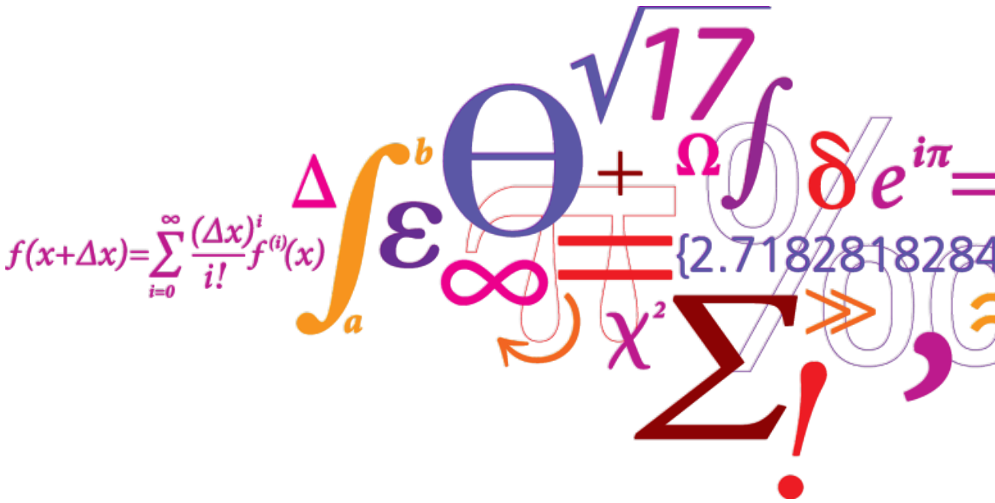
Innovation pilot – to improve innovation competencies of engineering students

Hanne Løje and Sara Grex



Hands on session
ETALEE Conference
Odense May 2017

DTU Diplom
Center for Bachelor of Engineering Studies

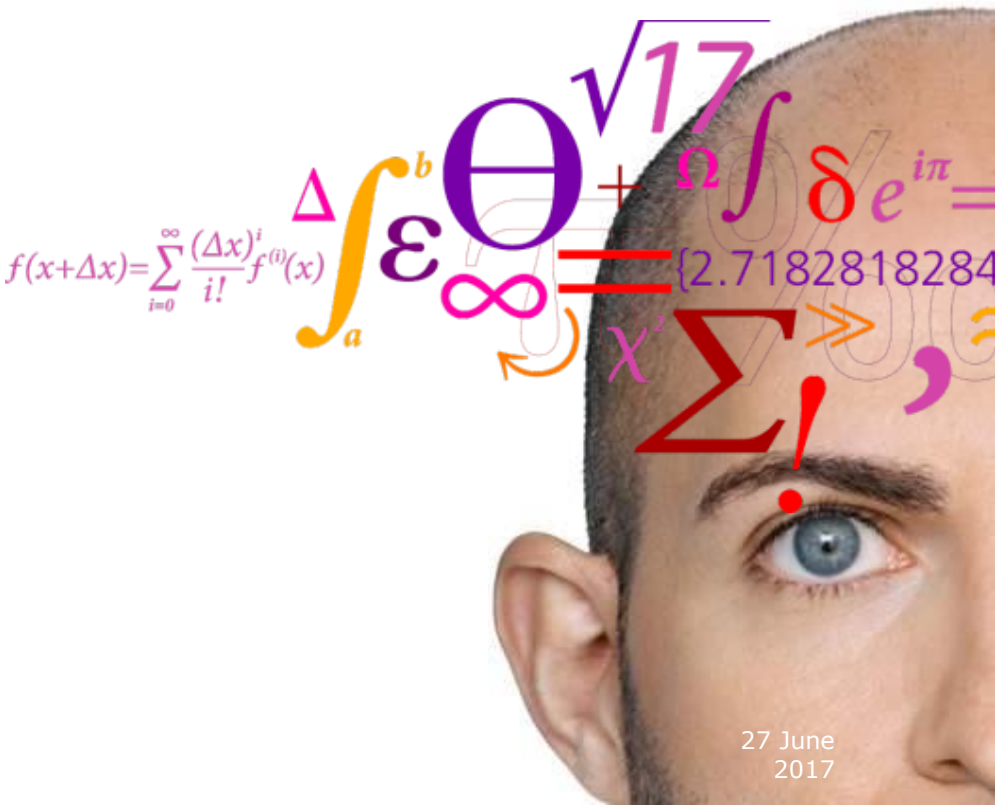
Outline:

- Welcome
- Introduction to the workshop
- Hands on session
- Sum up and thank you for your participation

Our question is

How to enhance innovation skills/competences in a large mandatory course with heavy company involvement and students for many different study programs?

Background


$f(x+\Delta x)=\sum_{i=0}^{\infty}\frac{(\Delta x)^i}{i!}f^{(i)}(x)$
$\int_a^b$
$\sqrt{17}$
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Innovation Pilot – a new mandatory course for all bachelor of engineering students at DTU

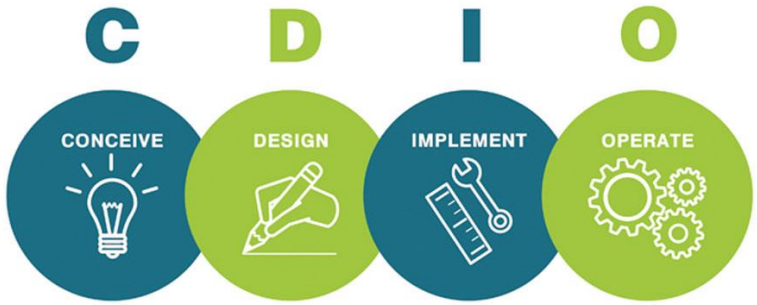
The history behind the course

In September 2014 the first version of the new developed CDIO-based diploma (B.Eng) programs were launched at DTU.

The programs are the result of a comprehensive merger process of former diploma programs, namely the programs at Engineering College of Copenhagen (now DTU Diploma) and the Technical University of Denmark.

The most significant new activity in the programs was the introduction of a common 10 ECTS compulsory course in Innovation in the later part of the programs.

The idea behind this course is to give students the opportunity to collaborate on inter-disciplinary real-life projects. This course strengthens not only innovation skills but personal and interpersonal skills as well.



Facts about Innovation Pilot

Course duration:

- 13 weeks spring/autumn and summer (July-August)
- 10 ECTS points (1/3 semester)
- App. 400 students per semester
- Mandatory course

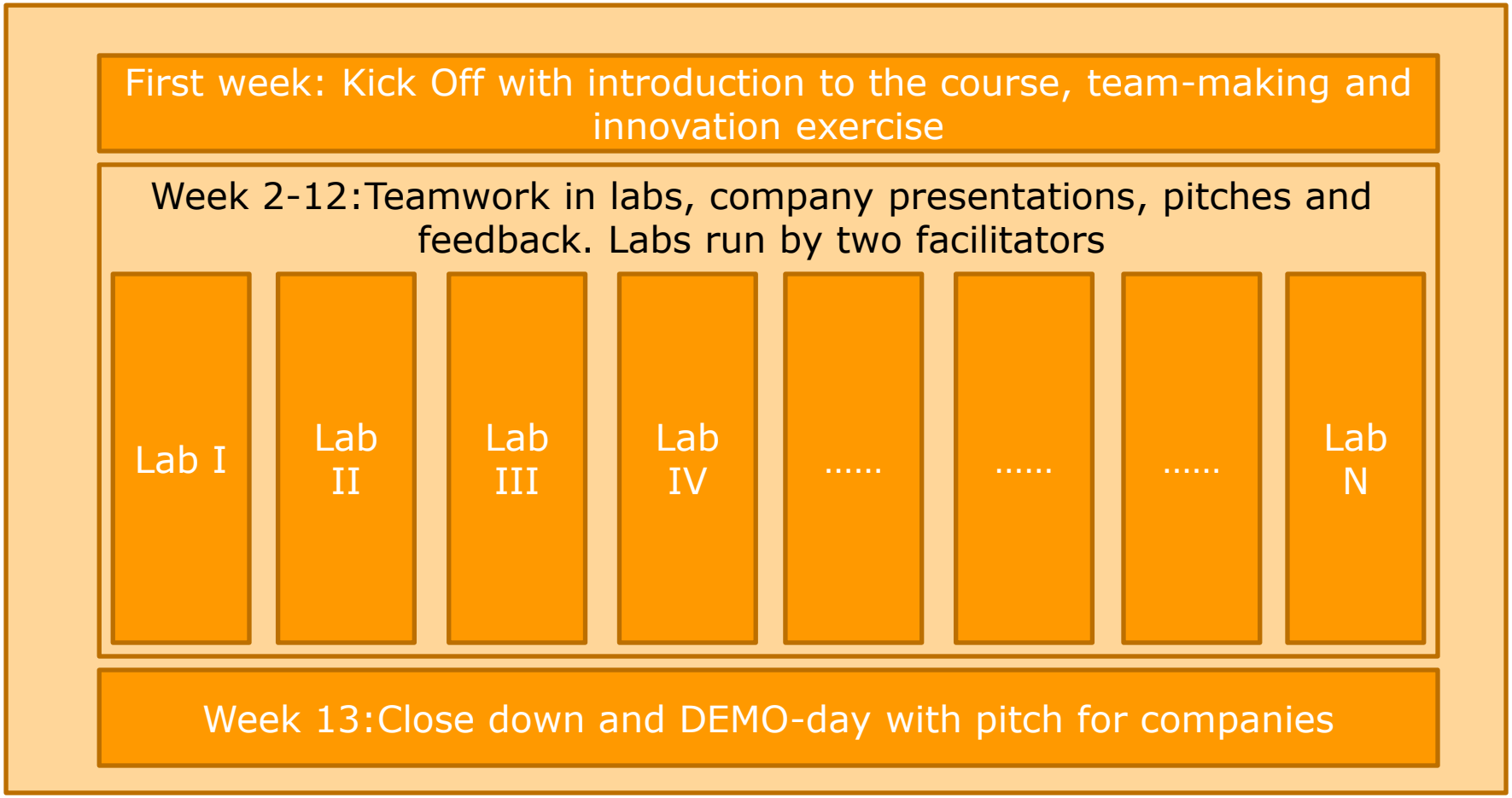
Teaching way and -material:

- Teaching material (video's + documents) are placed at CampusNet with links to the videos (you tube channel)
- The teaching form is based on blended learning with e-learning as preparation before each Wednesday and workshops/group work as work way on Wednesdays.
- The course runs each Wednesday from 8-17 (semester)

Type of assessment:

- 7 step scale, internal examiner
- All aid
- Evaluation of reports
- Evaluation is based on e-learning exam, process report, innovation presentation. The final grade is an overall assessment of the mentioned elements

Organization of the course (semester structure)

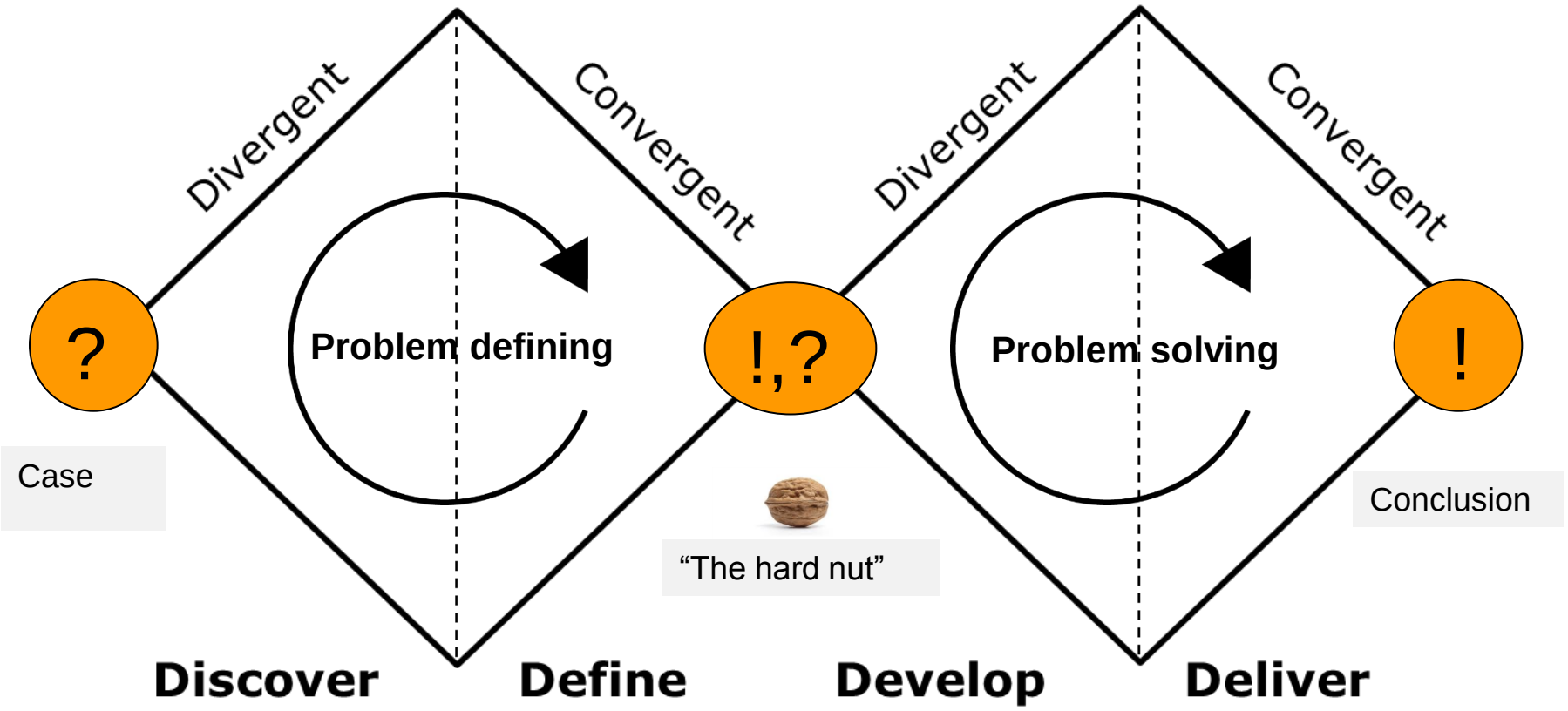


Facts about the course

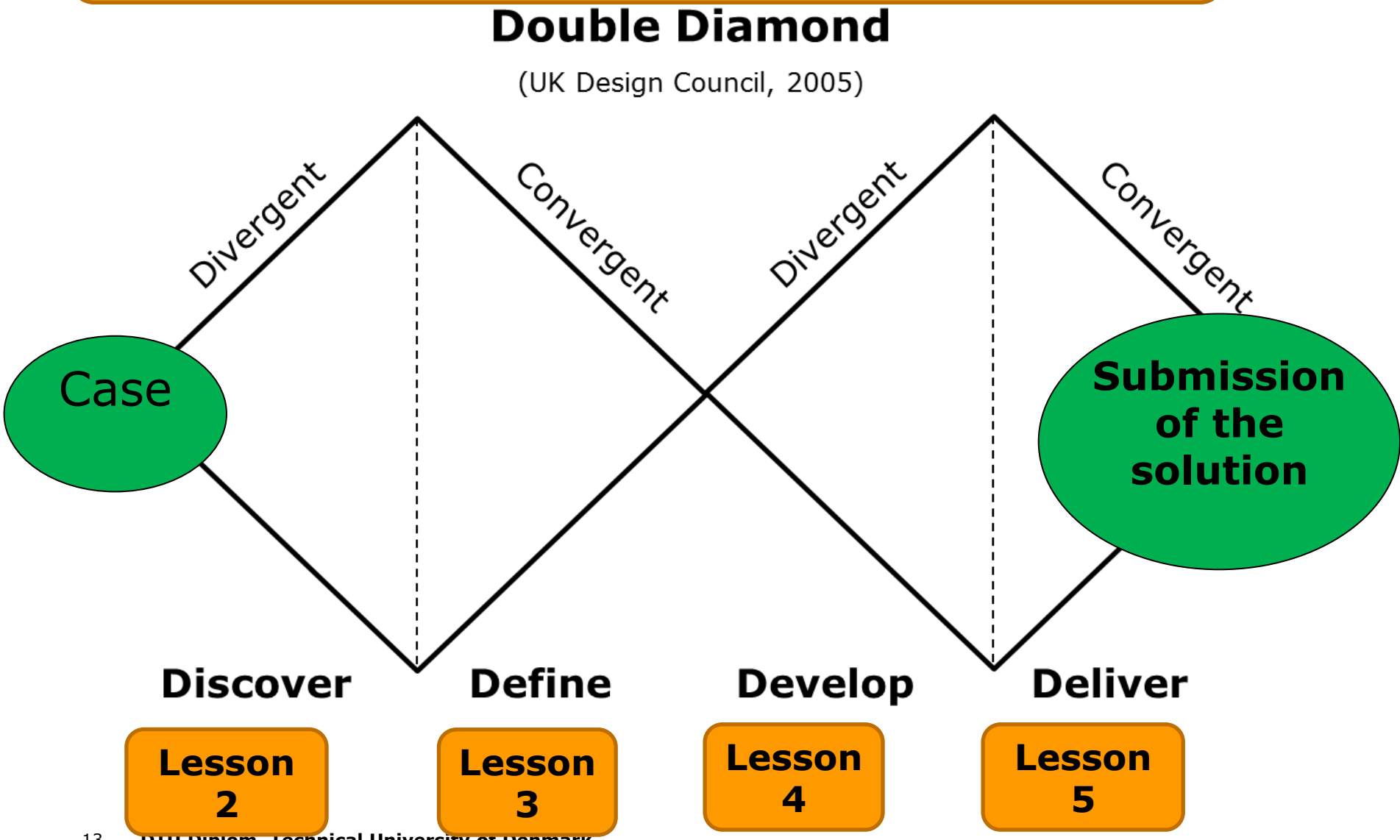
Year	Students (no.)	Groups (no.)	Labs (no.)	Facilitators (no.)	Companies (no.)
Spring 2016	42	10	1	2	5
Autumn 2016	233	42	5	10	21
Spring 2017	272	53	6	13	21
Summer 2017	*80-100*	*15-20*	*1*	*3*	*4*
Autumn 2017	*430?*	*70-85*	*5-6*	*10-12*	*25*

Double Diamond

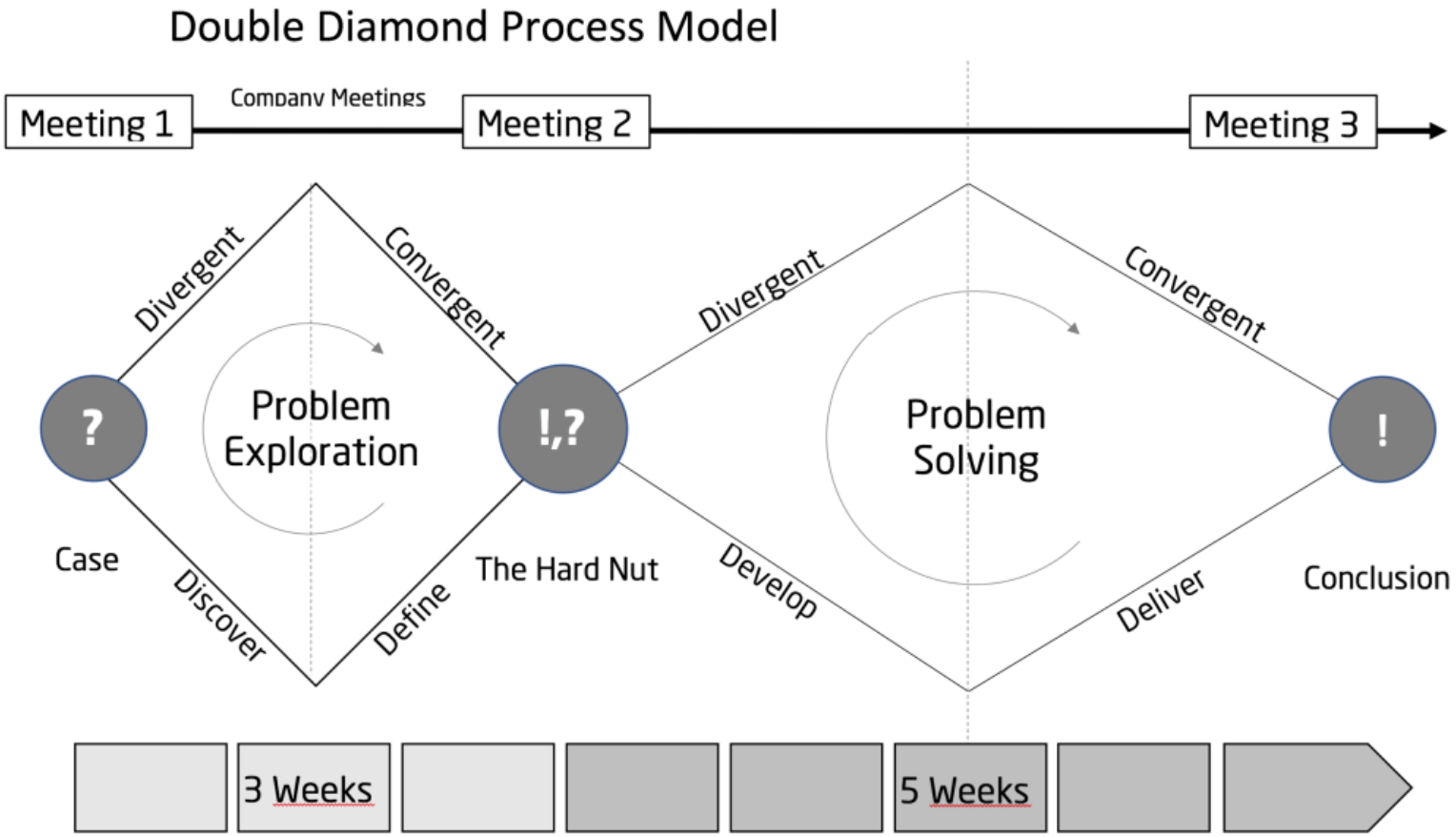
(UK Design Council, 2005)



First loop


Double Diamond
(UK Design Council, 2005)
Divergent
Convergent
Divergent
Convergent
Case
Submission of the solution
Discover
Define
Develop
Deliver
Lesson 2
Lesson 3
Lesson 4
Lesson 5

Second loop

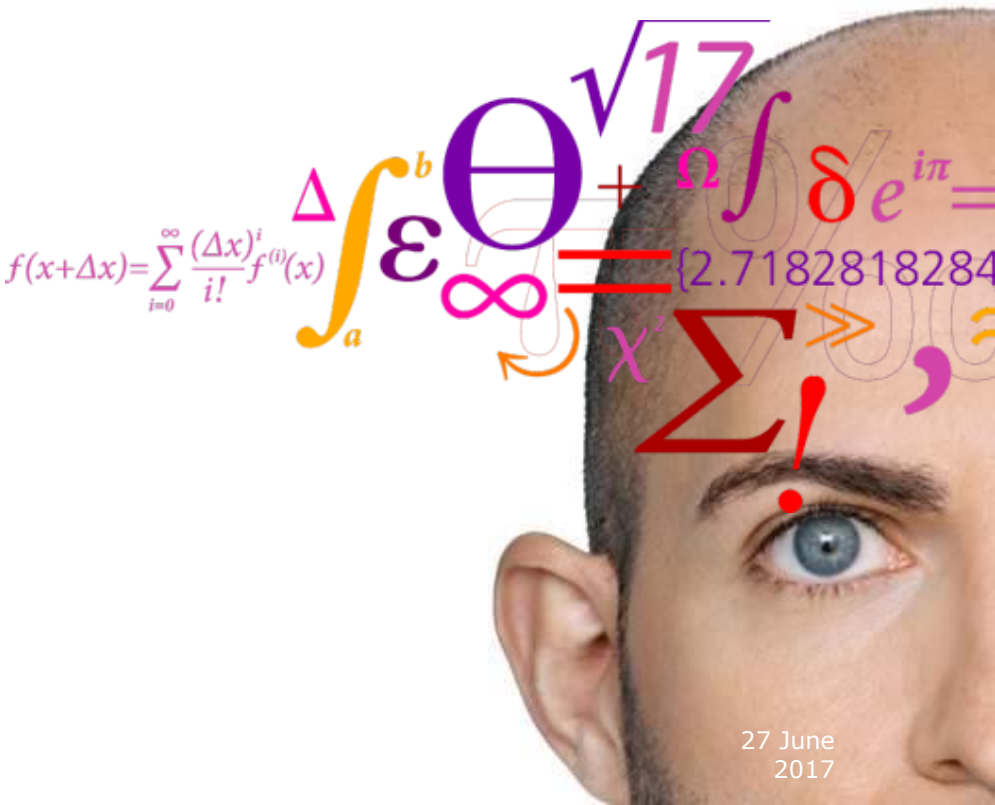


From Løje and Grex, 2017 (inspiration from Design Council)

Double diamond – a process tool to structure an innovation process

- To understand the problem before focusing on the solution
- Involvement of potential users and other stake-holders
- Make prototypes
- Make use of existing knowledge and experts to achieve a better solution

Hands on activity



Outline for hands on activity

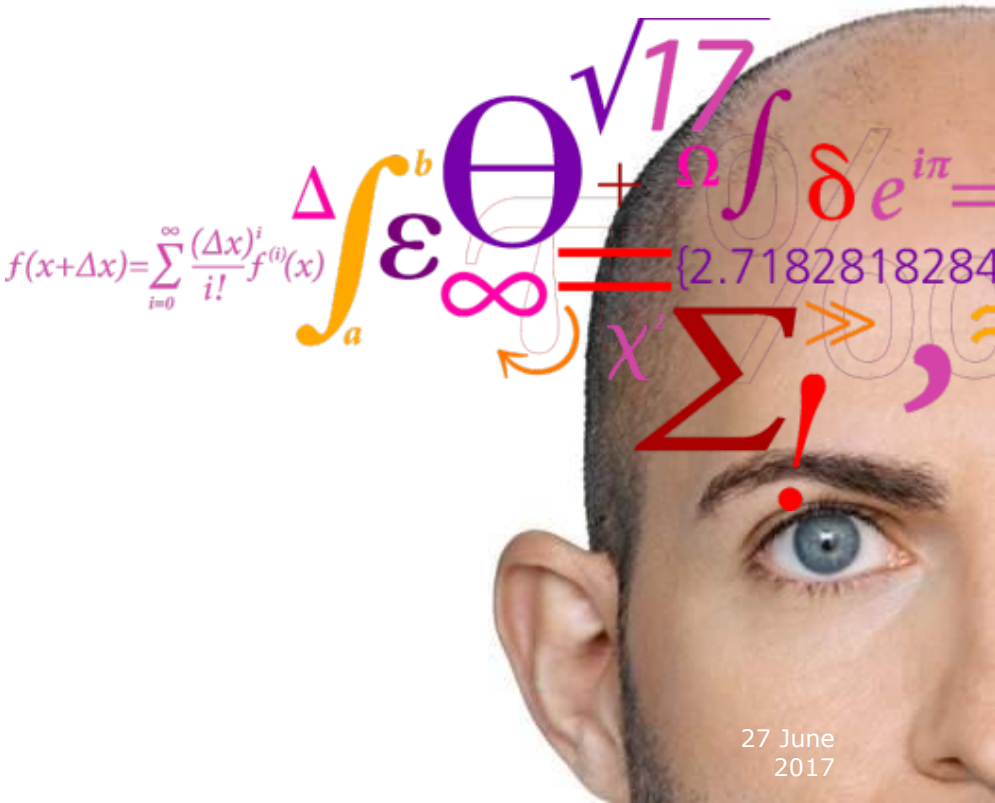
- Introduce you self to each other (name, working place and why you are here (conference/workshop))

- Part one:
  - First question "What is your experience with double diamond or what is your impression about double diamond from the short introduction?"
  - Discussion of the first question

- Part two:
  - Second question "Other suitable model than double diamond?"
  - Discussion of the question

- Sum up

Introduction to part 1



1. What is your experience with double diamond or is it the first time you hear about it?

Introduction to part one

In the course innovation pilot we have used the process model double diamond since last summer.

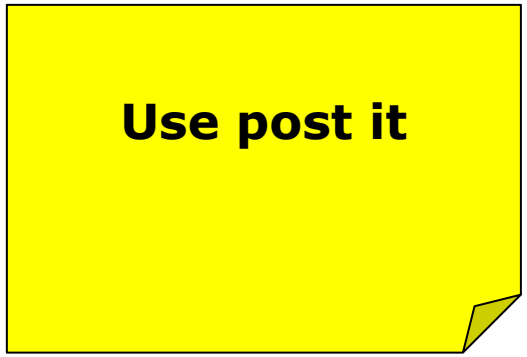
However we are still interesting in further development of the model and to hear your experience with the double diamond model and if it is the first time you hear about the model to hear what you impression of the model is after the short introduction

Part one - outline

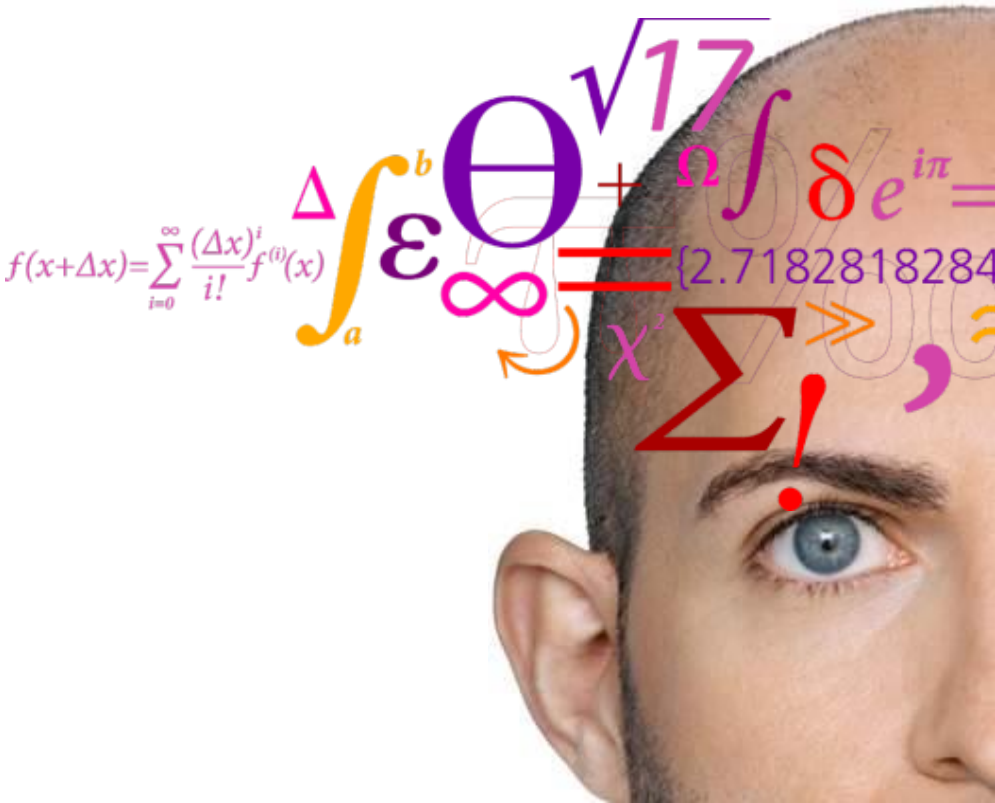
- Each person spent 2 minutes to think about their experience with double diamond and pros/cons and write key words on post it. If you have not worked with the model before – can you se some possibilities in using the model in your work?

- Talk with your neighbor and discuss your experience and also pros/cons highlight 3 things from your discussion to present for the other groups

- Presentation and discussion in plenum



Introduction to part 2



Introduction to part 2

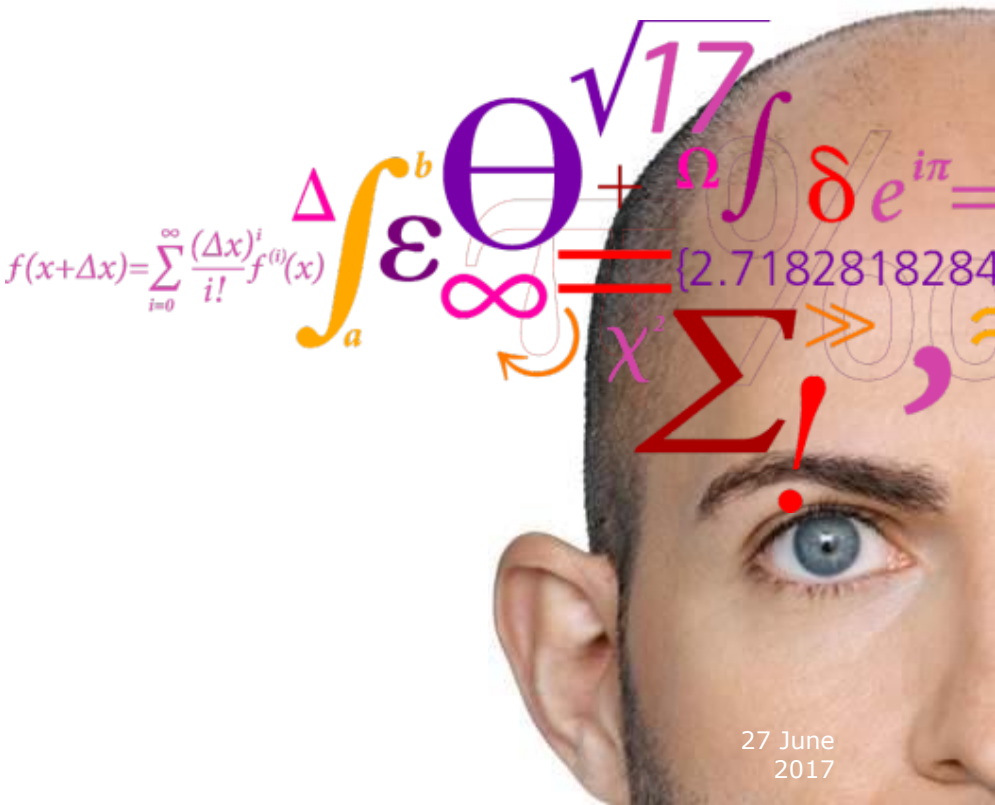
To continue from part 1 we would like to hear your experience with other process models

2. Which other process model are available and can they be used in teaching?

Outline part 2

- Every one find a new group and present them self shortly to each other
- Each person spent 2 minutes to think about other process model and write keywords on post it.
- Talk with your neighbor and discuss your experience with other models and also pros/cons highlight 3 things from your discussion to present for the other groups
- Presentation and discussion in plenum

Sum up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Double Diamond

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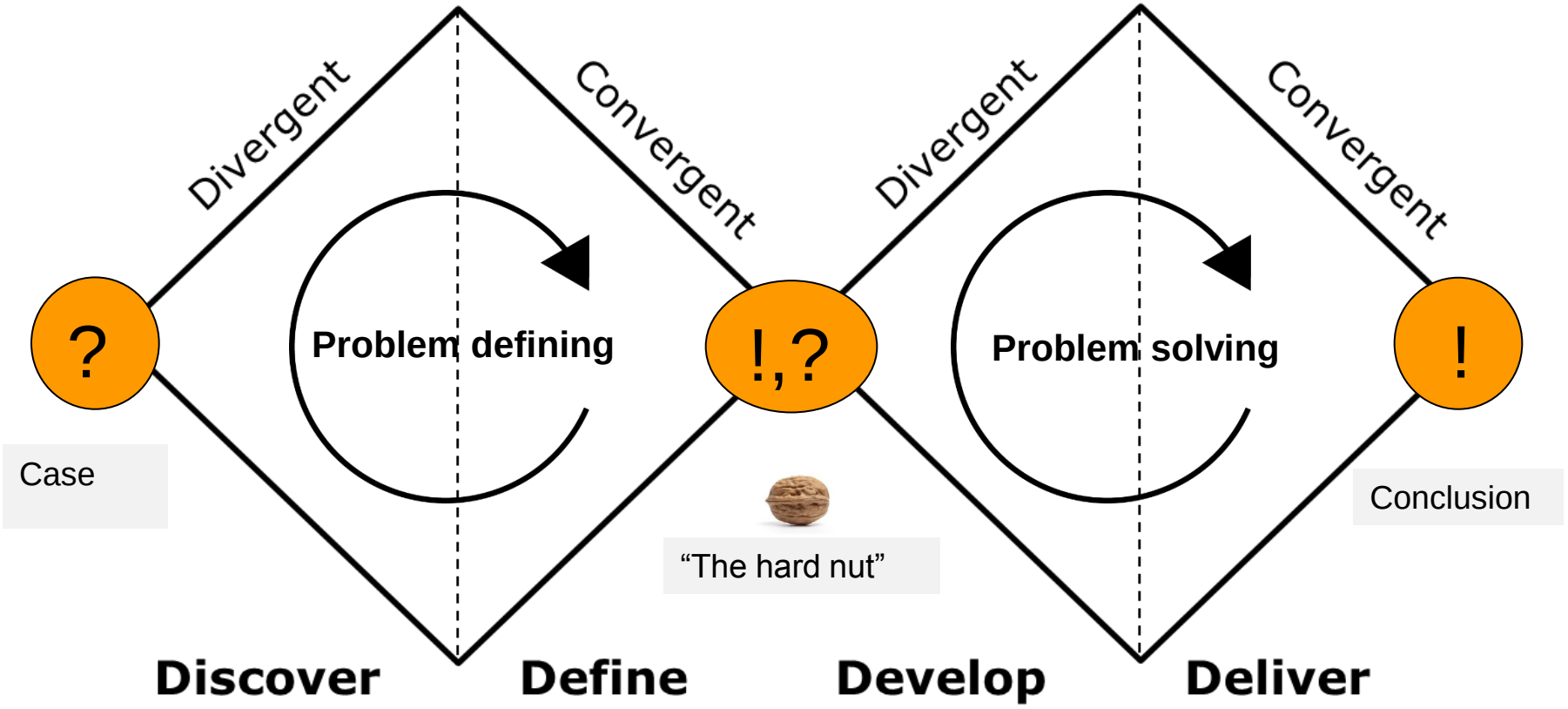


Double Diamond in Innovation Pilot

- Double Diamond is the process model in the course, which is used to train the students how to structure an innovation process, which includes a problems defining phase and a problem solving phase

- Double diamond is a simple and intuitive model

- Double diamond is a good model to use when there are many students with different backgrounds and difference experiences with innovation and also great difference in motivation and commitment

- Double diamond should be combine with a range of tools and methods which can support the students work during the different phases in the model

- Double diamond is a model, which is used in many companies

Pros and cons of double diamond model

Pros:

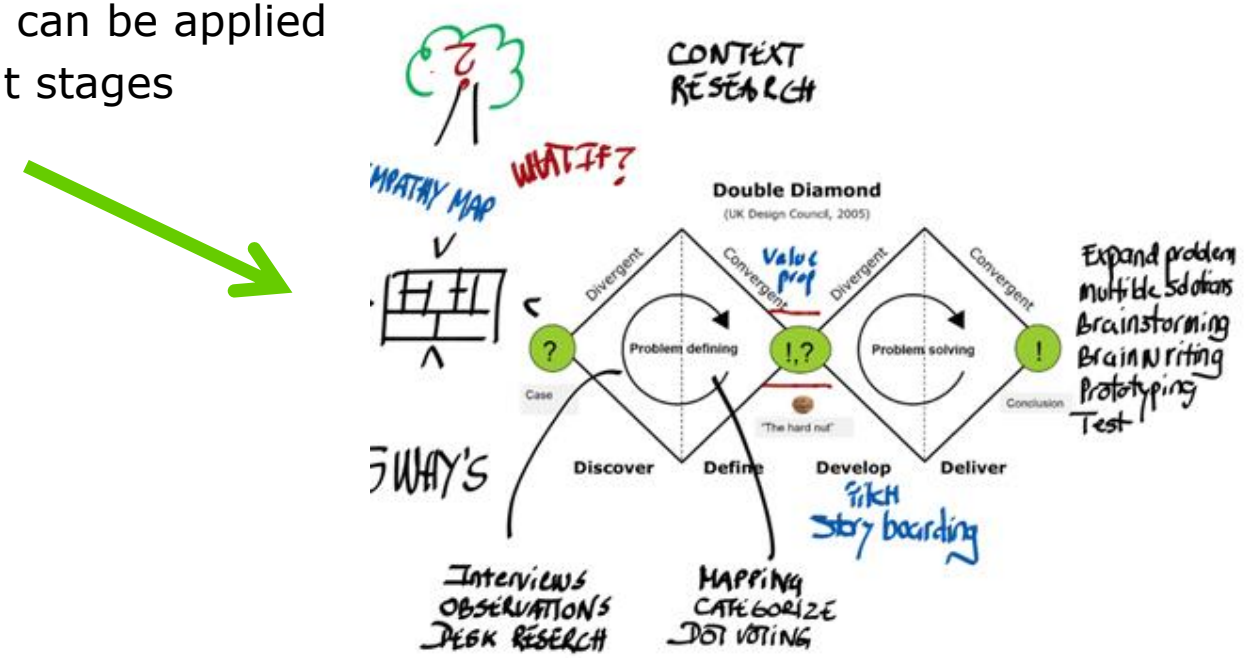
- Give good structure
- Easy for the students to understand and use

Cons:

- Can be a challenge to stay in the divergent phase without focusing on solutions

Statements from students

- They can easy adapt to the model and it give a good structure
- It is a simple and intuitive model to use when you have never worked innovation and process models before.
- Different tools can be applied in the different stages



Next step

- We will use your input for optimization the process model used in Innovation pilot

Reflection or comments?

Thank you for your attention