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# AN INTERACTIVE WEB-PAGE FOR SELF-TESTING

November 19, 2019

~~Group number: **20**~~

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~~Department of Mechanical and Industrial Engineering~~

# Contents

**Preface**

*This report will discuss the evolution of the final product "The road to knowledge". It will cover topics like evaluation of the product and the project management. Further on it will discuss digitalization and it´s problems and possibilities. An appendix with an interview with the professor, a link to the HTML- and Javascript files for the website and further illustrations will also be attached. The peer-review is also attached in the appendix. The project team would not be able to finish the product without help from other people. The team would like to thank the professor Bassam Hussein and the student assistants for being factual and constructive when answering questions. The group is also thankful for being able to use the professors literature. The project management will also thank the members of the class and other students for answering our google survey and questions about the final product. At last the group would like to thank our friend and computer science student Ole Bøe which helped us in choosing format for the website and programming language when the team was in need of guidance regarding what was achievable with their current knowledge and skill sets.*

*Group number: 20*

# 1 Digitalization project

## 1.1 Product

The product is a web-page with four windows. Front page, about, quiz and a link to TPK5100s website. The quiz consists of questions related to the literature in TPK5100-Project management with questions from all chapters. All questions are multiple choice and after answering you get a complementary answer. The product was selected because of the groups experience with using similar products. The product is easy to use, recognizable and productive.
**Figure 1** below displays an example of how the page could look like in the quiz.

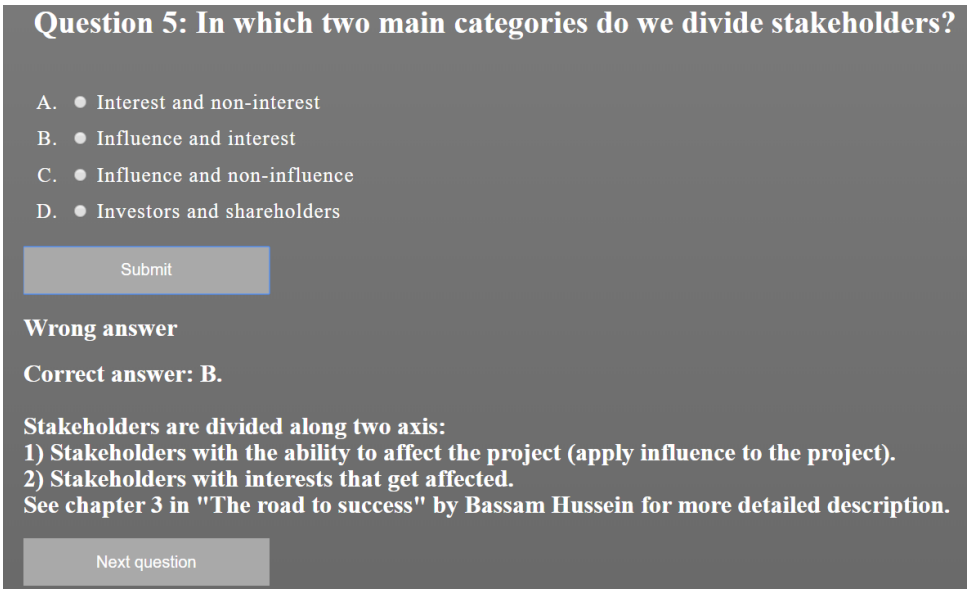


**Figure 1:** Layout of a question from the web-page.

## 1.2 Challenges

Digital transformation is the integration of digital technology into all areas of an organization, fundamentally changing how you operate and deliver value to the consumer. It's also a cultural change that requires organizations to continually challenge the status quo, experiment, and get comfortable with failure.

In this case the task was to plan, develop and produce a digital learning aid in project management. First challenge that occurred was how to get the literature from the book over to a digital platform. Digitization is representation of a document, image, object, sound, signal, or measurement as digital data. An analysis of the most important literature in the textbook was completed, and developing of questions that would give the most learning outcome was made.

The task was to challenge the students to develop a digitalization project that benefits the development of learning in the course. The whole world is affected by a digital revolution. Digital platforms make the life of ordinary people easier with simplifying everyday tasks. Digitalization is known as an increase in the use of digital- or computer technology and includes improvement of the product/process, automation of the processes and simplification of communication. The challenge here is to make this digital learning aid in a way that make

learning easier, is practical to use, gives motivation for further learning and easily available for all students.

Change is inevitable and for it to be successful it must be accepted. Soft factors are a very important factor in digital transformation and therefore an important challenge to overcome to ensure project success. Digital technology is all about connecting people and machines. For the past three decades it has been evident through various project management research that these factors are more important than technical factors in ensuring project success. The main target audience for the project are the students enrolled in the course. Students today have a lot of experience with digital tools. Everyone has a computer and know how to search the internet and use this as a learning tool. An advantage the group had was that all the members are students in the same class. This advantage included insight in the course, own desires for improvement and test group for quality assurance of the digital learning aid. The web page consists of existing technology and a learning model that many students have former experience with. The benefits of the simplicity and recognition factor is that students don't have to have a long habituation period and can put the web page to use right away. The web page will make an impact in essentially the internal efficiency. It creates a improved way of working via digital means. Because of the way the page is build, external opportunities can also become an impact. With some easy customizing, people outside the course can also use this an an learning aid.

**Figure 2** below illustrates the three phases of the process that all came with different challenges.

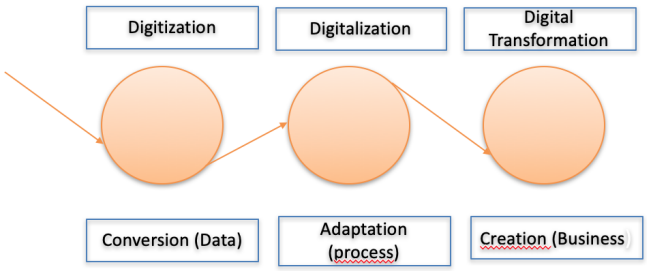


**Figure 2:** Process digitalization project

Another challenge in the digitalization project was to develop the web page. Because of the lack of programming knowledge inward the group, external actors and searching the internet became the solution. This process challenged the project group to acquire knowledge and create a working environment with collaboration. These people related factors is another example of soft factors implemented in the digitalization project.

## 2 Self-evaluation of Project Management

A full self-evaluation has to include an evaluation of all the work done from the idea was decided to the project was completed and delivered. The group sat down at first to identify risks when designing and developing a web site. As the group acknowledged lack of significant programming skills, a risk of not being able to develop the web-site was avoided. After speaking to Ole Bøe with a computer science background, the group concluded that it was feasible to use HTML and JavaScript to create a website as these computer languages aren't too complicated for people creating their first website. By doing this examination, the group made sure that one of the main success factors was achieved: Development of a fully functional web-site.

The group stayed organized by putting one person responsible for their own section of the project. The

responsibilities were a project manager, a digital responsible, a syllabus responsible, and a report responsible. Despite this the tasks has not been fixed to only one person and the group have collaborated on the tasks, but this has helped the group getting an overview of the status of each of the different areas of the project. For example the digital responsible have had the opportunity to focus on learning how to set up a website. This is often a one-man-job, so the other group resources could be used for other tasks like making questions or preparing the report. All in all the organization of the project group were successful.

The project group made a time-schedule with weekly meetings and work-sessions at specific times. At these meetings the group discussed how the stakeholder management were going and if some interaction with a stakeholder were needed. An example of an interaction is the interview with the professor (**subsection 7.4**). A risk that was not taken into account was the fact that two of the four group members had other voluntary work outside of school that lead to absence at the agreed sessions. This led to some setbacks, but was not a problem that led to failure at any point. Further on, the group did a good job in mapping all the important work-packages and thus avoided underestimation of workload.

An important part of the project that was not taken into consideration at the planning phase of the project was how to test the success of the product. When the product was completed the group realised that the product had to be tested in various ways, and also document how good the product was. First of all the website had to be stress tested to see if the server managed high traffic, and secondly the page had to be tested to see if it was simple enough for the users to use. This had to be done, but since the group did not realise this until a late phase of the project, it was only a moderate amount of time left to do this and possibly do some changes as a result of the testing.

**We evaluate our project management effort as successful :**

| **Scale** | **Strongly Disagree** | **Disagree** | **Neither agree nor disagree** | **Agree** | **Strongly Agree** |
|---|---|---|---|---|---|
| **Group response** | | | | **X** | |

**Table 1**

# 3 Self-evaluation of value to the learners

As this is a question website made for the course TPK5100 it is obvious that those with the highest benefit from the product are the students enrolled in the course. One might argue that the page is targeted for the teachers of this course, as the site is also made with the intention of being a tool that can be used by both the student assistants and also the lecturer. It is probable that they will yield great benefits from utilizing a product such as this one. However, the purpose of the site is so make it easier to learn the basic terminology of the course, and that means that the group of people that probably will use the site the most are the students.

To evaluate the value to the learners, it is important to reach out to a representative amount of people. The easiest way to do this is to reach out to them on their student mail. This was not found very effective in the project management phase as not too many answered. Therefore the project group decided to reach out to the students in person during classes. The students were approached with the web-page and asked to fill out a survey afterwards. The same thing was done with a few students that had the course last year to get a few more

objective answers. Answer options in the survey were disagree, slightly disagree, neither/or, slightly agree and agree.

For this product to be reliable and a success, it is important that it can handle great traffic. To stress test the product, the project management sent a link to 30 associates and asked them to use the web-page for a few minutes at a specific time. The project management found this a representative number of people, as there will likely not be more than 30 users at the web-page at the same time.

The number of students that were reached with the survey in class was 21. This was not the number the management hoped for, but with only 15-minutes break between lectures, and the fact that this method is time-consuming this number can be accepted. When it comes to the stress test, the persons to execute this was selected based on who was easiest to contact and reliable to perform the test at the planned time. This sums up to a total of 51 contributors to the testing and evaluation of the product.

The result of the stress test were as expected. The project team decided to use Netlify, which is a free to use service as long as the user promotes them through the web-link with their domain "*.netlify.com*". This decision was made because it is a free service, and because Netlify is a reliable source trusted by for example Facebook and Nike.

One of the main focuses of the product development was to come up with an easy to use web-page. This was important to make it user-friendly and because the group saw a lack of competence in programming. The results shown in **Figure 3** backs up the fact that the project management team reached this goal.

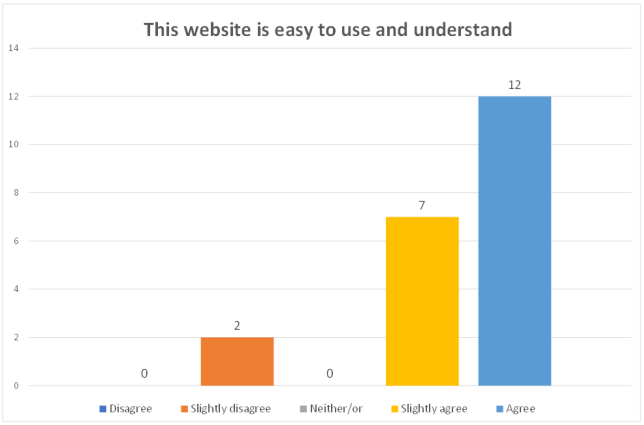


**Figure 3:** Easy to use.

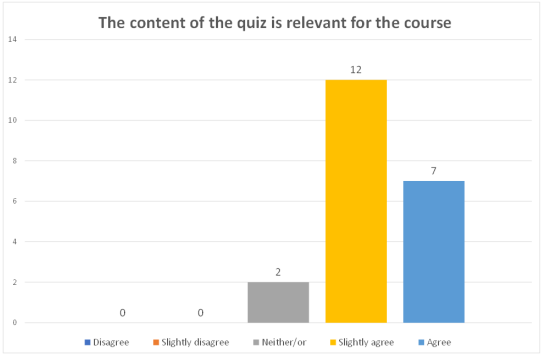


**Figure 4:** Relevancy of the content.

Having relevant content on the website is really important for the success of the project. Relevant questions on the quiz is essential in order to get the users to test their knowledge and maybe learn something new if they get the question wrong. The results from the survey shown in **Figure 4** imply that the questions were on point academically, meaning that the users that answered the survey feels like they've learned something. This is of course good, as one of the goals of this website is to make it easier for students to learn the terminology.

The main reason for digitalizing is to simplify and enhance learning. This was also one of the main reasons for initiating the project. As this is a digitalization project this is considered of great importance and should be expressed from the results from the survey. **Figure 5** shows that on average the users are relatively agreed that this product simplifies the learning.

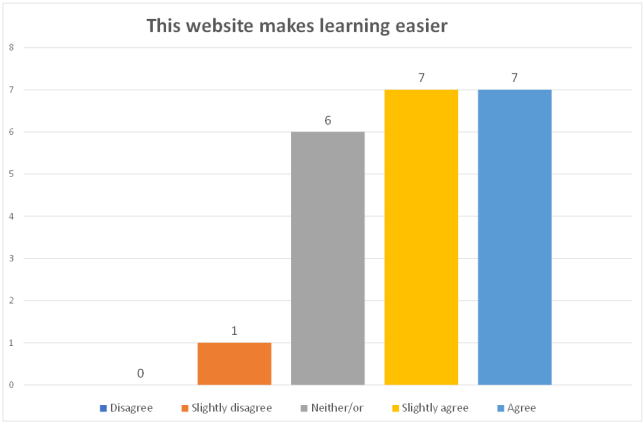


**Figure 5:** Makes learning easier.

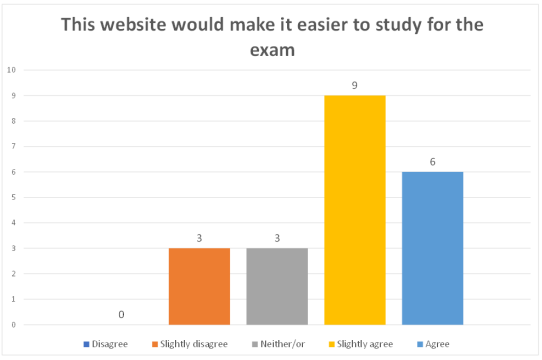


**Figure 6:** Use the website as a tool before the exam.

One easy way of quantifying learning in a university course is by looking at the grades. So one way of looking at the effect of e.g. a websites contribution on learning is to look for a change in the grades. On the survey in **Figure 6**, the students answered that they would use a tool as this one for preparing for the exam. This might mean that students prepare better for the exam than they would without a website. This is of course all hypothetical, as the course is currently not using a website like this, but judging by the results of the surveys conveyed for this project it can definitely be speculated that if there was a website like this one, it could have an effect on the average grades in this course.

All the results from the survey can be found in the appendix, in ***subsection 7.1***.

**Our product 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** |
|---|---|---|---|---|---|
| **Group response** | | | | **X** | |

**Table 2**

# 4 Success & Failure

A typical digitalization project consists of different stages. The project life cycle often includes initiation, execution or development, and project determination. All the different stages consists of factors that will cause the achievement of a successful project. This project are now in the last phase and this chapter will list the factors which has emerged during the process.

For the project to become a success, success factors should be carried through. Failing in implementing

this factor could cause the project to fail. A success factor is a term used as a description of the ground rules that should be adhered to during project planning and execution.These rules are usually identified on the basis of former experience, understanding of context, and under-standing of existing limitations on resources or budget. Identification of these ground rules has positive impact on various stakeholders commitment and dedication to the project.

It is important to separate success factors and success criteria. Success criteria are those things identified by stakeholders e.g. sponsors and end users, that must be achieved in order for the project to be a success.

## 4.1 Success factors

The following is a list of factors that have contributed to success or problems for the project:

1. **Self-knowledge**

   As stated earlier in the report the group did not have required skills in programming and therefore an important factor were to realize lack of competence in programming and compensate for this.

2. **Common understanding of purpose and goals**

   The project group made sure that a common, clear understanding of reason for initiating the project was developed and agreed on. By defining this understanding, it is a lot easier to come up with and decide a set of goals and sub-goals. To define a clear set of goals and sub-goals is important to have specific goals to achieve, and a specific way of achieving these goals. By doing so, the progression of the project was time-effective.

3. **Communication with stakeholders**

   There has been a big focus on mapping the stakeholders requirements, and this has been done my sending mail to student assistants and the lecturer, as well as conducting surveys. In these surveys the users give feedback on the product-idea or the product itself. By doing the surveys the project group can get approval or disapproval from the end user, which are one of the main stakeholders. The surveys have been conducted in the beginning to map the demand from the users, and at the end to ensure sufficient quality of the product.

4. **Detailed plan kept up to date**

   The project group made a detailed plan before initiating the project. As well as this, each group session started with a discussion of what the group wanted to do/ work on during that session. The detailed plan and these discussions made sure that there is no issue about what each individual of the group is working on. All members of the group was aware of the most critical work-packages. The content and design of the product was decided in these group sessions and agreed upon by the group as a whole.

5. **Familiarity within the group**
   The project should be completed while having three other courses competing with time during the semester. Therefore the group gained on the fact that the group members knew each other beforehand. It made work processes smoother. An example of this is that the group started quite fast on the project work.

6. **Risk management process**

The earlier mentioned project plan included an assessment of the risk that the project could face. These risks have to be dealt with either when they happen, or they have to be actively prevented preemptively.

7. **Time estimate**

   Estimation of time is key to produce and deliver a product according to a specific deadline. By setting up a schedule for the different work-packages and deadlines for these, the group knew how to distribute their time to deliver a final product by the final deadline.

## 4.2 Failure factors

1. **Technical focus**

   As the main goal of this project was to develop a web-page, it was easy to narrow the focus down to actually programming this page. This led to ignorance of several other important work. Gathering of content to the page was not thought of, as well as quality checking the content and language. Setting of time to quality check the web-page with the users after it was developed was not thought of either. That caused a stress situation where this had to be done in a short amount of time.

2. **Unproductive prioritisation**

   In a semester many things happen, all from UKA to other courses. As said earlier some group members had voluntarily work at UKA and therefore this were sometimes prioritized above the project work sessions. This led to a split in the group sometimes when doing project work.

3. **Sinking motivation in group**

   As the semester reaches the end exams gets closer and the group had tendency of thinking more about exam studying than the project. This lowered the motivation for the work sessions.

## 4.3 Key factor

The most essential success factor for this project is the detailed project plan. Having the group work unanimously towards achieving the end product in an effective manner is key for any project. As the product was outside of the groups scope of competence it is especially important to remain focused on what work actually need to be done, and minimize the time spent on tasks that don't really offer any value to the project or product.

## 4.4 Relevance to literature

According to "The Road to Success" by Bassam Hussein a lot of these success/failure seems common, as they occure inthe cases mentioned in the last part of the book. The factors from the book that fit with this project are:

- Success factors:
  - Good information flow
  - Realistic plans
  - Clarity of the goals
  - Trust and respect within the group
  - Good communication

- Failure factors:
  - Lacking prioritisation
  - Sinking motivation
  - Too focused on technical solutions
  - A lack of competence
  - Underestimating the risk factors
  - Overoptimism

# 5 Lessons learned

It is the first time the project group members have done a project like this and therefore there are many lessons learned that could be helpful for other students. The team advice to not underestimate the theoretical part of the project. This means that it is easy to get carried away with the making of the product and forget other parts like reading up on theory on digitalization projects.

The group also advice to consult with other students or professionals on programming if the members of the team do not have sufficient background. It might seem overwhelming to program a website or an app, and therefore difficult to get started. By asking a data-student this process got easier. This also hold for other difficulties or uncertainties as well. Asking the professor and project coordinator when something were unclear. This removed difficulties and secured further progress.

The group experienced that when they met in real life it were more progress than when they delegated tasks through online chat. In an perfect world this should not be the case, but the experience from this project is clear. Small misunderstandings is cleared up much faster and the work process is much smoother.

The team advice to write a good plan and put effort into it. Although the deadline for the plan might feel quite abrupt it will be very helpful later in the project to have a good plan. The group used the plan often when writing the report and starting up each work session as a reference for what that were needed to be done.

The project team learned that getting feedback from students can be challenging. When 20+ groups are asking for feedback it can be difficult to get answers. Getting feedback from the users of the product is crucial when evaluating the project and product. The main plan was to send out surveys on mail to the students. This did not result in many answers and therefore the group had to ask people to answer the survey in the breaks of the lecture.

# 6 References

Hussein, Bassam. *Veien til suksess. Fortellinger og refleksjoner fra reelle prosjektcaser* Fagbokforlaget (2016)

Pinto. *Project management, achieving competitive advantage.* Pearson Prentice Hall (2015)

Rolstadås, A., & Hussein, B. (2002, July). Hybrid learning in project management—potentials and challenges. In Proceedings of the PMI conference, Seattle, USA.

# 7 Appendix

## 7.1 A. *Results from the survey*

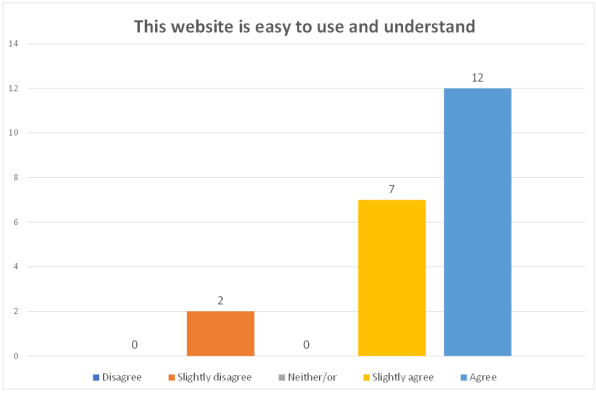


**Figure 7:** Survey result 1

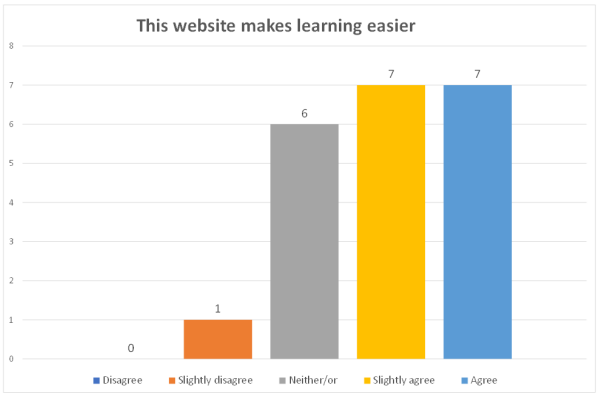


**Figure 8:** Survey result 2

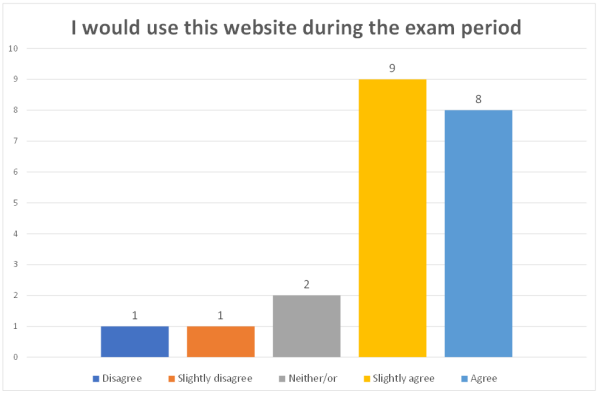


**Figure 9:** Survey result 3

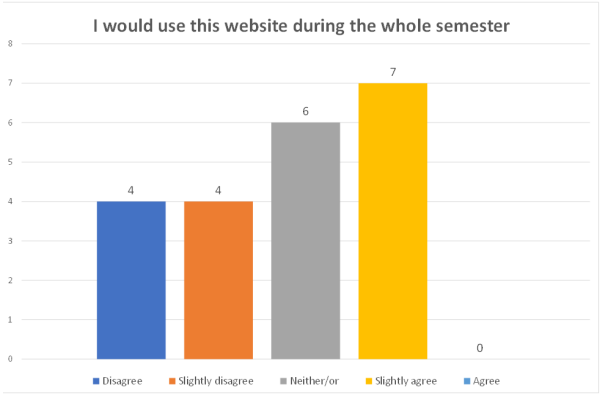


**Figure 10:** Survey result 4

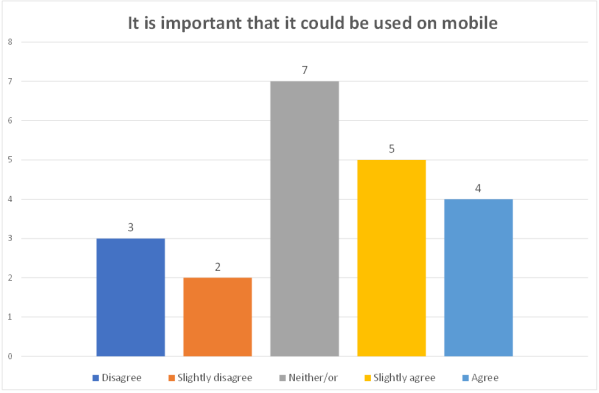


**Figure 11:** Survey result 5

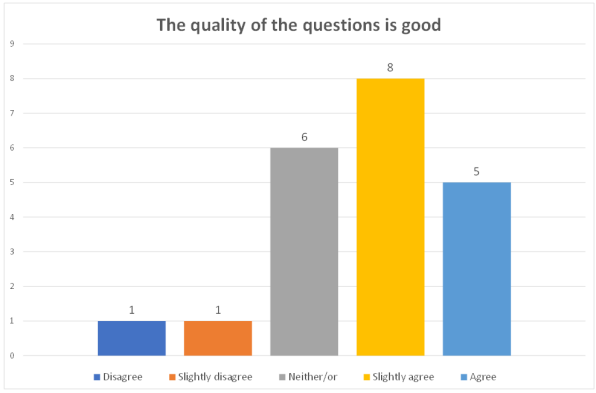


**Figure 12:** Survey result 6

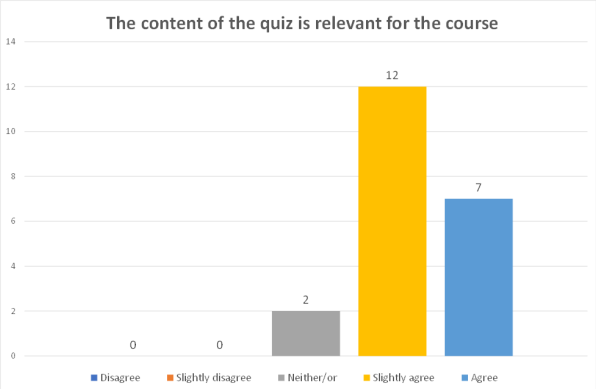


**Figure 13:** Survey result 7

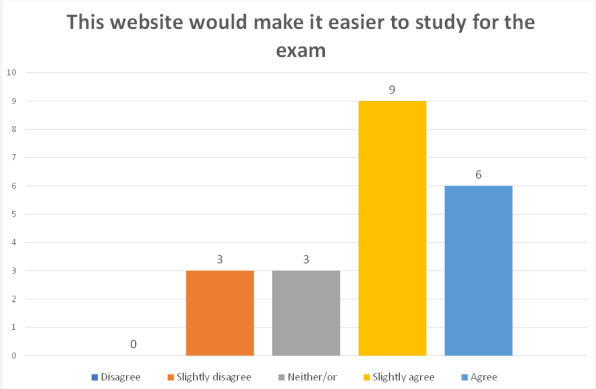


**Figure 14:** Survey result 8

## 7.2 B. *Codes*

**Link to the codes on GitHub:**
`https://github.com/haagrav/TPK5100-Group-20`

## 7.3 C. *Link to Product*

`https://roadtoknowledge.netlify.com`

## 7.4 D. *Interview with the course representative, Bassam Hussein*

With the students at the top, the professor comes close behind as an important stakeholder. Therefore it is important to have a dialogue with him. The project team therefore scheduled a meeting with him the first of October. It was a 15 minute session where relevant questions were asked.

First of all the professor were very positive to the idea and felt that this was something he could use in his course. Concerning his rights for the course syllabus it was alright to use as long it was referred to.

*Will the professor manage to be categorized as a big interest, critical influence stakeholder?*

It was asked for confirmation that the professor would be a stakeholder with big interest and critical influence. The project team was concerned that the professor would not have time to follow up each group and therefore not have critical influence. This was dismissed by the professor.

*How much should the stakeholder mapping cover?*

The group were not sure how wide the stakeholder mapping should be and asked about this. The answer were that one should mainly focus on the class and not exaggerate.

*Is it enough to make a prototype or must it be a complete product?*

The product should ideally cover the entire course syllabus, but this would take long time to implement and the product would be quite extensive. The professor agreed that around 15 minutes review time would be

alright and therefore the product is just a prototype with questions not covering the entire course syllabus.

*How much should the future potential of the product be discussed?*

The product is a prototype, but it is interesting to highlight the potential and further evolution of it. To discuss the further potential was alright to do according to the professor. One big part of the evolution of the product would be adding new questions. An idea is that next years students would be asked to suggest a relevant question for each exercise and then the student assistants or the professor could add the best questions to the website. This is off course an idea in the initial phase, but the professor was not negative to add this to his exercises.

## 7.5 E. Peer-Review of Group 19

### 7.5.1 Strengths

The product group 19 have developed is a clear and easy to understand website. The website also work perfectly as an app on your mobile device. The website is not groundbreaking, but a simple idea that people recognize and easy understands. A lot of similar learning aids have been seen to help the student achieve better results. Over to the app itself. The information is put in a clear system. Positive things that can be highlighted on the website are that it is easy to maneuver, stats over your results, good layout on mobile device and the possibility to read about the chapters before you take the quiz.

### 7.5.2 Weaknesses

There are two weaknesses on the product produced by group 19. First the front page is a bit boring with only black and white. It does not catch your attention, but the rest of the layouts works good. The other weakness is lack of information about their sources. There are no stated sources on the page. They refer to page numbers in the book on the quiz. This is probably "The road to success", but this should have been made clearer. Good information about the sources is important to make the web-site reliable.

Our thoughts on using this product as an learning aid in project management is shown in **Table 3**

**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** |
|---|---|---|---|---|---|
| **Group response** | | | | | **X** |

**Table 3**

### 7.5.3 What grade would you recommend for this product?

From 0-10 this product gets 8.