**TPK5100 - TERM ASSIGNMENT** 



Submitted by:

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## Introduction

One of the main success factors, critical and vital for any type of project development, is the part which involves "adequate project planning" (Hussein 2018, p. 86). This can however be tedious and confusing in all phases of the project lifetime, especially for the inexperienced project leader. Thus saw a need for some kind of tool to structure and visualize project imperatives and plans, without the user getting lost in hand drawn diagrams and clustered notes. That is, a need for some tool that can automatically and dynamically produce important outputs on the fly, like AON charts (Hussein 2018, p. 135), and project stakeholder composition. By effortlessly producing such outputs, we think such a tool also can naturally arrange a "good project startup", a crucial success factor (Hussein 2018, p. 86). That is why we chose to implement the web application "Your Project Planner ©", a tool meant to bring your project to reality!

With this application we wanted to make it easier for everyone not only to plan their project but also to learn about project management. Therefore, we have included definitions and explanations about the necessary theory to understand the wonderful world of project management!

Our application is simple and easy to use for everyone as we want to make everyone's life easier when it comes to planning, especially students that have too much work and don't have the time to properly manage their projects.

#### **1** Evaluation of Project management effort

A Our project work was divided in two main groups: programming and designing. While some people were in charge of programming the web-page, others were gathering the information for the theoretical features of the application as well as designing its front page.

The informatic group was subdivided into a front- and back-end group. The frontend group was responsible for the user experience and flow of the website, while the back-end group was responsible for everything that the user does not directly interact with. This includes storing user data in a secure way, and calculating the critical path for the time scheduling page. To keep track of the progress, we made a Trello board where each group member could track the tasks they were working on.



Figure 1: Task tracking of the front end group using Trello.

After the initial infrastructure work, we implemented the login page, which allowed for user data to be safely stored and retrieved by the user at a later date. With this we could incrementally add features such as project creation, deliverable and subdeliverable mapping, work package creation and relation mapping and finally time planning.

As the framework around the website was completed early, these features could in theory provide value to customers if rolled out incrementally. This is also the case for potentially future features, which would seamlessly be integrated into the project structure, and be presented as new features for the user.

The theoretical group designed the logo as well as the web-page. They were also responsible for the definitions and explanations included in the application. Moreover, they elaborated and conducted the surveys given to potential users of the web-page.

Elias was in charge of coordinating these two groups, always making sure to let the theoretical group know the needs of the informatics team.

For personal reasons like illness, covid and the work load of other subjects, our work got delayed at some point however, by organizing and increasing the number and duration of the weekly meeting towards the end we managed to finish everything on time.

B Our goal to counter the time estimation problem was to have an agile project, that is, an iterative approach which allowed as to adapt better to the time limit. This included defining several sub deliverables, of different priority. We think that this was a success factor for our project planning, and helped us deliver our product on time.

A risk we identified was overestimating our skills, and our ability to acquire new skills. We weren't as successful in this as some people felt like it was harder than expected. We thought the people without prior programming skills would be able to contribute more to the programming aspect of the project, in hopes of sharing the workload and giving all participants ownership to the codebase. But, this was not the case and lead to more work for the people with more advanced programming skills.

On the other hand, we didn't have any problems finding people to answer our survey, with over a houndred answers. Our way to deal with this risk was to make sure we didn't take too much from the people's time so they would be more willing to take part in our surveys. We actually managed to get feedback from many people from many countries and different backgrounds.

Lastly, we didn't fail due to the lack of a clear leader since at one point of the project Elias took this role and was in charge of coordinating the whole project. However having a more pronounced leader from the start, could have improved communication between all parties in the group. At times it was hard for each and every one to know how far the project has progressed, and which tasks they should handle. Thus a more structured information exchange would have benefited us.

C Since we are a small group of six people communication was not a main problem. We had a group chat dedicated to the project as well as weekly meetings where we would work together for long hours. Some weeks an extra meeting was necessary to better organize the work for the week. There where no conflicts within the group, and everyone was "on the same page", so to speak. However, as stated previously, the information exchange inside the group could have been better in regards to how far the project had progressed and which tasks needed extra work. This was especially evident between the two predefined groups. This problem could have been manged by introducing "syncing" meetings, such that everyone would have better understood the project progression and tasks at hand. D One of our success criteria, for us, was to learn more about the course as well as improve our knowledge and performance within the course, which we think it was a success since we had to spend a lot of time getting familiar with the concepts and definitions explained in class, moreover, this project gave us the opportunity to dig deeper into the book "On the road to success: Narratives and Insights from Real life" (Hussein 2018) which was very useful towards the success of the project. However, the most important success criteria was to deliver a functional application that could be used to plan a project as well as being an educational tool. Overall we think that, despite the difficulties, we managed to deliver a functioning app that fulfills the requirements, but what is more important, the app is designed in a way that can be expanded and improved at any moment. Therefore, we can easily develop and improve it in the future if needed.

We evaluate our project management effort as successful:

Scale	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Your response				Х	

#### 2 Evaluation of the impact (Project success)

- A Our target audience includes mainly university students learning project management. However the app does not exclude anyone wanting to learn about project management and/or apply a tool for refining and organizing their project.
- B The group made a survey to map the interest of our target. We wanted to see if the audience would find our app useful. In addition we wanted to critically test our application on a small amount of people. They were asked to test our project planner and to answer some questions afterwards. This way we could have direct feedback on our app that could be later analysed in order to improve the application.

In the following graphs we can see the answers to our survey as well the questions that were asked. Out of the 129 people who answered 96.9 percent were students, as seen in figure 2. In figure 3 we can see where the people are from. As we can see we were able to obtain a large and vary sample with people from different parts of the world. Figure 4 and 5 indicates the various opinions concerning how hard project planning is perceived, and how much time it requires. By looking at the graph we can see that people agree that project management can be hard and time consuming, therefore we can conclude that our app would be helpful for them. Finally, figure

6 and 7 displays the opinion about the usefulness of our idea, with 88.4 percent stating that a project planning app would be useful, and 68.2 percent stating that definitions and explanations would be usefully to help educate themselves and 29.5 per cent think that it might help.



Figure 2: Market survey, are you a student.



Figure 3: Market survey, distribution of student background.



Figure 4: Market survey, project planning difficulty.



#### Figure 5: Market survey, project planning time.

Do you think a project planning app would be usefull? 129 respuestas



Figure 6: Market survey, project planner usefulness.



Figure 7: Market survey, explanation usefulness.

We let a group of people test our app and then asked them the following question:

- (a) What do you find hard about project planning?
- (b) Did our app help you understand/automate hard parts of project planning?
- (c) Was it hard to navigate?
- (d) Did you find the app easy to use?
- (e) Can you see yourself using this app?
- (f) Did you learn something new with the app?

Some of the most interesting answers that we obtained where:

- (a) "What I find hard about project planning is assigning task and making sure they are done, as well as organizing and making sure everyone is on the same page" "I find it hard to stick to the dates and divide the project equally between the different group members" "I think the hardest part of project planning is thinking about the project when you have nothing planed yet, it's like looking at a blank paper" "I find it hard to organize everyone and distribute tasks" "I think its hard to keep track on how the different parts of the project are progressing. I always want know what is going on, maybe i should trust other group members more" "Understand all the parameters to consider because if at the end you forgot something it can messed up the whole project" "Have all objectives very clear"
- (b) "It was nice to reflect over what had to be done instead of staring to a blank paper" "Its more motivating this way because you see it more visual" "It helps to put on paper all the steps and it made it easier to see the project's steps more clear" "I saw the full project more clearly" "It makes it easier to keep track of all the aspects of the project and the progress" "I like that it was very schematic and clear"
- (c) Everyone agreed it was easy to navigate however some Mac users had experienced some errors while using the app and one person said they found it hard to make the difference between deliverables and workpackages.
- (d) Everyone found the application easy to use, however some people thought it was very engineering orientated
- (e) Most people agreed that they would use it or might use it
- (f) "I learned about workpackages and that it can be fun to structure, I think it might be useful with large school projects" "I realized that my project might take more time than I thought" "I learned that time management is key" "I learned how to better structure my project" "I found the definitions very interesting and learned new things despite the fact that I'm very familiar with project management"

We talked to a man who is in charge of a company and his advice after using the app was:

- In project types, "market studies" and "market development" should be included.
- When defining the work package it should be specified that in resources and duration you only need to write a number because people might want to add

what kind of resources they are using, maybe you could also add an option to let people do so.

- It's very engineering oriented, should add more economic oriented terms in the definitions, also some economics aspects like the budget and the cost of each deliverable were missing, this could be easily added when defining the deliverables and workpackages.
- Should add tips in addition to the definition for people that know nothing about project management.
- It's very well organized and segmented and would be useful for pre-project or simple projects, would definitely used it for large projects if the previously mentioned functions were added since he likes the segmentation, simplicity and visual results.

The results of our user testing shows that most answers were positive and we were given some good advice to improve our project. From this we can conclude that we should work on the suggestions given, considering specially the advice given by the business man to improve the app and make it a viable option for students wishing to structure their project planning.

We evaluate the quality of our final results as outstanding:

Scale	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Your response					X

#### **3** Factors that have contributed to failure / success.

We stated project organization and good communication were success factors. This where areas in which we had some problems at the beginning but managed to improve as the project progressed. Another success factor was time management as the project was very time consuming since we had to create a whole web-page and the necessary back-end logic, and that takes a lot of time. This combined with unexpected sickness to several project-members, we did have a lot of work left in the last weeks but as we managed to deliver our application we think that despite the difficulties the time management was a success.

We also stated that a good pre-study/research phase would be important for the success of the project and we managed to gather all the needed information to carry on our work.

By incorporating the agile methodology into the project management, we were able to incrementally and relatively quickly provide a functioning system which potential users could get access to. After the initial technology planning phase, which was completed the same week as the pre-report, all the supporting infrastructure such as a local website and database was functional.

It is important to mention some success factor that were not noted on the pre-report but did help us succeed in our project. Every member of the team was committed to the work, working every week and attending all meetings. Elias taking control of the organization of the project was also a success factor since the lack of a clear leader would have lead to an unorganized work.

Comparing our identified success factor and the ones listed in page 92 of the book we can see that these are similar:

- Organization and good communication collaboration within the project organization
- Agile project structure Use of appropriate project execution (agile, adaptive, plan driven)
- Team members committed to the work- Commitment
- Choosing a leader Clarity of roles and responsibilities for those involve in the project

There were, however, some of our identifies success factors that were not listed int he book:

- Time management
- Pre-study/research phase

Lastly, looking at the listed success factors in the book we were able to identify some more factors:

• Skills, knowledge and competence: our team had some issues with the fact that the necessary skills were concentrated in a few of the team-members, and it was harder than anticipated to teach the other team members. But, the fact the necessary skills to create the application where present in the group meant it still was a huge key for the success of our project

- Flexibility: as we mentioned earlier in the report, our project was by the design easy to adapt and scale up or down, and we were able to solve the problems as they arose.
- Loyalty to decisions: our group was synchronized in our decisions, allowing us to quickly phase through important decisions that otherwise would have been time consuming.

#### 4 Most important lessons from your project

Our experience suggests that when choosing what type of project you want to carry on, you should considered how much time you are given to before the delivery date. Moreover, you should take into account how much time each week you can or are willing to work on the project. If you have many things going on, or have very short time until the delivery, you might consider choosing an easier project.

We also learned that not everyone has the same experiences and skill set. This is something important to consider when choosing and organising your project, since you might have to spend time training or teaching other group members. This time is usually hard to predict and not taken sufficiently into account when first planning the project and could affect your success criteria.

We would recommend to set weekly organization meetings where the project needs and responsibilities for the week could be discussed. This way the work can be more independent, the communication improved and everyone knows what to do and how to help. Indeed, it is important to have a very good communication from the beginning. Remember that the early stages of the project management are crucial, and that a good communication and organization in this stage will reduce risk and problems later.

An advice if you are having problems organizing or meeting is to employ a project management tool like Trello (Corp. n.d.). This way the group can effectively update the projects development. However, everyone in the group should actively participate in the board in order for it to be useful, something we struggled with.

Lastly, when organizing the project make sure to break your project into small and clear work-packages. Every person in the group should be able to take a package and work on it independently from the others

## 5 Reflection on learning and unlearning

This is a short list of attitudes, practices or knowledge we had to obtain to achieve our project goal:

- Programming languages python, HTML, React and JavaScript, as well as different frameworks such as flask.
- Web page design
- Logo design
- Project management theory
- Colour theory

The most evident parts of the project that required learning new tings to overcome critical barriers, includes most of the programming aspects of the project. Programming in its nature requires a lot of new input and procedures that continuously has to be tested and built. This is not necessarily "brand new" information, "per se", but information that has to be exercised/made use of and customized to our specific project. Learning these new procedures was critical for the success of our project.

When designing a tool that both produces project plans and teach the user important lessons on the way, one definitely require a adequate grasp of the subject syllabus. Thus it was critical for us to learn project management definitions and project visual outcomes.

This is a short list of attitudes, practices or knowledge we had to discard to achieve our project goal:

- Procrastination
- Exchange student
- Language

Projects where a product is developed can have a fairly tight time budget, and procrastination can be a major enemy to the desired outcome. We had to let go of the "old ways" of delaying the work to just before the deadline, and start working consistently throughout the project lifetime. The group consisted of five Norwegians students, and one exchange student. The exchange student had to adept due to the different background compered to the NTNU students. The way of carrying out projects at NTNU is different from the exchange student 's university in several ways, where the norm is purely theoretical projects. Therefore, the first thing that had to be unlearn was the predefined notion that theoretical projects are better than practical ones. The exchange student had never heard of Trello, Overleaf or Github, and quickly realized that they needed to unlearn their customs and adapt to the Norwegian way of working. Things such as their ordinary schedules had to be unlearned, as the exchange student was used to work and homework being done in the afternoon and evening, while these things are done before 4pm in Norway which felt uncommon. Even the way of communicating and sharing the progress of the project was different. The comfort zone had to be thrown away, going from using WhatsApp and Google Drive to Facebook and Messenger in order to communicate with the other team members.

As our group is multilingual, we had a language challenge. Most of the group was Norwegian, and would sometimes switch over to Norwegian without thought. This posed a problem for the exchange student, and could in worst case exclude the student from an important discussion. As English is not he mother tongue of anyone in the group this sometimes resulted in reduced ability to articulate oneself. However, this challenge can be seen as an important learning opportunity, specially for the Norwegian group, as they should reflect around their responsibility and role in including foreign students and adjusting their way of working. This to achieve a working environment that feels welcoming and healthy for everyone, not only to the familiar NTNU students, which will be critical when leaving the university and joining the working force.

#### 6 Acknowledgments

In this section we want to acknowledge the help and support given throughout the project. First we would like to thank our professor, Bassam Hussein who gave us the necessary information and resources to complete this work. We would also like to acknowledge the help of the student assistants for helping us with technical problems and support throughout the course. Lastly, we are grateful towards every person that participated in our surveys, specially the testing group that took some time to actually use and understand our application, as well as giving us useful advice and feedback to improve our project. Special mention to Patrick Lebraud for giving us a more professional insight on how to improve the application.

## Bibliography

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## Appendices

## A Link to product

https://yourprojectplanner.help/

#### **B** Link to video

https://drive.google.com/file/d/17 - rHcDBcaOInT5RRbgSy8w2B5doMJCGo/view

## **C Pre-report**

## **1** Type of product you will be producing.

We will produce a project planning webapplication for students, using the course material as the basis. The plan is to make the user answer a questionnaire, teaching the user about project management along the way trough giving information and asking critical question. At the end the user should receive a graphical summary tool to help visualize their project.

#### **2** The expected benefits of the product (the outcome)

The project should result in an application which will help students or organizations to plan small to medium sized project and assignments, and educate the users about project management.

# **3** Potential stakeholders and your plan to involve these stakeholders during project development.

Potential stakeholders:

- Students G1 (collaborate)
- Other end users G3 (inform)
- Educators G3 (inform)
- Directory of education G4 (monitor)
- (Appstore/google play (if app sometime) G4/G2 (monitor/satisfy))

We consider students the most important end user of the product, which means their collaboration is critical for our outcome. Thus we plan to do a survey and interviews to gather function and design preferences. For educators and other end users, which we do not consider our most critical stakeholders, we plan to inform about and promote our product. The directory of education more than likely does not care too much about our product, but we plan to monitor their potential involvement, in the case that our product raises their attention in a positive or negative way. (Initially, Appstore and Google play are i no way associated with the project. However if there were to be made an app, their involvement would be considerable, as their satisfaction has to be considered.)

## 4 A project risk assessment plan, indicating the main risks and how are you going to address these risks

Uncertainty in time estimation: most of the group have never made a web application before, and parts of the group have little experience in programming. We plan to scale the project along the way, increasing or decreasing our scope and ambition at different checkpoints. The product is agile, and become working and functional to a end-users without all initial goals being achieved.

Overestimating our own skills: most of the group have quite a lot of experience programming, and some members have worked on web-applications and databases before. But this is a brand new project, within a academic area they have little experience in from before. We therefore plan to break the work into self-contained work-packages, making it easier to detect weak-links.

Difficulty in find relevant people who would want to answer our questions/ attend interviews. We are students working on a generic semester project, possibly making it difficult to convince people to care for our project. Our plan is therefore to ask people we know and use our network of connections to reach out to the right people.

Organizational failure due to no clear leader/project manager. We have a flat power structure, to encourage creativity and ownership of the product. But, this could lead to problems when the group disagree or are uncertain in what to decide. Good communication, clear tasks owner with veto rights, and voting if necessary.

## 5 What skills you need to acquire in order to produce your product? How you will acquire these skills?

IT:

- React framework and JavaScript/TypeScript One of the group members have quite lot of experience in React and Javascript, and plans to create sample components and act as a educator in the start of the project, to get the rest of the front-end group up to speed.
- Python back-end Similarly to React, another group member has vast experience in Python back-end, and will act as a main driver and educator on the bakck-end
- HTML and CSS

Design: As the team doesn't yet hold the needed skills for designing we would acquire the necessary knowledge through internet resources, for instance through YouTube or Google.

- Color theory
- Logo design
- Marketing
- Page layout

Project management:

- The curriculum of the TPK5100 Applied Project Management NTNU course.
- Some literature research on project managment

## 6 Project breakdown structure indicating the major deliverables, sub-deliverables and work packages

A project breakdown structure (WBS) can be seen in figure 1. The different work packages can be broken into concise and self-contained deliverables, for example a single page in the web-application, but we don't have the neccessary planing done to fill them in yet. We plan to use a TODO-board such as Trello to keep track of our progress.



Figure 1: Work Breakdown Structure diagram for the student planner application project.

## 7 Project schedule. Produce a time-estimate of each task (build and produce) in the project.



Figure 2: Time scheduling for the student planner application project.

The project schedule is divided such that most of the time will be spent on producing all the planned deliverables, to achieve the desired outcome. Thus most of the time will be spent on design and implementation.

To create a robust solution we have a technology planning and design planning phase which will be initiated after the time planning before any work can be done on the actual implementation. The design aspect of the project is also something that will be fine tuned. Thus the relationship between the implementation and design is finish to finish.

The work on the final report will start as soon as the pre-report is finished, as this will contain documentation of the process in addition to the final product.

## 8 A list of the most important success factors that you should adhere to in order to succeed in the project.

- Project organization
- Good communication in the group, and with the stakeholders
- Time management
- Good pre-study/research phase
- Good performance in the course, as the project is based on the course curriculum

### **9** Roles and responsibilities in the project.

- Design team: a team consistent of two members will have the main responsibility and power in deciding the look and feel application.
- Front-end team: a overarching team which includes the design team, responsible for creating the front-end of the application.
- Back-end team: a team which will be responsible for creating the required database structures, data storage and the data processing.