Developing JavaScript Web Applications for Moodle 3

Proposal

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**CH3880 Graduate Diploma in Information and Communication Technologies**

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# Executive Summary

Anne Wignall is a retired teacher of science and chemistry. She is also a textbook author. In recent few years, Anne has devoted herself to create a number of computer activities to help student to study on Moodle. Anne wishes to perfect Diagram quiz, Hangman exercise Chemistry element picture exercise and an option activity which is to automatically judge if it is one of the possible right answers of circuit diagram quiz.

My mission is to fix the quizzes, translate them from Flash/Actionsctipt into html5/ES6 and work on Moodle 3. The project also needs to be supported by smart phone and tablet (Android&IOS).

The tasks are:

* Diagram: Dragging the right keyword answer label into the appropriate box, the position of the boxes display random coordinate each time when users do the exercise.
* Hangman: Filling the blanks of missing words of a definition and a animation to show the process of getting the all of the words right.
* Chemic element picture:
  + 1. Dragging the right answer label to the right box base on the parameters that the chemic element picture has given.
  + 2. Dragging the right answer label to the right box base on the chemical formula.
* Circuit diagram: It currently works alright, but for the circuit diagram it may has multiple right answers, computers need to automatically recognise the right answer when the components change the order and they do make sense.

# Introduction

Ara Institute of Canterbury is highly regarded as one of New Zealand's leading providers of industry led applied ICT and computing qualifications. It has strong links with industry which provides fantastic internships opportunities. It work closely with ICT companies throughout New Zealand who provide our students with internship opportunities so they can gain real world experience in the industry. In addition, they also tell students what they need to be teaching in order to stay relevant and on occasion guest teach as well. Working closely with industry - is the core of what Ara does with computing[1].

# Problems

Anne uses a quiz tool called Hot Potatoes to create quizzes in HTML and JavaScript. The plugin Hot Potatoes, allows quizzes to be run on Moodle. The version of Moodle on Anne is Moodle2. The schools she works with are using Moodle 3 now, which is part of the reason that need to upgrade the files to the demanding environment of Moodle3. The currently issues are:

Diagram:

1. It can not to be set as an activity on the Moodle now. It cannot get mark from Moodle.
2. Each time that the diagram generated has different coordinate of answer boxes, The boxes always keep in the same position in the diagram at the moment, so when users do the diagram quiz they may just remember the order of the answer not really know the answer match what part in the picture.

Hangman:

1. It has not to be set as an activity on the Moodle now. It cannot get mark from Moodle.
2. Filling the missing word quiz can be created by the Hot Potatoes at the moment, but Anne wants a different form. She wants to fill in a whole sentence or a short paragraph and combine with an animation to show the process of how well for filling all the gaps. At the moment there is no animation and it may lead users less motivation without the animation. Also the Hangman needs a sort of count number to calculate how many chance users can get wrong guessing letter or word.

Chemic element picture:

Both tow type of chemic element picture quiz have not been set as an activity on the Moodle now. It cannot get mark from Moodle.

Circuit diagram:

For the circuit diagram it may has multiple right answers, computers can not automatically recognise the right answer when the components change the order and they do make sense.

# Objectives

The programs have to work in Moodle 3, which has added security levels; they need to work with Firefox, Chrome, Safari and Microsoft Edge. We're not bothering with Internet Explorer. They need to work on mobile devices with touch screens, both iOS and Android, and desktops, and laptops. Her goal is primarily students in the third world.

1. The project is aiming to fix all the problems to the existing resources. Each activity has different issues.

2. After fixing them, it also needs to implement new features (animations) that Anne wanted to add to these activities according to the requirements.

3. It needs to make the user more positive and motivating to use the quiz for studying on Moodle.

# Solutions & Technical Approach

For the project I am going to use JavaScript to rewrite the Flash code. I am going to use CSS3 to control the layout and style. XML also used in the project.

In the project, many places need the dragged labels, I currently have two ideas of how to implement it:

1. Using HTML5 canvas feature to draw them, then change the coordinate if it has to.
2. Using CSS and HTML tag to draw the component and use JavaScript to make them dragged.

For the animation of showing the process of getting success of Hangman, I am going to use several Gif images to show each steps. I have two animation scenarios may attract user to use it and make it more fun:

1. Building house: When user get right, the house is built gradually, if uses get wrong, there will be a bomb to destroy the house.
2. Car racing: The more the uses get the right answer, the closer the car gets to the destination. And the car will be stopped by car crash.

The animation is not priority, the function of Hangman is first. But if takes some time to get the animation done, Anne will be very glad to have it, because she like it. She also said more “violence” more fun.

# Vision & Benefits

The project vision is fixing these quiz resources and add new features to fulfil following goals:

1.Identify and fix all bugs

2.Modernise

a) Mobile support (Android, iOS)

b) Multi-browser support (major browsers on Windows)

c) Replace Flash to JavaScript

3.Improve usability

User guide documentation

4.Add new features as agreed throughout the course of the project

Must have features that were given at the beginning of the project

Additional features requested that would be given from Anne if must have features were finished

5.Improve maintainability by restructuring the existing code (refactoring)

As a result, the client will get following benefits.

1. The programs that actually work
2. Better usability
3. Creating and maintaining quizzes become easy
4. Use of the programs on Moodle become easy and meaningful

# Quality Assurance

Quality Assurance is short for QA, which means the approaches of checking if a project meets the client’s requirements.

1. Readability by maintainer: In order to making easier for maintainer, write readable comments and modularity code help maintainer understand the system quickly.
   1. Comments: It includes function header comments and line comments. Describe what happens for the code.
   2. Modularity: Make the code structural and clear, can be easy to add up new function or reuse the code for maintainers.
2. Separate js file: Separate the js file into different file base on the class and design pattern
3. Classes: Create classes base on the
4. XML structure: The XML should be structural, it should not write every tag in one line. It needs to

use indentation for each child tag.

1. Functionality: The project should work as required, which means the project works. There are three main users that will use the project and care about the functionality.
   1. Client
   2. 3rd World students on mobile devices
   3. Teachers- create new quizzes by modify xml file

# Risks

Risks in the software developing can not be avoid, many reason can slow down the project or even make the project fail. There are three parts of risk needs to consider.

1. Project Risk – some factors could cause a project to fail;

1.1 Financial - the investment of the project is not enough;

1.2 Strategic – the requirement may change or need to add some new feature;

1.3 Technical – the key technology of the project may not get enough support in the future;

1. Production System Risk
   1. The production support team members may have not enough experience and skills sometimes.
2. Personal Risk

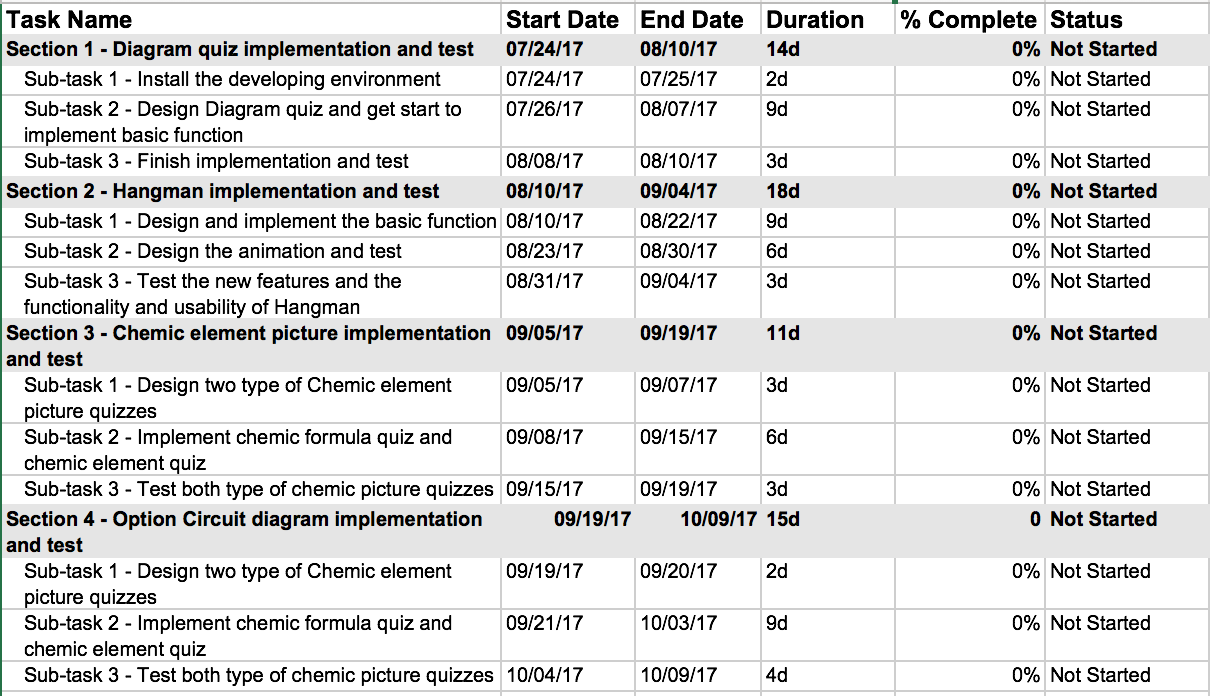
3.1 The degree or the knowledge of skill may not enough to support the project.;

3.2 The impact on developers health and the emotional will effect the project schedule;

# Plan & Deliverables

|  |  |  |
| --- | --- | --- |
|  | **Description of Work** | **Start and End Dates** |
| **Phase One** | Diagram implementation and test | Jul 24th ~ Aug 10th |
| **Phase Two** | Hangman implementation and test | Aug 10th ~ Sep 04th |
| **Phase Three** | Chemic element picture implementation and test | Sep 05th ~ Sep 19th |
| **Phase Four** | Circuit diagram implementation and test | Sep 19th ~ Oct 09th |

The time table as follow:



From Oct 12th to Nov 17th, I am doing the project report and other academic work.

# Budget

This is a no payment project, so there is no budget estimate.

Reference:

http://www.ara.ac.nz/study-options/our-study-interest-areas/computing