense to the average user, requiring minimal effort to explain how it is used. Our game does this by making items on the doctor's desk interactive, so the player can easily remember what the use of each item is.
- Reliable: the product must not malfunction or crash. As far as we have tested, Doctor's Orders does not malfunction or crash with its current features. We cannot guarantee is remain entirely bug free as it is still early days.

Accessibility Considerations

Accessibility in terms of gameplay means avoiding unnecessary barriers that prevent people with a range of impairments from accessing and enjoying something. 15% of the population are disabled, whereas 20% of casual gamers are (GamesIndustry International, 2019). Other conditions that are not considered disability can also prevent someone from enjoying a game; a large number of the population have a reading age of below 11 years old, whilst many males have red-green colour deficiency. Some individuals can have situational impairments that affect their gaming such as a noisy rooms or bright sunlight. As with anything, gamers come with different levels of ability. This makes accessibility a vital and difficult aspect of designing a game. Accessibility guidelines are divided into 3 categories in games: basic, intermediate, and advanced. To ensure we covered as much ground as possible, we made sure everything outlined above was considered.

Sprint Meeting #4

Recorded Minutes

Preliminary meeting on 25th February 2019.

Jay arrives at 9am, leaves at 6pm.
Connor arrives at 9am, leaves at 6pm.
Ava arrives at 9am, leaves at 6pm.

The team meets the client at 4pm for 2 hours.

Final group meeting on 29th February 2019.

Jay arrives at 9am, leaves at 6pm.
Connor arrives at 9am, leaves at 6pm.
Ava arrives at 9am, leaves at 6pm.

The team meets the client at 4pm for 2 hours.

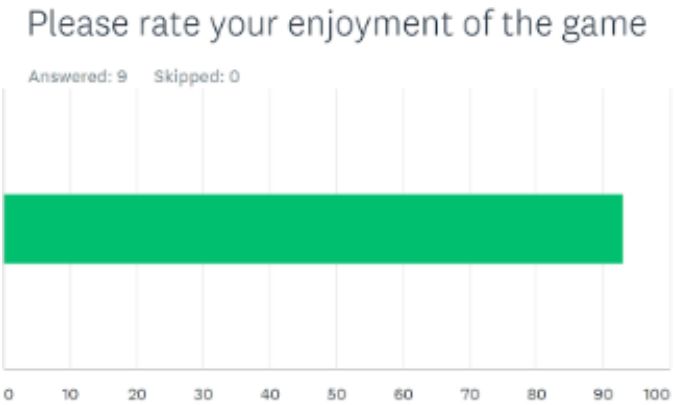
Topics Discussed

At the start of our final sprint, we reviewed our previous sprint work as a team in order to decide what we would all work on next. Once all the tasks had been decided, the management spreadsheet was updated with our allocated roles and priories for each task, so that the team could keep each other up to date on their current progress. Before everyone started working on their separate tasks, we presented our PowerPoint to the client. The main aim for this presentation was to showcase our current demo of our product, as well as receive valuable feedback from the client. The final group meeting was at the end of the sprint, where we presented and handed over our final project demo.

Client Feedback

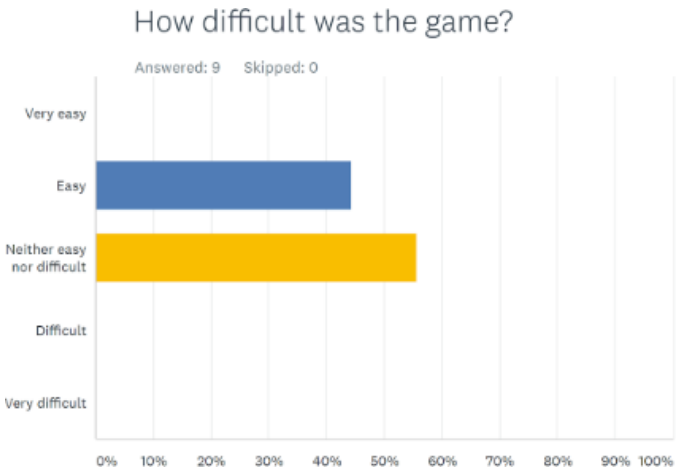
The client was greatly satisfied with the version of the game we showcased to them at the start of the sprint. One thing they wanted us to do was to collect feedback from their Key Stage 3 students, so we set up a poll for all of them to take after playtesting the game for the first time.

User Feedback



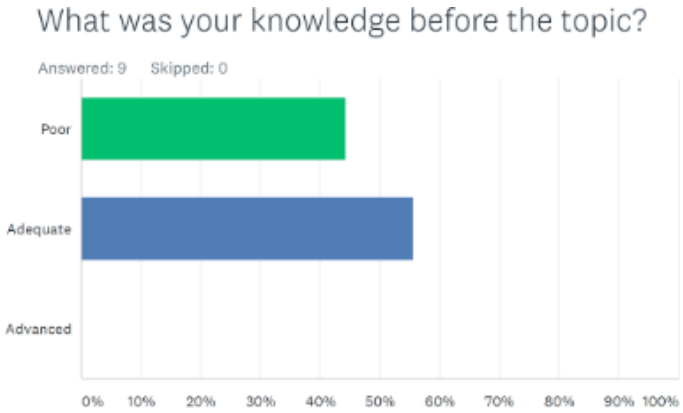
We first asked students to rate their enjoyment of the game out of 10, which resulted in an average enjoyment rating of 92%. This is much higher than we were expecting, especially considering that this is a demo version of the game. This does mean however that there is still room for improvement. In order for us to do this, we will implement the features discussed further on the user feedback below.

Figure 39: *The first question on the poll that we created.*



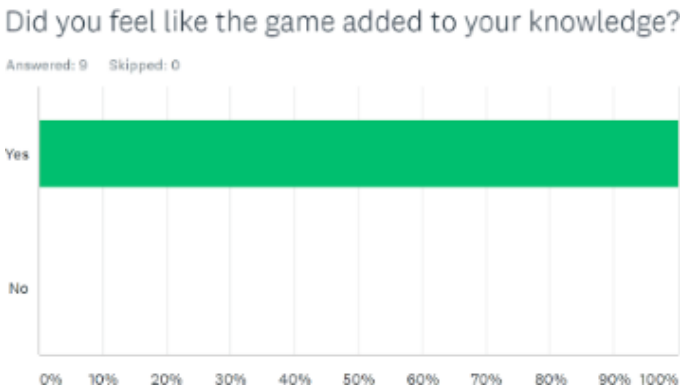
The majority of the people surveyed stated that they found the game 'Neither easy nor difficult' with the others finding it 'easy'. This means that the difficulty of the first level is exactly where we want it to be. If we surveyed more people and it started to skew more towards easy, then we would add a limit as to how often you can refer to the 'medical dictionary' or add a timer to each round.

Figure 40: *The second question on the poll that we created.*



Many of the people surveyed had adequate or poor knowledge of the effects of imbalances in the diet. This is where we expected KS3 students to be when they are first introduced to the topic. Whilst the game has been primarily developed for Key Stage 3 students with little to no knowledge on the topic, we could add multiple difficulties based on the player's current knowledge.

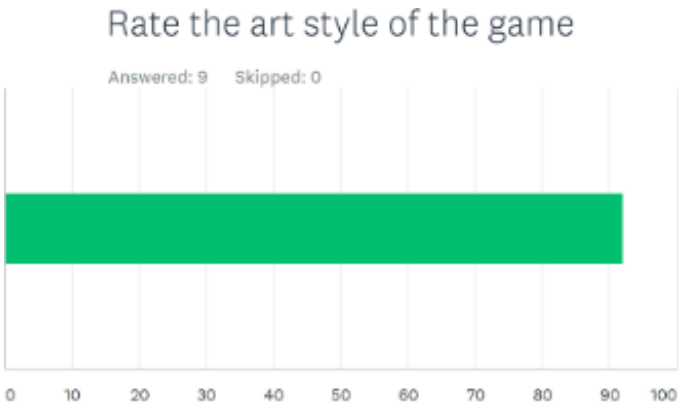
Figure 41: *The third question on the poll that we created.*



We were really pleased with this particular result, as 100% of students found that the game added to their knowledge. The main aim of the game is to educate and test players on their knowledge of the effects of imbalances in the diet. Most of our players started with 'poor-adequate' knowledge, so by learning something new, the game has achieved one of its main objectives.

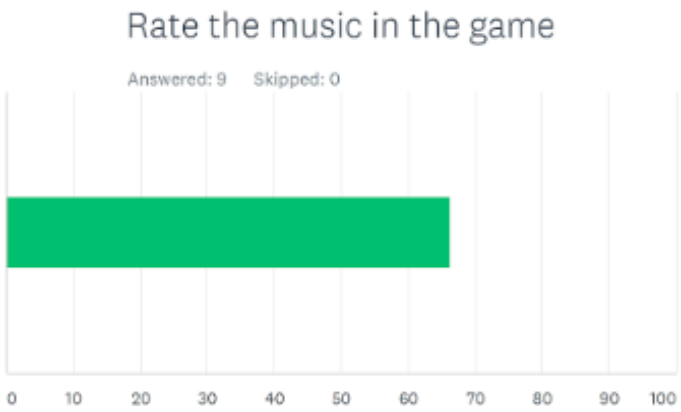
Figure 42: *The fourth question on the poll that we created.*

An interesting follow up would be to see exactly what they learnt while playing the game. This would then enable us to make changes to the game to make it an even better learning tool. When testing further versions of the game, this question would then be added into the survey. The next question regarding our chosen art style of the game can be seen below in the continuation of the results.



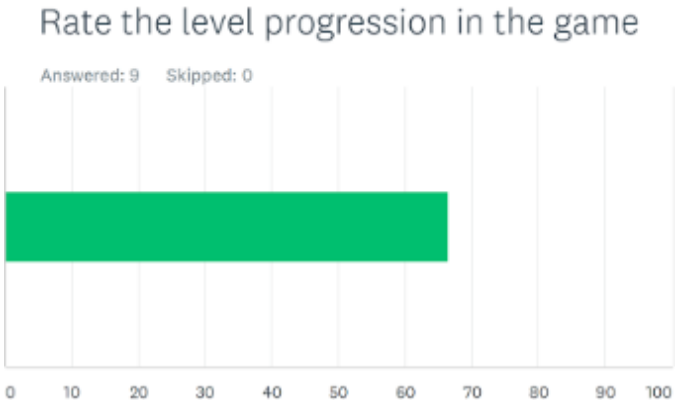
The majority of the players surveyed liked the art style of the game. This is a good sign as our game's art style is something that we pride ourselves in. Having spoken individually to some of the students surveyed, consistency in art style was something we picked up on in particular. This is something that we would definitely continue to focus on if we were to develop later editions of this game.

Figure 43: *The fifth question on the poll that we created.*



The music in the game turned out to be not as favourable as the art. Due to this, we altered this later in the sprint, by reducing the volume in order for it to be less obtrusive for the user. In future versions of the game, a mute audio button could also be included, so players that do not want to listen to the music can instead choose to mute it in game. We could also add more sounds to the game, to create more of an atmosphere.

Figure 44: *The sixth question on the poll that we created.*



Level progression was an element that also did not receive a particularly high rating. We were anticipating this as they only played the first level of the game, which has 5 rounds at present. We felt this would be sufficient, but after seeing the survey, we would need to include more rounds in later additions of the game. This would also then aid users in getting used to the game mechanics.

Figure 45: *The seventh question on the poll that we created.*

Once the students had rated the various aspects of the game from 1 to 10, we then asked them for general open ended feedback that we could then utilise before developing our demonstration to the client. As you can see in **Figure 46**, the general feedback we got from the game was very positive, however there was not a lot of points we could draw from the data. This contrasts the answers from **Figure 47**, which were more helpful for us in further ironing out the gameplay. We noted down each suggested improvement, then discussed whether or not as a team we would have the time to alter or implement the requested features in the time left in the sprint before finalising the product.

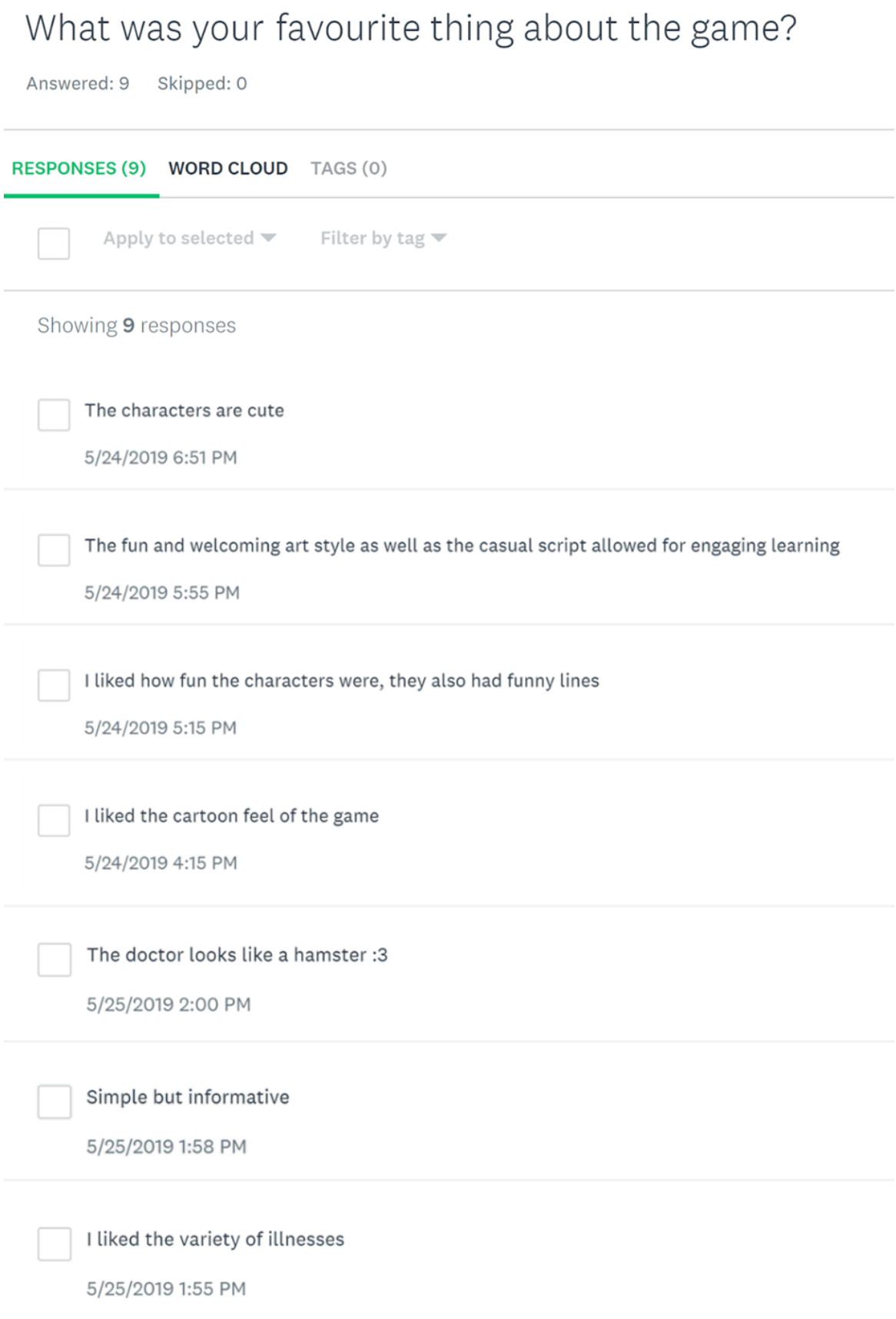


Figure 46: Some of the open-ended feedback the Key Stage 3 students gave at the end of the poll.

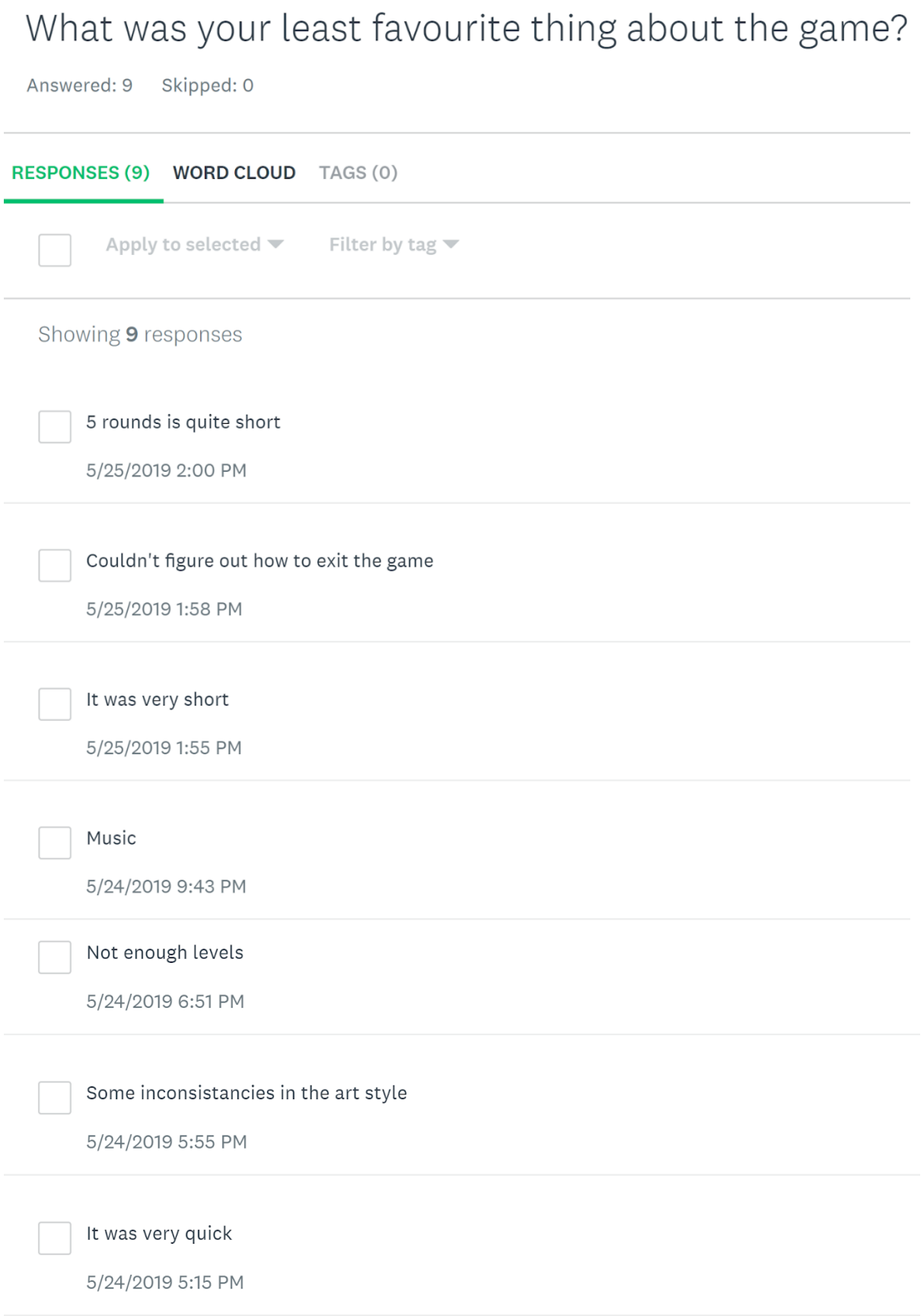


Figure 47: Some of the open-ended criticisms the Key Stage 3 students gave at the end of the poll.

Fixing Critiques from Target Audience		
Critique	**Group Comment**	**Improvement**
Game Length	This game is a demonstration of what the game would look like when developed further. As such, we have developed 1 level as a proof of concept.	We will not be able to increase the game length during this sprint, due to the extra time it would take to develop extra character art needed for this.
Music	Some players enjoy having music in the game, whereas others prefer listening to their own music instead.	We have added an icon in game so that the game can be muted for those who do not want to listen to the music.
Game Exit	We did not originally have an exit icon above the door, so we will change this in order to make the exit easier to see.	The tutorial has been edited so that the game exit is marked more clearly for those that could not see during the game.
Art Style Inconsistency	The art was made in Adobe Photoshop and Illustrator, so this depends on where the asset was made and who in the group it was made by.	We have gone through the assets and subsequently made them as uniform as possible, changing various ideas and designs where appropriate.
Faster Text	We set the text slightly slower than needed; students were reading faster than expected.	We have slightly increased the speed, making sure not to set it too fast for some students.
Bug Fixing	As this is an alpha, we are aware of the bugs and minor issues in the game and we are planning on fixing them.	The remaining time in the sprint has been spent fixing any bugs that have occurred during any part of the game.

Demonstration

A demonstration of the game can be found here: **https://youtu.be/RLMiHrwUGkY**

Project Conclusion

As a group, we are happy with the feedback that we have received for this demonstration version of the game. We spent the remaining sprint hours implementing the above improvements. Each team member has played a vital role in producing this product for the client, from writing lesson plans and requirements, to creating assets for game code to display. If we were to attempt a similar project in the future, we all agreed that we would spend slightly more time outlining the code of each class, in order to reduce the time spent coding, which may have allowed as to add a few more features in the demonstration. Overall, we are all very happy with the project, as we have learned a lot by working on this project, whilst delivering a product that is ready to be expanded into a shippable game.

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