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UTTOP - HAMK

International Project –
Circular Economy –
Recycling, Recovery and
Reprocessing of
Materials
UTTOP & HAMK

THE COURSE TEAM

HAMK - FINLAND

- Mr. Lauri Karvonen

Senior Lecturer in English and Swedish

- Ms. Susan Heikkilä

Senior Lecturer in Electrical and Automation Engineering;

UTTOP - FRANCE

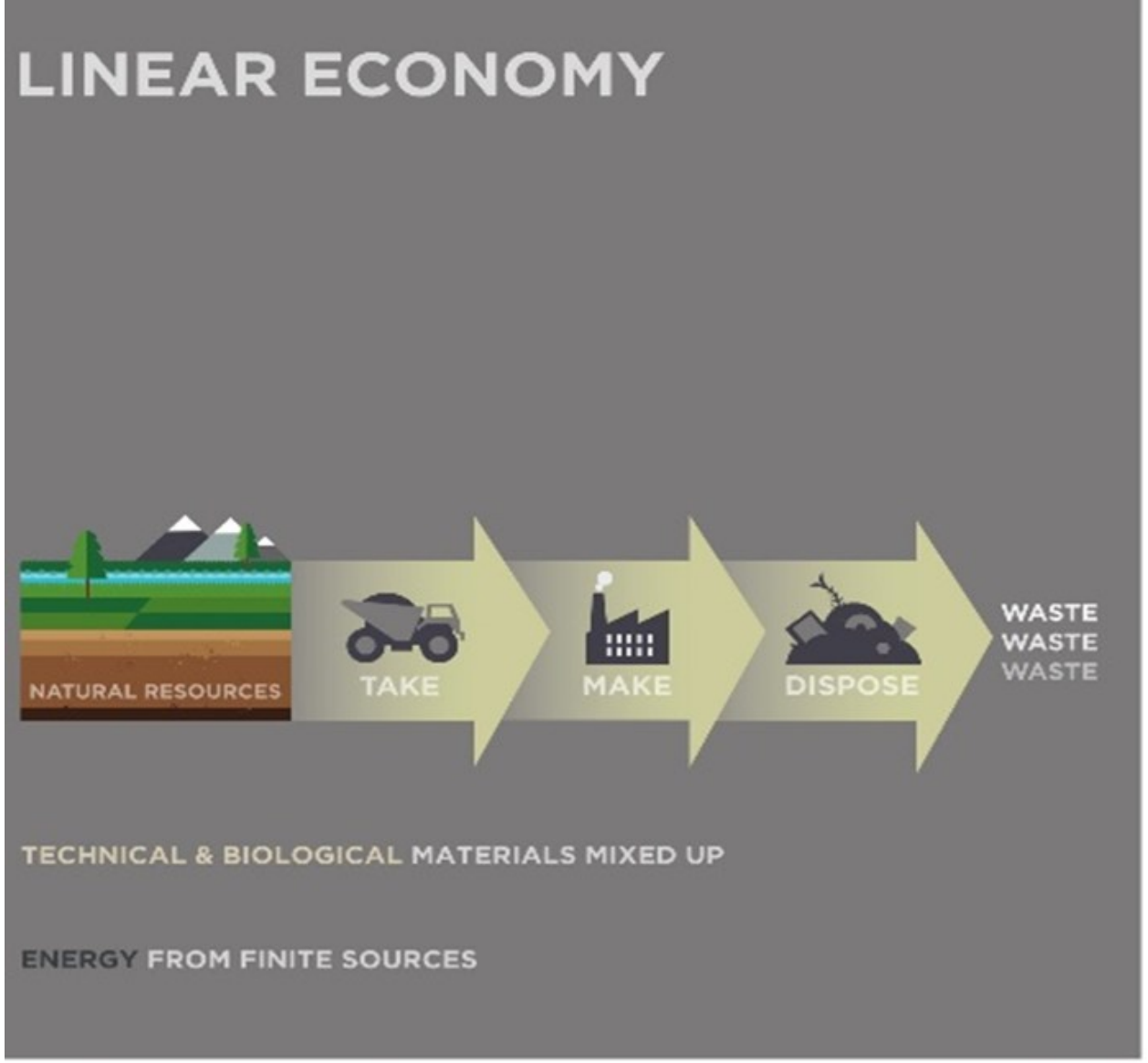
- Ms. Line Langlois

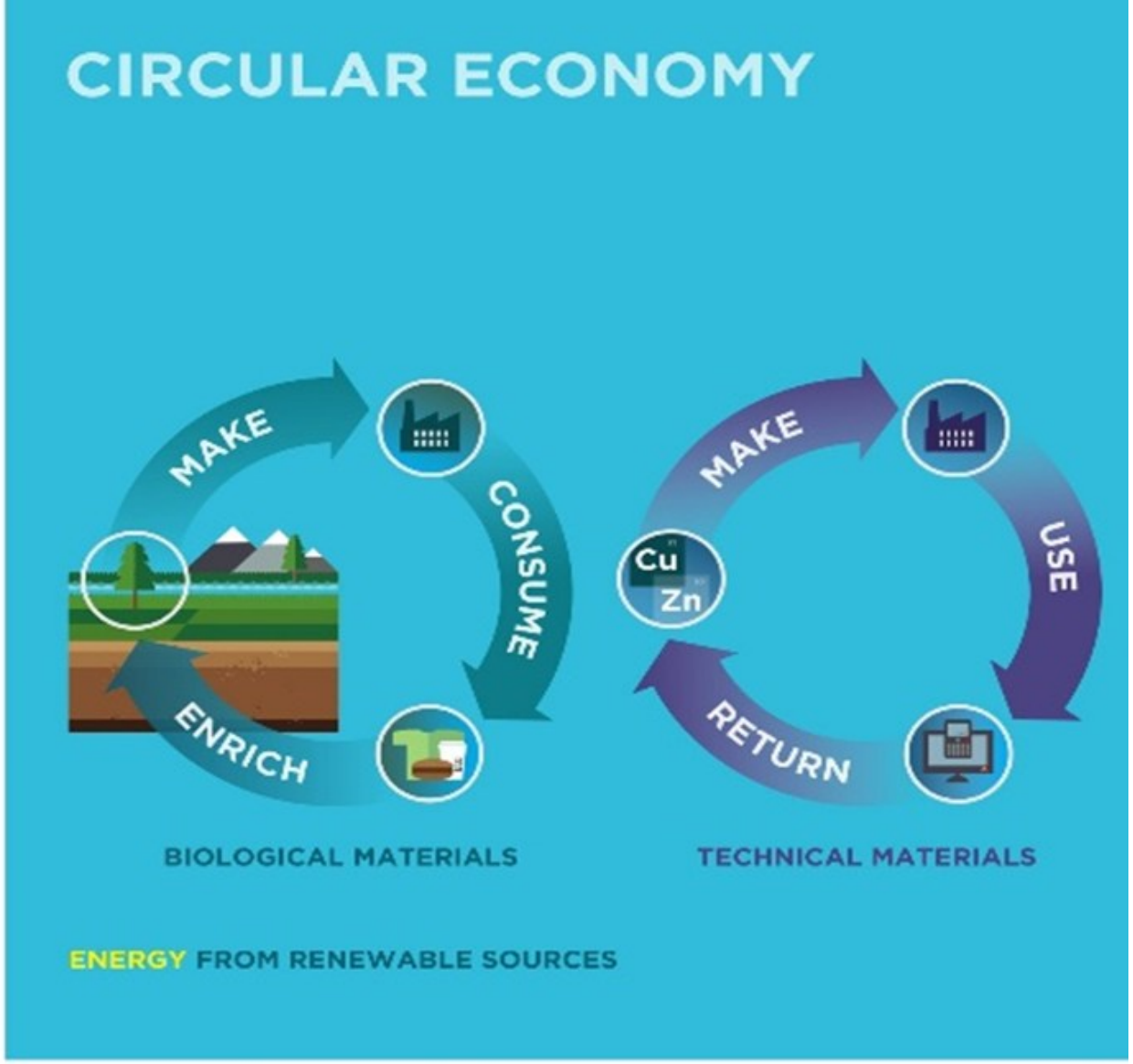
Professor of English and Author

With the participation of:

- Ms. Tiphaine Mérian (Replacement of France Chabert)

Senior Lecturer in materials





Ellen MacArthur Foundation (2018*). Exploring the circular economy*.
https://www.slideshare.net/adorngeo/exploring-thecirculareconomy/6

ELLEN MACARTHU
FOUNDATION

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Circular Economy – Recycling, recovery and reprocessing of materials

- Examine the topic from:
  - Significance at an individual, societal and global level.
  - Significance in the student's own field of study: automation & electrical engineering / mechatronics.
  - Development proposals: how to proceed towards a more sustainable environment.

Choice of Topic - Examples

- Collecting and re-using construction waste
- Methanation of bio-waste to produce gas
- Re-using and processing to transform organic waste from human food
- Life Cycle Analysis (LCA) applied to PET bottles
- Recycling of paper and cardboards
- Recycling, processing, and re-using of glass waste
- Recycling of batteries from electric cars in Finland and France
- The use of sustainable composites for the manufacturing of electric cars
- Reusing of electronic waste
- Recycling of hazardous materials – a comparison between France and Finland
- Dismantling of airplanes, trains, and cars

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Choice of Topic - Examples

- Collecting and re-using of plastic from PET bottles
- Ways of valorization of farm waste
- Recycling of aluminum from cans
- Plants and processes for chemical recycling of PVC
- How to collect, treat, and re-use polystyrene foam
- Recycling of metallic powder in additive manufacturing
- Issues of plastic wastes in oceans and solutions
- How to re-use and valorize tires
- Hydrogen in car manufacturing

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Choice of Topic: Examples

- Retrofitting gas-powered cars in Finland and France
- Adapting urbanization to reduce heat waves in cities
- Capture and utilization of CO_2
- Building an autonomous house : Materials, automation and autonomous energy production
- Future low CO_2 emission transportation
- Materials for thermal insulation in construction
- Using of vegetal fibers in automotive industry
- Eco-design in electronics to favour recycling
- Treatments and dyeing process of natural textiles with low environmental impact
- Collecting and sorting packaging in France and Finland

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Choice of Topic: Examples

- Using AI to improve recycling
- Collecting industrial waste collection and recycling channels
- How to recycle mobile phones
- Innovative solutions for using sheep wool
- Production of bioplastic from mushrooms
- Using wood to manufacture airplane parts
- Sustainable development in the aviation industry
- Algae-based bioplastic for packaging
- Carbon fibre recycling in France and Finland
- Applications of the 4R's guide in waste management
- Developing sustainable infrastructures for the Winter Olympic Games

Implementation of Project in 2026

- Students divided into 18 multinational teams:

  3-4 HAMK + 2 Uttop students

- HAMK size of group approx. 60 students,
- UTTOP size of group approx. 36 students
- platform **Teams –** you can also agree to meet elsewhere
- Project kick-off meeting in Teams on **Tuesday 17 March** at 9 -13 pm FIN 8-12 am FR & Team agreement on **Thursday 19 March** at 2-6pm FIN 1-5pm FR
- Interim Project Presentations **(HAMK and UTTOP separately) – Week 15 and 16 (UTTOP) – Week 15 (HAMK)**
- Online project meeting **Thursday 2 April** at 2-6pm FIN 1-5pm FR
- Final Project Presentations on Teams on **Monday 4 May** at 2 -6 pm FIN 1-5 pm FR

& Tuesday 5 May at 9-13pm FIN 8-12am FR

Outcomes of Project

NOTE! Assignments may vary slightly between UTTOP & HAMK:

1. **Team agreement**
2. **Agenda** for 1 meeting (although more meetings can be held)
3. **Memo** for 1 meeting (although more meetings can be held)
4. **Interim Project Seminar - Separate HAMK-ENIT (*example in slides 11-13)***
5. **Final Project Presentations (15 minutes per team – *Good and bad examples in slides 14 to 16*)**

Examples of Slides in an Interim Project Presentation

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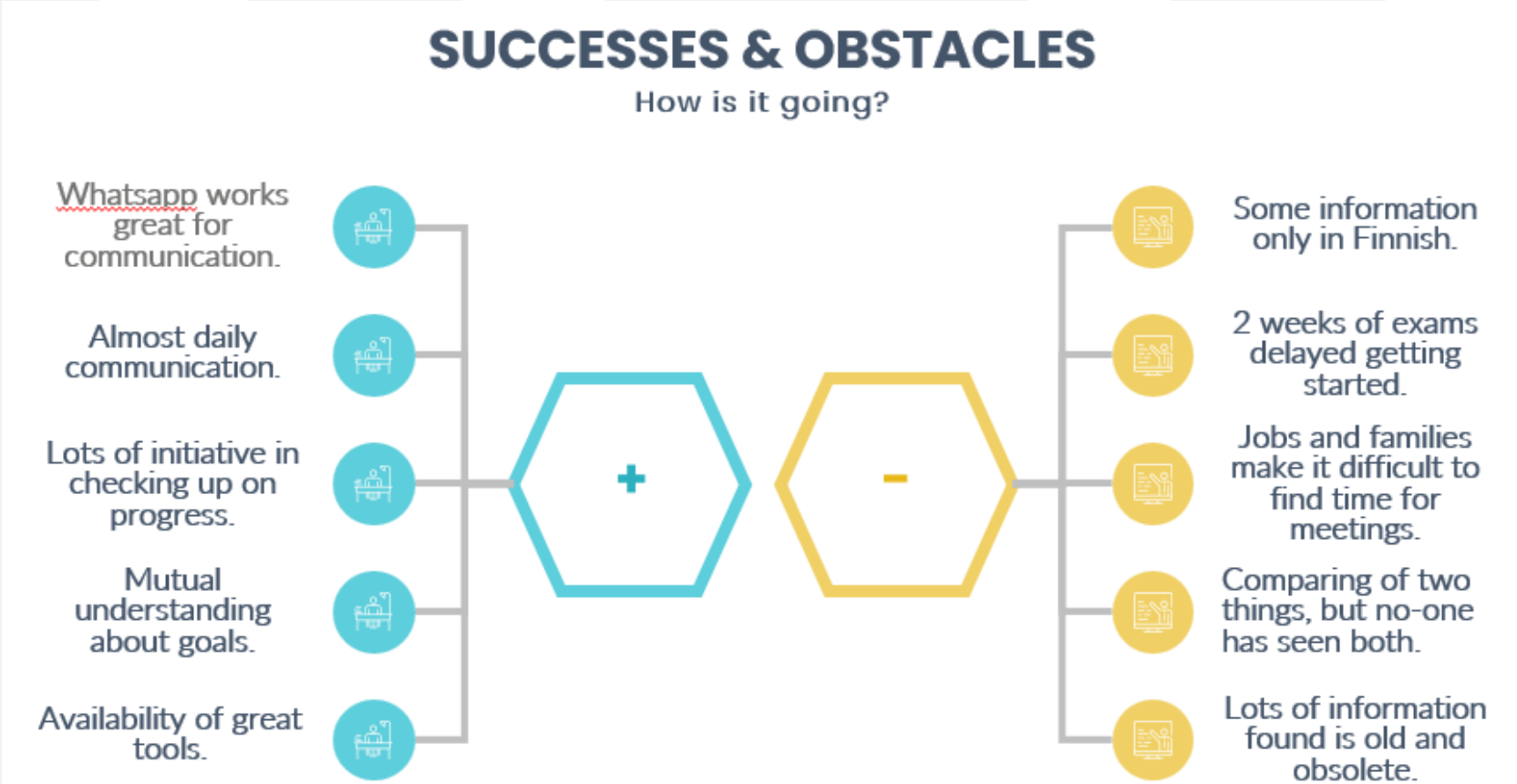

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Examples of Slides in an Interim Project Presentation

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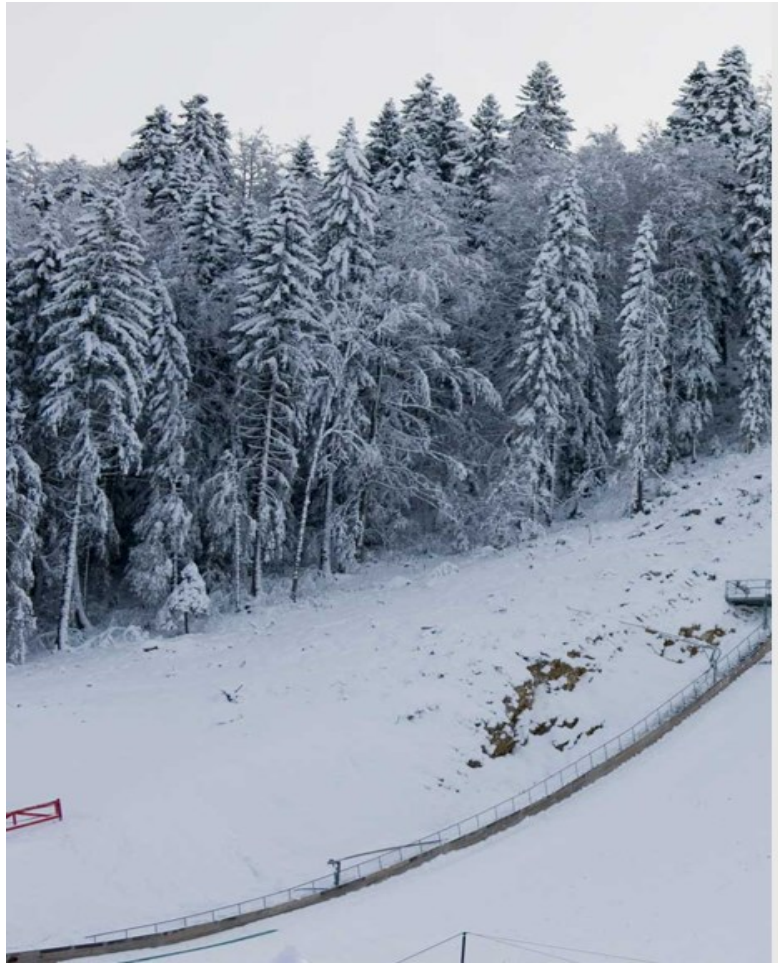
Examples of slides for the final presentation



Environmental challenges of the Winter Olympics Games

01

Deforestation

- Recurrent theme, for the Olympics organization
- Beijing 2022 : 20,000 trees fallen
- Equivalent of 1,000 soccer pitches

02

Carbon footprint

- Increased over the editions
- 1.3 million tons of CO2 (2018 and 2022)
- For the Summer Olympics Games :
- Rio 2016 : 3.5 million of CO2

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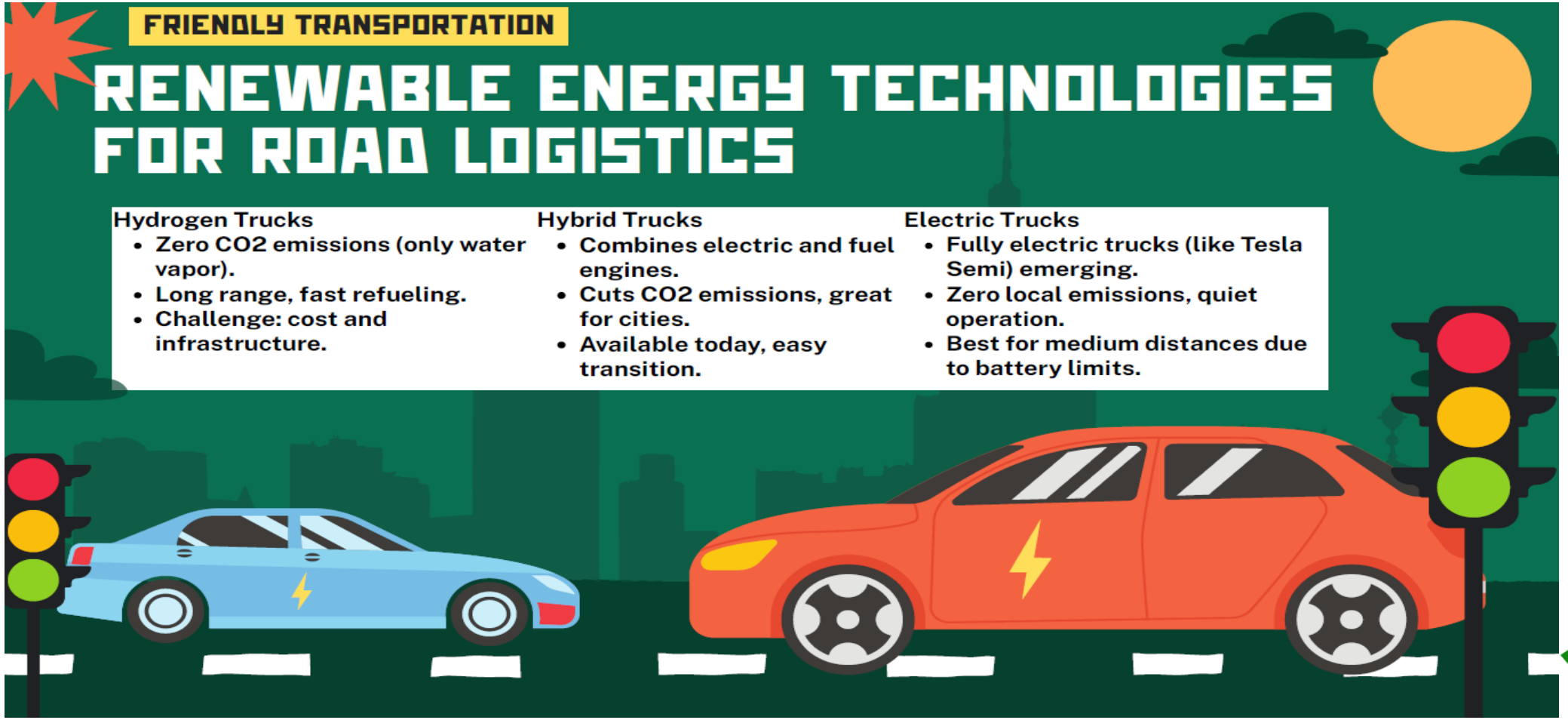
Examples of slides for the final presentation



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Examples of bad slides for final presentation

History of tire recycling of Finland

- In the early 1990s, end-of-life tyres in Finland were often discarded in landfills or left in nature, leading to environmental concerns. To tackle this issue, key players in the tyre industry including manufacturers, importers, and retreaders came together in 1995 to establish Suomen Rengaskierrätys Oy. The goal of this organization was to create a centralized and efficient system for the collection and reuse of used tyres across the country.
- In 1996, the Finnish government introduced the first regulation focused on the recovery and processing of discarded tyres. This regulation laid the groundwork for organized tyre recycling and established the principles of producer responsibility. These responsibilities were further reinforced by the Waste Act that came into force in 2012, along with its producer-specific requirements implemented in 2013. Under this legislation, tyre producers are obligated to ensure that at least 95% by weight of used tyres are recovered and put to beneficial use.

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Delivery

1. **The student teams:**

- get a Teams channel to work on
- introduce themselves
- present their plans for the project
- arrange how to communicate

2. Online meetings in Teams

. Fill out the team agreement

. Draw up an agenda and a memo

3. Final Project Presentations in Teams

4. **Peer assessment of presentations live** in Teams using a special form for this.

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Dissemination of Results

1. As a result of this project **meeting documentation**, **videos and a project summary** are created on recycling, recovery and reprocessing of materials either/both from a personal viewpoint, and from a societal, local, and field-specific perspective.
2. **Self and Peer Assessment** and feedback is given to each team.
3. **Teacher assessment** and feedback is given to each team.
4. Students develop their **team working skills** and **project work ski**lls.
5. Students develop their **multicultural awareness and communication skills**.
6. Results of the project are published in the form of **articles/presentations**.

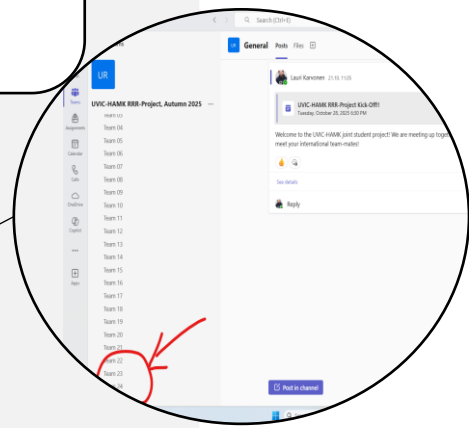
Kick-off meeting 17/3, Team 18…

…talk about **topics** and decide on their presentation theme

…agree to create **WhatsApp group** and **set up a meeting time**

…meets their **team members**

…fill the **team agreement** on their channel “Team 18”

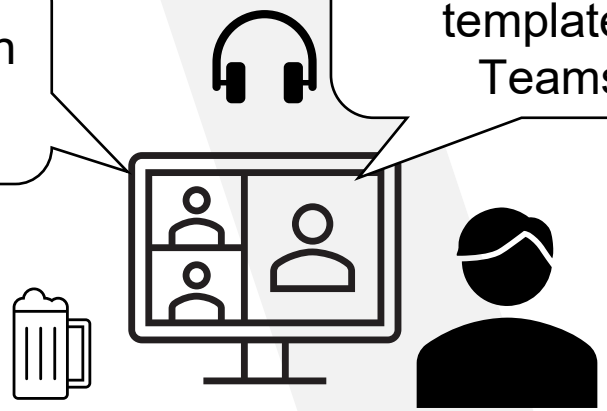


Project meeting in April…

…divide **jobs** and have **clear roles**

“I can research PLA plastics”

“Nice, I created a presentation template in Teams”



…continue **working** and **researching**, **collecting** material

“OK, we’ll meet up in 2 weeks and I’ll do an agenda”

…have a documented project meeting with **an agenda** and **minutes**

Microsoft Planner

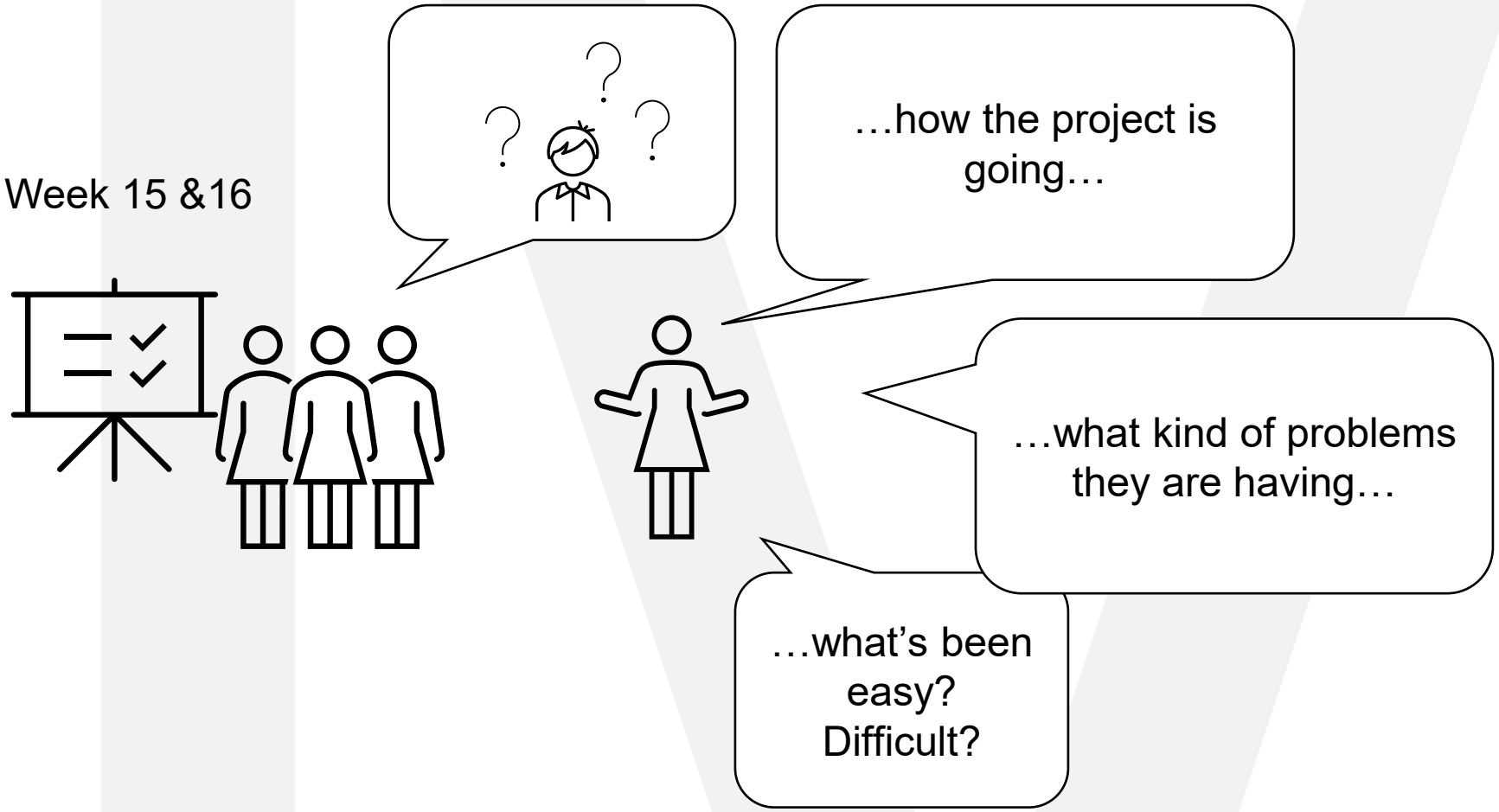
(Lucas puts up tasks and reminders up for everyone)

Trello

(Gaston said he can be the project lead)

Interim seminar (Separate HAMK/UTTOP)

Week 15 &16



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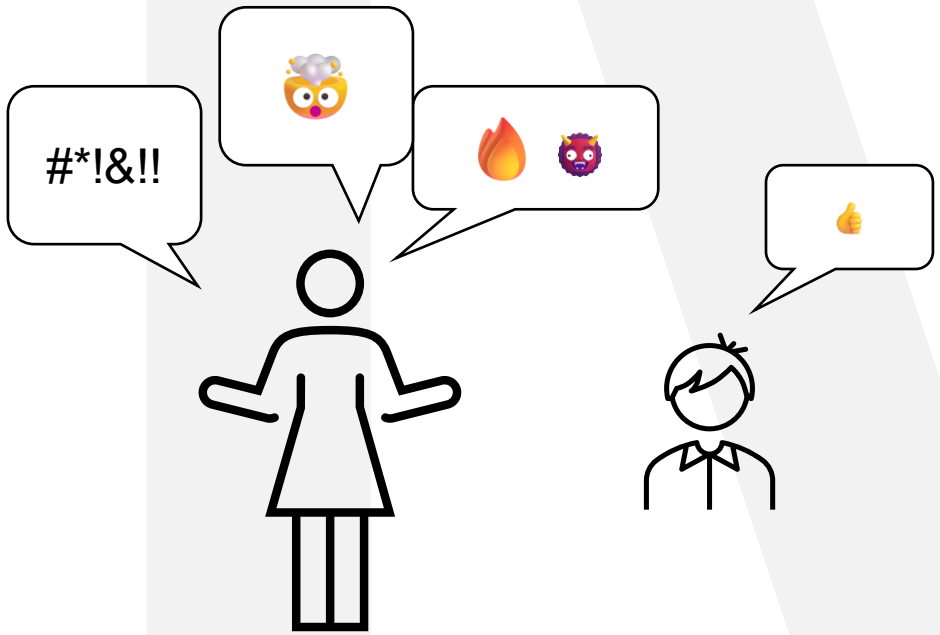
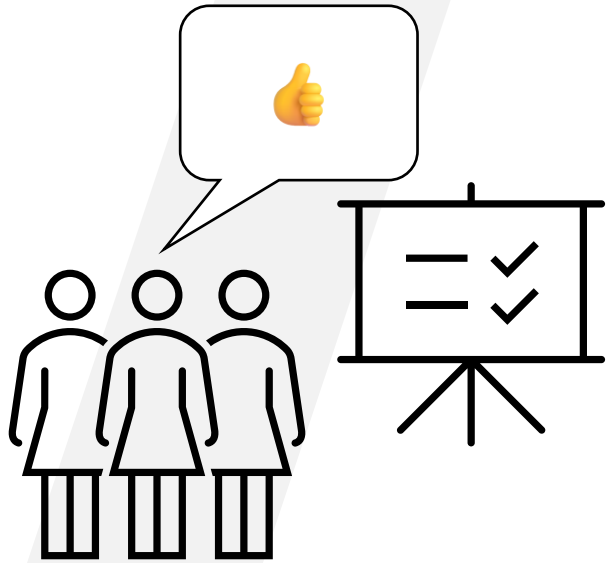
Team 18 gets feedback and guidance...





Before final presentations 4/5 &5/5

Pecca has returned the Team 18 **agenda** and **meeting notes** into **Moodle**…

"Ok, so I can do the introduction"

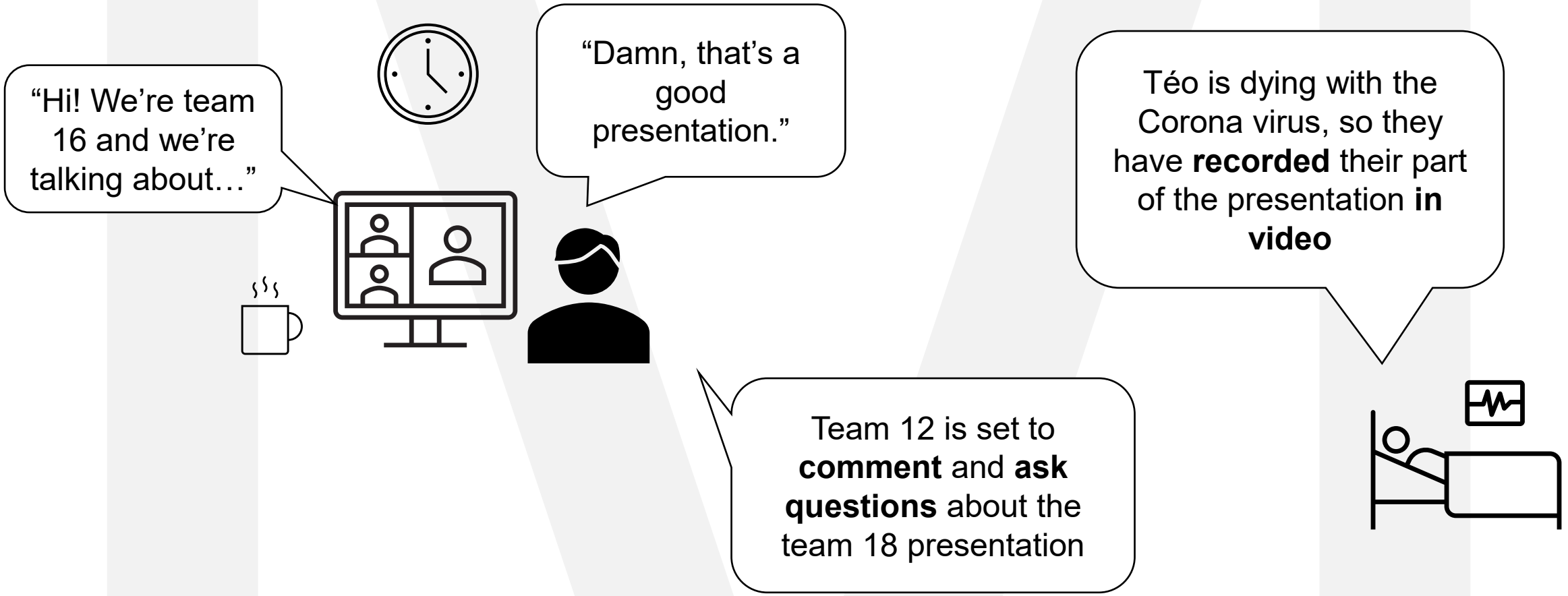
"I'll time you and tell you if we are going over-time"

Team 18 has **prepared their presentation** and **practices** together

They have returned their **presentation file**, and all make sure they can **be ready on 4/5 & 5/5**

"Nice, we'll practice it one more time"

On the presentation date 4/5 & 5/5…



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Finishing project and celebrating learning goals!

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How was the project in your opinion?