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ASK: Streamlining interaction between students and lecturers

Streamlining interaction between students and lecturers

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Preface

The final report is a part of the project assignment in the course "TPK4115 - Applied Project Management" with learning objectives within the fields of *Project Quality Management* and *Project Management* [1]. The project as a whole consists of the already handed in Project Plan, our functional product "Ask" and this report.

A combination of lectures, in-class-assignments and hand-in exercises have been building blocks towards a broader understanding of Project Management and writing of this report. We would like to thank course coordinator Bassam Hussein for high enthusiasm in class and guidance during the semester, as well as Kristin Hafseld who have been forthcoming and helpful regarding questions the group has had throughout the project. We would also like to thank the student teaching assistants Sofie Bang, Johanne Ausland, Maria Brudseth Dyrseth, Lina Matre Lynås, and Anna Solberg for good and detailed feedback in on the hand-in exercises.

Group members:

Trondheim,
April 30, 2020

Contents

1. Digitalization project

1.1. The product

Our product is an application accessible on mobile devices, tablets and laptops and makes it easier to ask questions during lecture.
In our experience, as students at NTNU, one of the most frequent reasons that people hesitate to ask questions is the fact that they don't want to disrupt the flow of the lecture, or that they are afraid of raising their hand in classes with a large attendance. Studies support our experience and show that the norms of behaviour are one of the major prohibitions of interactions between students and the professor [2]. The fear of asking a dumb question is taken out of the equation with our application as it provide a platform where students can ask questions anonymously and contribute to active participation in classes.

The purpose of the application is to enhance the quality of lectures through active participation in classes. Dillon's study clearly states that the lack of questions during classes impair both teaching and learning [2]. By making it easier to ask questions, both students and lecturers will benefit from more interaction in the classes and strengthen the academic learning outcome.

Further, we intend to store old questions in a "question bank" that students in proceeding years can make value of. If certain questions seems to be repeating they can be sorted by subject and added to a "frequently asked questions" page for each subject in the course. Overall these tools will help the students get a better overview of the subjects, lecture plans and the possibility to participate with an unbiased input where every student can help make a tailor-made lecture. With vertical integration of BlackBoard log-in, the app distinguishes itself from other similar applications by connecting the students' and the university's databases to assure that the students only have access to the courses they are signed up for.

1.2. Challenges in small scale Digitalization Projects

Developing the prototype gave the group the opportunity of working on a small-scale digitalization project. Such projects are characterized by short duration, few team members and limited resource availability. Generally, the objective is to impose change by introducing new digital technologies [3]. Although, our project represents a simplified version of a "real-life" project, some of our experiences are still highly relevant, and give insight into typical challenges in these types of projects.

Digitalization projects often have a high level of uncertainty, especially those involving product development [4]. Therefore, estimating precise timelines of activities and understanding resources requirements across all project stages are challenging. For us, the lack of experience with similar projects, and the introduction of a new tool (Figma) increased the project's uncertainty. As a result, we found estimating time needed per project stage difficult, as well as realistically determining feasible features with the final project. To mitigate some of this uncertainty, one group member tried out different tools (e.g. Figma and Marvelapp) before we completed the product plan. While this helped us understand how the final product could look, and making timelines more realistic, including peo-

ple in the group with correct technical skill and complementary experience would have simplified the process and helped reduced more of the uncertainty [5].

The Management Institute conducted a study in which they revealed that ineffective communication is the primary contributor to project failure about 30 % of the time [6]. For us, communication was especially challenging due to social distancing policies (due to COVID-19). The group allocated work and responsibilities between the members, to work as effectively as possible. However this fragmented work-mode made communication crucial, with free flow of information and coordination among team members important for resulting in a consistent end-result and to avoid any unnecessary work and misunderstandings. To handle this challenge and ensure continuous communications within the group, we utilized different real-time collaboration softwares (e.g., Google Drive, Overleaf) to seamlessly work from different locations, followed-up by weekly meetings tracking progress and comparing it to the project plan, as well as more frequent meetings between individuals that had particularly overlapping tasks and responsibilities.

As small-scale digitalisation projects often have few members, uncertainty driving the project to evolve somewhat differently than initially planned may lead members to direct their focus towards technical details, thus, neglecting stakeholder management. Simply put, more physical aspects, like budgets and time schedule targets may sometimes (wrongfully) be prioritized over other softer elements [7]. It is often challenging for a small scale projects to find capacity to maintain engagement of and communications with stakeholders, which is important as implementing feedback from outside the group helps the project delivery to meet its requirements and increases the probability of success [5]. Although, we did conduct a stakeholder analysis in the project plan, the group found it challenging to involve the important stakeholders throughout the project-stages without sacrificing too much time and resources. For example, the group was focused on producing a functional product in early stages, with the risk of this prototype not meeting the criteria set by stakeholders, potentially leading to excess work. We see this as a continuous challenge in such projects, finding the right balance between external alignment and internal focus.

2. Self-evaluation of the project management effort

The evaluating process will use project management success criteria as a tool to assess whether our team has enabled an efficient progress towards the project's success criteria [4]. This section elaborate on the project management success, the project success, and a final evaluation in the provided scheme from template.

2.1. Project Management Success

As part of the initial project plan, we created a project schedule describing the tentative progress towards the final delivery. The plan was separated into weekly periods and broken down into three milestones; the delivery dates for the project plan, the functional product and the final report. This breakdown has helped the group by aligning our work towards common intermediate goals following the timeline of the project. As mentioned,

to help with the alignment we have used a collaborate folder in Google Drive and a collaborative Overleaf document. The three weeks prior to the first deadline we met at campus to discuss various challenges and supported each other with feedback. After the outbreak of COVID-19 we have continued with meetings using the digital service Zoom. This has allowed us to stay in touch and ensure the necessary project development in order to meet the project criteria.

When we defined the characteristics of a digitalization project in our project plan, we stated that the imposed constraints on the projects would be one of our main challenged. With several deadlines and the fact that the work would be graded, we stated that the planning phase would be critical to the project success. This has proven to be true and will be discussed in later sections of the report. We have met all the given deadlines, and the feedback we have received confirms that the work has met the contextual requirements. We were, somewhat obvious, not constrained by a budget, but rather constrained by the global pandemic. Together with several other courses that have been craving our attention we have dealt with our constraints in an efficient manner and at the same time stayed within our time budget. Thus, we claim to have achieved project management success.

As part of the initial risk assessment outlined in the project plan, we made a matrix of potential risks related to the project. One of the main benefits of doing this at an early stage was to obtain an awareness of potential hazards and thus gain a buffer to cope with these. An example from our risk assessment was "Lockdown of NTNU". We knew that there was a possibility of a lockdown due to the pandemic. Being aware of this treat, we were prepared to conduct our meetings virtually if necessary. The positive experience with the risk assessment is one we will bring along to future projects.

2.2. Project Success

As for the evaluation of the project success, we need to compare the final product with the initially stated success criteria. Reading through the project plan in retrospect, we find that these criteria could have been stated more clearly. This would have helped the group unify around the important aspects of the work, as to whether our final grade or the functionality of the application should have been weighted the most when deciding if the project was a success. With this being said, we stated in the project plan that the end user should be our prioritized stakeholder, and that the functionality of the platform was a key success criterion. We claim that we have been true to these criteria throughout the project. We have developed a shell which exhibits the main functionality of the intended app, and we believe that our idea would contribute to increasing learning outcome from lectures. If we were to add additional success criteria, we would focus on the acceptance among lecturers and professors as they will be users of the application as well. Further success criteria could state goals for market share compared to similar apps, a percentage of lecturers at our university using the app, and a number of students downloading the app during the first period of the launch.

Summing up, we could have stated the initial success criteria more specifically, but as the deadlines have been met with positive feedback, we agree that the project management effort have been successful. The main reason for why we do not strongly agree with the statement is the lack of application testing. We have tested it thoroughly ourselves, but

due to the lockdown we have not been able to get peer reviews. With this in mind we are not confident enough to state that we strongly agree, but overall we do agree with the statement below.

Strongly disagree	Disagree	Neither disagree or agree	Agree	Strongly agree
			X	

3. Self-evaluation of the value to the learners

In order to evaluate the value our product bring to the learners, we use this section to highlights some of most important factors that affect end users value.

3.1. Target Audience

Our product is designed with purpose of facilitating interaction between students and lecturers at NTNU. Even though the core concept behind our idea is widely applicable to a wide variety of situations, we have decided to limit the scope of the product to the context of NTNU lectures. While this limits the number of potential use-cases, it has also allowed us to cater the product more to the needs and wants of students at NTNU.

3.2. Describe learning objectives of your product

In section 1.1 we elaborate on why more questions and student engagement during lectures has a positive effect on learning outcome. The intended purpose of the product is to facilitate this interaction, and thereby increasing the quality of lectures [2]. Additionally our product will save questions and other information related to the class in a way that enables the student to readily access it, and potentially get a better overview of the curriculum.

3.3. Method used to evaluate the final product

In the early phase of our project we created a questionnaire specifically intended for NTNU students. The questionnaire was distributed through a variety of Facebook groups, which were dedicated to students from NTNU. This questionnaire aimed to chart and validate our assumption that there existed a need, and want, for a product like ours. Additionally we asked if any of the participants were willing to share their email-address and partake in a follow-up questionnaire.

Due to the COVID-19 pandemic, any form of in-class user testing of the product was difficult to perform. We instead made an informative text which outlined and illustrated the concepts and applications of our solution, and asked a selected group of students to read and provide feedback based on their perception of the product/service. We then relied on this feedback and their responses to gauge how likely they were to use the product and their level of satisfaction.

3.4. Selection of participants

In total we had 36 respondents to our initial questionnaire with 22 of these providing their email-addresses. 19 out of 22 students responded to our email, and participated in our follow-up questionnaire which involved reading the informative text mentioned in subsection 3.3. As illustrated in Figure 3.1, the majority of these students stated that they "frequently" or "very frequently" attended lectures at NTNU, yet "rarely" or "never" asked questions during the lecture.

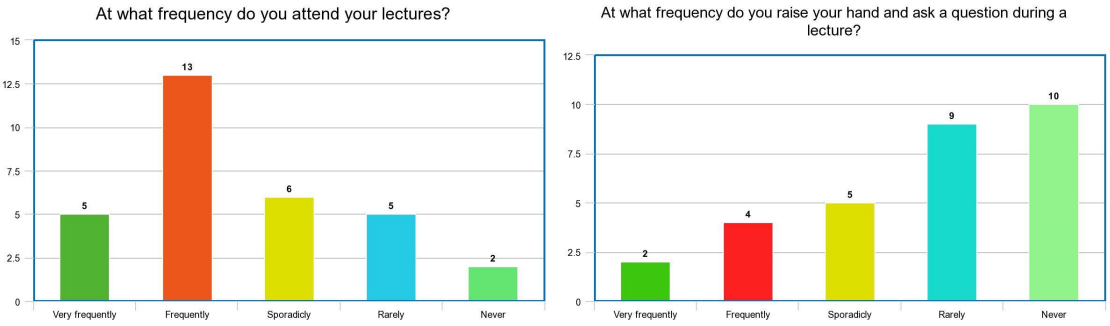

Figure 3.1: Data illustrating students patterns of attendance and engagement in lectures

3.5. Results from surveys

As indicated in Figure 3.2, students seem to be both conscious and in broad agreement of the fact that questions and interactions with the lecturer has a positive impact on their learning. They also state that they wish to see an increase in this activity.

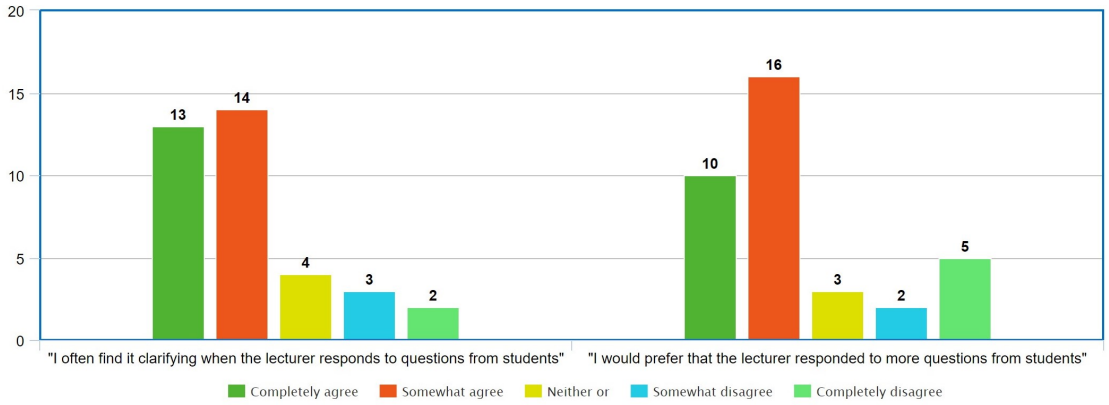

Figure 3.2: Data indicating that students appreciate and would prefer more interaction during lectures.

Figure 3.3 show how the students responded to whether they would ask more or less questions during lectures if they had a product like ours available. These observations in conjunction with the answers illustrated in Figure 3.2 gives us a strong indication that there was a need and want for our product.

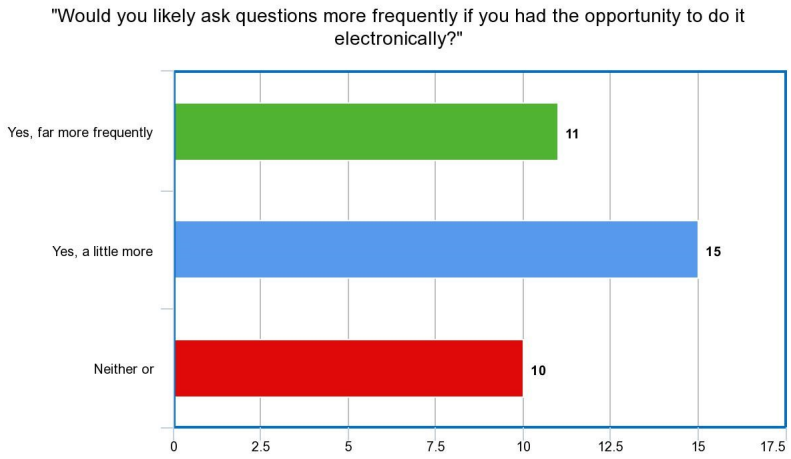

Figure 3.3: Distribution of answers when asked whether a platform like ours would increase their chance of asking questions during lectures.

However, in order for the product to serve its function, and provide a desirable effect on learning outcome, it is essential that the students actually put it to use. For this to happen they need to have the opportunity, motivation and desire to use it. We consider this concern as primarily consisting of three distinct barriers-to-acceptance;

"The students need to have a device which allows them to use the product during lectures",

"The students must not find the product overly cumbersome to use",

"The students must see the benefit to themselves of using the product".

As mentioned earlier and shown in Figure 3.2, the students seems to want more interaction during lecture and according to Figure 3.3 they believe that they would ask more questions if they had the opportunity to do it through a platform like ours. Data from the questionnaire also indicate that the vast majority of students have a smart-phone or laptop at hand during when they attend lectures (92 %). Data from the students who participated in the follow-up questionnaire indicated that the interface and layout of our application seemed convenient and intuitive in its use.

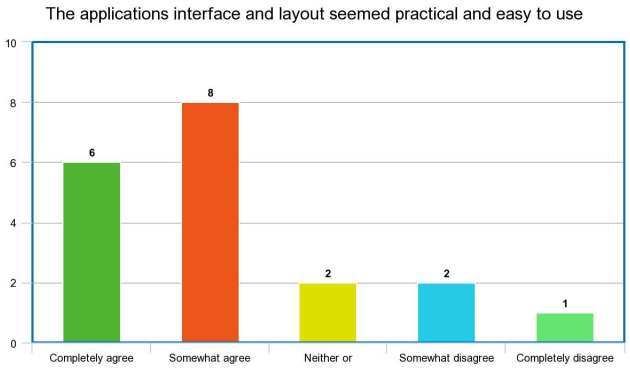

Figure 3.4: Answers from the student participating in the follow-up questionnaire on whether they found the application and interface layout practical and easy to use.

3.6. Evaluate the degree of support to the following statement

Our product is of high quality and we recommend it to be used as learning aid in project management.

As a result of the COVID-19 pandemic the product has not had the opportunity to undergo extensive user-testing in an actual use-case. With this, our evaluation of the product quality will necessarily rely on the information and feedback we have received from students who only had limited opportunity to try the product. However, the data we have collected seem to indicate that the product we have created both serves a useful purpose for the end-user, and that their expectations with regards to the applications design and interface are satisfied. As such we claim the product to be of good quality and recommend that it be tried used as a learning aid in project management and other similar classes.

Strongly disagree	Disagree	Neither disagree or agree	Agree	Strongly agree
			X	

4. Factors that have contributed to failure/success

The outcome of a project can be viewed as the cumulative results of a variety of different factors, defined as success-factors. To which degree a project results in success or failure hinges on the factors respective contribution. The nature of success-factors varies, but they can be categorized as; *case-specific*, *structural* and *cultural factors* [4].

In accordance with the hypotheses surrounding correlation between project characteristics and success factors, we initially based our success factors on the results of the characteristics analysis conducted in the project plan [4, p. 59-60]. In this analysis we identified *constraints* as the most relevant characteristic for our project, and as such we placed special emphasis on two success-factors, *early planning* and *clarity regarding constraints, guidelines, demands and specifications*, in accordance with Table 3 [4, p. 59-60]. Both factors was of great importance in the initiating and planning phase of the project and the latter success-factor was communicated through e-mail with the project-owner as we made the plan for the project. In addition to these two success-factors, we identified the following success-factors to be of importance in this project:

- Thorough and structured risk assessment
- The implementation of clear roles and responsibilities from the start
- Communication
- Honesty, trust and confidence in the abilities of the project team
- Structured stakeholder management
- Flexibility in development

While we did not explicitly state this list of success-factors in our project plan, the risk assessment reflects some of our initially identified success-factors, as we wanted to implement preventive measures. This was done as a precaution in the case that they proved to be difficult to uphold throughout the duration of the project.

4.1. Factors contributing to project success

As the project team had little experience with digitization projects, the team made good use of the already mentioned *risk assessment* in the early phase of *project planning*. This was done in order to mitigate any potential negative effects of the contextual uncertainty and constraints related to the project. As such, the team spent considerable resources (primarily time) on these structural success factors. The importance of early planning and risk assessment was further increased by the aforementioned impact of the pandemic crisis which lead to a lockdown of NTNU campus. Due to our preventive measures the project team were able to quickly adapt and maintain progression according to plan through scheduled, weekly online meetings. Strong focus on the structural success factors mentioned above, laid the foundation for efficient workflow throughout the project. Additionally, *delegation of roles and responsibilities* strengthened ownership to the project and contributed for continuous progress.

All members of the project team knew each other prior to the project and all had previously worked together in various teams. As such, the team quickly identified the roles best suited for the individual personalities and the cumulative effect of these success-factors led to the team working *efficiently*. While we initially did not explicitly state efficiency as a success factor it proved to play an important role as the efficient workflow increased *motivation*, *confidence*, and *trust* internally in the project team. Particularly, the cultural success factor *trust* proved to be essential to the projects success. As mentioned in section 2.1 the team members had several courses which demanded attention and resources (*time*) throughout the semester and the ability to trust each other and rely on each member's capabilities proved to be vital in order to uphold progression and adhere to the project plan.

As the project team had limited experience with app development we decided to base our application on an online shell model. The model allowed the project team to adapt the functionality of our product to the feedback received from our end-users during testing. The implemented *flexibility in development* was therefore vital to this project's success as it mitigated some of the uncertainties in product development.

The *stakeholder management* proved to be a double edged sword and will be discussed further in the next sub-section. In the project plan we identified *end-users* as the prioritized stakeholder group, while *project owners* was categorized as a central stakeholder. The end-users of this project consisted of students and lecturers and in particular the project team spent significant resources on the students in terms of gathering feedback on functionality of the application. Due to our efforts in the planning phase of this project we were able to adapt the functionality of the final product in accordance with the feedback. The project owner was also included to some degree, as mentioned above, particularly related to clarifications on the demands and specifications related to the final delivery.

The final success factor for this project relates to internal *communication* in the project team. Through our previous experiences working in project groups, the team identi-

fied the need for sufficient communication channels. We anticipated that communication would be important to maintain the project team's *motivation* and we decided to implement a "Communication Feedback Policy" in order to motivate each other prevent "burned-out" team members. Our decision to write our reports in Overleaf allowed for real-time collaborations in larger groups and functioned as a communication channel for quick feedback outside of our scheduled meetings.

4.2. Factors contributing to project failure

The *stakeholder management* conducted by the project team proved to be beneficial in some areas, as well as disadvantageous in others. While we feel confident that our stakeholders analysis, found in the project plan, was adequately executed, the project team failed to fully realize the contributing potential of the stakeholders. When dealing with the project's uncertainty, the team mainly focused its attention towards clarifying the demands and constraints with the project owners and later realized that we did not focus enough on the project owner's expectations towards the functionality of our application. In hindsight, we should have paid more attention to the project owner's as they were defined as a central stakeholder in our analysis. With this in mind our application is expected to deliver on the demands and expectation of our end-users, primarily students, and not the project owner or lecturers. It can therefore be argued that *lacking priorities* with regards to stakeholder management, had a negative impact on the product.

Another factor which could a contributing factor to project failure is our risk assessment regarding "lockdown of NTNU". While we assessed that such a scenario would hinder our ability to have physical meetings, we did not fully assess the impact this scenario would effect the development of our application. As lockdown struck NTNU before the final product was finished the application and end-user testing had to be conducted online. This was not ideal as it proved to be difficult to conduct the end-user testing in an controlled environment online. As such, we should have been more thorough in our risk assessment of this particular scenario and we can therefore conclude that *underestimation of risk factors* to some extent hindered the overall success of our project.

4.3. Conclusion

The structural and cultural success/failure factors discussed in this section corresponds to the selection of factors illustrated by Hussein in Table 1, 2, and 3 [4, p. 59-60]. While we remain satisfied with the outcome of this project, we acknowledge our shortcomings related to the failure factors discussed in section 4.2. Due to our neglect regarding demands and expectations from lecturers, one could argue that this failure factor has hampered the long term potential of our application. However, our primary case-specific success criteria - flexibility in development - which directly impacted the way our product was developed, should mitigate some of the long term risk as our applications is easily adaptable. Most apps these days are developed continuously beyond their launch dates as new feedback arises, and our product is no different in this aspect.

5. Most important lessons from our project

All of the team members are students at their fourth year at the university. As we have had several similar courses during the preceding semesters, we had not anticipated a learning outcome as great as we have gotten. This is mainly a consequence of the syllabus of the course, guiding us through project management with a theoretical foundation applied on an actual application development. In the following paragraphs, we try to summarize some of our most important lessons from the project.

State clear success criteria in order to guide the project in the right direction. We have learned that it is important to state clear success criteria to ensure a measurement on the degree of which we reach our goals. Reading up on our initial project plan, we admit that this should have been done in a more comprehensive manner. We have stated that securing positive user experiences with our product should be our main focus, and thereby that the application's functionality is our main success criterion. In hindsight, we should have stated more specific criteria, like feedback on the functionalities in the short run and the number of users in the long run. Finally, we should have stated goals for the project management.

Structure the group in a coherent manner to reach the desired end state. Ensure organized coordination from the start with the whole group. Be aware of deadlines, content requirements and agree upon a reasonable distribution of work. In this way it is easier to avoid loose threads, which quickly lead to extra work and misunderstandings. Use tools familiar to all team members, such as Overleaf, Google Docs and Zoom.

Familiarize yourselves with the syllabus. As stated in the introduction to this part, we have experienced that reading carefully on the theoretical basis will help you a long way towards good learning outcome. The syllabus elaborate on the importance of stating success criteria at an early stage, and why this is important to achieve quality assurance for the final product as well as the learning outcome [4]. When the theoretical basis is understood by the entire group it is more likely that the discussions will lead the progress in the right direction towards the intentional learning outcome.

Do not undermine the value of thorough risk assessment. Risk assessment has become very relevant this year due to the outbreak of the global pandemic. Our advice is to take this seriously as it can have severe impact on the project. In our case it helped us learn virtual solutions for meetings and top plan for the necessary work ahead of time. It may seem like a matrix that just needs to be in place, but by taking it seriously it is possible to prepare for potential hurdles way before they appear.

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A. Peer-Review Report

What is the number of the group you are assigned to evaluate: **11**

A.1. Strengths and Weaknesses

The product is fully functional and we find it easy to use and navigating from the front page to the quiz page is effortlessly. The additional page "nyttige lenker" is a neat platform that easily accesses additional pages with relevant course information. Furthermore, the quiz-sessions have clear and intuitive user interface which provides exactly what the intention of the product is, a question and answers for which the user are to identify the correct match. The progress bar and possibility to share score is in our opinion a strengthening effect for better motivation to do well in the quiz and at the same time keep track of your own progress. We consider the product to be of low maintenance and it should be easy to add more questions and chapters to the quiz-page and other relevant links in the "nyttige lenker" section.

Our first impression of the product left us with a "blog-feeling" rather than the feeling of this being a learning aid. We find the page layout in the quiz page to be of low level of innovativeness and we suspect that the quizzes are too short to capture the full scope of the chapters. A larger question bank would improve the quality and learning outcome, but would require continuous refill of questions. One aspect of quizzes for learning outcome that we find challenging is once the the user have answered wrong and get presented the correct answer, he or she will memorise the question rather than learning why it was wrong, which ultimately have negative impact on the learning objective. We also would prefer an elaboration when an answer is wrong so that the user can understand what he or she have misunderstood. Finally, we get a error code when trying to go back to front page after a quiz session is finished and a new log in is required.

A.2. Recommendation of the product

	The product we reviewed is of high quality and we recommend it to be used as learning aid in project management				
Scale	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Your response			X		

Table A.1: Scaled recommendation of Group 11's product as a learning aid in project management

On a scale from 0 to 10. What grade would you recommend for this product? **5**.

Overall, we find the product to be intuitive and easy to use, but we find challenges with using a quiz as a tool in a course like project management where answers often is of complex nature and hard to express through a quiz. We truly appreciate the ease of use of the quizzes, and the website provides a quick overview of the topics covered in the course. What we miss, and the reason why the grade is not higher, is the lack of feedback by the quiz. A quiz with thorough explanations of both correct and wrong answers would facilitate a learning arena for the users. As the quizzes appear today, they are more a tool of testing your knowledge than a learning aid in the course.