

'Jiihaa, it is almost summer!'



WAT SYNTHESIS SESSION

8.6.2023 – Marko, Meeri & co

AIMS FOR TODAY?

1) Think and breath!

→ *It has been a long & hectic year...*

All this together, making use of your portfolio (which you can also revise after the session)

2) Synthesise & reflect your first year of studies

→ *How does WAT look like for you now, after one year?*

3) Reflect on you WAT identity and give feedback

→ *What in WAT promotes the building of your identity, how to improve?*

4) Look forward for the 2nd year

→ *What to study? What about Master's Thesis?*

And by the way,
this is most likely
the last time we are
together with this group!

During the 2nd year of your studies you are much more spread out

PROGRAMME

1) Welcome & introduction

2) Synthesis & reflection: assessing your own learning through programme ILOs

These slides
available in [Portfolio
MyCourses-page!](#)

BREAK

3) Feedback and professional identity in WAT

- Synthesis on your survey answers + reflections (20 min)
- Your professional identity & WAT: Group discussion with mentors & teachers (40 min)
- Open discussion (15 min)

4) Next steps: 2nd year, incl. exchange + Thesis

REFLECTION

How has your first year
as a WAT student been?

Think silently just by yourself: you can write things down, too

After, describe your first year to others
with **1-2 WORDS**. Repetition is fine!

PLEASANTLY INTENSE
SOCIAL
HECTIC²
INTENSE²
TIRING
CONFUSING²
EXHAUSTING
BUSY²
TIME-CONSUMING
INTERNATIONAL
VERSATILE
CHALLENGING²
OVERWHELMING
REWARDING²
QUICK²
ADVENTEROUS
SURPRISING
CAOUREU
RELIEVED
EYE-OPENING
INSPIRING
FOCUSING
VICTORIOUS²
FUN²
EXCITING⁴
FULFILLING
SURE

SYNTHESIS & REFLECTION

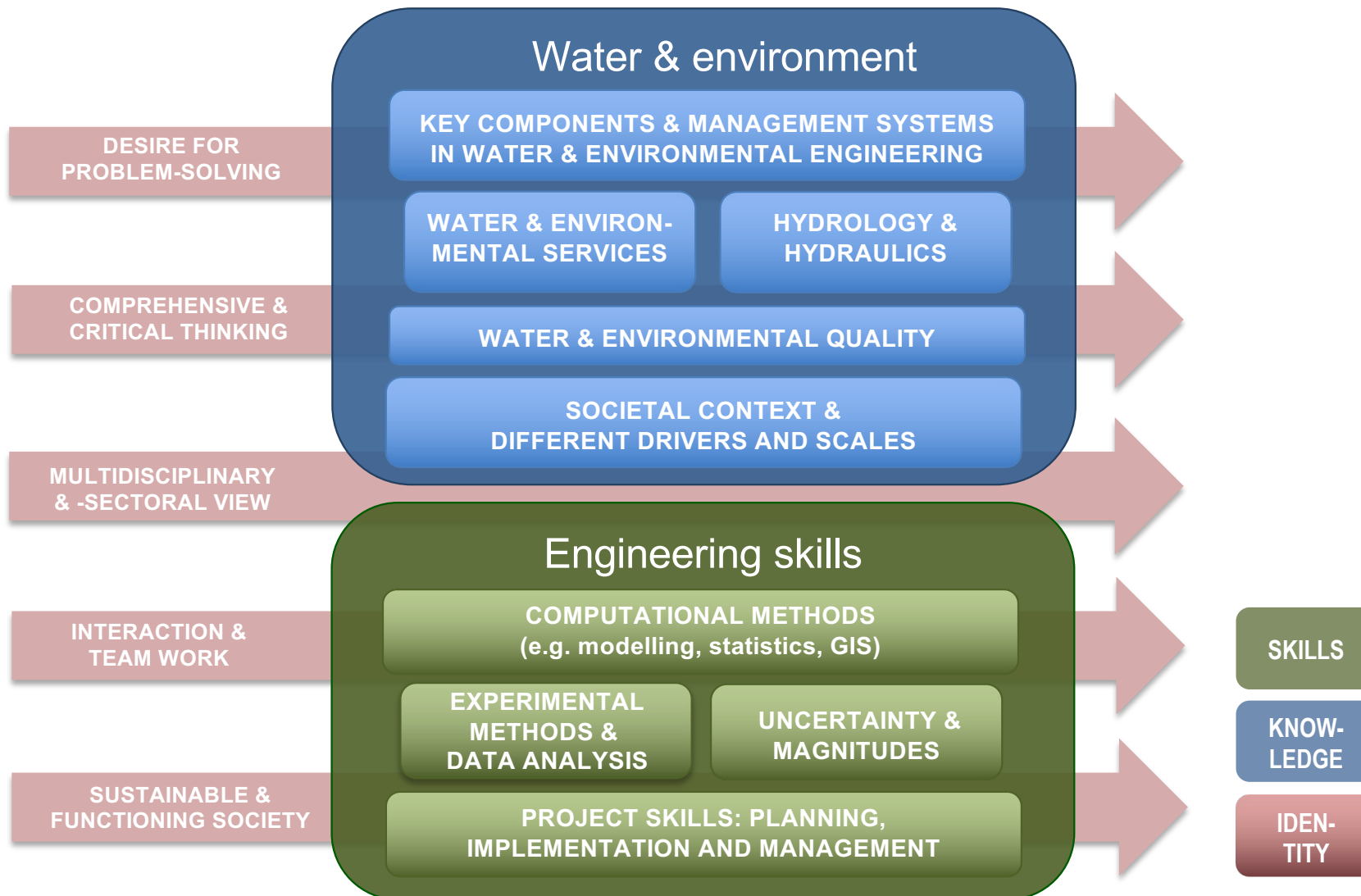
What have you learned
during your 1st year?

Short answer: a plenty! (we'll discuss this also later during feedback session)

Next: synthesising and reflecting your learning against the **key competencies** that the WAT programme aims to provide

→ Please make use of your portfolio + your WAT Survey answers!

WAT COMPE- TENCIES



ILOs: knowledge

Our graduate is able to:

- 1) Recognise the key **components and management systems 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 built environments
- 3) Define and differentiate the main sections of **water and environmental services**, with focus on the treatment of water and waste water
- 4) Understand the key principles of **water and environmental quality**
- 5) Identify the **societal context** relevant to the water and environment, and comprehend the different **scales** (spatial and temporal) and key **drivers** applicable to water and environmental engineering

ILOs: skills

Our graduate is able to:

- 1) Apply **key computational methods** related to water and environmental engineering
- 2) Understand relevant **experimental methods and data analysis** processes, including the use of data archives
- 3) Comprehend **uncertainty and different orders of magnitude** related to the measurements, data analysis and modeling
- 4) Recognise and analyse the main components of water- and environment-related **planning, implementation and management processes, and use related basic project skills**

ILOs: identity

(i.e. general
working-life skills)

Our graduate:

- 1) Is motivated and has a desire for **problem-solving**
- 2) Thinks in a **comprehensive and critical manner** about his/her work and field
- 3) Maintains a **multidisciplinary and -sectoral view** related to water and environmental engineering
- 4) Is able to work as a part of a team and has relevant skills for **interaction and communication**
- 5) Promotes a **sustainable and functioning society**

Assessing what you have learned

- 1) *Read carefully the Learning Outcomes for Knowledge, Skills and Identity skills*
- 2) *Select (for each) 1-2 Learning Outcomes that you have learned **MOST OF***
→ Write to that ILO “Most”
- 3) *Select (for each) 1-2 Learning Outcomes that you have **NOT learned so well***
→ Write to that ILO “Least”
- 4) *You can also write short comments for each ILO*

*WRITE SO THAT WE
UNDERSTAND, PLIIZ 😊
(we will collect your answers)*

8 min

JOINT DISCUSSION

What did you learn?

What not? Why?

Differences? Surprises?

→ Do our ILOs reflect the content of our programme?

PROGRAMME

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2) Synthesis & reflection: Assessing your own learning

BREAK

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4) Next steps: 2nd year, incl. exchange + Thesis

These slides
available in [Portfolio
MyCourses-page!](#)



FEEDBACK ON OUR MASTER'S PROGRAMME

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

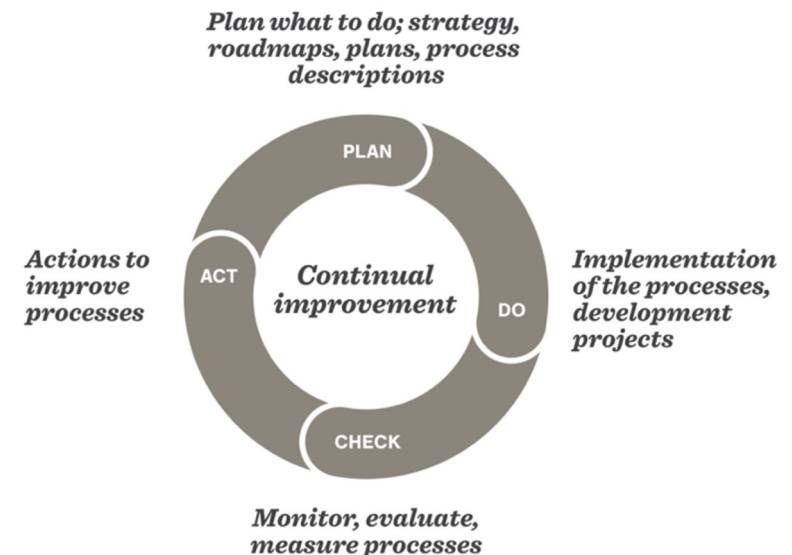
WHY TO GIVE FEEDBACK?

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

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



PDCA = Plan-Do-Check-Act

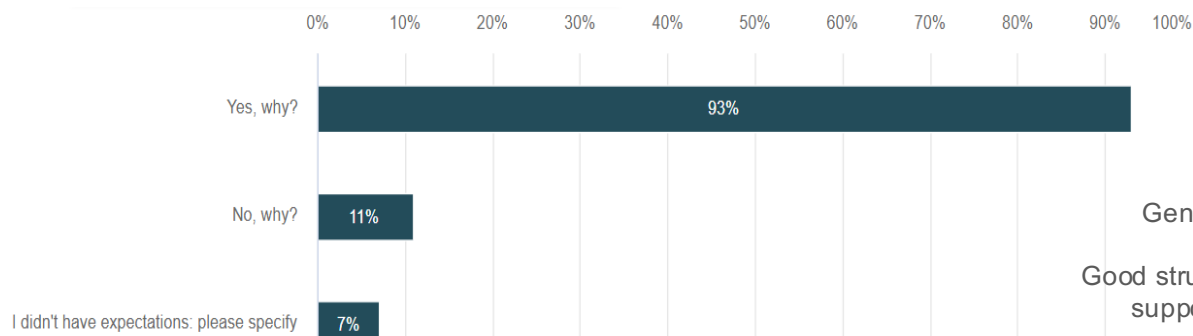
WAT SURVEY – THANKS!

- Almost everybody have responded so far (27): **thank you!**
- You provided very thorough and useful views on our WAT programme and courses: **thank you!**
- General feeling from the feedback is very positive! programme works, and provides you with a diversity of knowledge and skills from our field
- The majority have started to establish own professional WAT profile / identity and have an idea on the direction
→ **You're well on your way to become WAT experts!**

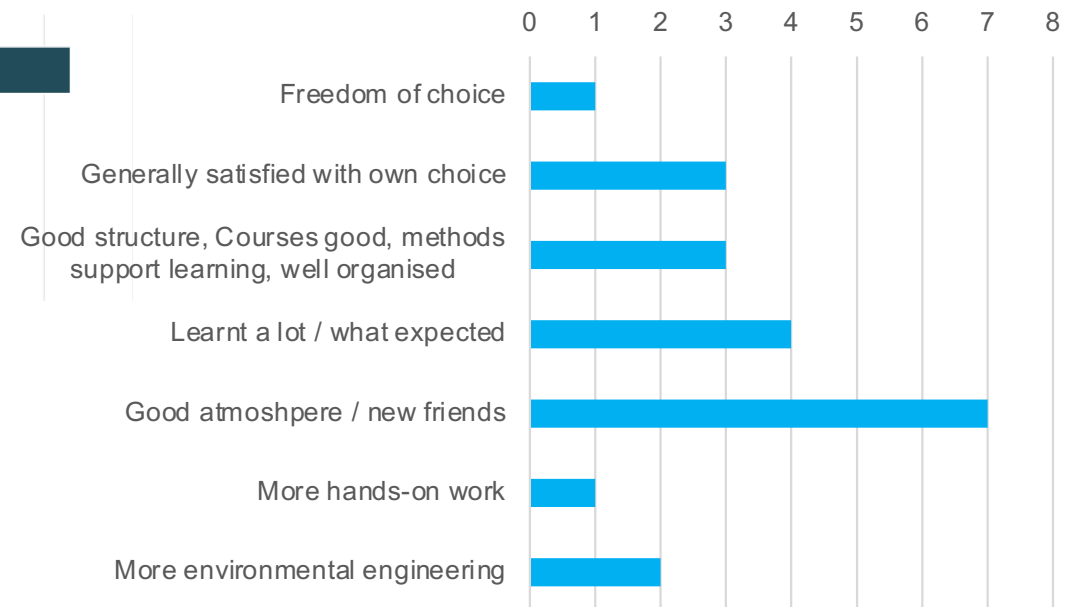
HOW SATISFIED YOU ARE WITH WAT?

A majority of respondents very/extremely satisfied with the programme (93%) and teaching (74%)

Has WAT met your expectations?



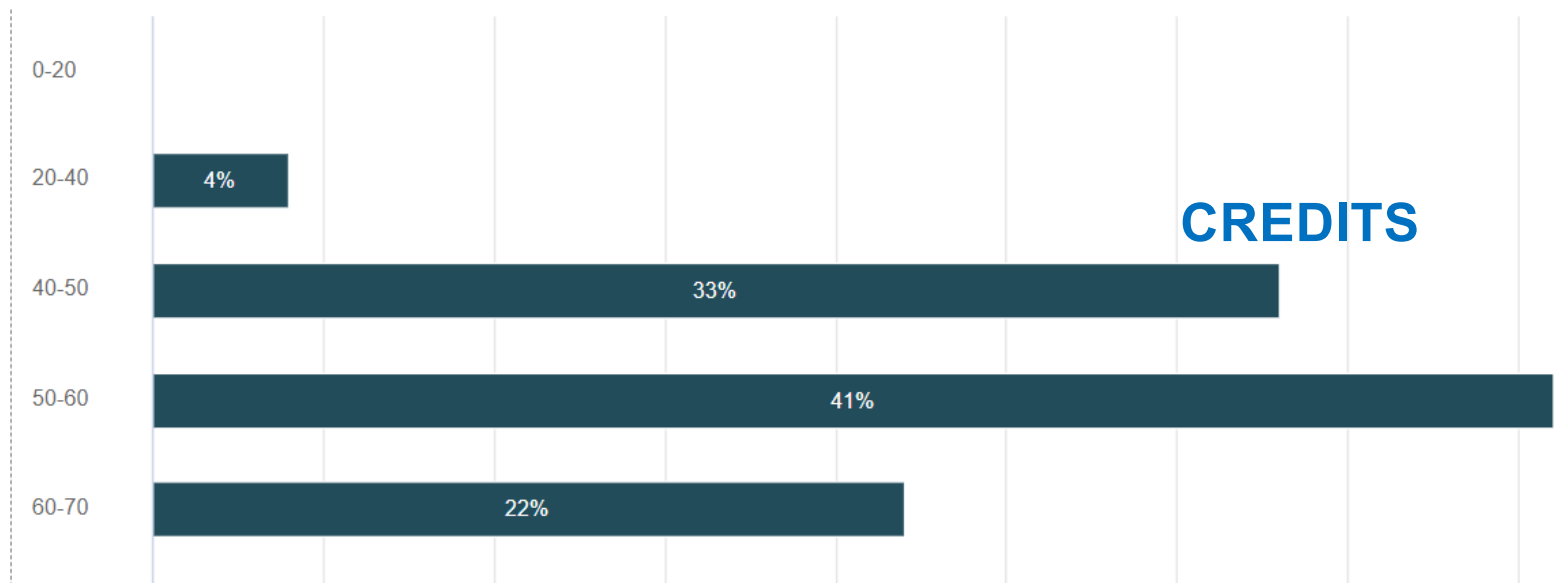
Some highlights from your open text answers



Great to hear!

WAT SURVEY - CREDITS

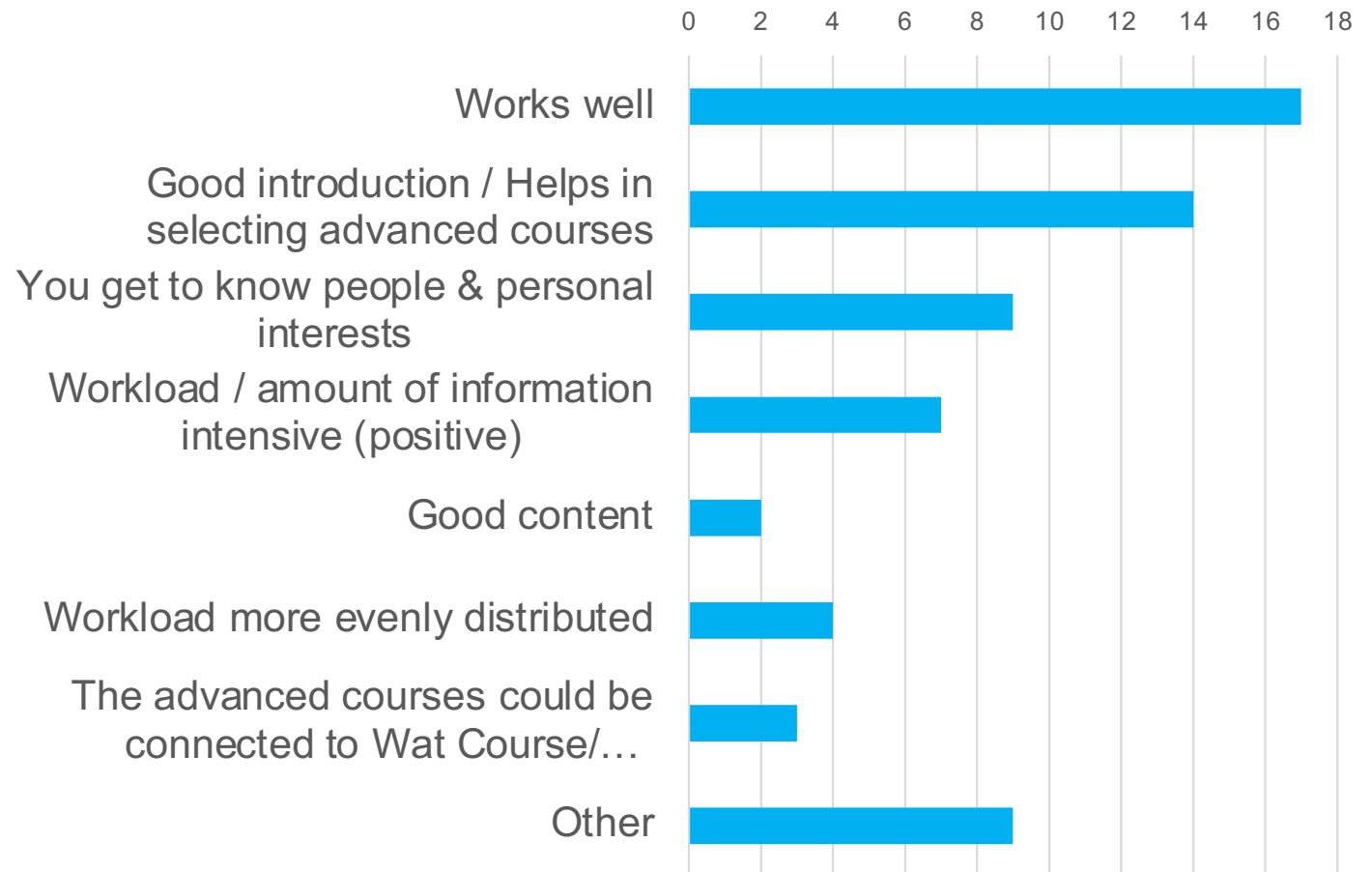
- 94% have gained > 40 credits



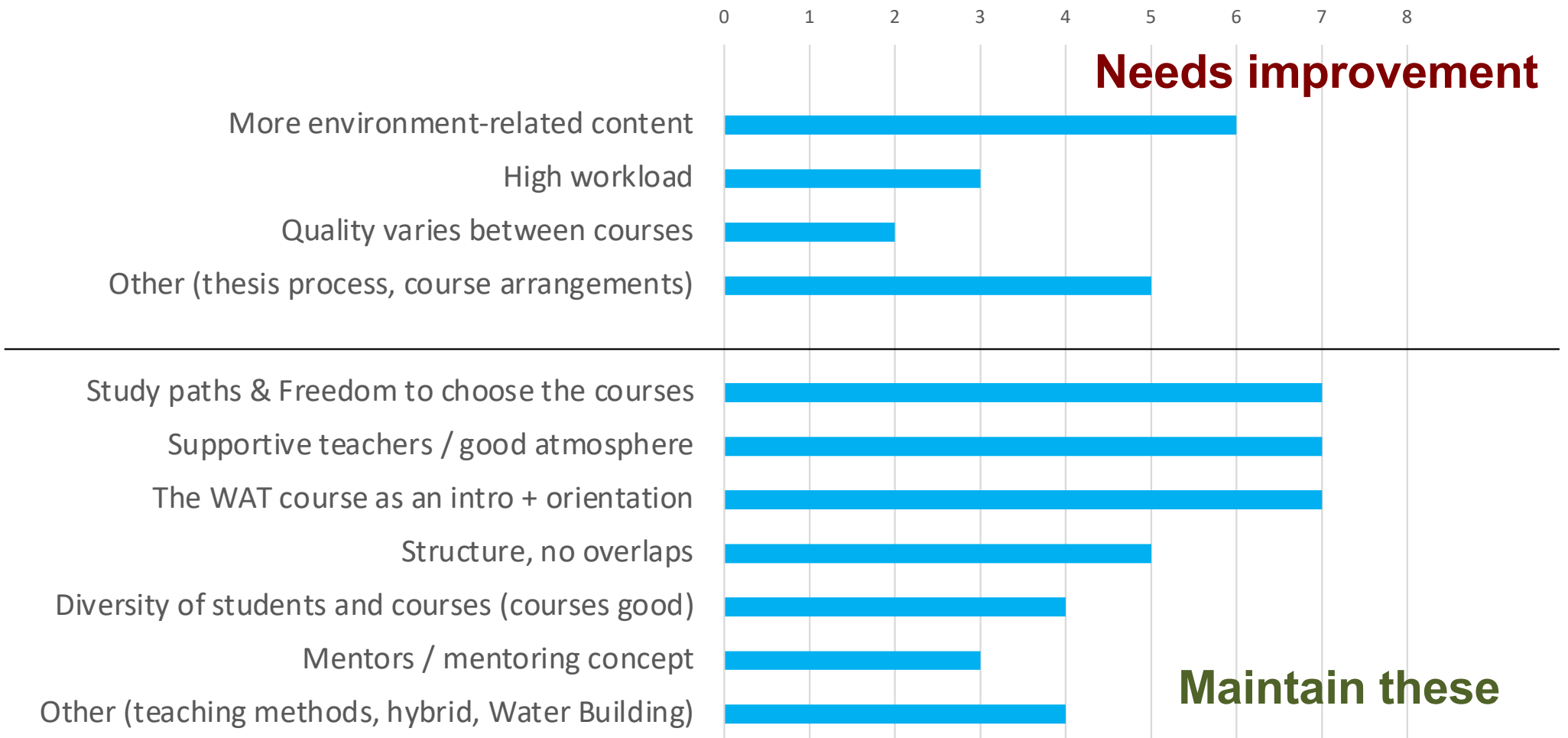
- 74% worked during studies

COMMON WAT COURSE WORKS

- Beneficial in choosing advanced courses
- Was very intensive
- Good start for getting to know new people

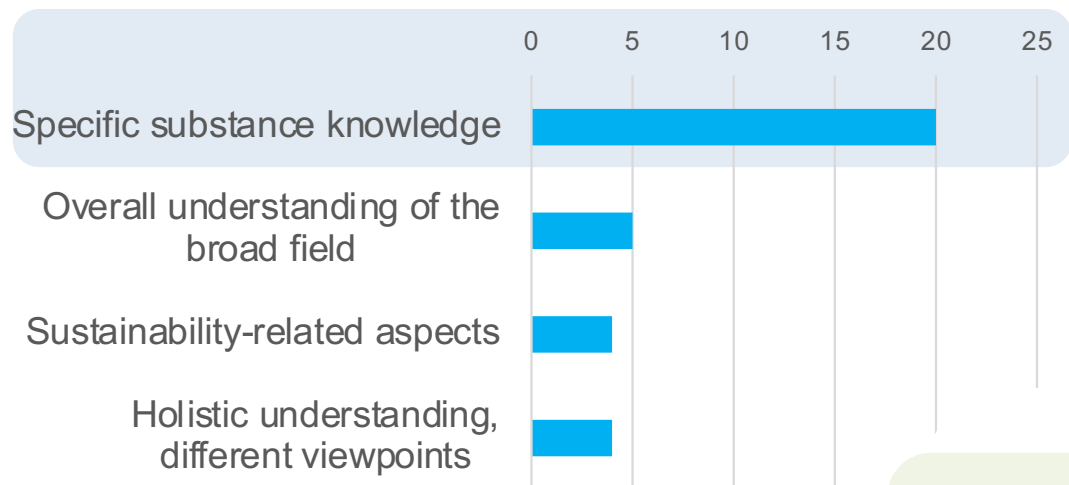


WAT programme & teaching (categorised from your open text answers)



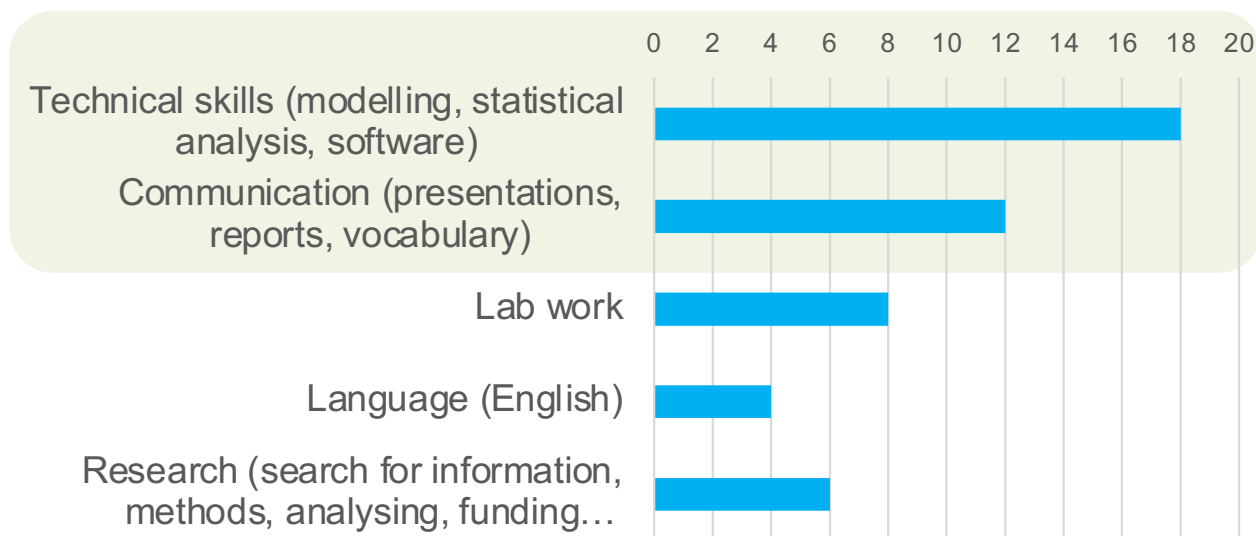
WHAT HAVE YOU LEARNED?

CATEGORISED FROM YOUR OPEN TEXT ANSWERS



Knowledge

Skills



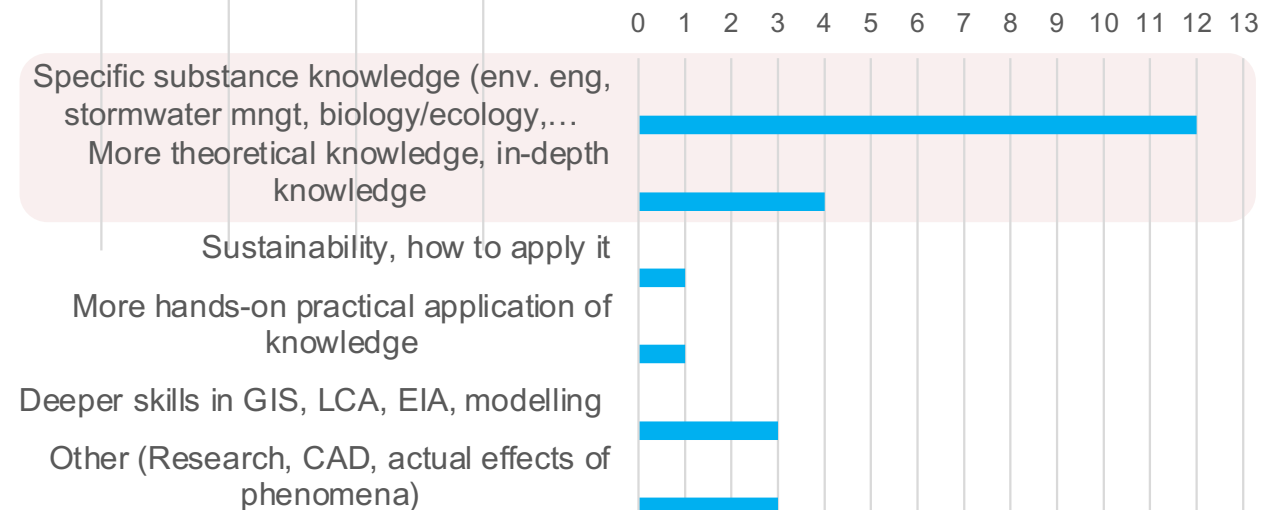
WHAT HAVE YOU LEARNED?

CATEGORISED FROM YOUR OPEN TEXT ANSWERS



Identity skills

Knowledge, skills and identity you felt you are still lacking → not that many!





How does this feel?
Anything surprising?
Questions, comments?



ME, MYSELF AND I

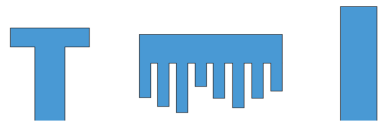
...BECOMING A WAT EXPERT

BECOMING A WAT EXPERT

The next part of our session discusses how our WAT Master's Programme supports to build YOUR professional identity as a WAT expert

Note: you define what “WAT expert” means

→ Can be linked to our programme ILOs or be different:
it is your personal competence profile

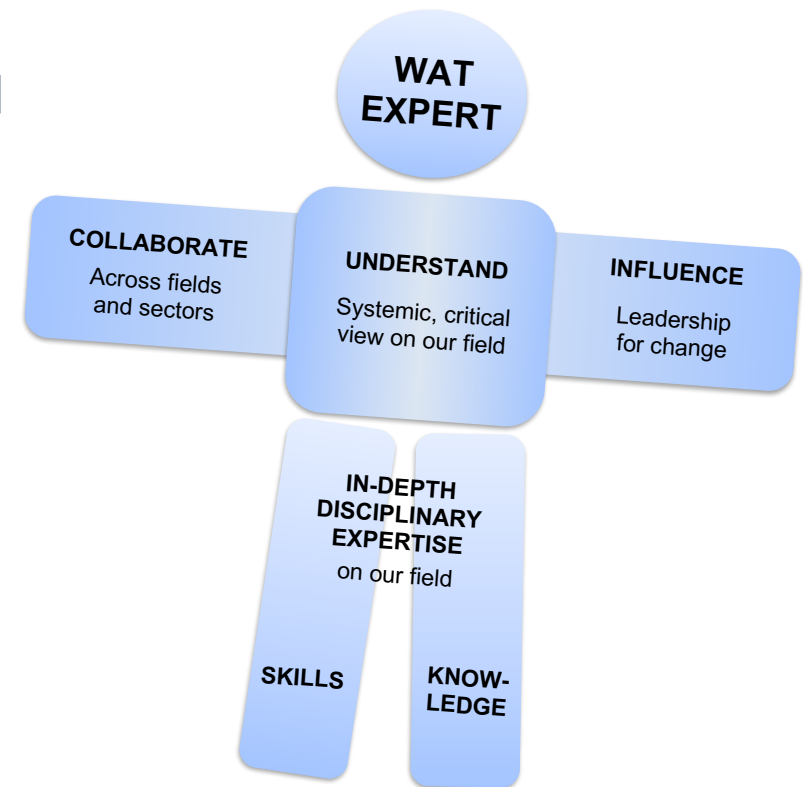


WAT EXPERT – WHO, ME?

Our programme aims to provide you with a T-shaped learning profile

→ *What is it..? (we discussed this during WAT Course's last week)*

Combination of in-dept disciplinary expertise (legs) and broader understanding and capacity for collaboration & influence (arms & body)



See more in additional slides

PERSONAL DEVELOPMENT SO FAR?

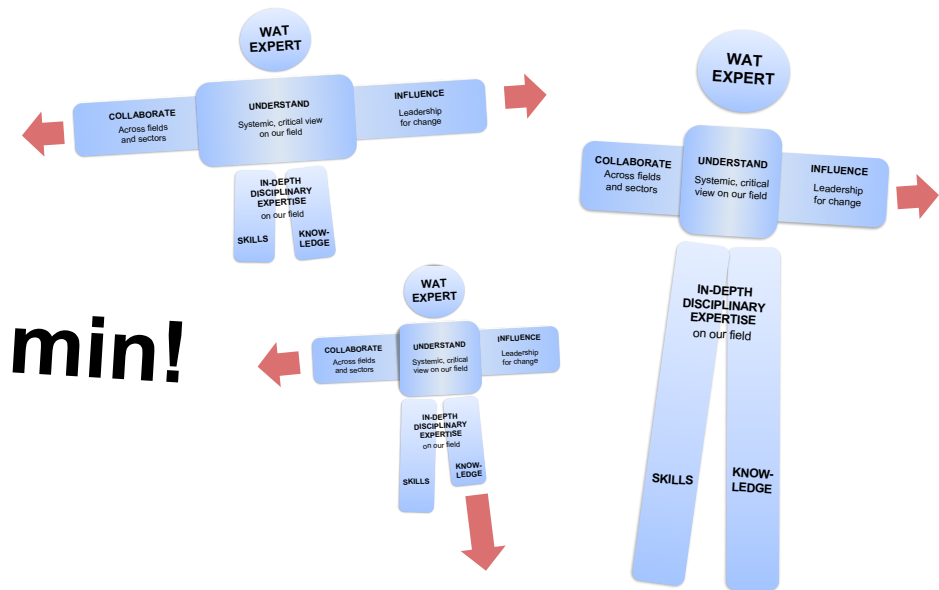
What is your professional profile now?

→ What kind of legs you have?
(left leg: skills, right: knowledge)

→ What kind of arms and body?
(left arm: collaboration, right arm: influence, body: understanding)

→ How you want to grow still?

5 min!



First draw your current self as a T-shaped WAT expert

Then use arrows to indicate how you want to grow still during your studies

→ Write also how you could do this

GROUP DISCUSSION

**25 min
+ 5 min**

A) What kind of WAT experts you are?

→ How have you built your expertise?

C) What kind of WAT experts you want to become?

What would improve the building of your professional identity?

BONUS: How we should develop our WAT programme based on these observations?

→ What works, what requires development?

DEVELOPING OUR PROGRAMME

Your feedback has been very valuable: thank you!

- We'll discuss this with our 'opetiimi',
but it seems overall things are working pretty well
- Some things naturally require attention still

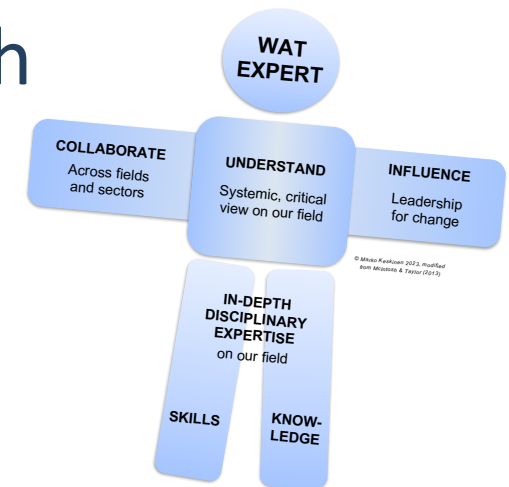


WHAT NEXT?

WAT EXPERT – WHO, ME?

Now you may think: I don't have any in-depth expertise, just random bits and pieces!

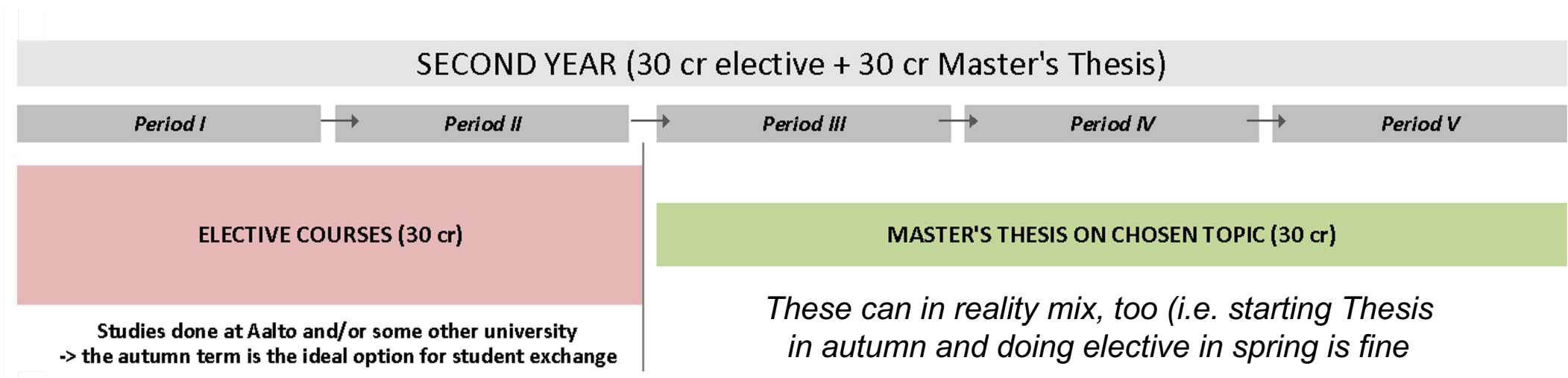
→ You do have the expertise: it is just more 'fundamental' and broad than the specific expertise provided e.g. by UASs (AMK:t)



WAT experts must see the big picture and be able to apply their expertise into different contexts and under changing circumstances (group & project work one key 😊)

→ Think how to strengthen this during your 2nd year + Thesis

WAT 2ND YEAR



Study things that you are interested in and support your career goals (use your portfolio as a help)

→ Going outside Aalto (at least ENG) is strongly recommended!

Master's Thesis very important for both your studies and your career, so think carefully its topic + place to do it

→ Come and listen to our seminars, too!

COURSES ON ENVIRONMENTAL ENGINEERING?

More environment-related content was identified as a need for improvement item in the WAT survey

- *Now we are running a pilot that helps to fill this gap in our curriculum!*
- *Done in collaboration with KTH*

ENG – two KTH virtual courses

Online courses offered for Aalto MSc Water and Environmental Engineering students at KTH in Autumn 2023:

[Environmental chemistry and risk assessment \(AE2801\)](#) (7.5 ECTS)

Period of teaching: 30 Oct 2023 - 15 Jan 2024 (in English)

Number of seats for Aalto students: 5-10

[Life Cycle Assessment \(AL2608\)](#) (7.5 ECTS)

Period of teaching: 30 Oct 2023 - 15 Jan 2024 (in English)

Number of seats for Aalto students: 5-10

Further information
from Teemu Kokkonen

The courses have been pre-approved by the WAT teaching staff and **can therefore be included in the advanced courses of your degree's major**. Thus, also the process to transfer the course into your Aalto degree is easy.

→ Further information will be sent in August 2023 to those who have already indicated their interest.

In case there are still seats left, there will be a possibility to apply for the courses at the start of September.

Once completed, the **course will appear in your transcript with the original name and as pass / fail**.

The students will be selected on **first come, first served** basis. Please fill in this [Webropol](#) form to indicate your interest.

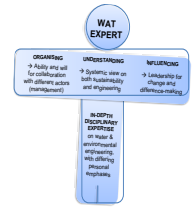
Please note that these courses are only available for students enrolled as Aalto degree students in Autumn 2023.

REMEMBER WAT SPECIAL COURSE!

- WAT-E3010 is a 1-5 ECTS special course that you can plan and do based on your own interests
 - Can be part of your Major, as long as content links to our field: possibility to specialize or broaden your expertise e.g. towards environmental engineering
 - Can also be done as part of Elective studies
 - Responsible teacher Matti, but contact that staff member whose expertise is closest to your interest to agree on how you will do it

Can be done anytime
(also during summer
or Period I)

ELECTIVE STUDIES



- Elective studies provide together with your Master's Thesis your own specialization: think carefully what to take!
 - Do you want to broaden or deepen your expertise? More skills or knowledge?
- Elective studies do **not** have to form a minor = you can take freely any mix of courses totaling 30 ECTS
 - The main prerequisite is that the courses are meaningful for your personal study path and career plan, and thus complement your other courses
- The elective courses should be at Master's level, too
 - Exceptions: courses clearly from another field may also be at Bachelor level
 - Contact Programme Director if you plan to take Bachelor level courses!

ELECTIVE STUDIES

- Our webpage has examples of possible programmes that you can take your elective courses from

Examples for elective studies from Aalto (WAT programme)

There are many types of courses that suite well our field also here in Aalto. For examples, it is worth checking the courses from following AaltoENG's Master's Programmes:

- Building Technology
- Geoengineering
- Geoinformatics
- Real Estate Economics (incl. law)
- Spatial Planning and Transportation Engineering

Similarly relevant to our field are more methodologically-orientated courses available at Aalto's Systems Analysis Laboratory (<http://sal.aalto.fi/en/teaching>), sustainability-focused Creative Sustainability courses (<http://acs.aalto.fi>) as well as entrepreneurship-focused Aalto Ventures Program courses (<https://avp.aalto.fi/avp-courses/>).

Several programmes at Aalto and ENG provide very relevant courses
→ Both thematically and methodologically: your choice what to emphasise

MASTER'S THESIS

- PREMISE: It is part of your studies, not a working place
 - Provides a possibility for summative learning + creates a specialisation: think carefully its focus (use e.g. your portfolio)!
 - Supervised by our professors: accepts your plan
- Yet, many WAT students do get some compensation for their Thesis work (salary or other)
 - But requires activity (and also bit of luck) from you!
 - We will announce open positions through email
- If you haven't found a Thesis topic by Spring 2024, contact Marko and we'll think together what to do!

MASTER'S THESIS PROCESS

Compulsory parts of the process:

1. Listening to one Master's thesis seminar
 2. Presenting own research plan in Pre-seminar
 3. Attending Thesis Finalising session
 4. Presenting final Thesis in Master's thesis seminar
- Detailed information in [Portfolio page](#) (MyCourses)
+ in our Master's Programme's pages

AFTER GRADUATION?

Several possibilities to pursue your career: our graduates work in both private and public sector

→ Master's Thesis often a stepping stone to your first job

Interested in to learn and study more?

→ Doctoral Thesis is a possibility as well!

→ Deepen your knowledge, get a new degree

+ enjoy Water Building and WAT staff even longer 😊

WAT surveys 2017-20

WAT Stakeholder survey 2019-20, report in Finnish here:

<http://urn.fi/URN:ISBN:978-952-60-3785-1>

English summary slides of the stakeholder AND **WAT Alumni Survey 2017** available here: <https://mycourses.aalto.fi/course/view.php?id=30189>

Also check alumni survey -related Master's Thesis + 2 articles:

<https://aaltodoc.aalto.fi/handle/123456789/31604>

<https://www.mdpi.com/2071-1050/10/8/2605>

<http://bit.ly/KarvinenVehmasKeskinen>

Main message: employment situation in our field is good, employers satisfied and the tasks & employees diverse

→ Do your Thesis on the topic that interests you most!



Questions, comments?

(You can also ask privately after the session)

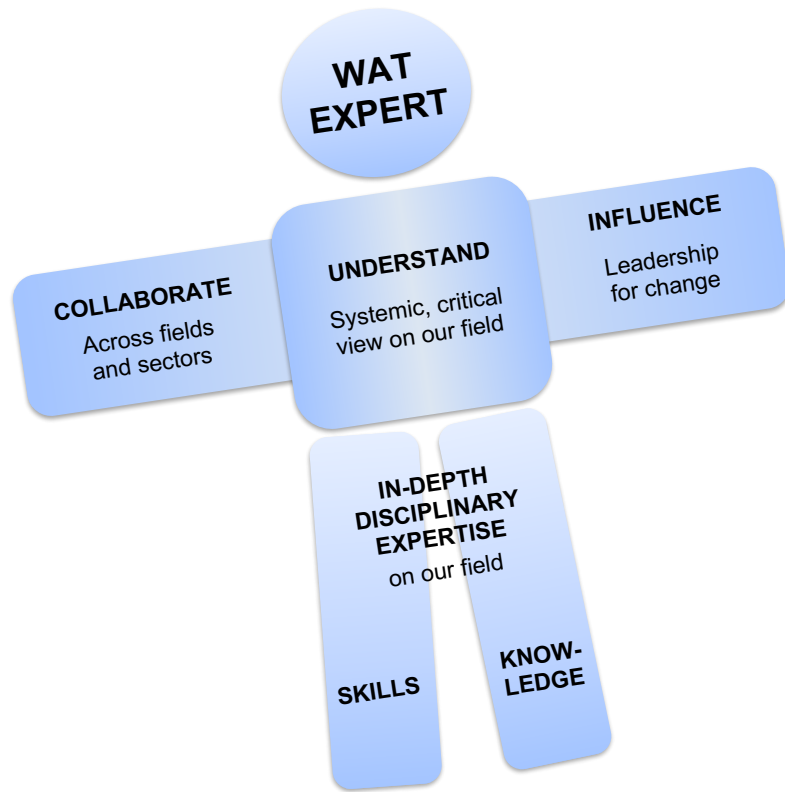


*THANK YOU VERY MUCH FOR
THE FIRST YEAR OF
WAT MASTER'S PROGRAMME!*

Enjoy the summer!

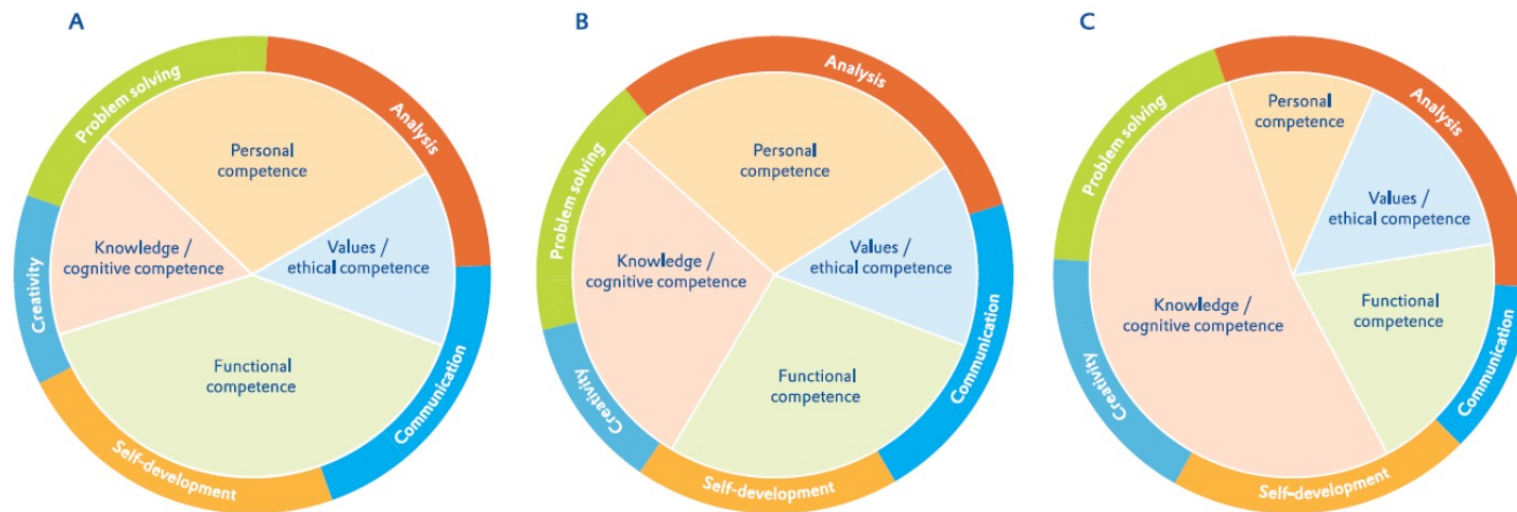


Background slides



WAT T-SHAPED LEARNING PROFILE?

T-SHAPED LEARNING PROFILE?

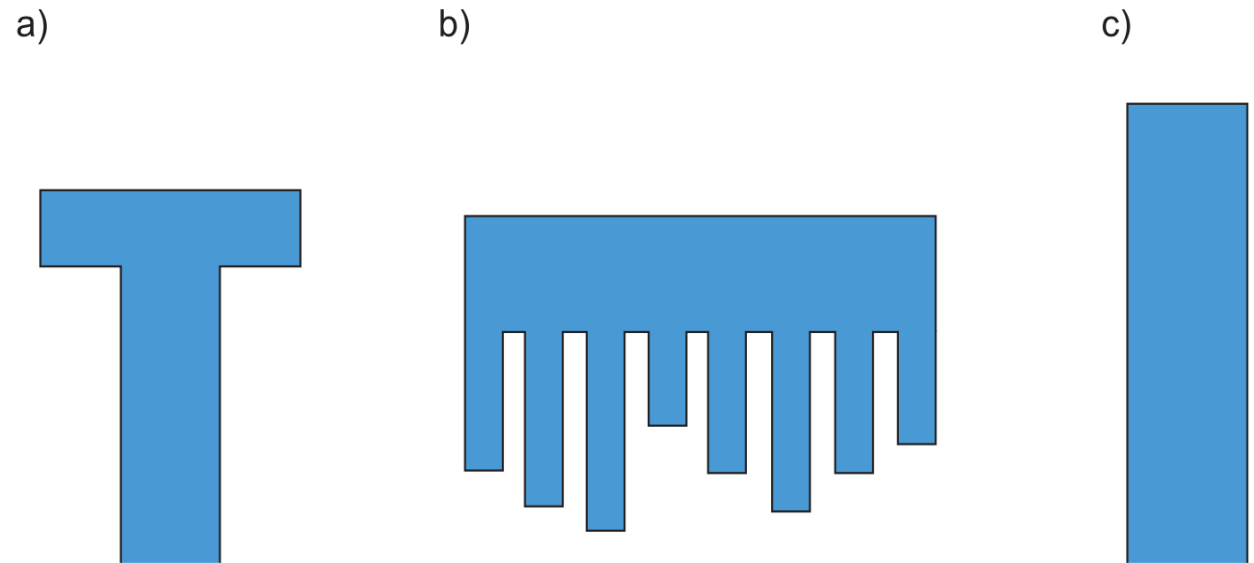


Uhlenbrook & de Jong 2012

Fig. 1. Comparison of possible occupational competence mixes of different water professionals: (A) director of a catchment agency interacting with various stakeholders and managing various resources (human resources, finances, facilities and infrastructure etc.), (B) water engineering consultant who specialized in hydraulic structures, and (C) research water chemist specialist in processes related to transport of micro-pollutants.

Sources: McIntosh & Taylor 2013 + Uhlenbrook & de Jong 2012: <https://www.hydrol-earth-syst-sci.net/16/3475/2012/>

T-SHAPED LEARNING PROFILE?



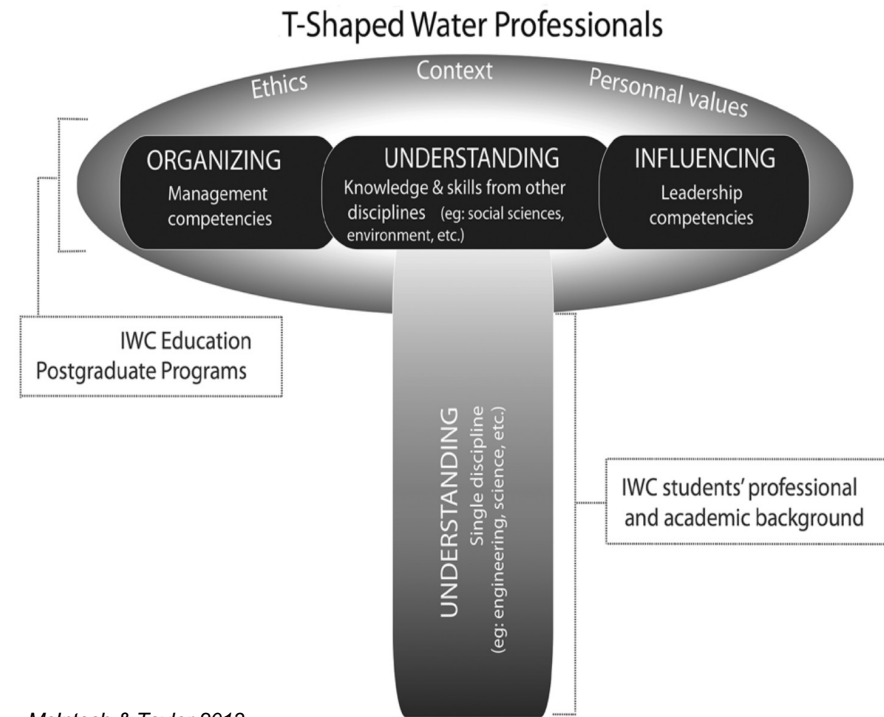
Uhlenbrook & de Jong 2012

Fig. 2. Schematic sketch of the competency profiles of (a) T-shaped professionals, (b) generalists, and (c) I-shaped professionals (adapted from Oskam, 2009, modified).

T-SHAPED LEARNING PROFILE?

Uhlenbrook & de Jong 2012:

It is not enough to be trained as a generalist, somebody who knows a little bit of everything. To tackle the global changes, a T-shaped competencies profile is required for the graduates of future (Fig. 1a). The vertical leg of the T stands for the solid knowledge in one discipline such as hydraulic engineering, hydrology, aquatic ecology, economics, (water) chemistry, microbiology, informatics, sanitary engineering, environmental policy and law, agronomy etc (mainly knowledge and cognitive competence, cf. Sect. 2). However, this is not enough for an effective professional. The horizontal bar of the T stands, on the one hand, for knowledge and cognitive competence outside the own discipline, on the other hand, for functional, personal and values/ethical competencies as introduced by Cheetham and Chivers (1996). A basic understanding of adjacent disciplines and other professional knowledge and skills in complementary fields such as general business, entrepreneurship and selected soft skills (e.g. project management, leadership, negotiation skills, people skills, right-brain skills, conflict resolution, networking skills) are needed (e.g. Mollinga, 2009; Oskam, 2009; Kaspersma et al., 2012). Having an appropriate mix of all these competencies (usually achieved through complementary team members) is necessary to tackle novel complex challenges, to analyze multiple components, to identify emerging properties, systems and patterns, and to synthesize the big picture.



McIntosh & Taylor 2013

Figure 2. Conceptual model of a T-shaped water professional (used with permission from the International WaterCentre).

Sources: McIntosh & Taylor 2013 + Uhlenbrook & de Jong 2012: <https://www.hydrol-earth-syst-sci.net/16/3475/2012/>

OUR RESEARCH ON WAT

We also carry own research on the competences required in our field + their link to our teaching

- *WAT Feedback Surveys*
- *WAT Teacher Surveys*
- *WAT Alumni Survey in 2017*
- *WAT Stakeholder Survey in 2019*

→ Stakeholder Survey Report:

<http://urn.fi/URN:ISBN:978-952-60-3785-1>

→ Anu Vehmaa's Master's Thesis:

<https://aaltodoc.aalto.fi/handle/123456789/31604>

→ Scientific articles:

<https://www.mdpi.com/2071-1050/10/8/2605>

<https://lehti.yliopistopedagogiikka.fi/yliopistopedagogiikka-1-2019>

Conclusion: T-shaped learning profile works!

sustainability

MDPI

Article
Building a More Sustainable Society? A Case Study on the Role of Sustainable Development in the Education and Early Career of Water and Environmental Engineers
Anu Vehmaa, Meeri Karvinen and Marko Keskinen *
Water and Environmental Engineering, Department of Built Environment, School of Aalto University, P.O. Box 15200, 00076 Aalto, Finland; anuvehmaa@gmail.com (A.V.)

YLIOPISTOPEDAGOGIIKKA

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Marko Keskinen, TKT, vanhempi yliopistonlehtori, vesi- ja ympäristötekniikka, Aalto-yliopisto, Tietotie 1 E, 02150 Espoo, marko.keskinen@aalto.fi

UAVI

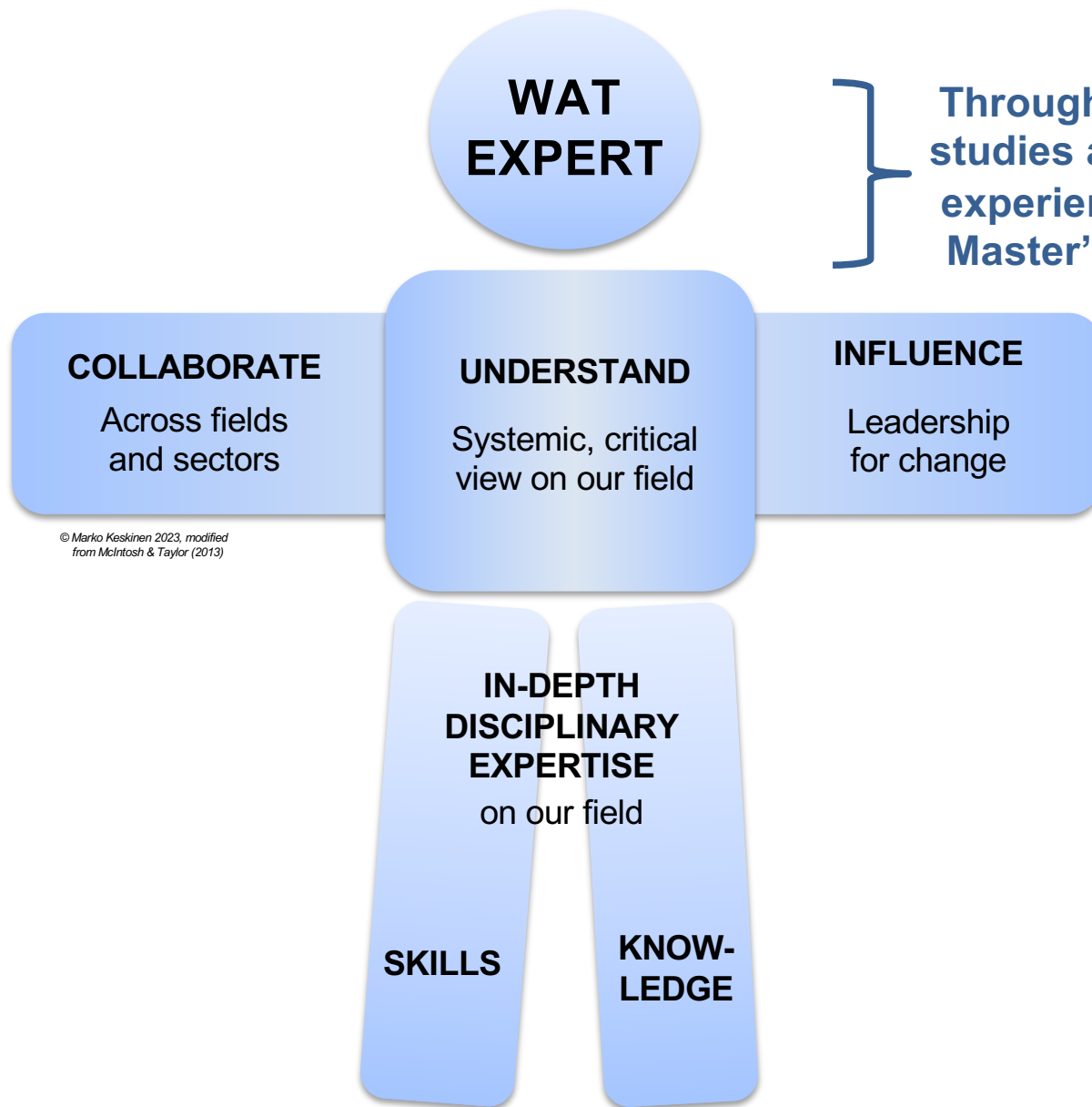
A?
Aalto-yliopisto
Insinööri- ja tekniikan
korkeakoulu

Anu Vehmaa

Working life of water and environmental engineers: a case study of career paths, core competencies and the role of sustainable development

Master's thesis for the degree of Master of Science (Technology) submitted for inspection.
Espoo 30.04.2018
Supervisor: Professor Riku Vahala
Instructors: M.Sc. Meeri Karvinen, D.Sc. (Tech) Marko Keskinen

Avainsanat: työelämätaidot, työelämäyhteistyö, urakehitys, osaamistarpeet, vesi- ja ympäristötekniikka, diplomi-insinööriopetus, insinööriosaaminen



Through all your studies and other experience, incl. Master's Thesis

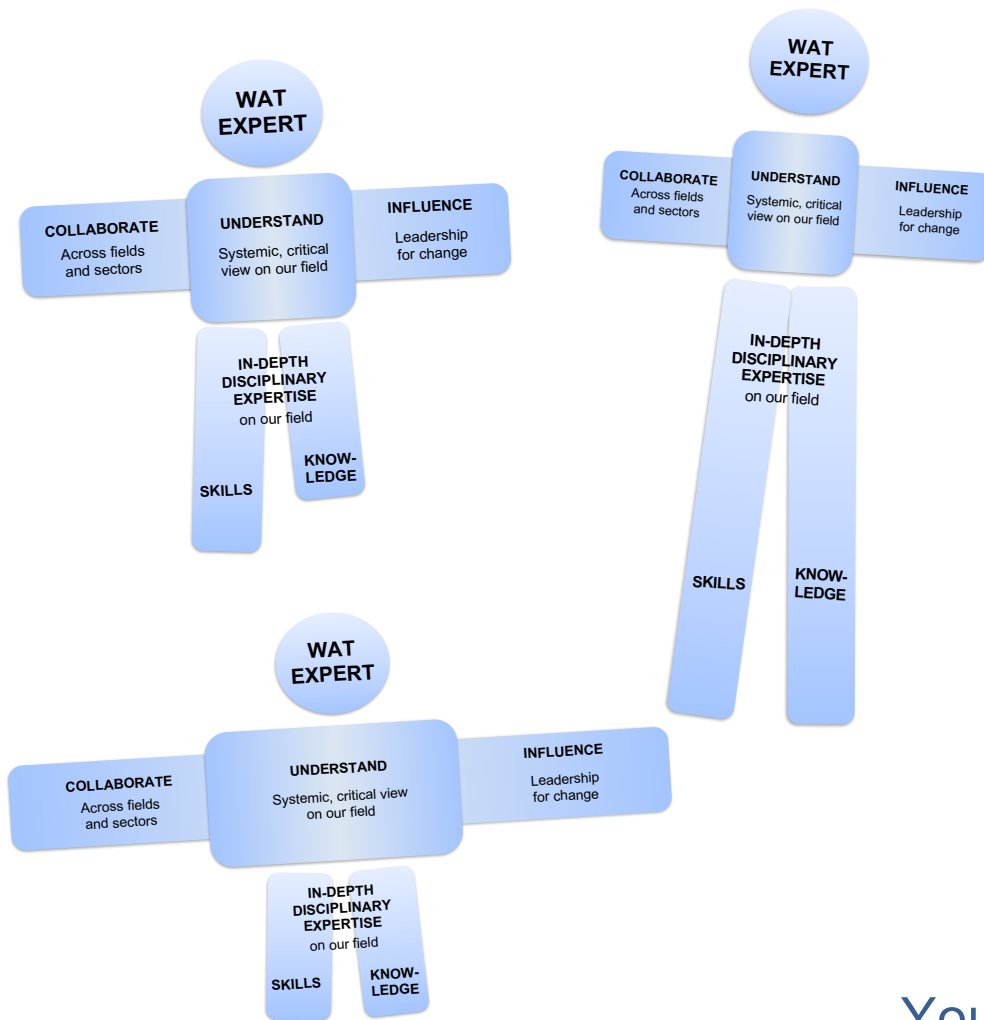
WAT T-PROFILE?

ARMS & BODY
Through your WAT studies + other experience

LEGS
Through your WAT major, possibly also electives

Portfolio helps you to think all this!

WAT T-PROFILE?



You will all still be different:
others will have longer legs,
others longer arms or one leg
may be longer than the other
→ Main point: everyone should
have both legs and arms...

Your Personal Learning Portfolio is one way to
think what you want to become: make use of it!