Terms of Reference

## Project Team

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## Vision of the Project

### Overall Purpose of the System

The aim of the project is to create an interactive system for students and teachers that will allow students to work thought a learning package on a particular subject and allows teacher to assign them these learning packages and comment on their progress.

The system will aim to help students learn various topics within the subject of mathematics while allowing functionality for teachers to manage the content. Each student will be able to access the system to take a quiz which includes questions of varying difficulties. They will be able to see learning packages and their progress for each. The questions that the students will answer will include a level of difficulty. These levels will be used to adjust the difficulty of the questions the student will be required to answer. The AI part of the quiz will use the levels to upgrade the difficulty and provide harder questions to the student if they answer enough easier questions correctly. Feedback will be provided to students after taking the quiz on questions that the student can flag as unsure or for questions that were answered incorrectly..

Teachers will have access to the system and be able to view the progress made by students. They will then be able to address forum topics they share with relevant students. The system can also suggest learning packages and quizzes for revision that can be visible to students.

### Main Functional Areas of the System

#### Administration/Users - IH

The system will provide functionality to handle different user levels - students, teachers, content creators, and admin permissions. If the user provides the correct login information, they are logged into the system and presented with an appropriate menu window differentiating depending on their permission level.

The admin menu will have functionality to enable user registration and membership - meaning the admin creates users of different user levels and can also suspend and delete registered user accounts. The admin will also handle the management of passwords, resetting them upon request. This section of the system could also provide a global search to include all learning packages, quizzes, and teachers.

#### Learning Packages - JO

The system will include different learning packages of different difficulty relating to mathematics. Content creators will be able to manage these packages in a range of ways, including editing them to keep up with current knowledge and learning specifications. The learning packages should be a variety of media, not only text. At a push, the functionality may be extended to include taking student feedback and changing the content appropriately.

#### Student & Teacher Views - AS

The interactive system has users including students and teachers. Each student would ideally be allocated to one teacher, like in the real-world with comprehensive school students. The students will be able to see the learning packages, their teacher, and clearly know which learning package they’re yet to complete and which ones their teacher recommends to them. The teachers, like in the real-world, will be able to see the progress of their students and compare their performances.

#### Quizzes - AW

The interactive system will include a section involving quizzes. Users will be able to answer the questions and based on their performance and time taken to answer questions, the difficulty of the questions will change. In addition to this question difficulty will also be based on the completion of learning packages. Feedback will be provided in the form of a score based on the user’s performance. The difficulty of the questions should be visible to the user to give the user an indication of their progress.

#### Discussion Board/Forum - JE

The system will include a way for teachers and students to communicate, raise concerns, and open discussions on the work. The use of a discussion board will enable the students and teachers to view threads and post messages, as well as getting responses from one another. Inappropriate messages or posts should be flagged for review and automated language analysis could make sure profanity is moderated before the post is live.

### Third Party Involvement

Clients will not be involved with the development of this project. Stakeholders for our project are students and teachers associated with them however they aren’t used for data collection.

## Team System Specification

### Requirements Capture & Analysis

#### Source of requirements for the common elements

The main source of requirements of the system is the stakeholder. While no data collection is used to gather prefered requirements, a deep analysis of what the potential stakeholder would need is considered. Comprehensive students, and their teachers, is the potential stakeholders for the system - how they would use the system and their desired functionality can be assumed using knowledge of the problem area.

#### Requirement capture plan

The product requirements are captured with the help of a literature review to analyse common practices in interactive systems, as well as common programming language for their implementation. Combined with existing product analysis and an insight into the stakeholders, the requirements can be captured and prioritised.

#### Existing Systems & Stakeholders

##### Existing Systems

Moodle(School.demo.moodle.net, n.d.) is an existing system that is similar to to the system we aim to develop. The system provides various views for different users and provides various activities for teachers to assign to students as well as provide learning materials to students. The system also provides a grade system for the activities students are assigned. Within the grades section Within the grades section, teachers have view-only access to their assigned student’s profile including their email address which allows them to have further communication with the students outside the classroom. Teachers can assign quizzes to students with various types of questions such as true or false, multiple choice to longer answer questions. These quizzes can also be previewed by teachers to see if they are suitable for their student’s skill level and also provide a link to relevant document to help students if necessary. A system that we haven’t included within the requirements is the addition of a calendar system that is used to keep track of assignment and quiz completion due dates. This could be a subsystem that could be added at a later date once the 5 core functional subsystems have been completed.

Another aspect of the system is the rewards available to students for completion of activities and skill level. These are displayed using badges that the student earns and are displayed on their profile. These are also available to teachers who complete training courses. A reward system could be something that could be added into the system at a later date to provide a visual representation of their ability based on their score.

##### Stakeholders

Students of the system would expect a clear interface with easy to recognise user instructions. From an academic source of information, they would expect up-to-date and relevant information about a topic. They would also expect to have some form of interaction with their teacher and to add comments or feedback on the quiz or academic material.

Teachers using the system would expect a coherent way of seeing progress of their students, and possibly be able to see improvements or compare student scores. They would also expect to be able to interact and give feedback to their students while not having access to their personal information or scores relating to students that they aren’t a teacher of.

As part of a finished system, users would expect to have some way of managing everything and editing the learning packages to keep up with current academic content. To facilitate this need, there should be a different user permission for admins and content creators. Admins of the system would expect to have control over user registration, passwords, account suspension and deletion, and providing a way to see all database data. Content creators, which may be teachers with certain permissions, will expect to be able to edit, delete, create, and archive learning packages of different levels while managing the student’s progress of each learning package.

### Requirements Specification for common elements

The system will be comprised of five subsystems. The combination of the substems provides the objectives for the project aim. The system will have a consistent look and feel and will make use of a database with appropriate encryption methods to facilitate data storage. The overall group requirements are as follows.

* Must: be demonstrable on University PCs.
* Must: follow common look and feel that will be designed with accessibility in mind.
* Must: allow proper user authentication.
* Must: allow different user types that can perform different roles.
* Must: use a database for data storage.
* Must: have database and programmed encryption for appropriate fields in the database.
* Should: be secure.
* Should: be error free.

### Legal, Social, Ethical, Professional Dimension

The system utilises a database to manage usernames, passwords, and associated emails of each user. To comply with the security concerns, these fields will be encrypted.

Professional concerns, such as addressing everyone with respect and formal manner, will be managed throughout the course of the project but follow the agreed upon code of conduct. The main professional problem that is notable to be addressed is the handling of absentees of group meetings and formal document submissions - the code of conduct defines the procedure as follows: If a member is absent from group meetings for more than 2 meetings consecutively, this issue should be taken up with the supervisor.

## Specification of Main Functional Sub-Components

### Ian Hamilton - Administration/Users

#### Requirements Capture and Analysis

##### Literature Review & Existing Products

Moodle is an easy to use platform built for learning and is rolled out globally (Docs.moodle.org, 2018). Best of all, it’s free and always up to date with current academic content. It has a strong in-built roles & permissions management which is specific to giving and revoking different rights per user of the system. Main highlights of the different roles is the ability to give students forum moderator privileges, giving students permission to grade assignment submissions, self-enrolment, let students add questions to the quizzes, limit the rights of students if they’re misbehaving by suspending their forum posting ability.

While dealing with sensitive or personal, identifiable, information about users, there needs to be a secure and robust way of identifying who has the right to see the information. User permissions is the correct way of approaching the data protection law, making sure GDPR requirements are met.

Ethical obligations, like making sure to provide relevant content and user control of the system is necessary. These concerns also fall into the social and professional category also as to maintain a professional standard for our system as a whole and for Northumbria University, the system needs to facilitate professional and relevant language, user control, hci considerations, coding quality, database usage - with encryption on relevant fields.

Security issues need to be considered - like the use of encryption to protect user passwords. The username and passwords should be held separate from relating information to make it harder for intruders of the system to access any sensitive or personal data. Luckily, in this project scope, no personal data is needed and for the sake of the 1st role out of the system, no real people will be modeled for the creation of the initial users of the system.

#### Requirements Specification

##### Description

To facilitate the use of user permissions, user registration, password management, and account suspensions, the system needs the functionality of an administrator. This subsystem handles the functional requirements relating to administrative work. The functionality needs to be robust, error free, and compliant with the overall system presentation and security.

##### High-level Requirements

1. Must: allow different levels of users (Students, teachers, content creators, admins) with different permissions.

2. Must: enable user registration.

3. Must: allow the management of passwords/password resets.

4. Should: allow the suspension and deletion of registered user accounts.

5. Could: provide search functionality that lists all learning packages, quizzes, and teachers.

### Jonathan Oliver - Learning Packages

**Literature Review for Learning Packages & Existing Products**

The learning package is an imperative section of any educational interactive system. There are several different kinds of interactive systems Moodle is the system we have chosen to base this on. Moodle is an open source and free interactive system (Docs.moodle.org, 2018)

that assists with the education of students. The learning environment is compiled of several different websites and systems that are also free to use. The system we intend on using will have the learning environment built into the system itself.

An integral part of creating a learning system that promotes deep learning is interacting with the user and not making the user simply reproduce knowledge. (Cairncross and Mannion, 2001)

“Instructional principles and practice have moved away from an emphasis on learning as reproducing knowledge to learning as transforming knowledge”

Learning environments of interactive educational systems are an indispensable part of the system, the learning environment needs to cater for the needs of the user/users.

A definitive way of ensuring adaptive learning is to create a multimedia learning environment with the use of images, text, and other media to capture the attention of the user. (Cairncross and Mannion, 2001) found that multimedia enabled designers were able to convey instructions or processes using a combination of text to display and moving images. This was to prevent the users from becoming distracted, they go on to discuss that human psychological limitations, such as memory load, perception and attention must be considered when designing interfaces.

Linking in with the quiz section we have decided to navigate to a multiple choice style of quiz, testing the knowledge gained as a result from the learning packages. The learning package will take onboard the successful ways discussed during this short literature review this will include using a combination of multimedia facets such as images, text and video and allow the users to gain knowledge that will be directly linked to the quiz section. This will include a breakdown of the section of maths the user will be learning, combining multimedia to allow for simpler learning.

**The Learning Package Description**

The learning package will use mixed media to continuously engage the users of the system, it will provide knowledge that directly links with the quiz section without ambiguity. Using a method to display progress within a certain section e.g. show how much they have learned of the Fibonacci system or Algebraic equations. The learning system should allow students to pause and continue learning from the place they saved to allow for continued learning at a pace and time suitable for them. The system could also allow for feedback to adapt the learning experience if the user is struggling or even finding the system too hard to use.

**5 High Level Requirements**

1. Must allow content creators to create, edit, delete and archive learning packages for different levels of maths content.
2. Must allow learning packages to contain mixed media (i.e. text, images, video, animation and sound).
3. Must display progress within the learning package.
4. Should allow students to pause/resume and save progress within a learning package.
5. Could adapt content within a learning package based on feedback from the student as to how easy/hard they were finding the content.

### Andrew Southam - Student & Teacher Views

##### Literature Review & Existing Products:

The main area of research will involve HCI and ease of use for menus. One of the important things is that both students and teachers can easily navigate round their menus and into different functionality. The Book of The Human-Computer Interaction Handbook states that when creating software with children in mind it's important to consider that they can be less developed than adults and care should be taken with what language and design the HCI takes ( Bruckman, A , Bandlow,A, Forte, A 2012) .

One big security risk to the sub-system will be the fact that teacher profiles will have access to a lot of personal information. To deal with this, the sub-system will be completely GDPR and Data protection covered, to do this, the latest legislation details will be followed on the two which are available online.

Some of the Ethical obligatIons with the system will be to make sure the system is suitable for children to use. Making sure that they cannot use it to access any kind of restricted material. The system will need to appear professional alongside this with relevant language to both teachers and students.

One major competitor in this industry to be considered is the interactive maths learning website Mymaths.co.uk ran by Oxford University, they have multiple different subjects to learn from in mathematics they offer lessons, games and quizzes to help learn student at different levels mathematics they also allow parents the ability to work thought the lessons with their children and track their progress introducing a different level of interaction into their system. My maths also offers the ability to assign extra revision when a module is answered poorly. Adding that bit of extra functionality that wikll help students learn.

#### The Student & Teacher Views system Description:

This system will provide all the interactivity for the menus for both the teachers and the students and provide almost all of the functionality for communication between the teachers and their students. The system will have to be easy to use and understand as they will be the main navigation between both functionality that i will be creating and the other members of the group will be creating. Some extra functionally other than navigations is: an email system that will allow teachers to email their students, Be able to assign learning packages to students and see how far they are through these learning packages and being able to to see all the learning packages that are available to provide to students.

#### 5 High level requirements:

1. Must allow all student members to see all learning packages and quizzes at each level along with details of which they had/haven’t completed in full or in part.
2. Must allow all teachers to see details of all students details of which learning packages and quizzes they had/haven’t completed in full or in part.
3. Must allow teachers to compare student performances (not anonymised) and students to see where they sit amongst their peers (anonymised).
4. Should enable teachers to recommend learning packages and quizzes for students both in terms of order of completion and time frame for completion.
5. Could allow teachers to email all of their students or just an individual student

### Andrew Ward - Quizzes

#### Literature Review:

This literature review looks at studies for existing pieces of software, and reviews existing software, that use quizzes as a way of testing a student’s knowledge. Moodle is one piece of software that is used within schools that utilises quizzes to test the knowledge of students. The quizzes that are used within Moodle use a large variety of question types such as multiple choice, true/false, short and long answer questions, embedded answers and questions requiring calculations.(Paturusi, Chisaki and Usagawa, 2014) By using multiple question types, it allows the student to be assessed in multiple ways while also keeping the student more focussed due to not every question being the same type. It is important to provide multiple styles of questions to the student as in some cases when student have used e-learning software, students have avoided more complex style of questions in favour of multiple choice questions when given the choice within a different piece of e-learning software called ‘Learn@WU’. (Case *et al.*, 2015) In addition to this, students can receive feedback in two different ways. The first method of feedback is immediate and brief after the completion of the quiz. More specific feedback is then given after this to indicate why the student answered incorrectly. Each question used by the Moodle quiz for the topic researched (logic circuits and discrete mathematics) is designed to be quantifiable as this is more easily measurable than long answers.(Paturusi, Chisaki and Usagawa, 2014) The research carried out found that in some cases, where questions required students to type out their answer, students were misspelling parts of their answers meaning they would answer questions incorrectly. This shows the disadvantage to using questions with that aren’t quantifiable and is often unfair if the quiz is testing their knowledge that is unrelated to their English skill. As a way of making the quiz somewhat challenging, another quiz system used questions that followed a set of criteria. These included: The questions were not trivial, correct solutions were in the lecture material and four incorrect answers were “plausible”.(Pollard, 2006)These are all suitable criteria to use within the system we are developing and should be taken into consideration. It is also worth considering the research undertaken by Pollard, which included getting students to submit questions. This method was successful as feedback was generally positive. The main positive feedback to this system was the instant calculation of results, which is a feature that we have considered implementing.

Overall based on the review of existing software and research on educational quiz based e-learning software, some of these features can be included as part of the requirements for the quiz system. The main parts include questions that can quantify answers in a way and avoid any possible user input error such as spelling errors. This means that questions should be focused around multiple choice, true/false and possible embedded ‘fill-in the blanks’ style questions. The immediate feedback is also an important feature relating to the user experience.

#### The Quiz system Description

The quiz sub-system will allow students to take what they have learned within the learning packages section and apply their knowledge by answering questions based on what the specific learning package. The questions that the student will be required to answer should be displayed in a way that avoids any possible user input error such as spelling. This would improve the user experience as users won’t become frustrated when they answer questions correctly but make a spelling mistake. This means that the type of questions displayed should be focussed around multiple choice or numerical answers.

#### 5 High level requirements:

1. Must present questions of varying level of difficulty dependent on successful completion of learning packages.

2. Must adapt level of difficulty depending on time taken and performance in terms of number of correct responses.

3. Must provide performance-related feedback for students during and at the end of the quiz.

4. Should provide visualisation of performance on a quiz, including how difficulty had been varied.

5. Could allow teachers to devised custom-quizzes for a student

### Johnathan Evans - Discussion Board/Forum

**Literature Review and Existing Products:**

Forums are used in software systems to allow users to ask questions and have discussions about the system. A forum is setup to allow users to make a conversation, known as a ‘thread’, in a specific topic section of the forum. For example, a user can create a thread in a help section that is for users that are experiencing issues with the system and other users can then reply to this with potential solutions. Forums are not only for help with system issues and allow users to have discussions about anything internally and externally of the system. Moodle, an open-source learning management system (Docs.moodle.org, 2018), integrates a forum that allows students and teachers to have discussions linked to their classes. This is the type of forum that we intend to integrate into our system, that gives our student and teacher users the ability to have meaningful discussions.

Unlike a chat system a forum is significantly more of a formal way of students and teachers to communicate. When a user posts in a forum it documents the user information, like the user’s name and date of the post, and displays it with the message on the thread. This information is useful as forums archive the threads and allow users to look back at previous discussions and get the context of who was posting and when the discussion took place. For our system it would be useful for users to see what quizzes the discussions were about and the date, so they can see how relevant the information is.

Inherently forums use user input, this must be handled correctly to make sure that the data is filtered to prevent any potentially harmful or offensive language. A filter integrated into this subsystem could be used to remove any harmful information by using a keyword detection method. This keyword method uses a pre-defined blacklist of words the system can use to sensor the offensive language. (xu, Zhi & Zhu, Sencun., 2010) While this method would prevent most offensive language, it would not be enough to solely filter all potentially harmful posts. As a second barrier against this issue a report feature can be added so that users can report a forum post which would inform a user with moderation status to review the post and make the decision if it should be removed.

**Discussion Board/Forum Description**

Implementing this forum will allow the students and teachers using the system to have meaningful discussion about the quizzes and provide an area for students to ask for help. The forum will be open to all users, allowing them to create threads and post on other threads. A report feature will be added so that users can report offensive posts to administrators for manual filtering. Overall the forum should provide a central area for users to communicate inside the system.

**5 High Level Requirements:**

1. Must only allow student and teachers to create and view threads (topics) for discussion.

2. Must allow student and teachers to view and post messages.

3. Must allow responses by student and teachers (giving username and date of post).

4. Should allow reporting of inappropriate messages to admin.

5. Could ensure that inappropriate language is subject to automatic moderation.

## Project Tasks and Deliverables

### Requirements Capture

Requirements capture will take the form of analysing relevant literature, existing systems, and considering the stakeholders. It will outline common practices and draw final conclusions and decisions on the most appropriate approach and requirements. Prioritised lists will be produced from this analysis.

#### Agreed Deliverables

The group will provide an appropriate literature review and a review of existing systems. Each individual will expand into their own section a requirements capture of their specific sub system.

### Design

Designing the system needs to include thorough communication between group members to estable common practices to make the implementation of the final system successful - therefore, clear design documentation in the form of wireframes and class definitions need to be produced. For the database, the group will need to each design fields and dependencies that their subsystem needs so they can properly implement their tasks.

#### Agreed Deliverables

Database design - Document outlining the database tables, their dependencies, data types, encryption methods, etc.

Wireframes - Each subsystem produces a wireframe detailing the GUI and what functionality merges with other subsystems and which point.

Class definition documentation - An outline of the different classes and their functionality as well as details of how other sub-system would use their code in the implementation of their subsystem.

#### Configuration Management/Integration

To properly integrate each subsystem into the final product, communication must be constant between group members - including written class definitions following similar coding standards.

GUI documentation should follow a template to stay consistent enough to be easily amended when subsystem integration is made. The GUI made by each group member should be similar and easily recognisable as part of the overall whole system.

### System Build

The Java programming language should be used and coded in the Netbeans IDE to make it easier and consistent when it comes to integrating the system.

#### Agreed Deliverables

The group as a whole will produce a database containing the data needed throughout the system such as usernames, passwords, possible emails, learning package material, and forum material. A database structure document detailing the fields, data types, and dependencies will be produced.

Each individual will produce the required functionality of their subsystem and appropriate GUI to accompany the subsystem requirements specified. This functionality will take the form of classes and GUI components. Coding of the GUI components is possible, however Netbeans allows the ‘drag and drop’ feature for a strong GUI creation - which should be utilised by all group members to make integration easier and possible.

When all functionality has been met, coding standards and instructions/information should be given to other group members detailing how they can access the functionality and how it will be integrated into the final system.

#### Configuration Management/Integration

Coding will match to follow in-house coding standards and follow general function and method structure to allow for easy integration into the final product. The use of Netbeans’ GUI design functionality should be utilised as to not ‘reinvent the wheel’ when it comes to programming the GUI components - which allows a professional and comprehensive strategy when it comes to integrating all the subsystems together.

### Testing

Code testing should happen throughout the coding procedure. However, as a final checking procedure, a testing plan from the entire group will be produced detailing which test type, the input data/action, the expected outcome, the actual outcome, and the changes made to fix the problem.

#### Agreed Deliverables

Testing documentation - Table of tests done with Test Type, Input, Expected Outcome, Actual Outcome, Changes Made. The testing should be thorough and will map to the group requirement of must having an error free and secure system.

### Resources list

- Netbeans Java IDE

- Personal Computers

- Microsoft Office Products

- MySQL

- English language

- Java Programming - jdk version 1.8, java version 1.8

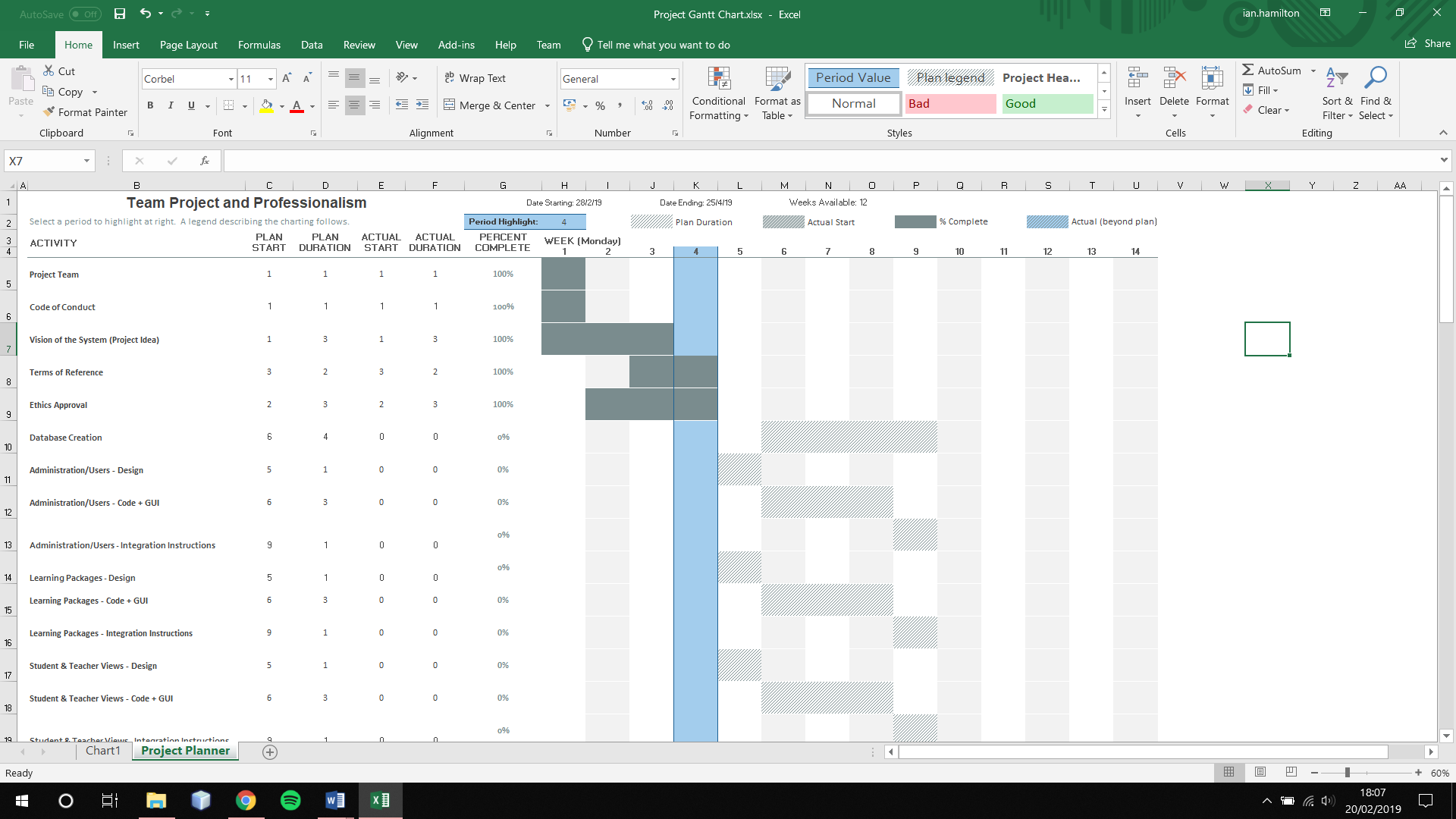
- PhpMyAdmin

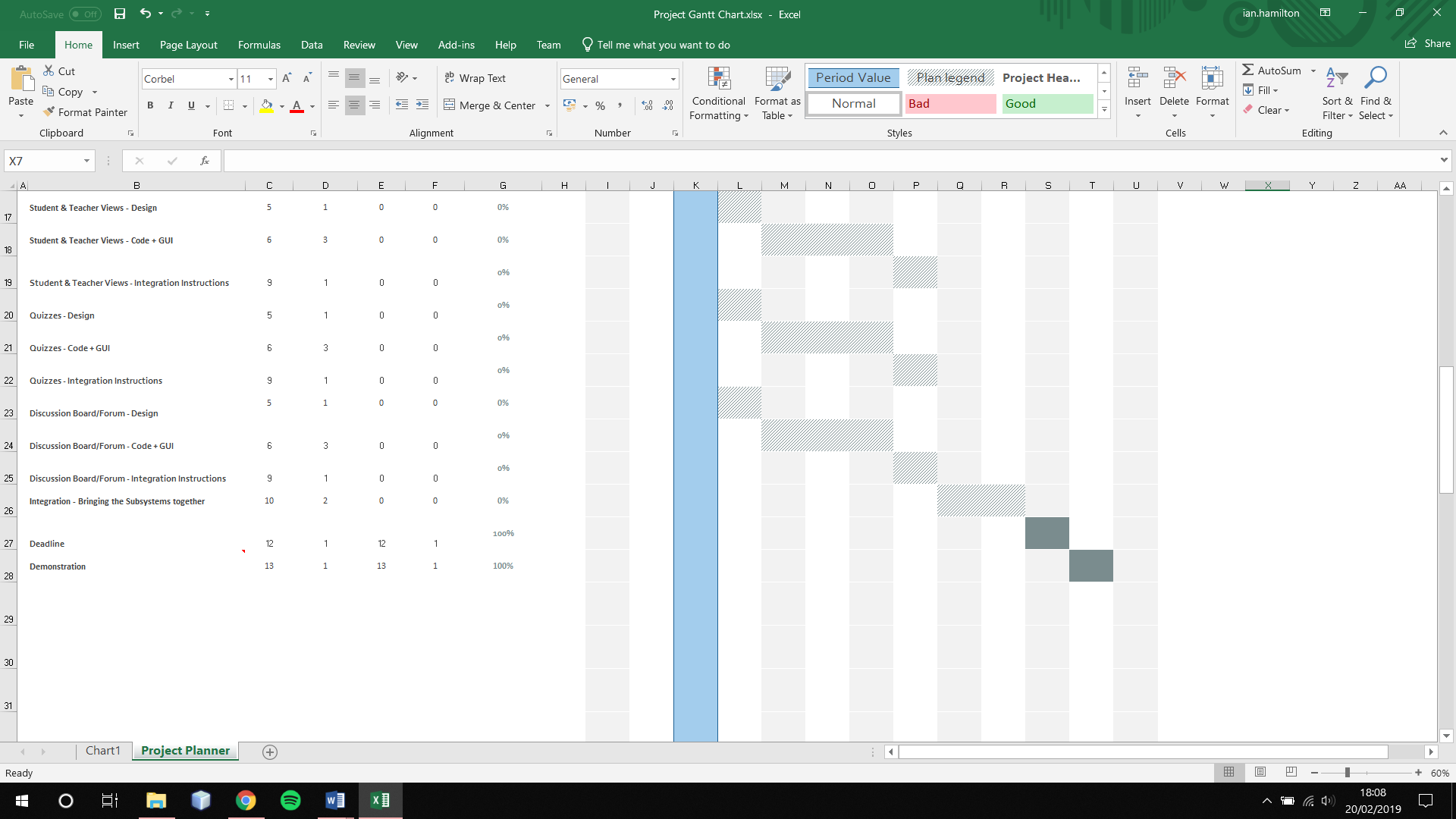
### Risk Analysis

Key: F (Financial), T (Technology), P (People), E (Environment), S (Security)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Risk Type | Risk Event | Likelihood (1-10) | Impact (1-10) | Risk Monitoring/ Control Flag | Risk Management Strategy |
| P | Illness | 5 | 2 | WhatsApp message saying they’re not going to come in due to illness | Group member must inform of illness that makes them miss group meetings and catch up/input from home. |
| P | Dropping out of University | 1 | 10 | Notification of dropping out | Prepare for subsystem dropout and communicate problems with supervisor |
| E | Lab not available | 4 | 3 | Notify group of availability on the day | Find replacement meeting location |
| T | Hardware malfunction | 6 | 7 | Notify group of malfunction | Use online backups and software available through the university |
| S | Collusion of other groups | 2 | 1 | Be vigilant in meeting areas | Report collusion to supervisor and module leader |

### Project Plan





## 

## Legal, Social, Ethical, Professional Dimension

### Legal

Data protection will play a major part in our program, with a database that contains personal information including emails and names .under the data protection act of 2018 “Everyone responsible for using personal data has to follow strict rules called ‘data protection principles’ (*Data protection*, 2019) including Lawfulness, fairness and transparency.

### Social

The social issues that will need to be considered include the possible sharing of passwords between users.

Other social issues that would need to be considered would include various professional relationships within the group. During the course of the project, each member of the group is expected to act professionally among each other and any issues regarding group members should be raised to the group and resolved internally. As stated in the code of conduct, if no resolution is arrived at, the problem will be taken further with the supervisor.

### Ethical

An ethical issue to consider is the misuse of the forums. To overcome this a flagging or reporting system could be implemented to allow admins to deal with any issues such as the use of derogatory language.

The project could impact ethical and social issues as the software is being directed at teaching students. Due to this, the software could be seen as replacing teachers, however the software will aim to be an additional resource to allow students to reinforce their learning without direct contact with a teacher. This also has the added benefit of allowing teachers additional time to plan teaching activities as well as an opportunity to evaluate whether their students have learned what they have been taught through the use of the feedback system.

### Professional

Professional problem spaces include upholding high standards for the project as it is a representation of Northumbria University students. To uphold these standards, professional practices will be used by all group members and problems or questions should require supervisor input.

It is a professional practice to make regular backups of work, as well as use the same text formatting consistently throughout the documentation process.

## Costing

Length of the project: 2 months - 40 working days

A office space in North Shields at £34 per person per month

<https://www.instantoffices.com/en/gb/available-office-space/north-shields/orion-way-29922>

Living Wage: £9.00 per hour per worker

National Insurance Contributions:

* you pay National Insurance contributions if you earn more than £162 a week
* you pay 12% of your earnings above this limit and up to £892 a week (for 2017-18)
* the rate drops to 2% of your earnings over £892 a week.
* Source: <https://www.talk-tax.co.uk/changes-national-insurance-2019/>

Employers' liability insurance:

Starts at £50 per year (when bought with public liability insurance <https://www.hiscox.co.uk/business-insurance/employers-liability-insurance/faq/how-much-does-employers-liability-cost> )

Total for Office: £34 /20=£1.70per day per person\*5=£8.50

Total for Insurance = £50/40=£1.25 per day

**Running Cost= £8.50+£1.25=£9.75 per day for 5 people**

##### Employees:

On-costs wages per employee per day: £9.00 \* 2.5 hours = £22.50

##### Day Rate:

Day Rate per employee: (running costs per day/number of employees)+on-cost wages for an employee per day

(£9.75/5)+£22.50=£24.45

Number of Staff: 5

Total Cost for staff time: £24.45\*5=£122.25 per day. National Insurance contributions aren’t needed due to weekly wage being below £162 per week.

Number of Days:40 days. Working week monday to friday. Individual coding will be finished by 8th April, Collect coding together by the 15th April. (8 weeks, 100 hours , 12.5hours per week)

Project Specific Costs:

No project specific costs are needed.

* No web hosting required
* All software and IDE are open-source
* No project specific hardware required

Total Cost for Project:

Contingency Costs: total cost +(between 5 and 10 %)

## Subsystem Requirements Specification

### Ian Hamilton - Administration/Users

#### Must

A.1 - Allow different levels of users with different permissions.

A.1.1 - Login as either a Student, Teacher, Content Creator, Admin

A.2 - Enable user registration.

A.2.1 - Provide a form for User Details input

A.2.1.1 - Username, generated password, email, user level

A.2.1.2 - New Student users will be allocated a teacher

A.2.2 - Update database with new user

A.3 - Allow the management of passwords/password resets.

A.3.1 - Default password will be based on username and date creation

A.3.2 - When password is reset, email the user with new generated password

#### Should

A.4 - Allow the suspension and deletion of registered user accounts.

A.4.1 - Can suspend any student for length of time

A.4.2 - Can delete users from database

A.5 - Provide functionality to inspect forum content that has been reported/flagged

A.5.1 - Can delete the flagged content

A.5.2 - Can approve the flagged content, removing the flag

#### Could

A.6 - Provide global search to include all learning packages, quizzes, and teachers.

A.6.1 - Provide a list of learning packages

A.6.2 - Provide a list of quizzes

A.6.3 - Provide a list of teachers

### Andrew Southam - Student & Teacher Views

#### Must

B.1 - Allow all student members to see all learning packages and quizzes at each level along with details of which they had/haven’t completed in full or in part.

B.1.1 - Can clearly see learning packages available to them

B.1.3 - Can see their progress in a learning package

B.2 - Allow all teachers to see details of all students details of which learning packages and quizzes they had/haven’t completed in full or in part.

B.2.1 Can see what packages student have and their progress on each package

B.2.2 Can sort by different classes

B.3 - Allow teachers to compare student performances (not anonymised) and students to see where they sit amongst their peers (anonymised).

B.3.1 - Contains a filter feature for teacher to sort by different conditions

B.3.2 - Student to have access to an anonymous leaderboard based on Quiz Scores

B 3.3 - Allows teachers to flag student that aren't making progress

#### Should

B.4 - Enable teachers to recommend learning packages and quizzes for students both in terms of order of completion and time frame for completion.

B.4.1 - allows teacher to see all learning pages available

B.4.2 - allow teachers to see what learning pages have already been added to students

B.4.3 - adds packages to both individual student and whole classes

#### Could

B.5 - Could allow teachers to email all of their students or just an individual student

B.5.1 - Allows teachers to see what section of student they are emailing

B.5.2 - Teaches have formatting tools for emails

B.5.3 - Teaches can email individuals as well as groups

### Johnathan Evans - Discussion Board/Forum

#### Must

C.1 - Must allow students and teachers to create threads on the forum.

C.1.1 - Provide areas of the forum for different topics.

C.1.2 - Provide a form that accepts information for creating a thread.

C.1.3 - Sends form data to the database in correct format.

C.1.4 - Allow the creator of the thread to edit or delete.

C.2 - Must allow students and teachers to view and post messages.

C.2.1 - Displays the forum thread to the users.

C.2.2 - Displays username and date on messages.

C.2.3 - Provides a form for users to type messages.

C.2.4 - Allow the creator of the message to edit or delete.

C.3 - Must allow responses by student and teachers (giving name and date of post).

C.3.1 - Provide a form for responding to another user.

C.3.2 - Display the users name and date of post on response.

#### Should

C.4 - Should allow reporting of inappropriate messages to admin.

C.4.1 - Provide a way for users to report a post.

C.4.2 - Admins are notified about reports.

C.4.3 - Allow the admin user to remove a post.

#### Could

C.5 - Could ensure that inappropriate language is subject to automatic moderation.

C.5.1 - Use a blacklist of offensive words.

### Andrew Ward - Quiz Questions

#### Must

D.1 - Display questions

D.1.1 - Display 1 question to the user at a time

D.1.2 - Display questions as different types. E.g. multiple choice, fill in the blanks

D.1.3 - Display brief immediate feedback to the user. E.g. correct/incorrect

D.1.4 - Display difficulty/ level of work to the user

D.2 - Provide a way of answering the questions via user input whilst avoiding user input error

D.2.1 - Allow users to answer multiple choice questions

D.2.2 - Allow users to answer fill in the blank questions

D.3 - Change question difficulty based on time to answer and correct answers

D.3.1 - If the student answers 3 questions correctly consecutively, more difficult questions should be pulled from the question database.

D.3.2 - If the student answers 3 questions correctly consecutively, each within 30 seconds, more difficult questions should be displayed.

D.3.3 - Display time taken

#### Should

D.4 - Should provide visualisation of performance on a quiz, including how difficulty had been varied.

D.4.1 - A bar representing percentage completed should be displayed

D.4.2 - Difficulty level should be clearly displayed

#### Could

D.5 - Could allow teachers to devised custom-quizzes for a student

D.5.1 - Allow teachers to select specific topic for questions to be focussed around

### Jonathan Oliver - Learning Packages

#### Must

E.1 - Must allow content creators to create, edit, delete and archive learning packages for different levels of maths content.

E.1.1 - facilitate the ability to create/edit learning content as the system progresses (future proofing)

E.1.2 - Allow the deletion of content from the system, to change questions to allow continuous learning

E.1.3 - Allow the option to archive content that is no longer in use

E.2 - Must allow learning packages to contain mixed media (i.e. text, images, video, animation and sound).

E.2.1 - Use of different types of media to keep users engaged in the learning

E.3 - Must display progress within the learning package.

E.3.1 - a bar showing percentage of learning for a particular section completed

E.3.2 - an overview of overall completion of learning section

#### Should

E.4 - Should allow students to pause/resume and save progress within a learning package.

E.4.1 - give students the option to pause game and save progress.

E.4.2 - Allow students to jump back in to the same save point and continue at a more convenient time

#### Could

E.5 - Could adapt content within a learning package based on feedback from the student as to how easy/hard they were finding the content.

E.5.1 - Allow the option for feedback

E.5.2 - Allow the learning system to provide/suggest different questions/modules for learning based on students feedback

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