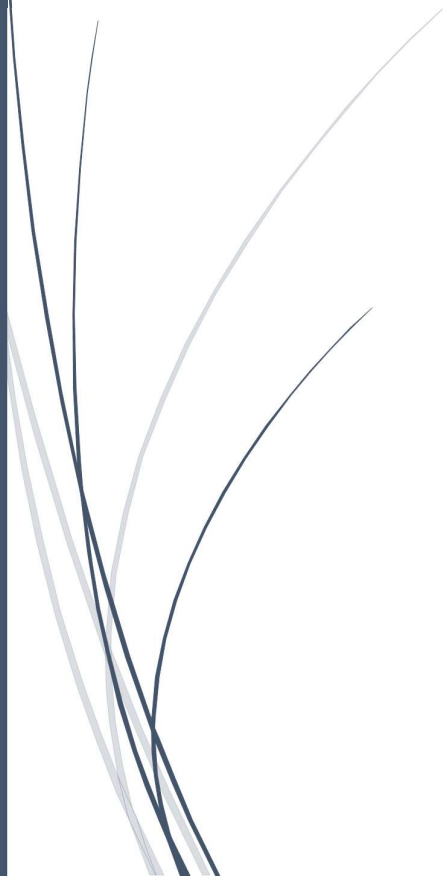
Innovation Pilot
Summer 2022

Reflection and Learning Report



Group 12

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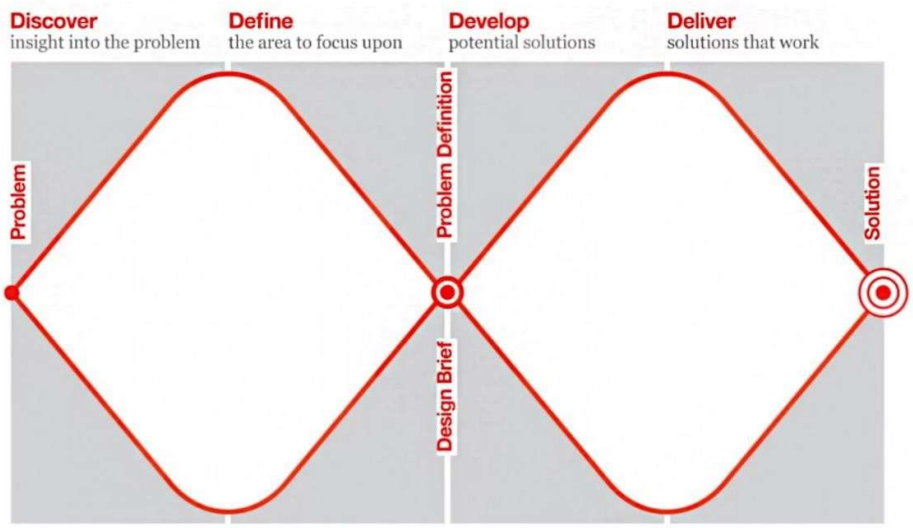
1. Innovation process and the result

The double diamond method is used throughout our innovative process.

The official Double Diamond design model we followed has four stages: Discovery, Definition, Development and Delivery.

Together, these stages worked for us as a map, and we used to organize our thoughts in order to improve the creative process.



Figur 1 Double Diamond

1.1 Discover stage: gathering data

The very first stage of the Double Diamond model consists of learning more about the different variables that affect the problem and its solution. It is common for companies to start this process by laying down their problem, presenting their hypothesis, and defining ways they can learn more.

Here we tried to discover the problem and keeping every possibility open (Divergent).

We applied three Technique's to gather as much data as we could:

- **5 whys:** Was applied to narrow down the possibilities of problems we have.
- **Question Trees:** Was applied to get understanding of the cause of the problem.
- **Mind mapping:** Was applied to discover and generate innovative ideas.

1.2 Definition Stage: filtering through data and sign-off

After gathering all that data in the first stage of the Double Diamond model came the definition stage.

So, we aimed here in the definition stage to filter through all the information we got from stage one and elaborating on it.

And then we had to define a clear problem to be solved. Our gathering was based on two factors:

- Data: Was gathered from Alu company and the available information from their website.
- Assumptions: Was predicted some unknown factors regarding the nature of the problem we trying to solve.

Based on these two factors we could define our problem more obvious and finally we could choose the hardnut.

1.3 Development stage: start to design

Here is our start of the actual design process, the actual making of the solution to the problem defined in stages one and two.

We all discussed different solutions such as methods to replace the traditional lock systems which use mechanical lock and key mechanism by new advanced techniques of locking system.

The development stage involved a lot of multi-disciplinary work. We started thinking as a team of designers that create a new product.

The start was prototyping an effective integration of mechanical and electrical intelligent devices, we took into consideration dimensions and used materials. To illustrate our thoughts, we started to prepare 3D visualization of the box connected with the electronic lock.

1.4 Delivery stage: test and release

We completed the 3D visualisation of the box and how it-is connected to the electronic lock.

2. Project work

At the beginning of loop 2 the group was given the choice to further work on the current case they were working on, choose a new problem to solve for the same case or choose a new case. A new case was chosen. The group was presented with a few new cases this gave the group the opportunity to choose a case that would suit everyone in the group, so each member had an equal opportunity to show their competence. The group had a semi-long discussion about which case they should choose. At the end of the discussion the new case that was chosen was Alu-box. After the case was chosen, the group had to choose a problem to solve from one of the problems that the company had posed. The group is composed of six members from 5 different study programs therefore by using the competence triangle the group could find out which problem would be best for the group to choose and try to solve. The competence triangle had

been used before in loop 1 but did not work optimally and the triangle was not discussed enough by the group. By using this method, a second time gave the group a better chance to fill in their competencies and follow-up conversations on how the team can use these skills together. After the conversations on what problem the team could solve by using all the members competence, two problems were chosen which the group would work on solving. The two problems that were chosen were “an integrated electronic lock” and “a new improved design of removable hinges.” After these problems were chosen, the team began to brainstorm ideas on how to solve them. The team started researching different methods to the new improve design of the removable hinges and how the electronic lock could be implemented. A lot of ideas were talked about but in the end the team decided to only focus on a solution for “an integrated electronic lock.” A survey was conducted to get a better understanding of what the customer really wanted from the aluminum box, to make sure that the right thing was being designed. The team began the development phase by designing the solution for the electronic lock, a program was written and a 3DCAD model was made as a prototype for the lock. At the end of the project the team found a satisfactory solution for the problem “an integrated electronic lock” by surveys and research about electronic locks.

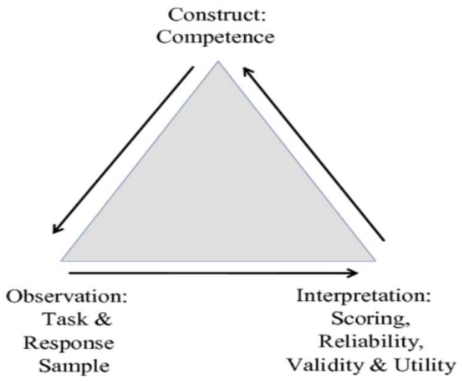


Figure 1 triangle competence

In the figure above shows competence tringle tools that the project has been build up in it is phases

3. Communication among group

We used different platforms to communicate as WhatsApp groups and Messenger, furthermore we have done many online group meetings via Teams. Nevertheless, we have done many physical group meetings in the school and in a cafe bar in the city of Copenhagen, as a method that can help us to know each other and understand the group personalities so that affect us to be closer to each other and have effective communication during the course

in addition, that made it easy to share our ideas and thoughts and build a clear picture of how every person in the group used to think and what effort each person could provide the group to solve the problems, we faced during the course.

In addition, we succeed in solving problems that we had in the course

by dividing the project into several sections thus the excellent communication we had between us helped us in the second loop where everything went seamlessly, and everyone was quite sure which section he was responsible for it for example doing the present of the pitches, and the way of distributing the report to be written

Our project is structured and divided based on our use of Asana so that we kept our growing organization aligned on Asana's flexible work management platform. The screenshot here shows our work management and tasks distribution.

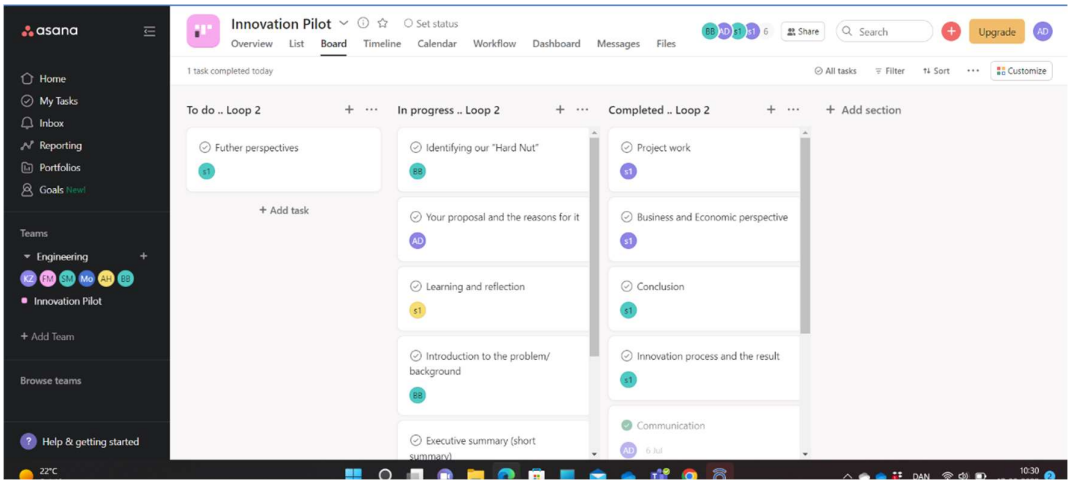


Figure 2 Table of work

4. Learning and reflection

4.1 Collaboration with the facilitators

In the Innovation Pilot, collaboration involves facilitators help with ideas and skills to achieve a common goal. When students with different perspectives, ideas, fields, and experiences work together to find innovative solutions.

Therefore, collaboration with facilitators has started from the beginning with the project group. Because more eyes on a project from the beginning means that many of project group's questions can be spotted earlier and answered altogether or solved more quickly. However, it empowers project groups to share their ideas with facilitators to gain the best solutions in the end.

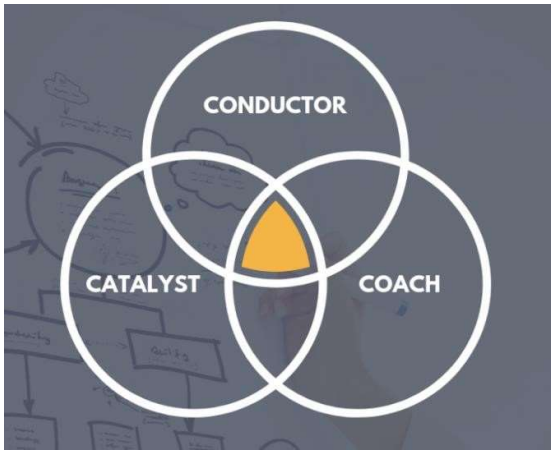


Figure 4 the role of facilitator

Project groups try to talk with facilitators often to answer their need and reach a project goal. It provides regular feedback and offers them new ideas to maintain a high level of collaboration and productivity.

Project groups used facilitators to help in the loop. Because it will lead to great work and encourage the project group to share their ideas and come up with the best innovative solutions.

Facilitators have encouraged the project group to be more confidents with their ideas and aware of so many things, which will help them in different ways to solve problems in the future. However, there were small external details they come with could be addressed, due to the limited time of project. What did the project group learn, a very relevant question?

The reflections project group have reviewed above, and the reflections have had throughout the project, they have also learned that at the beginning of the idea's generation phase one should not think of solutions and the most important thing is to develop the ideas and think out of the box and be creative. Because it's so easy to get so many good solutions in the beginning.

They have also benefited from the facilitators' way of thinking and their ideas and feedback to improve project work. they have also received so much good information from them where have helped project group with understanding the problem in their perspective and they become closer to that find a better solution for women in Tanzania.

As students, project group need to learn to appreciate feedback and understand their role in the process therefore they gain a lot from facilitators feedback during the demonstration and know their pros and cons and how can improve their way of working.

Facilitators feedback keeps group on correct track and reduces errors and misunderstanding of Jengo goal during the project, which that ends to achieve a great result.

4.2 Collaboration with the company

On the other side the project group got their primary data from day one and a box from the company to use it during the project, where AluBox held their meeting front of all students and talked about the project. The primary info has been told and informed. Furthermore, the project group got the chance to write to AluBox on teams, where they try to answer the questions that come from students to further develop their project work. AluBox became more familiar with answering the questions, which faced the project group and tried to establish a connection to the group to ensure the best result.

Even though the project group has gained from plenty of information that AluBox has given to the group. Secondary data has been collected from desk-research to support the primary data that handed to students from AluBox.

During the innovative solution's demonstration front of the AluBox, project group took AluBox feedback as advantage to correct small things and continue work on solution.

5. Appendix

Contribution table

Student	Innovation process and the result	Project work	Communication among group	Learning and reflection
Bashar	20	10	25	10
Malaz	10	15	20	20
Ahmad	25	10	10	20
Zakaria	10	20	10	15
Mohmmad	15	20	25	20
Jossef	20	25	10	15
Total	100	100	100	100

6. Individual Part

6.1 Ahmad

Before the course start, I had many expectations about how I should develop my competences and skills together with my group.

I have learned from this course how to share my knowledge and mentality with others and work together as a teamwork aiming to find good solutions that it could probably use in reality.

My contribution to the project as infrastructure engineer was in developing effective business strategies and make our product more attractive to the target market.

Furthermore, I have learned, as a member of the team, how to work across different engineering disciplines and organize cooperation in a heterogeneous project group.

I have learned a lot about the whole innovation process and especially how to use my knowledge to achieve the optimal solution of our problem at the end.

Personally, as a student I was excited to work and collaborate with students from different disciplines, which improved my innovation mindset and enabled me to add a value to the final product depending on sharing skills starting with defining the problem and ending with finding out a suitable and practical solution.

Personally, even though I have had my first child at the same month I started the course, and it make the study kind of difficult because I had to reconcile between the private life and study. The hardest thing was to find time to meet with group to participate actively with the task, and to find time and surplus to get home and chill with my family.

To have a baby is a very hard thing, I could not sleep for a couple of nights, and that make it difficult for me to stay awake to meet with my group.

But the most important thing is, that after all this, I were an active member in my group, and I did what I should have done, and at the same time, I were a good father and husband for my family

As a building engineer, I also helped the group and my role were to find the ideal place to put the luck in the box, to make it ideal and functional to have it in.

Professionally, I didn’t expect to learn this much from this course (62990) innovation pilot. I acquired my skills by learning how to work with a case using new methods that I didn’t used before, especially with “the Stakeholder analysis “which helped us to identify the specific target group. I have also made a conviction that the different engineering disciplines made it very workable to achieve the result.

6.2 Bashar

Generally, I have learned a lot from the course 62990 Innovation pilot, firstly how to collaborate with a team consists of members from different educational directions to solve complex challenges in companies through using engineering knowledge and thereby train an innovative mindset. Furthermore, I learned how to organize and implement a multidisciplinary innovation process using relevant innovation models and methods as well as technological knowledge.

I learned also how to connect business understanding and value creation with the innovation process aiming to formulate a number of possible solutions and finally choose the best one.

I learned a lot about how to collaborate with a team and how to communicate with the relevant stakeholders through, pitch, prototypes and written presentation.

What did I learn professionally?

Professionally I did learn the problem-solving process step by step and how could effectively manage and run a successful organization and finding a suitable solution by following the problem-solving process and methodology, which includes defining the problem, generating alternative solutions, evaluating and selecting an alternative and lastly implementing and following up on the solution.

Furthermore, the course has developed my own innovative mindset by teaching me how the innovation process goes ahead starting with Idea generation and collection and going through Idea review and evaluation and so ideas that are aligned with our strategic goals and have successfully passed through the evaluation stage can be further developed and so It's time to roll the idea out to the whole company and then start to adopt the idea and implement the solution.

What did I learn personally?

Personally, I learned how do different personalities affect me and affect all the Teamwork and quality of the final product.

I have also learned how to improve the logical mentality I had as software engineer and see the issues not only from logical perspective but also from administrative mentality and organizational and/or practical perspective. The most important I learned is how to merge all these mentalities and perspectives into one entity to reach a complete and integrated solution.

How did I help the group work?

My role as software engineer was focused on the programming section of the project including coding and documentation as well as testing and debugging to check whether the written code is solving the specified problem or not and testing if it is providing the desired output or not.

6.3 Jussef

I have learned many new things from the course “62990 Innovation pilot” as I have never tried to work with so many engineering students from so many different study programs. when you come from different study programs it can be an advantage but also a disadvantage as we all come with different competences. when we formed the group none of us knew each other which I had expected would be one of our first problems that we had to overcome, and we did.

What did you learn professionally

professionally, I learned many different ways to deal with a case. I learned about methods that I had never heard or seen before, for example I learned about the double diamond method, which was completely new to me, where I used to go straight to the problem, I learned that you should start with the discovery phase where you get inside into the problem and then step by step you get closer to a possible solution for your case.

What did you learn personally?

Ability to work with others. Sometimes we think our thought process is the only way to solve a problem but interacting with other people on your team helps you see things from other people's perspectives. There are a lot of learning opportunities as working in teams comes with a lot of different ideas. The best opportunity is that you learn how to work with a team and to ensure the highest possible success rate.

How did you help the group work?

I contributed mainly to the technical and designing part as a mechanical engineering student my job is to design, construct, simulate the product and make sure that the design and the technical stuff can be executed the right way. One of my strong skills is 3D CAD modelling with SolidWorks that I used to make our prototype and show how the lock would look like on the aluminium box.

6.4 Malaz

I have learned a lot from Innovation pilot course professionally and personally. It added a big value to the way I m thinking as software engineer through working in an interdisciplinary team.

What did I learn professionally?

I have learned the basic theory and methods in innovation and business understanding as well as cooperation and communication. I learned how to set up vision and goals for an innovation process by looking at the innovation challenge from different perspectives.

I learned to analyze, evaluate and describe possible solutions to an innovation challenge.

Furthermore, the course improved innovative mindset and helped me how to create a valuable result and how boost my product at the end.

What did you learn personally?

Personally, I realized the value of teamwork and how beneficial it is on a personal and professional level. It taught me the possibility of integrating ideas from different sources and educational background.

I learned a lot about how to communicate with the relevant stakeholders to satisfy them and achieving a solution meeting their requirements.

How did you help the group work?

My task was as software engineer that I contributed to implement the electrical lock to the box and do coding the the lock circuit and collecting the electrical components of this circuit. I have contributed to the testing and debugging to check whether the written code is solving the specified problem or not and testing if it is providing the desired output or not.

6.5 Mohamad

At the beginning of the course, I made a list of my learning goals were improve my entrepreneurship skills, was the essential goal so I can get a huge understanding of entrepreneurship and develop the skills to use it soon in my internship and my future job

furthermore, how to develop my communication skills and learn how to work more effectively in a group there are several things I had learn during participating in this course first of all the amount of time takes me to solve a specific problem and what type of research and how much research have to be done to solve a problem

What did you learn professionally?

professionally, I have learned a lot of things throughout this course, I have learned several methods on how to describes the problems from different aspects, how to dive the main problem into small problems to make it easy to deal with it furthermore how to define clearly the Hard Nut of any problem and I came to an important conclusion that the most profitable way to approach an innovative solution is first defined the problem clearly , not to think about the solution.

Also, the course helped me how to think differently as an innovator, as well as how to analyse the issue instead of solving it immediately. One of the theories I have learned from this course and I found more interested in me was the double diamond. A helpful tool that helped me find innovative solutions.

What did you learn personally?

On a personal level the thing I have learned from this course was gaining a larger social circle and getting to know new people, I have developed personally. A side from that, I have stepped over some boundaries, which I am eternally grateful for. This course has completely changed

my perception of the concept teamwork, and I am incredibly grateful for it. In the ending of this course, I gained so much knowledge and experience.

furthermore, the course helped me to develop my communication skills and how to communicate more effectively with my group member. I learned how to adapt with the workgroup quickly through daily communication and knowing and understanding the people I work with.

How did you help the group work?

I contributed to the electronic part of our solution, where my background as a student of electrotechnology helped me with programming the lock and build up the prototypes and doing the research for the content of the prototypes, I also helped create the pitch and develop our idea and helped my group member in the mechanical part of the lock.

What do you take with you to future projects?

As a result of the course, I will be able to apply my knowledge and experience I had gain from this course. This course has also introduced me to some useful analysis models and tools that I will use in my later work as an engineer. The most valuable thing I will take with me in the future is when I am working in groups or with clients, communication is crucial. and having regular status meetings in the group is helpful in keeping track of where things stand.

6.6 Zakaria

In the course "62990 Innovation Pilot " and in the work with the case expansion of an idea at different stages, we participants had to form groups of 6. Perhaps a requirement for group formation has been that we should not have been together and form different education fields. This requirement has both meant that the group has been supplied with different resources in the form of students who have experience in other areas of work than those I am used to.

The group members started the collaboration by going through the exercise "The Group's Rules of Play" to try to match the expectations of each other and the dynamics and wishes of the group, which was nice to get in place. I don't think any of the members feel of need to move on, although it would have been interesting to see how the dynamic would have developed if we have had more time together.

Idea generation

Already on day 1 we were thinking of ideas, we didn't get that far, but we got the process started. For day 2, we continued to come up with more ideas. On the same day we did our Brainwriting and brainwalking where we sparred with each other and did more idea generation and tried to develop each other's ideas.

We used brainwalking, where we individually developed the ideas that were put forward on "Miro", and ideas that had to be developed on, went round so that we all got around to each

other's ideas, then we did Brainwriting so that we could further develop together on all ideas and discuss which one we should take further, and which solutions were best.

Overview of used tables and tools

In the course "62990 Innovation Pilot " we were introduced to many different tables and tools that we could use for our business plan phases.

The competence exercises.

Inside Miro, we created a triangle where we mapped our expertise, from education, professional experience and personal. It was quite good for getting to know each other and our skills, so you know more about each other's strengths and weaknesses.

Design Thinking

We used this method somewhat loosely. Because we don't know much about this area we work with (producing milk). We then sent a questionnaire and called around to various companies to collect enough information. Therefore, we found various pre-sales that could be used or not used.

It's a fairly simple method to do at the start of your idea and it doesn't cost that much.

Business analysis

"Business Model Canvas"

Gives us the opportunity to create an overview of the whole concept is connected, the advantage of using the Business Canvas is that it puts the company together in that model.

"Value Proposition"

Looks up to BMC and gives us an insight into the group of people we help and the solutions we find and what kind of gains, pains, we give to our customers. As well as pains, gains, and what kind of service business gives to customers.

We have used the method to better understand customers' needs.

"Competitor analysis"

Here we have spent time getting to know our company's competitors and how we can differentiate ourselves from them.

"Stakeholder analysis"

Here we have used the method of dividing our stakeholders into 4 parts on a graph. Those who have a large or small influence on the project. The benefit is understanding our stakeholders and how they are involved in our project.

What have I learned from using those tools?

Personally, I have learned a lot about theories by using these tools and methods. I have learned a lot about the perception of what and how a theory is used has been an important learning for me.

I have also learned that at the start of the idea generation phase, we should not think of solutions at the start, and the most important thing is to develop the idea and think outside the box and be creative. Because it is so easy that you get so many good solutions at the start.

Learning from peer feedback session

I have learned that it has been important to be open, to be able to accept feedback positively and to give positive feedback to others. It was important not to focus on the mistakes you make, which may not be good for the recipient.