Educational Game for Public Engagement

Report Name	Project Outline
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1.   Project description

The main premise of my project is to create a water filtration simulator for the public created in HTML so it can run on a web browser. The game will have the user watch water being pumped from a lake into a water works, in which the water will be filtered, cleaned and altered for human consumption, before going to a nearby village as an example.

During the game there will be events that randomly occur in which, the water could be too contaminated, or the proper checks were not made and there have been effects to the villagers.

The player will have to maintain the water works, by adjusting filters, cleaning them, restocking chlorine and sending of data to computer scientists to analyse, before the water can be used.

This project must be built around the strong premise of it being educational about where clean water in the country comes from. It is essential that there are key elements which refer to the contribution of computer science in making clean water possible, while also being fun. The project will need to be fun and simple to play for everyone, however I think the age range of 7 and over should be able to understand the game fully.

I think that having events that occur randomly can help emphasis the educational elements, as it allows users to see what needs to be fixed to get the clean water, and issues that may occur if the standards are not kept.

The end goal for the project would be to have a fully working water simulation game for the public, that will teach people of all ages how clean water is produced and sent to their taps, while also showing the influence computer science has over the process. But above all the game should be fun and interesting for people of all ages.

The game will be created in HTML and will have some database connections, with a place to store how long players lasted while playing the game. It is still being decided if physics and 3D models will be used or if the art will be more retro.

2.   Proposed tasks

- **Investigation of the optimal programming language**
  This task will have to be thought of early on and will consist of some investigation into which programming language would be optimal. Currently, HTML5 and JavaScript have been seen to be the most optimal languages to host a game which can be played offline in a web browser.

  However, the main part of this task requires investigation into which sub-sets of JavaScript are optimal. JavaScript allows for a useful tool known as Physijs, which is a physics simulation platform, which allows for 3D modelling and physics to be used. It will need to be explored if whether Physijs would be good to use or not.

- **Investigation of educational elements**
  Research will need to be undertaken to have an accurate simulation of what processes occur when cleaning water **[2]**. However, the biggest challenge of this task would be stripping down the detail, so it is understandable for the public, while also not going into specific details about confidential processes.

- **Development**

  o **Investigation and implementation of a control system**
    The first task in the development process will be researching what an optimal control scheme would be for the game and how the game will play. As the game is a simulation and events will occur that require action, some click and drag controls can be optimal.
    Click and drag options would require mouse controls, however the implementation of touch screen controls for mobile usage could also be researched and implemented, if the mouse controls are done effectively.

  o **Management of game timer and random events**
    The second part of the development will need to focus on the functionality of a simulation. Because of the preferred practices of a simulation game, a game timer would need to be implemented.

    This can be used to record the time spent on the game up to a cap, or until a milestone is reached. This can be used to help implement random events which could affect the game play, such as, rainfall. The implementation of a game timer can help monitor progress for users and for added events.

- **Project meetings and progress tracking**
  The project will involve weekly meetings with the project supervisor. There will be two meetings, one as a group to have a peer to peer discussion about progress and a one-to-one meeting.
  A way of tracking progress will be created, this will be in the form of a public WordPress blog **[1]** to help document what has been reached on a weekly basis in a concise manner. Another platform I will be using for monitoring, will be an Excel document, which I will use as a progress tracker, to help document how much progress I have made on a feature during development.

- **Preparation for demonstrations.**
  There are two demonstrations planned for this work and an additional public demonstration. One is in the week before Easter and the other is following submission of the Final Report and the technical work.
  At this point, the plan for the Mid-Project demonstration is to show the functionality to manage the dates and display the information to students.
  At the Final Demonstration, it should be possible to demonstrate facilities to manage the module and assignment information and track when feedback has been returned.
  The public demonstration will be held during Science week, in which a functional demo of the game will be produced. This will be a good way to get public feedback on things needed to be improved, while helping development streamlined, with a target audience in mind.

3. Project deliverables

- **Working demo for science week**
  As mentioned before, there is a plan to get a fully working demo of the game available for public consumption for science week. Science week will be held at the start of March, so a working demo will be available for that date in mind. The demo will have all the core features and educational elements, while not being fully optimised. This can allow for consumer feedback and help aid the final version of the game.

- **Mid-Project Demonstration Notes**
  A set of project notes will be produced to summarise what was presented at the demonstration. This will be included as an appendix in the final report. A draft will be discussed with the project supervisor before the demonstration. The feedback of the Mid-Project demonstration will be added to a WordPress blog post to allow for easy reference.

- **Final Product**
  The final version of the educational game will be submitted at the end of the project. The game will feature all the educational and technical features required and the inclusion of any improvements stated at the earlier stages. This is a deliverable that is required, but it is notes as it needs to be considered.

- **Final Report**
  This document will be the report and associated appendices. In addition to discussing the work, there will be acknowledgement for any 3rd party libraries, frameworks and tools that are used on the project.

- **Final Demonstration**
  No documentation will be produced for this demonstration, but it is noted as it is one of the deliverables that should be considered.

4. Initial annotated bibliography

[1]　　　WordPress, Inc., "WordPress Homepage" 2019. [Online]. Available: https://wordpress.com/. [Accessed 01/02/2019].

　　　　WordPress offers free personalized and customizable blogs for students. It offers useful features such as draft blogs, third party plugins and a whole range of services.

[2]　　　Dwr Cymru (welsh water), inc. "Dwr Cymru Education" 2019. [Online]. Available: https://www.dwrcymru.com/en/Education.aspx. [Accessed 01/02/2019].