



CM3203 Initial Plan

Digital Learning – Education of the future

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1.0 PROJECT DESCRIPTION

The COVID-19 pandemic resulted in world-wide disruption to life. Whilst all industries have been negatively affected by the pandemic, some have been hit harder than most. Previously unknown weaknesses have been exposed and targeted, with the path forward for these sectors becoming clouded with uncertainty.

Arguably the most important area affected by the pandemic is the education sector. A joint report published by UNESCO, UNICEF and the World Bank states that COVID-19 pandemic-related school closures affected more than 1.6 billion learners and the current generation of students now risk losing \$17 trillion in lifetime earnings (in present value), approximately 14% of today's global GDP, as a result of these closures. (The World Bank, UNESCO and UNICEF. 2021)

In order to combat this, countries across the world were forced to transfer education from traditional face-to-face learning to a remote learning substitute. The effectiveness and quality of this shift in learning varied greatly, and as an emergency response, most definitely did not reach its educational potential. Emergency Remote Teaching (ERT) is not usually planned in advance, and in the event of an emergency situation (e.g. Coronavirus Outbreak), involves a sudden shift from traditional face-to-face teaching into a remote one. Often, students complain about the inequality in education and the difficulty in accessing educational resources whilst faculties complain about student engagement. (Affouneh et al. 2020)

Currently, most institutions offer a hybrid teaching format, incorporating both face-to-face and online teaching. With the possibility of emergency situations and other industries already shifting to remote working, it is likely online learning will become the new standard.

My proposed solution is to create a **Multi-Purpose Online Learning Environment (M-POLE)**, to be used by educators and students in educational institutions. The specific features of the M-POLE will be determined during the analysis of user research, as will the functional and non-functional requirements. The M-POLE will be a Web App, designed using Flask in Python-3. It will have database functionality in order to store and retrieve data as requested, this is imperative for the system as it allows for user accounts, upload of files and storing test inputs etc. Under normal circumstances, the M-POLE would be used as an assistant learning tool for teachers, allowing them to assign homework, upload learning material, provide feedback to students and track key individual/group metrics such as; grades, attendance, skill strengths and weaknesses. Students will be able to view their personal metrics alongside class averages, complete assignments and collaborate with peers. In the event of an emergency situation, the M-POLE will serve as an equivalent substitution for face-to-face learning, allowing users access to a wider range of features. These can include live teaching sessions, Video and Microphone compatibility and anti-cheat designed online assessments.

The design concept will be heavily research influenced, through the use of primary user research (Quantitative & Qualitative data) and relevant studies. User research will be carried out in the form of online surveys and interviews, with participants being secondary school teachers in the UK. The data acquired from all research will be used to derive functional and non-functional requirements and influence the design of the tool, with the goal to minimise the problems identified with remote learning (such as lack of student 'engagement', inequality in education standard).

2.0 AIMS & OBJECTIVES

The project can be divided into two elements, researching into the problem and creating a solution. I have begun reading into supplementary literature regarding my project area, and whilst there is plenty of research into the effects of face-to-face learning transitioning into remote learning, there is little information about the specific challenges educators and learners are facing.

2.1 AIMS

I have focused this project around the following aims:

- Discover & Document the challenges teachers and students are facing with remote learning.
- Produce a M-POLE in the form of a Web Application as a solution to the challenges users are facing

It is difficult to provide greater detailed aims as it is unclear what specific challenges are currently being faced by my targeted userbase. In response to this, the final report will contain a revised section of aims & objectives once user research has been conducted, in order to create more detailed and specific entries.

2.2 OBJECTIVES

In order to resolve the aims mentioned above, I have split the project objectives into Research Objectives and Solution Objectives. They are detailed as follows:

Research Objectives

- To define what teachers consider ‘student engagement’ to be and uncover why there is lack of this ‘engagement’ from students during remote learning.
- To assess the difference in quality between face-to-face learning and remote learning and what is causing this difference.
- To discover what educators require in remote learning technologies to teach at the same standard.

Research will be obtained from scientific studies and academic literature, as well as by conducting my own Qualitative and Quantitative research. This will be in the form of online surveys and video interviews with high school teachers, students are excluded from this research project as it is expected teachers have a better understanding of their educational needs at this age range. It is my intention also to conduct research into the effectiveness of my solution by inviting the interviewed teachers back for user testing of my solution. I will most likely gather this data through the timed assessment of specific tasks to complete with the tool and audible feedback.

Solution Objectives

- Create a web application using Flask framework in Python 3.
- Incorporate database functionality into the web application.
- Implement core features identified through user research.

3.0 WORK PLAN

Due to the scale of the project, it is necessary to create a well-designed and thought out work plan. To begin, I have divided my project into 3 core phases as detailed in the following table:

TASK	PROGRESS	START	END
Phase 1 - Empathise, Define & Ideate			
1.1 Initial Project Plan	100%	31-Jan-2022	06-Feb-2022
1.2 Ethical Approval	0%	31-Jan-2022	06-Feb-2022
1.3 User Research - (Acquiring and Analysing)	0%	07-Feb-2022	27-Feb-2022
1.4 Report Writing - (Introduction, Background & Approach)	0%	07-Feb-2022	27-Feb-2022
Phase 2 - Prototyping & Implementation			
2.1 Iteration 1	0%	28-Feb-2022	06-Mar-2022
2.2 Iteration 2	0%	07-Mar-2022	13-Mar-2022
2.3 Iteration 3	0%	14-Mar-2022	20-Mar-2022
2.4 Report Writing - (Implementation)	0%	28-Feb-2022	27-Mar-2022
Phase 3 - Testing and Evaluation			
3.1 User test & evaluation	0%	28-Mar-2022	17-Apr-2022
3.2 Report Writing - (Results and Evaluation, Future Work & Conclusions)	0%	28-Mar-2022	24-Apr-2022
3.3 Report Finalisation - (Support sections of report e.g. abstract, appendices)	0%	25-Apr-2022	01-May-2022

Figure 3. 1 Table containing phases and their comprised tasks, with start and end dates.

An influence behind and incorporated into the phased approach are the 5 stages of Design Thinking; **Empathise, Define, Ideate, Prototype** and **Test**. This process is the most suitable methodology for my chosen project, as it is most useful to tackle ill-defined problems (as the problem I am attempting to solve throughout the course of this project is relatively new and is not self-contained). Alongside this, increasing numbers of corporations are beginning to integrate Design Thinking principles into their organisational processes. The Harvard Business Review dedicated an edition to Design Thinking in 2015, in which an article listed industry giants such as IBM & GE as examples of these corporations. This process appears to be the most advantageous to both the project and myself, as I will have an effectively executed plan and gain experience with Design Thinking principles.

I will need to obtain ethical approval from the COMSC SREC in order to conduct my user research, I have included this into the work plan as it is vital that I receive this approval.

Using this table and relevant submission information, I have derived a list of milestones and deliverables for my project with their expected realisation dates:

Milestones:

- Submit Initial Project Plan – 06/02/2022
- Submit documentation for ethical approval – 06/02/2022
- Complete analysis of user research – 27/02/2022
- Complete coding of solution – 20/03/2022
- Review Meeting 1 – 01/04/2022
- Complete analysis of user testing and evaluation – 17/04/2022
- Review Meeting 2 – 02/05/2022
- Submit Final Report – 12/05/2022

Deliverables:

- Initial Plan Report – 06/02/2022

- Working prototype solution – 20/03/2022
- Final Report – 01/05/2022

Throughout the duration of the project, I will aim to have 1 weekly meeting with my supervisor. The duration of these meetings will vary from week to week, in accordance to any struggles or points I would like to raise in these meetings. I will aim to use these meetings as a form of accountability, in order to ensure I am following my plan to the best of my ability. Whilst I intend to receive minimal direct help from my supervisor, and rather guidance, in the event I find myself stuck and unable to progress these meetings can be used for assistance with my project.

Out of these weekly meetings, I intend to have 2 distinct review meetings with my supervisor. These will be on the following dates with the following aims:

Review Meeting 1 - 01/04/2022

- Demonstrate working prototype solution and receive feedback
- Implementing any additional features
- Review current version of the final report

Review Meeting 2 – 02/05/2022

- Review final version of report and receive feedback
- Demonstrate (if applicable) updated version of working prototype solution
- Identify opportunities for development in report.

According to my work plan, I expect to have completed the Final Report with just under two weeks until the submission deadline. I have designed my work plan like this to allow for 12 days of slack. Whilst I do not think I will need to use this additional time, it is good project management practice to account for any unforeseen hinderances so that the project can still be completed on time.

In order to optimise both myself and my supervisor's time, I will try to minimise the number of emails sent. Communicating via email can be slow and over the course of the project will lead to a significant amount of time lost. To avoid this, I will set up a team using Microsoft Teams as the main platform for communication. I will be able to schedule recurring weekly meetings with my supervisor and share documents to a shared file system. This means that my supervisor can make any comments or feedback at their most convenient time. I will also upload my Work Plan excel document that contains an interactive Gantt Chart so my supervisor can check it during the weekly meetings to make sure I am staying on track.

As previously mentioned, I have created a Gantt Chart to visualise my work plan for the duration of the project. The following key corresponds with the Gantt Chart:

- **Red** – Submission deadlines
- **Gold** – Review meetings with supervisor
- **Blue** – Deliverables (chronological order)

The Gantt Chart is depicted on the following page.

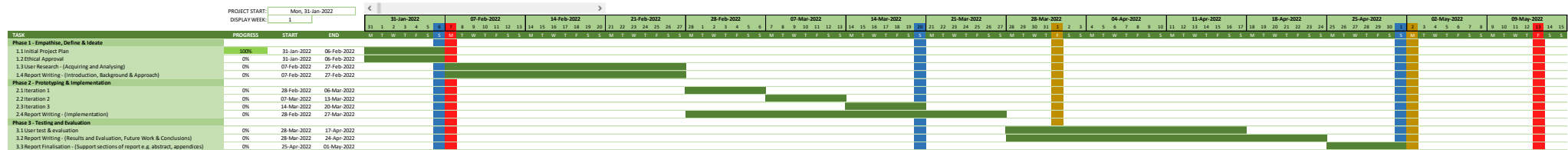


Figure 3. 2 Gantt Chart depicting project work plan, containing deliverables, submission deadlines and review meetings

4.0 REFERENCES

- [1] The World Bank, UNESCO and UNICEF (2021). The State of the Global Education Crisis: A Path to Recovery. Washington D.C., Paris, New York: The World Bank, UNESCO, and UNICEF.
- [2] Affouneh S, Salha S, Khlaif ZN. Designing Quality E-Learning Environments for Emergency Remote-Teaching in Coronavirus Crisis. Interdisciplinary Journal of Virtual Learning in Medical Sciences. 2020;1(2):1-3.