'Jiihaa, it is almost summer!'

WAT Synthesis Session

WITH PHOTOS OF DISCUSSION SYNTHESIS

24.5.2017 @ Open Innovation House

PROGRAMME

13:00-14.00 Introduction & video assignments

14:00-14.20 Coffee

14:20-15:45 Feedback on our Master's Programme

- *Synthesis on your survey answers + reflections / Meeri (10 min)*

- *Assessment of programme-level learning outcomes (30 min)*

- *Group discussion with your mentor (10 min + 10 min + 10 min)*

- *Open discussion (10 min)*

15:45- Next steps: 2nd year, incl. exchange + Master's Thesis

> *Survey prize by Meeri*

→ Akva & WAT 'vesikahvit' at Water Building from 4pm onwards!

![Aalto University logo]

What is Water & Environmental Engineering?

Your video or other assignments!

*→ Group by group from 1 to 6,
short Q&A after a set of two videos*
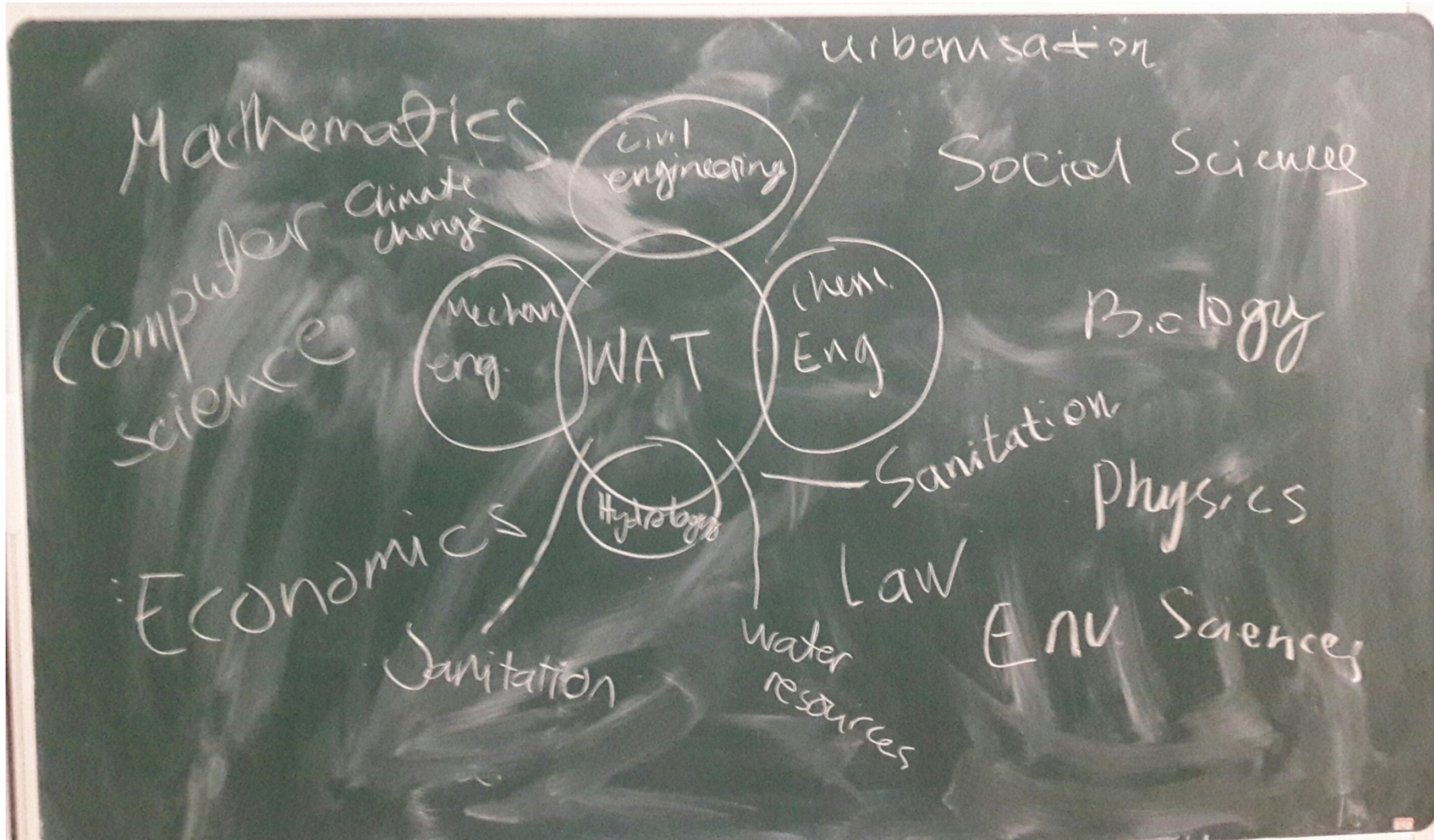
SUMMARY OF YOUR PRESEN-TATIONS

→ WAT as technical; as problem solving process; as different and personal (i.e. diverse); as multi-disciplinary field

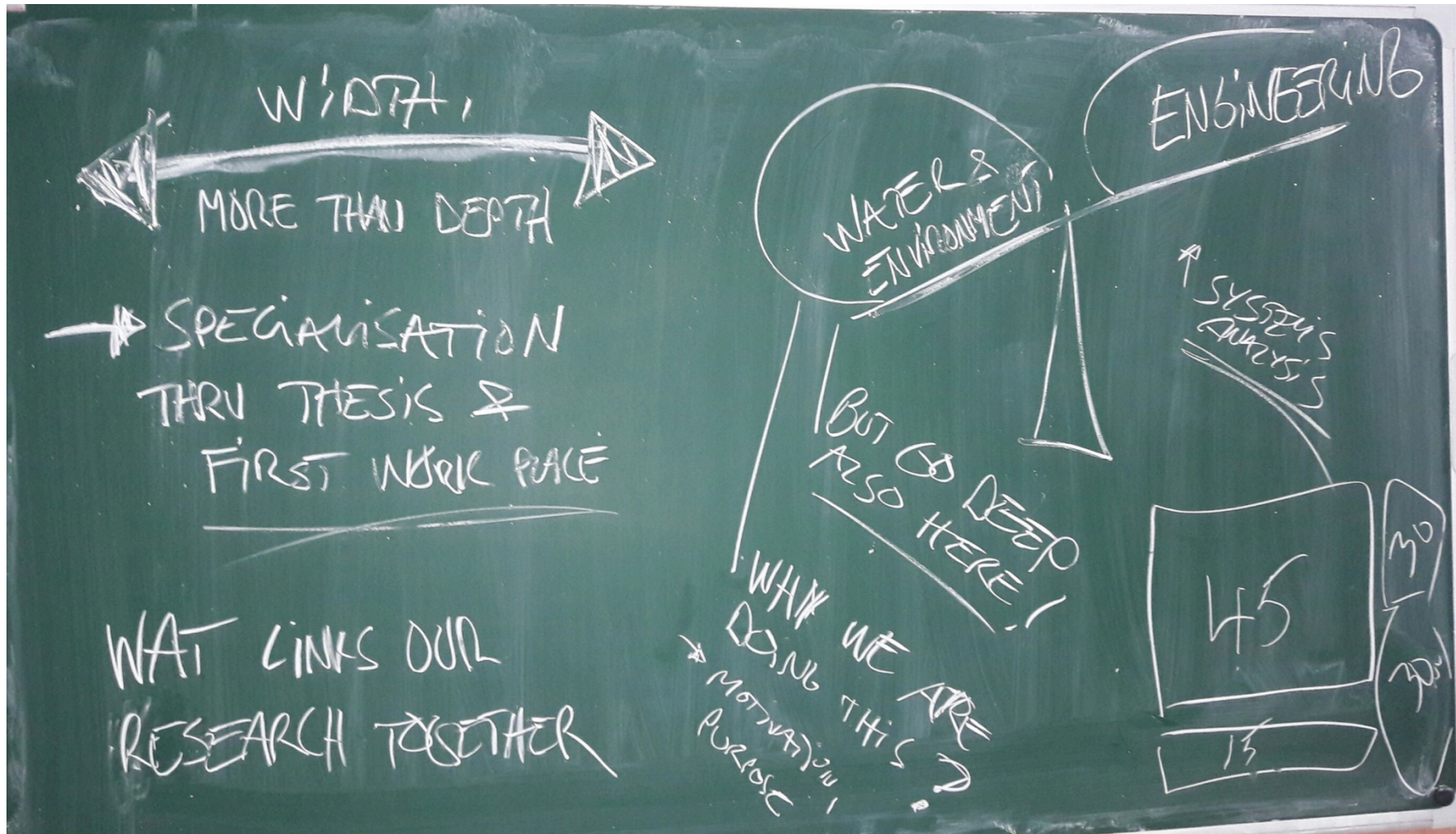# SUMMARY OF YOUR PRESENTATIONS
→ WAT as multidisciplinary field

SUMMARY OF WAT STAFF

→ WAT courses provide broad view while Thesis gives specialisation; balance between W&E and engineering

A? Aalto University

Feedback on our Master's Programme

You are the ultimate -and only- experts
of our new WAT Master's Programme:
thank you for sharing your views & visions
on how to improve it!

WHY TO GIVE FEEDBACK?

Feedback is important for both you and us, as it:

1) Helps you to look back and **reflect** what you have learned and what not - and why (thus links to portfolio process)

2) Provides teachers and Aalto leadership information (**feedback**) on how we succeeded in our teaching

   → Helps us to develop the programme

   → Direct link to Aalto's PDCA cycle

3) Benefits thus future students, as **ensures better courses & programme**!

Plan what to do; strategy, roadmaps, plans, process descriptions

PLAN

Implementation of the processes, development projects

ACT

Continual improvement

DO

Actions to improve processes

CHECK

Monitor, evaluate, measure processes
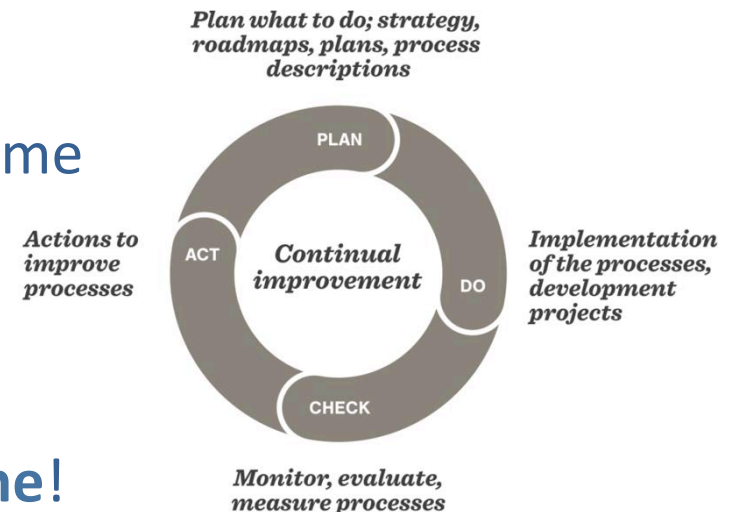
PDCA – Plan-Do-Check-Act

WAT SURVEY 2017 - MAIN RESULTS

- 77% have gained more than 50 credits as planned. 70% has worked during studies

  - Working hindered studies for some, but for some not

  - V period challenging

- Knowledge, skills and identity: everyone has learned something and thought about how to differentiate between these three

  - Skills: modelling, many software, data analyses, applying math, big data

  - Identity: group work, sustainable and multidisciplinary thinking, international environment, English, critical and academic thinking, engineering approach, communications

WAT SURVEY 2017 - MAIN RESULTS

- Portfolio process: 24/27 found benefits = documenting and visualizing own learnings, recalling and structuring what one has learned, understanding the entity of all the skills and knowledge gained

  - Time-consuming, submission too often, more feedback, did not facilitate to think about own learning or selecting courses, mentoring mainly a good thing, groups varied a lot

- WAT programme & teaching: Almost 90% somewhat/very/ extremely satisfied with the programme and teaching

  - Less group work, mandatory sessions and poorly planned/ implemented teaching

  - More in-depth knowledge and presenting current research, modelling, software (GIS, MatLab etc), lab work, analyzing of data, applying the theoretical knowledge discussed in lectures

Knowledge

- Each of you have been able to identify the central knowledge relevant for your own path

- Unique paths, → diverse graduates!

Water treatment technology, surface runoff generation mechanisms, laboratory analysis of water samples.
The most important knowledge is concerning the methods of risk analysis. Other knowledge that I have gained is technical knowledge of water pipe planning and such. All other knowledge provided was already familiar to me from my former degree.
A better understanding of the behaviour of water in different conditions, whether in groundwater flow or a water supply system. They're very important in any task related to water technology.
- water treatment methods - water treatment systems - waste treatment basics they are related to what I'm interested in and are the basis for further studies
Water and wastewater network design Urban planning Water quality issues Field working Multidisciplinary working Risk analysis
Groundwater flow, catchment hydrology, nutrient/pollutant runoff. These I consider important because I have a personal interest in them. Also if I would continue as a researcher in the field, I would propably go towards this water resources side. I have also learned a lot about development work, it's pros and cons and the important things to consider when planning the actions. This is important for me because the few actual thoughts I have had about career after school have involved doing good and being a specialist for NGO's would be a nice aim.
I have learned many things, but for example I recognise the key institutions related to water governance in different settings and also I understand the importance of the water assets as a critical infrastructure of the sustainable and functioning society. I consider these important because I like to learn about how the world works and what affects what.
I got knowledge for example on urban water systems, ecological sanitation, risk analysis and environmental management in industry.
More knowledge about the big picture in water field and governance. Something about entrepreneurship. Not that much actually, as my baseline was pretty good already I think and I had to drop the most useful courses.
How to break-down parts of a system into smaller parts and create a model out of them in order to understand its behaviour and/or predict a behaviour.
Water resources engineering, hydraulics and water and waste water treatment and design of such systems. Besides these, I learned to use some modeling tools, e.g. excel for modelling, Matlab and SMWW systems. I think these are going to be important in the future career but also during my exchange.
During first year of study in Aalto University, I learned several things such as for mathematically solving problem, few software in modelling, critical analysis etc. But to say central piece of knowledge is understand the nature and how important it is for us and future generation.
I've learnt a wide variety of different subjects but in my opinion the central piece of knowledge I have gained is the ability to consider a wider scope in my thinking.
The courses were so short, that it was only possible to get a glimpse of a subject. So now I know that there are much more feilds of environmental engineering that I knew before. I guess that's the main thing I've learned. I have improved my knowledge of a lot of subjects, but I wouldn't say I became an expert in any of them. I think this Master's provides an overview of a lot of subjects, but becoming an expert in a period of 7 weeks is pretty challenging.
Water utility, network design, biological processes, especially the biological process part. I had only the very basic knowledge from the biology and chemistry (only one courses for each in highschool) and one basic chemistry course in the batchelor. Therefore I have learnt a lot from biological processes during this spring.
Some important things that I learn during the first year of Master courses are working in group, time management, and computer skills, especially software related to major.   All these listed things above are also the needed and sufficient things when working in the real situation. That why I am concentrating in those.
Hydrology and built environment
Fluid mechanics and math. Also some hydrology and hydraulics from WAT courses.
Environmental governance and waste treatment in Finland. Understanding of governance can be valuable in work life. Waste treatment is interesting because it touches upon everybody's everyday life and I did not know much about it before.
Everything

Expectations met?

Yes 74%

No 33%

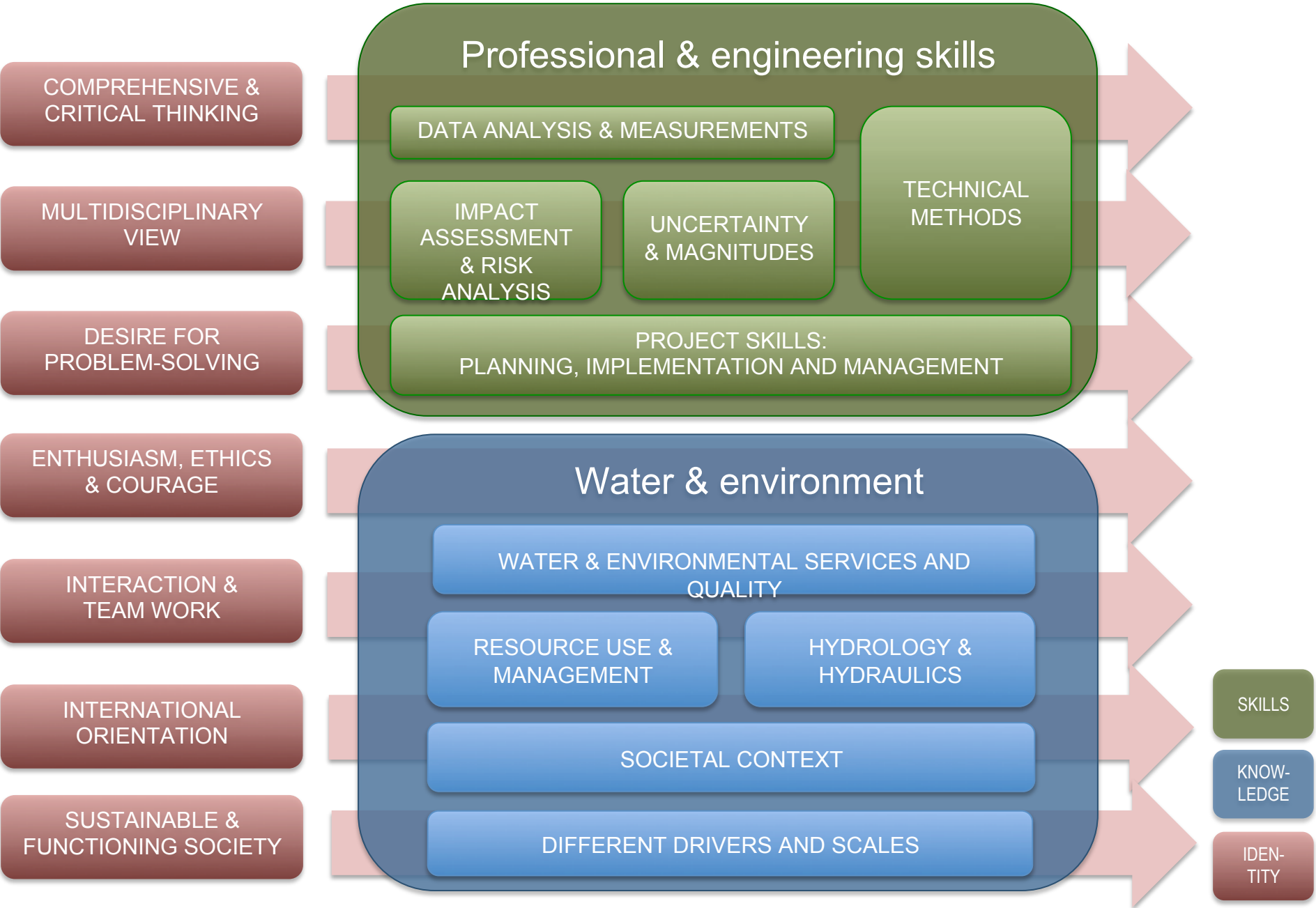**(No expectations 1%)**

Interesting courses and freedom to choose own path
I was interested in modelling water related stuff. I have learned basic from different course.
Technical methods
It was mostly what I expected, as in, I learned about water technology
I see good effort here, teachers seem motivated in what they do
I got what I wanted
I have gotten knowledge I hoped to get, ad participated in very interesting courses.
The courses I have studied have prepared me to start working on my master's thesis.
-
I have deepen my understanding in certain topics
Mostly it met, maybe there would have been even more courses which are linked to each other. I sometimes had the feeling that I am taking this specific course but have no "part 2" of it and the learning was just 7 weeks.
because I gained knowledge
Mostly yes.
many interesting courses, a lot of hands-on exercises including real designing
It is kind of active environment where no space between students and teachers.
Very interesting courses
Courses were good
Despite some problems, I have learned a lot.
I was not even sure if I was in the right field but after the year I know I am :)
It has met all my expectations
of reasons listed above
Expected better organized courses.
Not enough new info
I expected more environmental engineering courses.
answered in previous fields
I expected sometimes better teaching methods
I was hoping to improve more techinical skills
I had maybe too much expectations, but the level of difficulty did not rise to my expectations to a Master's programme in Aalto. Could also be that I am not sure that I am where I'm supposed to be.
The courses have not been demanding or relevant enough

WAT COMPETENCES AND LEARNING OUTCOMES?

Our programme-level learning outcomes

COMPETENCES

Professional & engineering skills

- DATA ANALYSIS & MEASUREMENTS
- IMPACT ASSESSMENT & RISK ANALYSIS
- UNCERTAINTY & MAGNITUDES
- TECHNICAL METHODS
- PROJECT SKILLS: PLANNING, IMPLEMENTATION AND MANAGEMENT

Water & environment

- WATER & ENVIRONMENTAL SERVICES AND QUALITY
- RESOURCE USE & MANAGEMENT
- HYDROLOGY & HYDRAULICS
- SOCIETAL CONTEXT
- DIFFERENT DRIVERS AND SCALES

COMPREHENSIVE & CRITICAL THINKING

MULTIDISCIPLINARY VIEW

DESIRE FOR PROBLEM-SOLVING

ENTHUSIASM, ETHICS & COURAGE

INTERACTION & TEAM WORK

INTERNATIONAL ORIENTATION

SUSTAINABLE & FUNCTIONING SOCIETY

SKILLS

KNOW-LEDGE

IDEN-TITY

Our graduate is able to:

knowledge

1) Recognise the key **thematic components in water and environmental engineering**, and understand the relevance of **sustainability** for the field

2) Understand the principles of the **hydrological cycle** and movements of water in natural and constructed environments, including quantitative estimates of the water fluxes

3) Define and differentiate the main sections of **water and environmental services** and related infrastructure, including treatment of water and waste water

4) Understand the key principles of **water and environmental quality**, and their relation to pollution, contamination and restoration as well as to ecosystems and human health

5) Recognise the key **resource use and management systems**, including those related to water resources as well as to material and resource efficiency and waste management

6) Identify the **societal context** relevant to the water and environmental engineering, including the key institutional, legal and economic **aspects**

7) Comprehend the different **scales** (spatial and temporal) and **drivers** (e.g. climate change, population growth, urbanisation) applicable to water and environmental engineering

Assessment results – the number of times students mentioned the learning outcome as one that s/he has learned most (GREEN) and least (RED):

1) 5 / 2, 2) 9 / 3, 3) 9 / 1, 4) 4 / 5, 5) 2 / 9, 6), 7 / 4 , 7) 6 / 3

skills

Our graduate is able to:

1) Explain and apply **key technical methods** (e.g. modelling, statistics, GIS) related to water and environmental engineering

2) Understand relevant **data analysis and measurement** processes, including the use of data archives

3) Deal with the **uncertainty and different orders of magnitude** related to the measurements, data analysis and modeling

4) Understands the principles and key methods of water- and environmental-related **risk analysis and impact assessment**

5) Recognise and analyse the main components of water- and environment-related **planning, implementation and management processes, and use related basic project skills**

Assessment results – the number of times students mentioned the learning outcome as one that s/he has learned most (GREEN) and least (RED):

1) 14 / 1, 2) 9 / 2, 3) 6 / 6, 4) 2 / 12, 5) 10 / 3

Our graduate:

identity

1) Thinks in a comprehensive and critical manner about his/her work and field

2) Maintains a multidisciplinary and -sectoral view related to water and environmental engineering

3) Is motivated and has desire for problem-solving

4) Is enthusiastic and has high level of ethics at work

5) Is able to work as a part of a team and has relevant skills for interaction and communication

6) Is internationally orientated and is aware of global dynamics related to water and environment

7) Promotes a sustainable and functioning society, and is aware of how welfare builds on the sustainable use of water and the environment

Assessment results – the number of times students mentioned the learning outcome as one that s/he has learned most (GREEN) and least (RED):

1) 10 / 3, 2) 6 / 2, 3) 7 / 0!, 4) 3 / 3, 5) 7 / 2, 6), 4 / 2, 7) 5 / 5

Assessing what you have learned

1) Go through the given programme-level learning outcomes

2) Pick three learning outcomes that you have learned most of

3) Pick 1-2 learning outcomes that you have NOT learned

NOTE: write clearly as we'll collect this form!

	3 OUTCOMES YOU HAVE LEARNED MOST OF (give just numbers)	1-2 OUTCOMES YOU HAVE __NOT__ LEARNED (give just numbers)
knowledge	2, 3, 6	5
skills	1, 2, 5	2
identity	1, 3, 5	7

GROUP DISCUSSION

Discuss with your mentor and write down
key points from your discussion

- You have all completed a unique set of courses.
  Discuss and list main reasons why the programme-level learning outcomes you chose in the previous task were/ were not fulfilled. (10 min)

- You have very diverse backgrounds and expertise, which is both a richness and a challenge.
  List ideas on how to best make use of your diversity in our programme. (10 min)

GROUP DISCUSSION

Discuss with your mentor and write down
key points from your discussion

- The programme was implemented for the first time.
  List together *three key points to improve our programme: what are the most relevant things to change?* *(10 min)*

→ Open discussion: *Share your group's three most relevant things to change in the master's programme. (10min)*

KEY POINTS FROM GROUPS TO IMPROVE OUR MASTER'S PROGRAMME

- LESS BUT BETTER ASSIGNMENTS

- MORE DETAILED FEEDBACK

- 2 YEARS TOO SHORT FOR MASTER'S STUDIES

- MORE CRITICAL THINKING, INSTEAD OF MECHANICAL/QUICK ASSIGNMENTS
  → WHY WE DO THIS

- DEMAND MORE FROM THE STUDENTS
  → THIS IS UNIVERSITY: DON'T START FROM THE BASICS ONLY

- HOW TO TAKE COURSES FROM OTHER PROGRAMMES?
  → 4-HOUR SLOTS TOO DEMANDING

- QUALITY OF TEACHING

- TRADITIONAL COMPUTATION (PEN & PAPER)

- WHERE IS ENVIRONMENT?

- BETTER COURSE PLANNING
  → CLEAR DEADLINES, EARLY ENOUGH
  → LEARNING OUTCOMES CLEAR & NOT TOO MANY

- MOTIVATION: WHY THIS IS RELEVANT?

- MANDATORY SURVEY BEFORE THE COURSE ON STARTING LEVELS 3 MY COURSES
  EVEN PRE-ASSIGNMENT? → ALSO DURING THE COURSE
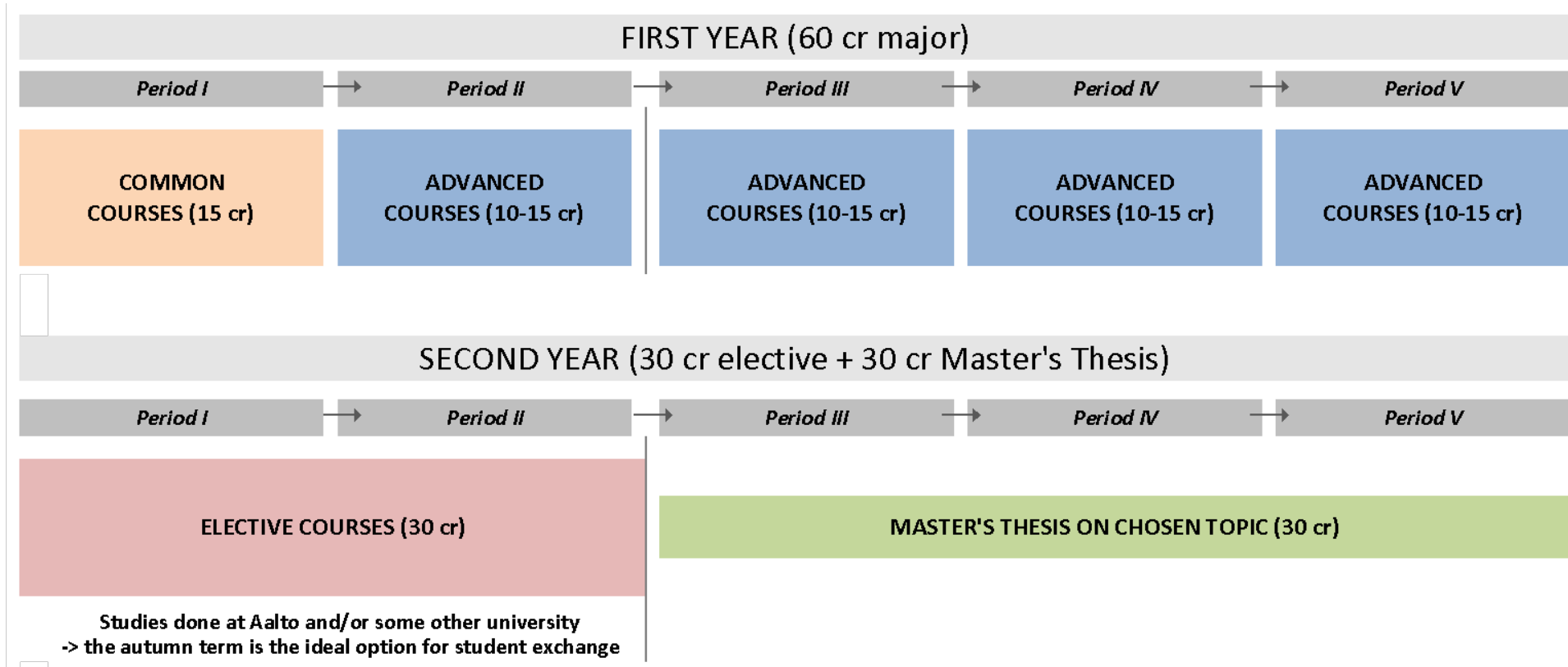
What next?

DEVELOPING OUR PROGRAMME

Your feedback has been very valuable: thank you!

→ We'll discuss this with our 'opetiimi' starting next Tuesday, but some changes clear already now:

- 3courses → **2courses**: less assignments, less thematic weeks, more time to assignments you found useful

- Less and different **group work**: findings new ways to work together (e.g. pair work, better feedback)

- Thinking about our study paths: how to enhance **'deeper' learning** with such a short study times?

TIMETABLE: 1ST + 2ND YEAR

FIRST YEAR (60 cr major)				
Period I	Period II	Period III	Period IV	Period V
COMMON COURSES (15 cr)	ADVANCED COURSES (10-15 cr)	ADVANCED COURSES (10-15 cr)	ADVANCED COURSES (10-15 cr)	ADVANCED COURSES (10-15 cr)

SECOND YEAR (30 cr elective + 30 cr Master's Thesis)				
Period I	Period II	Period III	Period IV	Period V
ELECTIVE COURSES (30 cr)		MASTER'S THESIS ON CHOSEN TOPIC (30 cr)		

Studies done at Aalto and/or some other university
-> the autumn term is the ideal option for student exchange

Who is planning to leave for exchange?

Who is planning to take courses from e.g. University of Helsinki?

Who already has a Master's Thesis place, initially planned or even fixed?

Who has no idea about Master's Thesis?

MASTER'S THESIS

- PREMISE: It is part of your studies, not a working place

  → *Provides a possibility for summative learning, and creating a specialisation (30 credits i.e. a lot!): make use of your portfolio to plan your focus!*

  → *Supervised by our professors: accepts your plan*

- Yet, WAT students have traditionally had ok chances of doing their Thesis to a company/organisation with salary

  → *But requires activity (and also bit of luck) from you!*

  → *We will announce all open positions through email*

- If you haven't found a place by February 2018, contact Meeri and we'll think together what to do!

A?
Aalto University

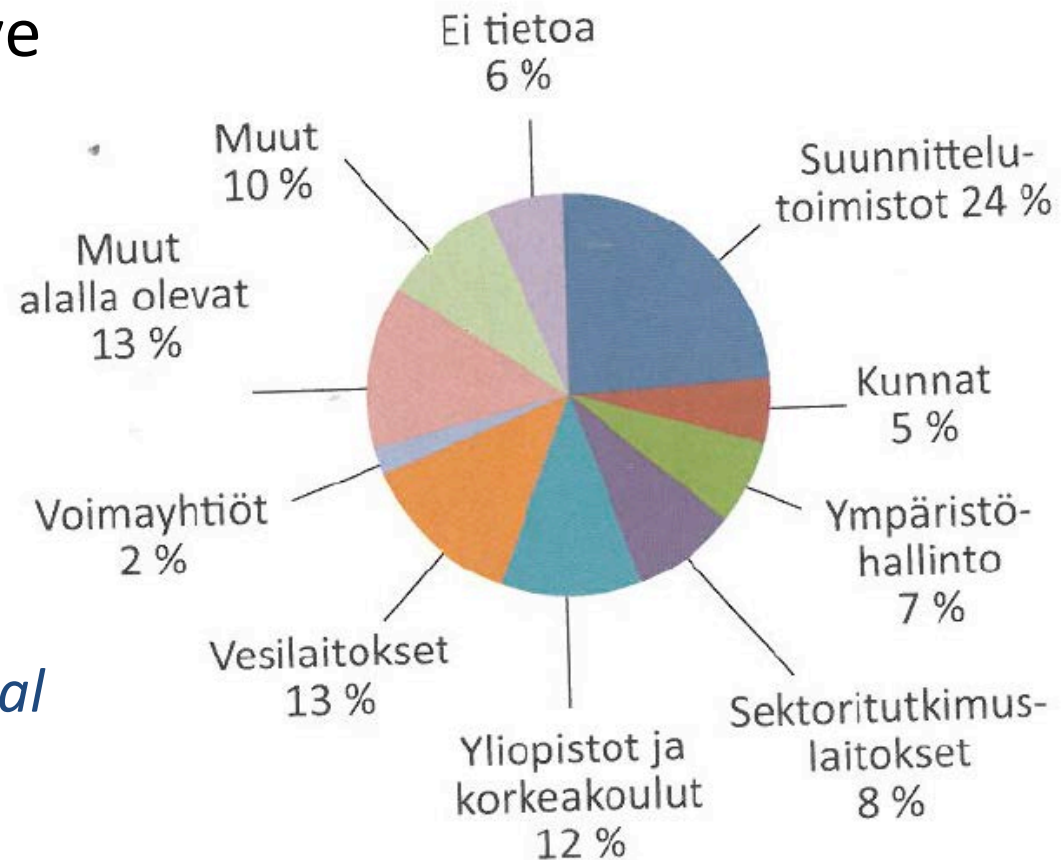*'It has been fun but hard - and now it is over'*

THANK YOU VERY MUCH FOR THE FIRST-EVER FIRST YEAR OF WAT MASTER'S PROGRAMME!

...now time for the surprise prize - and then some vesikahvit!

Background slides

WORK PLACES?

- ## Our field doesn't have just one clear work profile or profession

- *Public, private and research sector all very relevant*

- *Variety of competences*
- *Increasingly international*
- *Life-long learning, with different roles and tasks*

Ei tietoa 6 %
Muut 10 %
Muut alalla olevat 13 %
Voimayhtiöt 2 %
Vesilaitokset 13 %
Yliopistot ja korkeakoulut 12 %
Suunnittelu-toimistot 24 %
Kunnat 5 %
Ympäristö-hallinto 7 %
Sektoritutkimus-laitokset 8 %

LÄHDE: Koskela & Smolander (2012)

Vesitekniikasta Otaniemestä vuonna 2000 ja sen jälkeen valmistuneiden (n=191) työpaikat heinä-elokuussa 2012.