Project Management Plan: UniConnect

CS4457 - Project Management and Practice
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1. Introduction

1.1. Improving education, connecting students

For many students, coming into third level education is a whole new kind of challenge. Settling in to college life can be difficult for many, they have learn the campus layout, learn their timetable and learn how to use University software and facilities like the for example in the University of Limerick there's the Student Portal, Sulis and other platforms like moodle which their use varies from lecturer to lecturer. But it's not all about academic life, the social aspect of a University is one of the most important aspects of campus activities in the eyes of many. The biggest shock students face is not having any guidance or any push, as they are completely independent how they fare in academic and social life is up to them.

Our project is to deliver an academic, social media and dating platform to improve upon and eventually replace Sulis in UL while also adding new and helpful features for both students and University staff alike. Our primary aim is to facilitate educational needs that Sulis provides like module material, online exams and online meetings while also adding a Social Media and dating aspect for students. We aim to have a much higher user retention over Sulis and that users will be more engaged with the educational aspect as functions like forums on Sulis are often overlooked.

We will begin working on the project once we have our team of competent front-end and back-end developers. UniConnect will provide a functional, attractive platform for students with a modern design to be used to accommodate educational, social and relationship needs. Our service targets all students at the University of Limerick and any of the University staff that use Sulis/Moodle currently, to facilitate connecting staff with students and also connecting students with each other. Fulfilling staff and student needs on a centralized platform which can also be used by different university programs, such as the seven weeks program. Which is a program run by student life aiming to assist students as they transition into and adjust to university life.

1.2 SMART goals and feasibility

Over the course of the project we will be following the SMART approach. The SMART approach will clearly outline and define what we are achieving, how our success will be measured, the different tasks and who will be responsible for completing them, is our project realistic in the work and the time to do it and our overall project timeline. We will discuss all these aspects in the next chapters.

We are creating a platform for the University of Limerick to create an online educational and social space with a dating aspect intended to improve course and module delivery to students and to increase student engagement and happiness. Once the project is complete it will be run and maintained by the ITD department of the University. The project will be complete when the platform, our main deliverable, is delivered.

The goals we would consider a success are goals that are not monetary or business orientated. Our main goal is to have UniConnect replace Sulis completely within its first year, having it be the main educational portal on campus used by staff and students. This goal is measured by two factors, utilization and user engagement. In terms of utilization, more precisely we look to have around 90% of current Sulis student users and modules using our platform. The second success indicator would be user engagement or how long and how often users are using UniConnect, the more often it is used the bigger a success it is. The first factor would not be difficult to measure, the second would require some analytical measures put in place. As we are gathering user data we will have to ensure that we adhere to GDPR regulation, users may choose to opt out of this data gathering which may add a margin of error to our data.

 In terms of assignability, the one responsible for the project is the project manager. They will be the team leader and their job is to ensure that the overall project goals are achieved using their knowledge and communication skills to lead and support the rest of the team, help resolve issues and establish priorities. They will be assigned the task of creating the project schedule and budget, they will be responsible for defining scope and they will monitor and control the project progress. The rest of the team will be composed of competent two frontend, two backend engineers and two web/UI designers. Our team will be small, concise and highly skilled. It is their responsibility to complete tasks assigned by the project manager to the best of their ability. All of our sponsors are a part of the University of Limerick including the University itself, the IT department and student life who will provide budget, requirements and other information necessary. We will look to the University to supply necessary equipment like work laptops.

When considering whether the project is realistically achievable we can conduct a feasibility study. Using the TELOS approach which defines five categories, technological, economic, legal, organizational and schedule feasibility. Looking at current technologies like Sulis which features a forums for Students, although it is barely used on Sulis we would look to make it a more prominent feature on our platform. In terms of technology our platform is not much different from Sulis, it is just designed around University life instead of module delivery.

From an economic perspective there is little equipment needed, no initial investments needed, the main expenses of the project will be team salaries which come up to around €33,400 total monthly salary. With additional €65 domain fee. Our team will work from home so there won't be any infrastructure expenses like electricity or internet. Total salary cost over the scheduled project duration will add up to just over €300,000. This may vary depending on any changes to team salary, our numbers were based on average Irish salaries. Given the intended role our project will fill it is quite cheap, with the University having an already established IT department which currently maintains Sulis it should be a simple transition to the new system.

Platforms like UniConnect do not have any strict regulation in Ireland, when we are gathering user engagement data we will have to consider General Data Protection Regulation (GDPR) as mentioned before. It is something our team will have to be aware of but it is not a major obstacle in any way.

May 2022
Define project requirements and approve charter
Create list of full functionality and begin designing page layout

July 2022
Database implementation
Ensure GDPR regulations are followed with help of legal consultants

Gain web page layout design approval from sponsor
Begin designing database
June 2022

Begin implementing backend functionality
August 2022

September 2022
Finallise frontend design and backend implementation

November2022
Invite students to test Beta version and provide feedback

January 2023
Completing primary project deliverables and product launch

Internal product testing: Usability, database, performance, security.
October 2022

Review feedback and make final edits
December 2022

Figure 1: Project Timeline

The UniConnect project has a short timeline of nine months. Figure 1 shows our timeline with the major/ highest priority tasks from each month. The timeline gives a basic and simplified overview of the tasks necessary to complete the project. From designing to testing, gaining sponsor approval to deployment. We will go into more detail on these tasks later.

2. Scope

2.1 Scope statement

Here in the scope statement we will outline the UniConnect project. To complete the project we have a list of various sponsor requirements to follow. These requirements are based on the needs of the University that Sulis fulfills that we will be also required to fill. Our project must be a useful tool for lecturers as a learning management system and straightforward and easy-to-use for both lecturers and students. In order to justify the transition from Sulis to UniConnect this is an important aspect, many Students and staff have had difficulties navigating and utilizing Sulis which must not be a replicated user experience. The social media functions will have beneficial functionality to students in order to increase use time and promote engagement with and between users. Group chats between course members, allowing online access to campus programs and information like the seven weeks program which helps new students adjust to the university are examples of features which will help fulfill this requirement.

Project title: UniConnect

Product Characteristics and Requirements:

This project will take over from Sulis as the University of Limericks learning management system, while also adding a social media aspect to further connect students with the university and connect them with their peers. Following the deployment of UniConnect we look to have at least 90% of module deployment and management done through UniConnect and 90% of Sulis user base transferred to our user base. The system will be managed and maintained by the University's own IT department. It will be beautiful and highly functional product with a better user experience over Sulis

Product User Acceptance Criteria:

UniConnect will be considered a success if it is deployed by January 2023 and has minimum 90% of Sulis's user base transferred being the University's new learning management system.

Project Management-Related Deliverables:

Project charter, scope statement, WBS, network diagram, Gantt Chart and Cost Baseline

Product-Related Deliverables:

Learning management system/Student social hub

Product-Related Exclusions:

External Web hosting for platform

2.2.   Work Breakdown Structure

Work breakdown structure is the foundation for other plans such as schedule, cost resources and network diagram. UniConnect consists of frontend, backend, database, internal/external testing. Based on the scope statement it defines the project deliverables.
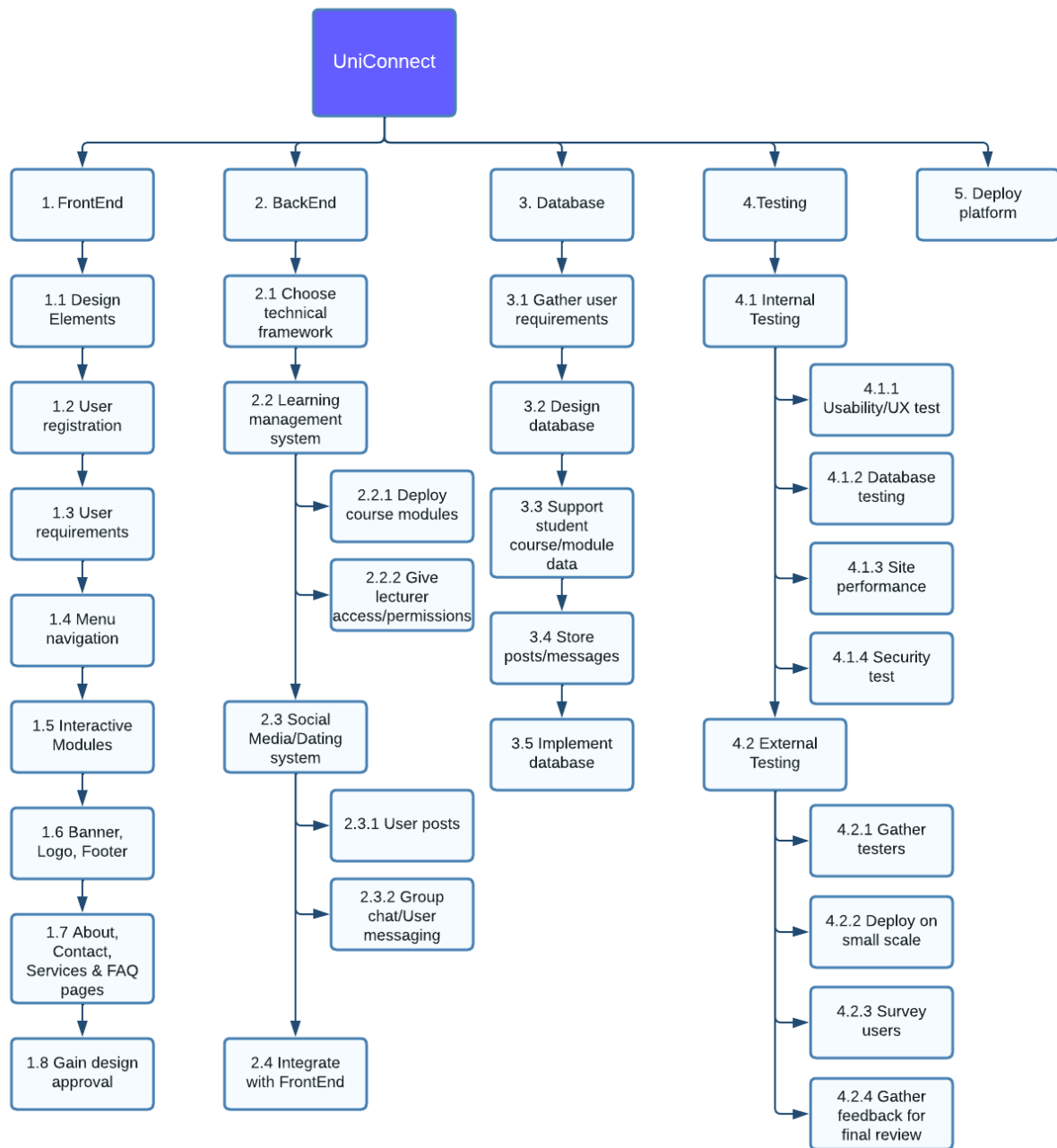
Figure 2: Work Breakdown Structure - UniConnect

In the work breakdown structure above it can be seen that it is divided into subject areas based around the different aspects of designing the platform instead of work assigned to the different project team members. As such tasks are structured based on a topic area. Each component is not defined by their work order, the work order will be found in detail in the schedule section. This work breakdown structure is an overview

which displays the effort and work steps that are necessary to complete the project. The work areas and work packages described in the work breakdown structure help to breakdown the project duration and the project costs in each area. The WBS is an important tool for work abstraction and needs to be well thought and applied. In relation to the project it breaks down the site into its essential components, which will be expanded upon in the WBS dictionary below.

2.3   WBS Dictionary

The work breakdown structure dictionary below gives more information about the individual building blocks. Important and relevant data is also provided in a simple precise manner to further process and control the work. For example, the schedule and costs are listed with more detail on the task. The WBS dictionary for UniConnect is shown below:

FrontEnd

1.1 Design Elements

WBS item:	#1.1
Owner:	Front End Engineer
Schedule time:	4 days
Performance Requirements:	Web design/UI skill
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Designing HTML pages for site

1.2 User registration

WBS item:	#1.2
Owner:	Front End Engineer
Schedule time:	2 days
Performance Requirements:	PHP and database skills
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Allowing Users to register to site

1.3 User requirements

WBS item:	#1.3
Owner:	Project Manager
Schedule time:	3 days
Performance	Working with sponsor to agree on

Requirements:	requirements.
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Defining requirements for users/user types

1.4 Menu Navigation

WBS item:	#1.4
Owner:	Front End Engineer
Schedule time:	2 days
Performance Requirements:	Advanced HTML and CSS skill
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Create navigation menu for all site pages

1.5 Interactive Modules

WBS item:	#1.5
Owner:	Front End Engineer
Schedule time:	3 days
Performance Requirements:	Advanced HTML and CSS skill
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Create module that expand/contract on click to create a compact, dynamic and interactive page

1.6 Banner, Logo, Footer

WBS item:	#1.6
Owner:	Front End Engineer
Schedule time:	1 days
Performance Requirements:	Understanding of standard web design features
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Create a website banner and logo with University of Limerick branding. Also put a footer at the bottom of the page with standard links and info.

1.7 About, Contact, Services & FAQ pages

WBS item:	#1.7

Owner:	Front End Engineer
Schedule time:	1 days
Performance Requirements:	Web design skill
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	About page is a simple page describing the site and its functions. Contact page will lead to relevant contact information for different University staff. Services page will link to different University services. Frequently asked question page to provide helpful answers.

1.8 Gain Design approval

WBS item:	#1.8
Owner:	Project Manager
Schedule time:	5 days
Performance Requirements:	Skill in communication and presenting idea
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Forward web page mockups to sponsor for approval. Taking any feedback/desired changes.

Backend

2.1 Choose technical framework

WBS item:	#2.1
Owner:	Back End Engineer
Schedule time:	1 days
Performance Requirements:	Knowing how to argue for you ideas and applying technical knowledge to decision making process
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Choosing technologies and tools to use for the technical side of the site. For example using Javascript for advanced animations/transitions or Bootstrap to better support various screens.

2.2 Learning Management System

WBS item:	#2.2
Owner:	Project Manager
Schedule time:	5 days
Performance Requirements:	Understanding the needs and requirements for a learning management system for a third level institution.
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Designing the learning management system of the site. Dividing up and assigning various tasks. Allow deployment of course material and a area to connect students and lecturers.

2.2.1 Deploy course modules

WBS item:	#2.2.1
Owner:	Back End Engineer
Schedule time:	1 days
Performance Requirements:	Understanding of other University systems to retrieve correct student info.
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Ensure all student users have correct module pages on site and can access all necessary material and info.

2.2.2 Give Lecturer access/permissions

WBS item:	#2.2.2
Owner:	Back End Engineer
Schedule time:	1 days
Performance Requirements:	Lecturer users have relevant permissions
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Allow Lecturers to upload content and edit course page. Upload resources, send announcements to students, create assignments, host exams and meetings.

2.3 Social Media/Dating System

WBS item:	#2.3
Owner:	Project Manager
Schedule time:	5 days
Performance Requirements:	Architectural design knowledge to create a social media app with dating features.
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Delegate tasks and design the social media/dating aspect of the platform.

2.3.1 User posts

WBS item:	#2.3.1
Owner:	Back End Engineer
Schedule time:	4 days
Performance Requirements:	Back end and database knowledge for large scale tree based database for massive datasets
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Enabling users to create posts for other users to see. Can include text, images, links, standard to any social media app.

2.3.2 Group chat/User messaging

WBS item:	#2.2.2
Owner:	Back End Engineer
Schedule time:	9 days
Performance Requirements:	Internet protocol knowledge and understand how to secure and send data packets over a network.
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Allow users to message other user and create group chats. Allow lecturers to set up group chats for course year groups.

2.4 Integrate with Front End

WBS item:	#2.4
Owner:	Front End & Back End Engineer
Schedule time:	5 days
Performance	Front and back end web development

Requirements:	knowledge.	
Contract Details:	No contract	
Cost Estimates:	No external costs	
Description:	Adding all backend functionality too the webpages, creating a functional website.	

Database

3.1 Gather user requirements

WBS item:	#3.1
Owner:	Back End Engineer
Schedule time:	3 days
Performance Requirements:	Ability to translate verbal requirements into technical design features
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Extrapolate from requirements the technical features necessary for a robust and well designed database.

3.2 Design database

WBS item:	#3.2
Owner:	Back End Engineer
Schedule time:	4 days
Performance Requirements:	Ability to design database to meet technical requirements.
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Design a database that is able to simultaneously support a learning system and a social media app.

3.3 Support student course/module data

WBS item:	#3.3
Owner:	Back End Engineer
Schedule time:	2 days
Performance Requirements:	Work with IT department to get correct student data for module deployment
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Ensure database has correct student

data, working with IT department and
University systems

3.4 Store posts/messages

WBS item:	#3.4	
Owner:	Back End Engineer	
Schedule time:	5 days	
Performance Requirements:	Ability to implement database to meet into technical design features	
Contract Details:	No contract	
Cost Estimates:	No external costs	
Description:	Store user posts/messages for social media aspect functionality.	

3.5 Implement database

WBS item:	#3.5	
Owner:	Back End Engineer	
Schedule time:	4 days	
Performance Requirements:	Skill to integrate database into website	
Contract Details:	No contract	
Cost Estimates:	No external costs	
Description:	Implement all database features into the website to complete functionality. Users should be able to upload and see content in all aspects of the site.	

Testing

4.1 Internal Testing

WBS item:	#4.1	
Owner:	Project Manager	
Schedule time:	2 days	
Performance Requirements:	Organisational skills to get team to work on testing project.	
Contract Details:	No contract	
Cost Estimates:	No external costs	
Description:	Test website internally for bugs, security vulnerabilities and any relevant issues.	

4.1.1 Usability/UX test

WBS item:	#4.1.1	
Owner:	Front End Engineer	
Schedule time:	2 days	
Performance	Understand how people think and the	

	Requirements:	ways they use websites and how they respond to different designs.
	Contract Details:	No contract
	Cost Estimates:	No external costs
	Description:	Test the user interface to see is it easy for a new user to understand and interact with the website.

4.1.2 Database testing

	WBS item:	#4.1.2
	Owner:	Back End Engineer
	Schedule time:	2 days
	Performance Requirements:	Problem solving and out of the box thinking to find any potential error or bug.
	Contract Details:	No contract
	Cost Estimates:	No external costs
	Description:	Test to see if data is stored and retrieved correctly. Ensure all user data is correct.

4.1.3 Site performance

	WBS item:	#4.1.3
	Owner:	Front End Engineer
	Schedule time:	2 days
	Performance Requirements:	Research and evidence collection skills to rigorously test software.
	Contract Details:	No contract
	Cost Estimates:	No external costs
	Description:	Test website performance, ensure all pages load correctly and that there is no lag performance issues.

4.1.4 Security test

	WBS item:	#4.1.4
	Owner:	Back End Engineer
	Schedule time:	5 days
	Performance Requirements:	Research and evidence collection skills to rigorously test software
	Contract Details:	No contract
	Cost Estimates:	No external costs
	Description:	Test website for any potential security vulnerabilities, ensure database is

protected from attacks

4.2 External Testing

WBS item:	#4.2
Owner:	Project Manager
Schedule time:	3 days
Performance Requirements:	Invite students to test project
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Ensure system is ready for larger scale test. Begin inviting students to be potential testers, offer incentives if necessary

4.2.1 Gather testers

WBS item:	#4.2.1
Owner:	Project Manager
Schedule time:	6 days
Performance Requirements:	Work with potential stakeholders to establish a large testing population. Effectively communicate to non technical persons.
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Gathering a large test population and ensuring they understand their role in testing the service and how to send their feedback.

4.2.2 Deploy on small scale

WBS item:	#4.2.2
Owner:	Project Manager & Back End Engineers
Schedule time:	3 days
Performance Requirements:	Experience in running and hosting a website.
Contract Details:	No contract
Cost Estimates:	No external costs
Description:	Deploy a beta version of the website for testers to use.

4.2.3 Survey Users

WBS item:	#4.2.3

	Owner:	Project Manager
	Schedule time:	2 days
	Performance Requirements:	Skill in data gathering. Ability to reach out to a large group of people.
	Contract Details:	No contract
	Cost Estimates:	No external costs
	Description:	Send surveys to testers to provide feedback following the testing of the beta version of the platform.

4.2.4 Gather feedback for final review

	WBS item:	#4.2.4
	Owner:	Project Manager
	Schedule time:	5 days
	Performance Requirements:	Processing and filing large amounts of data for analysis and technical use.
	Contract Details:	No contract
	Cost Estimates:	No external costs
	Description:	Gather and sort all tester feedback to be analyzed to suggest any changes that may need to be made during final review.

Deploy platform

	WBS item:	#5
	Owner:	Whole team
	Schedule time:	1 days
	Performance Requirements:	Experience in deploying a website
	Contract Details:	No contract
	Cost Estimates:	No external costs
	Description:	Following the final review the platform is live and available for all University staff and students to use.

3. Schedule

This section discusses the development schedule for the various stages of the project. This will allow us to create a realistic idea of how long we need to complete each stage of the project.

3.1 Planning the schedule

Initiating, Planning, Executing, Testing and Delivering(handoff)

Our project's development schedule is broken in to five segments:

• Initiating

• Planning

• Executing

• Testing

• Delivering/handoff

During the Initiating stage, we narrow down the concepts for our project in greater detail than what was done before our proposal.

After this initial stage we begin our planning phase where we must take the specifications decided on in the initiating phase and plan out the components required to make our website function and who to assign certain roles to, we will also begin to calculate the amount of time required by our developers to develop each part of the website, what order they will be developed in and what equipment may be required. From discussing this we can calculate the budget required for the development phase.

After this we can begin our execution phase where we will develop the product. During this we will follow our predefined schedule for development and account for any obstructions that are encountered and react to them accordingly.

After this a testing period will commence where we will be taking time to address and identify issues in the product and in the latter half of the phase, we will take time to address these problems to have a polished product.

The final phase will be delivering the product to the customer and a handoff period assisting with the University's IT department to get set up and familiar with the requirements for hosting the website and its required database.

3.2 Schedule Estimate

The initiating phase is the shortest stage. It should take no longer than a week to prepare our projects for proper planning. This will just consist of meetings to structure our coming planning meetings.

The planning phase is estimated to take 3 weeks based on our experience with previous development cycles. This will begin in May of 2022.

The executing phase is estimated to span from June 2022 to September 2022. This will include the development of the database and the main web pages, which will be developed simultaneously. The creation of the database will only consume a small amount of developer resources, so the construction of the main webpages and implementing their functionality will be the Critical Path of this project. If there is a significant delay during this period, the testing and delivery dates will have to be pushed back.

Testing will begin in October 2022 and the duration of it will be two months. The latter half of this period will include a public Beta test where we will be able to gain feedback from the customer base.

In December the bugs discovered during testing will be addressed which should take about a month accounting for decreased productivity due to the holiday period taking place.

After this phase the product can be delivered and a 5-week handoff period can begin where we will work with the University's IT staff to help them set up their servers to move the database onto them and to host the site internally.

3.3 The Critical Path
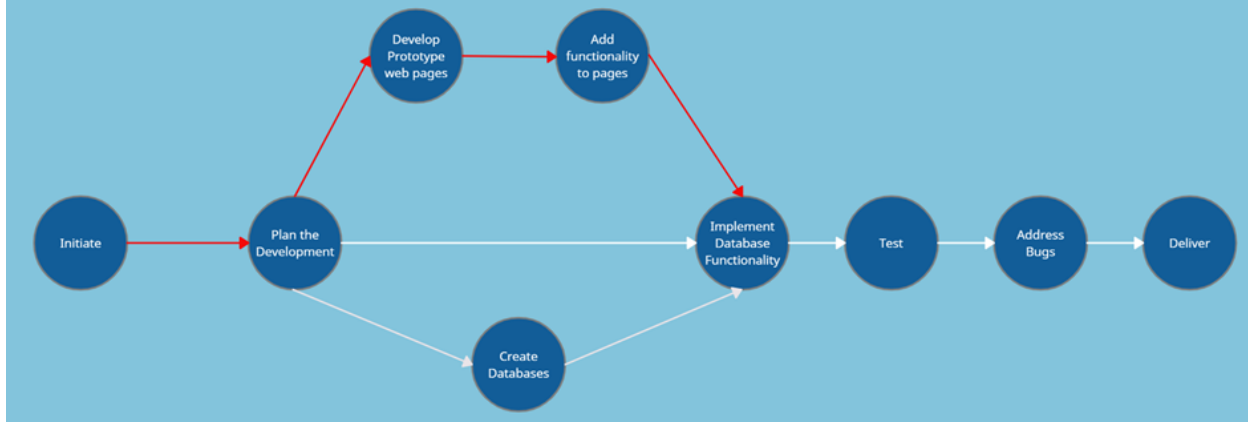
Figure 3: Shown in red is the critical path of our project, the main web page development period

As shown in Figure 3 and the Schedule Estimate section, the primary planning and web page development section is the Critical Path of our project's schedule. The reason the database creation is not a part of the Critical Path is that if a delay was to occur during the creation of the database it would not cause major obstructions elsewhere in the timeline due to being developed simultaneously with the main web pages and it is requiring far less time to finish.

If the main web page creation was to be delayed it would prevent testing to begin as scheduled and have a knock-on effect on the later stages of the project.

3.4 Monitoring and analysis of the schedule

To monitor the progress of the development and its adherence to the schedule we will monitor the Planned Value and the Earned Value of the project. If we are not completing sections of the project by the dates set out by our planned timeline, we will know that we are behind schedule. With this we can adjust dates and resources as necessary.

4. Costs

4.1 Identification

The main costs associated with this project are:
 The cost of employee salaries

The server to host the test databases

The employee's salaries are €33,400 monthly equating to €300,600 for the cost of the employees for the entire period.
The development server will cost €3,000 to purchase externally.
A €65 domain fee.
Software licenses will cost €11,000 for 5 licenses.

The total cost of the project will be €314,665.

4.2 Direct and Variable Costs

Now looking into direct and variable costs, the direct costs are costs firmly linked to the project. For example wages, travel costs or material costs. Variable costs is a cost that increases with the amount of work. The direct and variable costs are listed below.

Direct Costs
     -Wages
     -Web domain

Variable Costs
     -Wages (In the event of a delay)
     -Software licenses

4.3 External Procurement

Due to the nature of Software Engineering there is little to no external procurement needed. Since our team will be working from home they will already have access to almost all of the necessary equipment (computer and internet connection). The only hardware that will need to be bought externally will be the test server which will cost €3000.

4.4 Tracking Costs

Due to our low number of costs it will be very simple to keep track of the costs accrued throughout the project. It is highly unlikely that we will exceed the outlined budget due to the nature of the hardware and licenses that need to be purchased. We will track costs by comparing our expenses to our expected expenditure every week and month.

5. Quality

The quality area of the project management plan will give structure to our plans for quality standards, assurance, and targets. Clearly outlining our goals in this area should help to make them feasible.

Regarding quality, we have certain steps that must be taken to achieve our targets. First, we must define a quality standard by which we will adhere to. This standard will be upheld throughout the project.

Next, we would discuss how we are conforming to this standard, utilising quality assurance plans and processes to our aid.

Finally, we will outline our plans for quality control, and how we will meet our quality standards outlined previously, ultimately providing a defect-free product by the deadline.

5.1. Quality standard

When defining a quality standard, one must consider the end-goal of the project. Our goal is to provide a defect-free product to our sponsor by the deadline provided, utilising all possible resources to do so. Our product would provide students an easy way to connect with fellow students for various purposes. We can shape our quality standards around this product goal.

Ultimately, we look to provide an intuitive interface, with faultless functionality at the core of our product. Students will be able to connect with others at ease and should not experience issues resulting from **our product**. For this reason, we have opted to use DIN EN ISO 9001 as a quality standard for this project. This standard is recognised worldwide and defines the steps/requirements for highly effective quality management in a company.[1] From this standard we can derive a set of actions we can take to achieve our quality goals.

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[1] Certqua.de. (2015). *International certification in accordance with ISO 9001*. [online] Available at: https://www.certqua.de/web/en/zertifizierungen/haupt_zertifizierungen/qm-zertifizierung_iso_9001.php#:~:text=DIN%20EN%20ISO%209001%20is,quality%20management%20in%20a%20company. [Accessed 13 Apr. 2022].

Within the standard, there are seven important principles of quality management. The principles we feel are relevant are engagement, leadership, and a process approach. These principles will help us to keep project teams engaged with the tasks at hand, lead these project teams towards our project and quality goals, and maintain levels of efficiency.

5.2. Quality Assurance (QA)

Quality assurance takes place throughout our project timeline. We must ensure that we adhere to the standards outlined above, and we must be certain that we are consistently meeting quality standards/goals as we progress with development. A primary concern throughout quality assurance is the prevention of issues which may lead to defects in our finished product. By preventing issues, we are furthering our chance of providing this defect-free product, which, as stated before, is our end goal for this project.

A sample process for one key piece of functionality in our product is shown below.
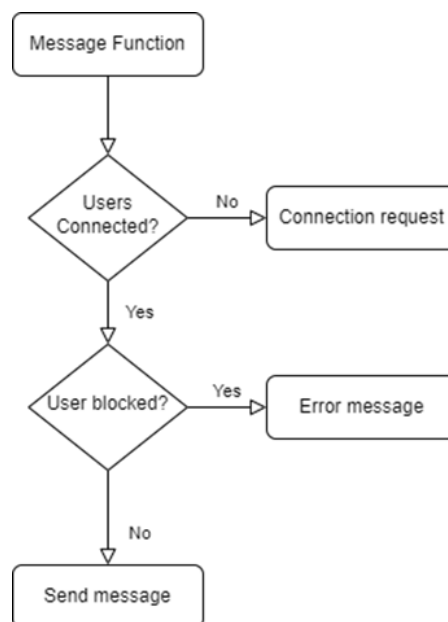

Message function process

This message function is a key piece of functionality within our product. Quality will need to be upheld when developing this functionality. We can do this by ensuring each process in the process chart is performing as intended, and not leading to unexpected errors or causing bugs elsewhere in our product. Ultimately, utilising these process

maps will help us in identifying possible areas where issues may arise, and will aid in our prevention of these issues, thus improving our quality assurance.

By performing quality checks along these processes, checking to ensure functionality is performing the way it should be (i.e., saving to database correctly), we mitigate the chance of issues arising or our quality being affected.

In the following image, there is a process map for the process of a user updating profile details.
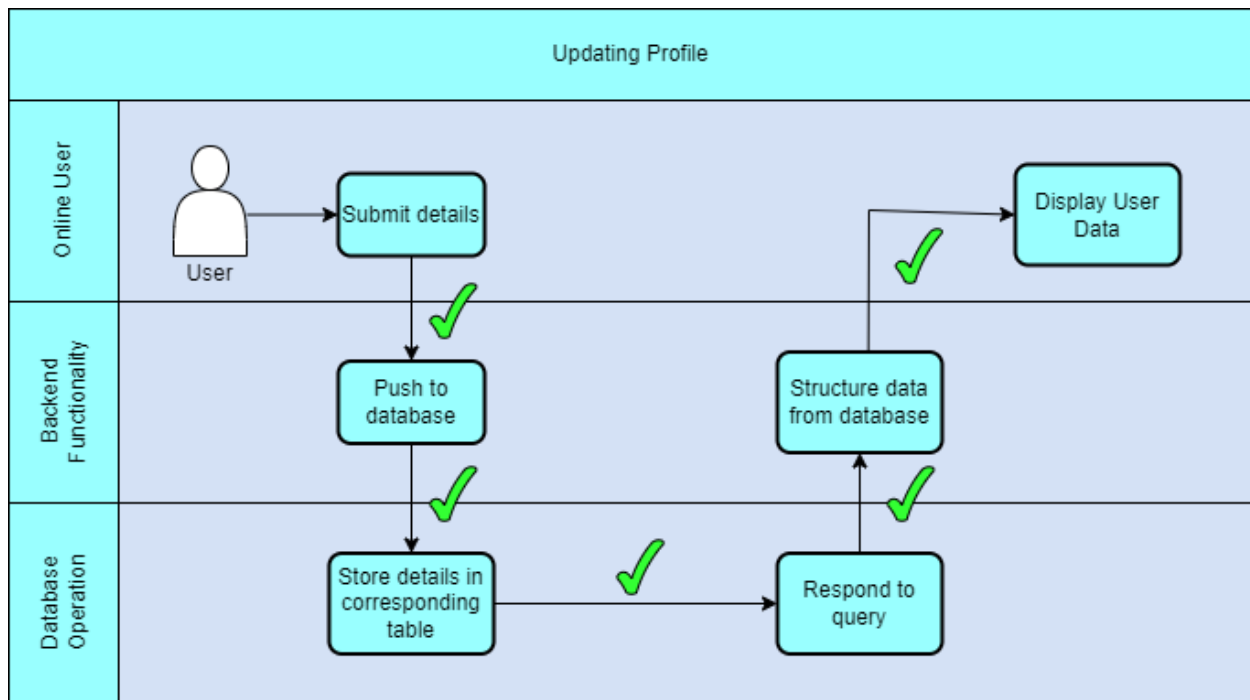
Process Map for updating profile details

The **green ticks** show proposed areas of quality checks. The tasks for updating profile information are relatively simple, however without proper checks throughout, the result could be very different to what may be intended. Ensuring we have quality checks at each proposed area would allow us to provide the level of functionality expected by the user, and only once a quality check is successfully passed can we move to the next one. They expect to have their submitted details accurately reflected on the website after going through the process shown above. This involves pushing data to the correct table in our database, storing it in the corresponding rows/columns, and subsequently pushing this data to be displayed again to the user, and anyone else. These quality checks at each marker ensure we're meeting our standards as set out by DIN EN ISO 9001.

5.3. Quality Control

Quality control takes place both when certain components are completed (database structure, UI), and at the end of our project, once we have completed the product and carried out the work involved. In this step, we are ensuring that the standards we set out to achieve in the beginning, and according to DIN EN ISO 9001, have been achieved and are correct. Essentially, we are appraising the completed product.

We will identify any causes/issues which contribute to poor product quality or missed targets and ensure that our deliverables are as good as they can possibly be. To do this, we will utilise a quality inspection.

Throughout inspection of our final deliverables, all aspects of quality will be checked, and the product will be investigated to identify any bugs, errors, or other non-conformance issues within the product.

Below is a sample check-sheet which would be used to record the occurrence of bugs/errors found in a region of code used in our product for updating profile details.

Check-sheet - Updating Profile		
Query	Pass	Fail
Details saved to database?		
Database table correctly formed?		
Backend code forming profile based on correct data?		
User successfully accessing their profile data?		

Checklist for Updating profile details

This check-sheet can be used to assess whether bugs/errors are present either upon completion of a region of code, or completion of the project.

5.4. Quality Goals

Overall, the goals of this project regarding quality are clear. Within our business, we aim to provide quality products to our sponsors/customers. To do this, in this case, we will adhere to the standards of EN ISO 9001, which outlines the principles for which we should strive to adhere to. We aim to provide a product of impeccable standard, utilising all resources we find useful, and allow us to achieve these quality goals.

6. Resources

6.1. Resource Planning

Regarding resources, we can deduce what we need by analysing the Work Breakdown Structure. When analysing the WBS, we see that we will need resources for FrontEnd Development, BackEnd Development, Database Forming, Testing and Deployment. From this, we can categorise the resources under the following headings: people, materials, and equipment. Using this as a guide, we can further analyse our projected resource usage.

6.1.1. People

A wide range of people will be working through each stage of development of UniConnect. Each stage may require different people with different qualifications.

- The Project Manager

- Team Lead (FrontEnd, BackEnd)

- Software Developer (Each team)

- Database Administrator/Engineer

- Test Engineer

All people listed are part of the project team. Contract workers are not anticipated to be required, based on the current WBS and schedule.

6.1.2. Materials

For this project, we will be dealing with a virtual product. There are no physical supplies needed for the undertaking of this project, all work will be carried out virtually.
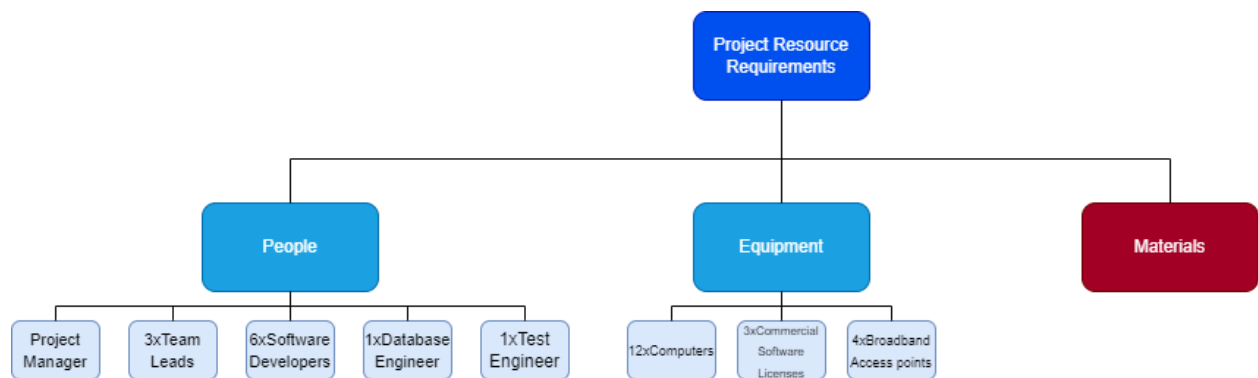
6.1.3. Equipment

The following are tools we will utilise to carry out work and achieve the project goal as set out by the project manager and sponsor.

- Computers

- Broadband Connection

- Software licensing

This equipment will be used to aid towards production of the final deliverables. This listed equipment is **not** part of the final deliverable.

The following is a resource breakdown structure of the anticipated resources needed to carry out this project.

Resource Breakdown Structure

With no materials required to be produced, apart from the final piece of software, we are left with People and Equipment as resources to focus on.

6.2. Responsibility Assignment

This segment relates to the assigning of relevant tasks to people working on the project. These tasks will be assigned to individual teams, roles, or workers. We will be using the RACI chart to do this. A RACI chart allows us to form a clear view of who is responsible for what aspect of the project.

RACI is an acronym for Responsible, Accountable, Consult, Inform.

Responsible: Who is the person carrying out the work?

Accountable: Who will be accountable for verifying the task is done correctly?

Consult: Who can we refer to if the need for help arises?

Inform: Who should we notify when the task is completed?

The following figure is a RACI chart developed for this purpose of assigning responsibility for each team/unit of the project.

Activity	Role					
	Project Manager	Front End Lead	Back End Lead	Software Developer	Database Engineer	Test Engineer
FrontEnd Planning	I	A	C	R		
FrontEnd Design	I	A	C	R		
FrontEnd Approval	A	R				
BackEnd planning	I	C	A/R	C	C	C
BackEnd functionality	I	C	A	R	C	
BackEnd connectivity	I	C	A	R	C	
Database configuration	I		C		A	
Database linking	I		C		A	
Testing front-end	I	C				A/R
Testing back-end	I	C				A/R
Finalization	A/R	C	C	C	C	C

RACI Chart for responsibility assignment

Looking at this RACI chart, we can see that each task has a clearly planned assignee, and because of this, the project should run smoothly given our most important resource has been planned appropriately, with work distributed evenly among them.

6.3. Resource Control

6.3.1. Where will resources come from?

We currently have our outlined project team acquired, and no other members are anticipated to be required to carry out this project. The people on this team currently work alongside the project manager and will be utilised for this project.

The equipment, such as computers, software licenses and broadband connection supplied to each worker, will be, for the most part, already held by the team. We will also need to renew the software licenses in the month of December 2022. These software licenses are purchased directly from the vendor.

There are no physical materials required for this project.

6.3.2. Teamwork/Team building

Once our team has convened and discussed the project, they will begin work with the project manager's approval. This team has worked internally together in the past on various solutions for other sponsors, so they will be aware of who they report to, who they work with and so on. We have no intention of expanding this team unless we encounter issues along the way, making it necessary to receive external aid. In which case, team building exercises will follow, involving new members of the team and creating a healthy team environment.

If conflicts arise within the team, the project manager will deal with these conflicts directly, and search for compromise. This will be important for various reasons, and if disagreements occur between team members, they will need to be addressed thoroughly.

6.3.3. Equipment Maintenance

The need for maintenance of equipment used in delivery of the project is anticipated to be minimal. Equipment used as tools for production of the project, such as computers, will be used as a workstation by employees. These computers are powerful machines, built to last, and maintenance is likely not needed through the timeline of this project, if they are kept in good condition.

7. Risks

This section discusses the various risks that could affect the project, as well as how we intend to handle them.

7.1. Risk identification

To figure out the risks our project faces during development, we have to look at the factors which may or may not have an impact along the way. These are what we will consider a risk.

We also assess our strengths and weaknesses in order to identify weak spots that could amplify the impact of negative risks.
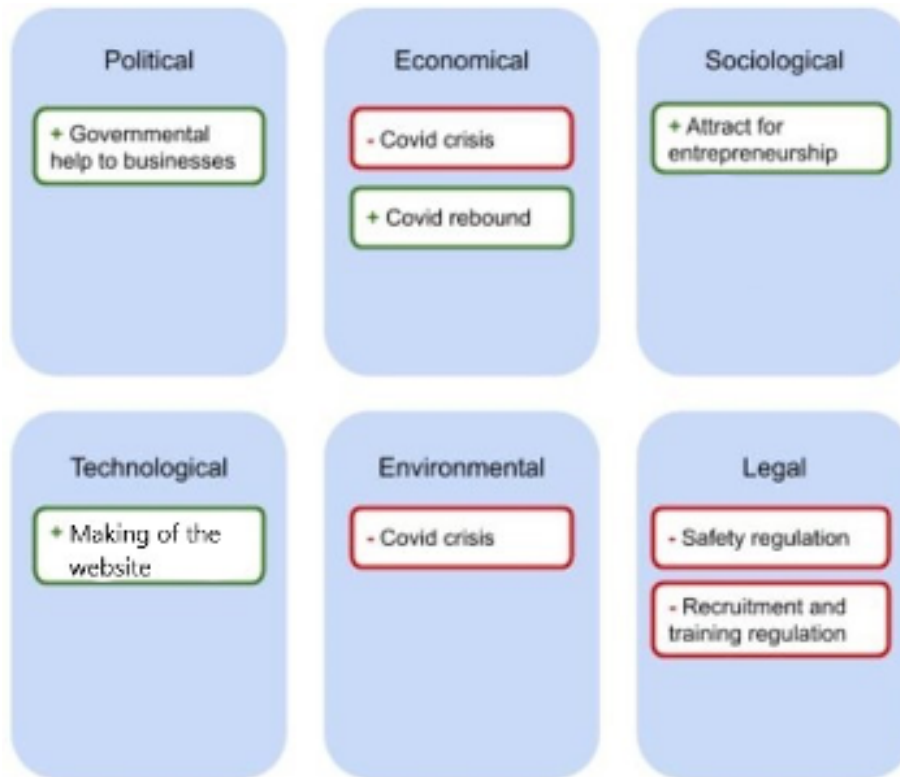

Figure 12: PESTLE study of the project's environment

Figure 13: SWOT diagram of the project

Table 4: Known risks, causes and effect

ID	RISK	Category	Root Cause
R1	Sponsorship Secured	Overall Project	Early-Stage Startup
R2	Exceeding Timeframe	Schedule Single Task	Improper Planning
R3	Scope Creep	Schedule Single Task	Improper Communication
R4	Staff Turnover	Overall Project	Early-Stage Startup
R5	New Competitor	Overall Project	Early Startup
R6	New Regulation	Overall Project	Early Startup

This analysis gives us 6 risks to manage. Looking at the table we see that the majority of risks are related to the staff we employ and the influences on them. Getting the work done on time for the sponsor could end up being an issue and if the scope is expanded upon it may prove costly. Our lack of experience also implies we probably missed a lot of risks. We have to keep an eye out and prepare for those by ensuring flexibility, mainly on the budget and scheduling.

7.2. Risk prioritization

7.2.1. Probability

The chance for a risk happening is variable and hard to quantify. We do not have estimates for the probability of all risks, so we have made the choice of grading their probability on a scale varying from low to high (1-3).

7.2.2. Impact

Every risk is not equal in its impact on the project. As we already specified in the identification phase, some are related to a single task or aspect of the project while others threaten all aspects. We do not have proper estimates for the cost of each

risk, so we decided to follow the same low to high gradient (1-3) to highlight the risks that could have the biggest impact on the project.

7.2.3. Prioritization rating

Each risk is assigned a prioritization rating, according to their probability and impact. They are multiplicative to ensure we focus on highly probable and impactful risks before anything else.

ID	PROBABILITY	IMPACT	RANK
R1	MEDIUM	HIGH	6
R2	MEDIUM	HIGH	6
R3	MEDIUM	HIGH	6
R4	MEDIUM	HIGH	6
R5	LOW	HIGH	3
R6	LOW	MEDIUM	2

Table 5: Prioritization rating of risks

7.3.   Risk management

The plan for managing risks is, devote them a number of resources after investigating their priority and making it proportional. This management consists in:

- Maintaining a constant watch for triggers, allowing us to assess early if a risk will realize itself.
- Preparing for each risk by allocating resources to mitigate the effects and reduce the likelihood of negative risks, and to better the chances and the effect of positive risks.
- Following the progress of each risk compared to the project current state, some risks come into play or lose their relevance at later stages of the project.

Given team members will mostly have managerial and prospective roles during this project, a substantial part of their job will be to prepare, follow and act upon those risks.

Code: R1	**Code:** R2	**Code:** R3
Name: Sponsorship Secured	**Name:** Exceeding Timeframe	**Name:** Scope Creep
Description: Funding or material is secured through sponsorship	**Description:** Needing longer to complete the website than initially intended	**Description:** The client wanting more features then initially asked for.
Trigger: Offer from college or Student body.	**Trigger:** Work not done on time.	**Trigger:** contact from the client
Preparation: prepare pitch and personnel to prospect to potential sponsors as soon as possible.	**Preparation:** Have the correct plan in place for work done.	**Preparation:** Know what we have to get done and what exactly has been asked for.
Response:	**Response:** Inform client of delay.	**Response:** discuss with client and come to an agreement on final details
Status: Awaiting contact from the university	**Status:** No delays as of yet	**Status: none as of yet**
Rank: 6	**Rank:** 6	**Rank:** 6
Proba: Med	**Proba: Med**	**Proba: Med**
Impact: High	**Impact: High**	**Impact: High**

Code: R4	**Code:** R5	**Code:** R6
Name: Staff Turnover	**Name:** New Competitor	**Name:** New Regulation
Description: The leaving and joining of staff to our team.	**Description:** A new competitor creating the same product	**Description:** Workshop/workplace regulation may evolve, or we may have to conform to unsuspected regulations. Which could lead to more work on site.
Trigger: Team member hands in notice of leaving	**Trigger:** New website being made that is directed at students.	**Trigger:** Expert advice
Preparation: Having a plan for bringing new employees on board	**Preparation:** Build presence before end of project, be ready to adapt our services.	**Preparation:** Consult as early as possible to avoid additional cost down the line.
Response: Hire well qualified employees	**Response:** Propose fusion or partnership. Revise project statement.	**Response:** Assess quickly if and how much change has to be made to follow the new regulation. Make the necessary modification or scale back if not possible.
Status: Job listings can be posted as soon as needed	**Status:** Team members on the lookout for competition	**Status:** Consultant to be contacted as early as possible.
Rank: 6	**Rank:** 3	**Rank:** 2
Proba: Med	**Proba:** Low	**Proba:** Low
Impact: High	**Impact: High**	**Impact: Med**

8. Stakeholders

The Stakeholder paragraph deals with the way in which cooperation between stakeholders should take place. For this purpose, all stakeholders are first identified and then prioritized in the following. Based on these findings, a stakeholder register is then created. Finally, the collaboration strategy must be discussed in more detail.

8.1. Stakeholder identification

The first step in creating the stakeholder register is to identify the relevant stakeholders for the project.

This task has already been partially completed in the presentation of our Pd Factory. Nevertheless, this task will be discussed in more detail here.

Brainstorming is the method used to identify all stakeholders. The following questions should serve as support.

- **Who does the work?**
- **Who has influence over it?**
- **Who is affected?**

Through this method, a total of four stakeholders were identified.

- Client
- Project Manager
- Website Developers
- UX (user experience) designers

8.2. Prioritization of stakeholders

The next step in creating the stakeholder register, is to prioritize all stakeholders.

To be able to create an order of importance for all stakeholders that is as precise as possible, the "mapping" method is used for prioritization. In this method, two axes are juxtaposed, one axis describing the power and the other axis describing the interest of a stakeholder.

The power of a stakeholder means the possibility of influencing his decisions. A high-power rating is, for example, the possibility of being able to complete the project quickly.

A stakeholder's interest rating, on the other hand, is characterized by a great will the participation. These stakeholders want to complete the project at all costs.

In this elaboration we have additionally agreed on a scaling of the axes from 0 to 5 each. For a better assessment, the values 0, 3 and 5 on each axis were described in more detail.

Power:

0: No possibility to influence something in any way.

2.5: Had the opportunity to influence individual areas through discussions with the project's decision makers.

5: Of all stakeholders, the greatest opportunity to cancel the project.

Interest:

0: Whether the project fails or is completed is irrelevant.

2.5: Rather stands after the success of the project but would also be able to accept failure.

5: Wants at all costs the success of the project.

When using the "mapping" method, we are also able to generate information on the basic approach to individual stakeholders. Depending on the area in which the stakeholders are located according to the power and interest rating, a rough strategy for cooperation can be defined.

Monitor (Minimum effort):

All stakeholders at the bottom left represent the least important. They should only be monitored over the period of the project.

Keep satisfied:

The stakeholders on the top left, represent the most dangerous. They have less interest but a great deal of decision-making power. The strategy in this case is to maintain enthusiasm for the project.

Keep informed:

The interest groups located at the bottom right should be fed information by the project so as not to diminish your enthusiasm for our project.

Manage closely:

The last stakeholder group is located at the top right. These have a lot of power and interest. The entire project stands and falls with them, so care should be taken to ensure very good cooperation in all matters.

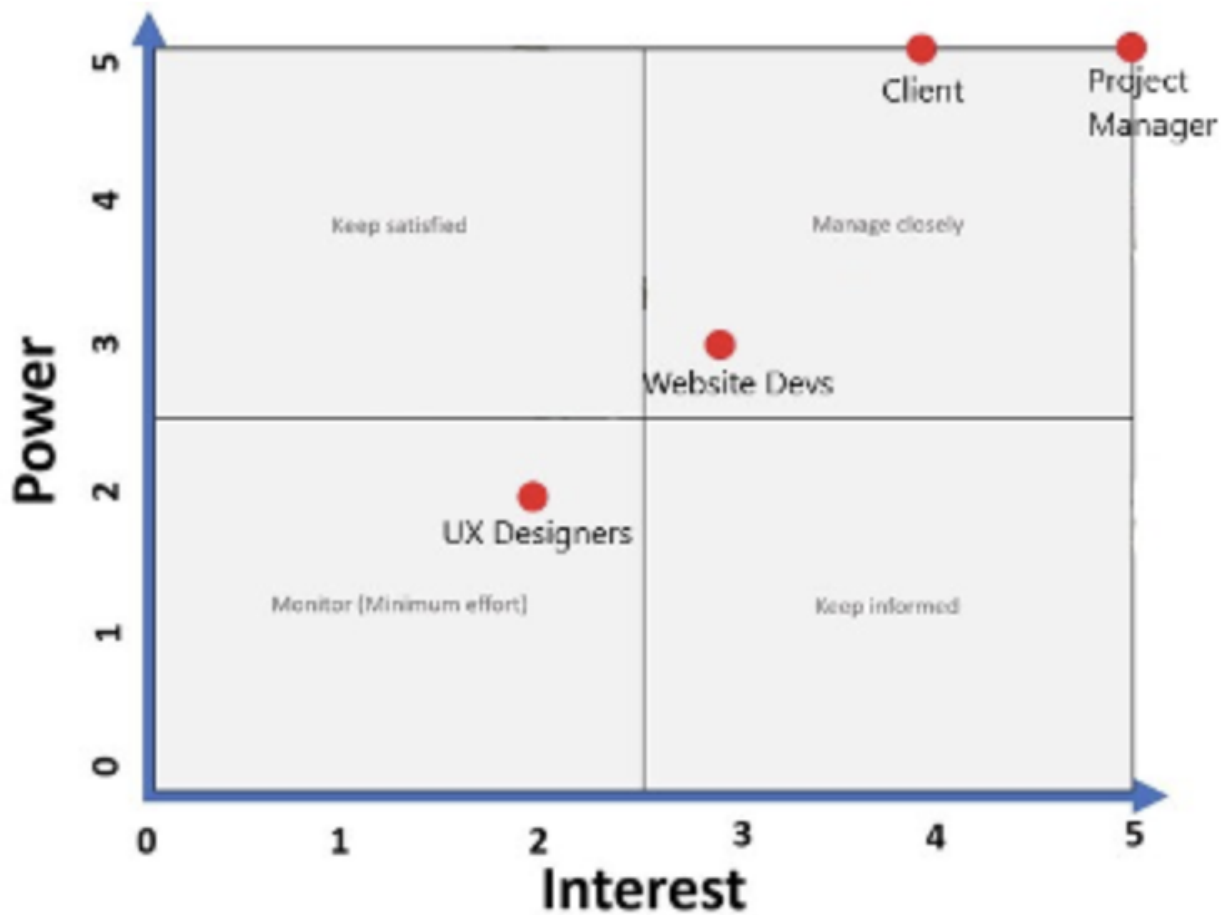The following diagram now shows our prioritization of all previously identified stakeholders.

Figure 14: Prioritization of all relevant stakeholders

The graph above shows the following information.

Stakeholder name	Interest	Power
Client	4	5
Project Manager	5	5
Website Developers	3	3
UX designers	2	2

Table 6: Prioritization of all relevant stakeholders

Now all stakeholders are defined and classified according to interest and power in relation to our Pd Factory. The next paragraph therefore shows the finished stakeholder register, which integrates this information.

8.3. Stakeholder register

Identification			Importance			Expectations	Handling
NR.	Name	Role	Power	Interest	Score		
1	Project Manager	delegates and manages the entire project. Represents the point where all information about all areas converges.	5	5	10	Expects diligent performance of all tasks he/she assigns.	Manage Closely
2	Client	Represents the funder for the project. If they decide to drop out, the project fails.	5	4	10	Expect the project to be successful without further cash grants. In addition, they want all the necessary information and work status about the project.	Manage Closely
3	Web Devs	Responsible for building the website	3	3	6	Expect the project to be successful and well compensated. May want a say in decision making.	Keep Satisfied
4	UX Designers	Responsible for designing how the website will look	2	2	4	Expect the project to be successful and well compensated.	Monitor

Table 7: Stakeholder Register of the Pd-Factory

This register is divided into several columns through which the individual stakeholders can be easily compared with each other.

The first column shows all the data identifying the stayer. Each of them is assigned a number by us. In addition, this category contains the information of the name and the role in the project.

The second column (Importance) takes up the topic of prioritization. The ratings of power and interest are entered in each case. In addition, the score is determined by the sum of these two numbers. The higher the score, the more important the stakeholder is for the project. The entire stakeholder register is organized according to the score, with the stakeholder with the highest score at the top.

The third column deals with the expectations of the individual stakeholders. Here, the core expectations of each party are briefly discussed. This information can play a decisive role in communication.

The last column (Handling) is intended to re-emphasize the basic strategy for dealing with this stakeholder.

8.4. Stakeholder Engagement

The last important issue in relation to stakeholders relates to the way in which they engage with each other.

The evaluation of all stakeholders results in the following table, where C stands for the current assessment and D for the desired assessment.

Table 8: Stakeholder engagement assessment matrix

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
Project manager					C D
Client				C D	
Website Developers				C D	
UX Designers				C D	

Using the table above as a basis, the engagement plan can now be created. This plan follows a certain distribution.

In the first column, the names of all stakeholders are listed.

The second column reflects the power and interest rating from the stakeholder register.

The third column refers to the analysis of the current attitudes towards the project.

The last column is the most important one in this plan, it is about the collaboration strategy. This information is based on the desired attitudes. In general, this column contains guidelines on how to deal with each stakeholder, which at best lead to the change of the attitudes to the desired ones.

The next figure shows our Pd Factory engagement plan.

Table 9: Stakeholder engagement plan PD-Factory

Name	Power/Interest	Current Engagement	Potential Engagement Strategies
Project manager	High/High	Leading	Our project manager represents our central organ of the entire business. He should keep the feeling of being in a leading role. The more freedom he has to make decisions, the more motivated the project manager will be. This circumstance will help to build up the Pd Factory sucessfully. A close and good relationship is essential.
Clients	High/Medium	Leading	The entire project stands or falls with the Client. They are less interested in exact technical details, but mainly want to receive positive news and a fast progress in the project. It is important to have a good relationship with the client at all times and to report to them constantly about the results. The goal of the strategy should be to keep the investors out of the decision making process as much as possible without upsetting them. Too much investor involvement could slow down the progress of the project.
Website Developers	Medium/Medium	Supportive	The web developers can be described as the executive of the project. These team members perform all necessary tasks. In the future, they will continue to be a supportive force for the successful completion of the project. For this goal, they should be regularly informed about all positive and negative points of the project.
UX designers	Medium/Medium	Supportive	The Ux Designers are in a unique role as that once their work is complete there isn't usually that much more to work on but they can be supportive to the project for any ideas and reworks needed to be implemented.

8.4.1. Issue log

It is very important to listen to the opinions and comments of each stakeholder. On the one hand, they can improve the quality enormously through attentive observations. On the other hand, it can happen that if the opinions of the stakeholders are not considered to a sufficient degree, the motivation of the stakeholders decreases considerably, because they get the feeling that they are not important in the project.

It is also important to respond to all comments to an appropriate degree. So, there should also be the possibility to discuss the good topics in detail.

In our project, all stakeholders should have the opportunity to submit their concerns and comments on each to the project manager in written form. These notes must be detailed enough to be understood by the project manager.

Furthermore, a time slot is to be agreed upon by the project manager and the stakeholders to meet for a discussion. For this time, the project manager prepares all relevant topics that have arisen through stakeholder comments. In addition, the project manager will appoint all parties to participate in this meeting who are involved in these topics through their tasks.

Finally, this time should be used by all stakeholders to have a fundamental and factual discussion about the concerns and comments collected.

The result of this discussion is recorded by the project manager. Depending on the usefulness of the comments, they are implemented in the project plan or improvements are made.

This approach achieves the best possible inclusion of the opinions of all stakeholders and promotes the motivation and quality of the project.

9. Communications

9.1. Stakeholder communication

During the project's life cycle, communication between stakeholders and the project team or project manager is crucial. Stakeholders frequently want to know how things are going. Others are concerned about specific stages, or staff becoming stuck and requiring assistance. To keep all stakeholders informed, it is critical that a communication plan be devised within the project team and beyond. First and foremost,

who will be informed and to what degree must be determined. Chapter eight has previously addressed and articulated some of this material.

The ninth chapter describes which stakeholders should be notified and how contact or information management will be handled. The project manager, the project team, the investors, the machine and input material suppliers, and the IT infrastructure are all in the spotlight when it comes to communication. The first stage is to do a communication analysis to establish how stakeholders will be informed, who will be the point of contact, and when this will occur. The table below serves as both a starting point and an illustration.

Table 10: Stakeholder Communication Plan

Stakeholders	Document	Format	Due
Client	Monthly status report	Hard copy and meeting	First of month
Project Manager	Weekly Status Report	E-mail and meeting	Every Monday Morning
Web Developers	Software implementation Plan	Intranet	May 1st
UX Designers	Web Page Layout Design	Intranet	June 1st

Project Manager
The team is scheduled to meet once a week, or more frequently if necessary, to deliver weekly status reports to the Project Manager. Delays will be noted, and workflow or individual task issues will be discussed. As much as possible, communication should be straightforward and vocal. Fast communication channels allow for the early discovery of faults as well as problems that may worsen as the project progresses. Meetings can take place either online or in person. Depending on the circumstance or opportunity. The whole project team receives an overview of the project's timeline and status due to weekly updates. All employees can then be involved in key decisions.

The Client
The client is communicated with on a monthly basis. Because they are in charge of the funds, it is critical to present them with as much information as possible on the project's status. Graphics and detailed displays of outcomes should be employed. It is beneficial to distribute information on paper or via e-mail. Clients must constantly feel as if they are a part of the process. Formal requirements

must be followed, as well as an official demeanour. Meetings with the client should be done on a regular basis. Personal interaction facilitates the discussion of issues and suggestions. It also strengthens the foundation of mutual trust.

Web Developers & UX Designers
Once the Software implementation Plan and Web Page Layout Design is finalised, there will be little need for regular communication with the Web Developers and UX designers outside of their weekly status report with the Project Manager. If a situation arises where an unexpected issue prevents either developers or designers from carrying out their work then they should immediately bring this to the Project Managers attention.

Communication should be formal. Contact can be established either by email or in person.

In conclusion, contact with stakeholders is critical and must not be overlooked. Different strategies are utilised depending on the target group or interest. The stakeholders have previously been classified and prioritised in order to determine how to differentiate between them. This classification makes it easy to determine how contacts and information flow, as well as stakeholder veto rights, should be established.

9.2. Dashboard Status-Report

The aim of a status report is to show the project status and share progress with your team and other stakeholders. This makes it easy to see whether your project is on track, at risk or off track and add important project information, such as project owner, due dates, links to important resources and track performance.

All stakeholders should be able to acquire a rough overview of all aspects of the project by glancing at this dashboard, even if they don't have a lot of experience with web development. The information in the status report is based on the current results of the relevant area. This solution might also be very useful for the project manager, who sometimes lacks technical knowledge and thus has to be presented with information more efficiently.

9.2.1. Traffic lights method

Creating a dashboard is all about combining information with visual elements. As a result, the implementation of the "Traffic lights" approach is particularly appropriate for our project.

This strategy is based on activity. This implies that various activities and tasks are categorised into three categories: red, amber, and green.
In this context, a red rating indicates that there is a significant issue with accomplishing this work or activity. To overcome this situation, some outside intervention is required.

The amber rating indicates that the project plan has a slight delay. However, in the end, such a matter must be resolved only by the responsible employee. This method can also be used to assess potential concerns.

When a project has a green rating, it may be presumed that there are no issues with the task and that everything is going according to plan.

The risk of assessing a project in this style can result in project managers or other team members being afraid to report problems in order to satisfy shareholders. It is important that all team members are honest and forthcoming with issues when taking this approach.
Otherwise it could result in what is considered a "watermelon project". Watermelon projects occur when there's a blocker to the transparency that Agile projects emphasize. This usually occurs when a senior executive or Project Manager makes a decision that showing anything other than a green status results in some negative consequence. While some Project Managers may think they are protecting the project, they are actually causing harm and undermining the entire process.

9.2.2. Dashboard status-report of Uni-Connect

Figure 15: Dashboard-style Status-Report

Project Name	Project Manager	Staus Date	Project Status
Uni-Connect	John Wick	22/04/2022	On track

Project Health

Project Progress: 23%

Cost:

Task Status:

Risks:

Issues:

Timeline:

▮ : Current date

The project-status dashboard, shown in the table above, will give an always up-to-date status report. The dashboard took into account basic project information, project progress, project cost, task status, risks, difficulties, and the deadline. Furthermore, the first row displays the current project status as well as the date on which it was last updated.

Project Progress measures the completed, in progress and incomplete tasks and compares them to the overall task list for the project. This is then displayed in the form of a pie chart to easily understand the progress of the overall project.

Beside Project Progress is Cost. This compares the actual expenses so far with the planned expenses as well as the overall budget for this project. This is represented in a bar chart, when compared to the progress of the overall project, we can start to see if we will stay within the planned expenditure of the project.

Task status is represented as a pie chart, complete tasks are green, in progress are yellow and incomplete in red.
Both Risks and Issues are represented as pie charts also, each broke down into priority ratings: High, Medium and Low.

Finally, the timeline is displayed at the very bottom with each milestone. The current date will be displayed along the timeline to gauge approximately how far along the project is. Ideally each of those milestones could be colour coded so that they are green if complete, and grey if not.