GRE@T-PIONEER

Monitoring and supporting students in their learning – example of a flipped hybrid course

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BACKGROUND

- **Advanced courses** = often offered as intensive onsite "workshops" or "summer courses"
  - ➢ Too condensed format to lead to "efficient" learning
  - ➢ Issuance of certificates of attendance (with no real measure of engagement, progress and understanding)

- **Online and hybrid learning environments** = more accessibility and flexibility
  - ➢ Often low engagement and high drop-out rates

BACKGROUND

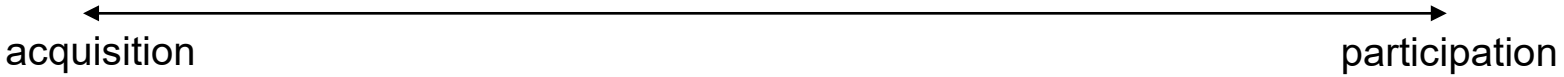
- “Innovative” learning design proposed in the GRE@T-PIONEeR project, having for objectives:
  - To offer **advanced** courses
  - In a **flexible** manner
  - And having a **high engagement** of the participants in the activities

WHAT IS GRE@T-PIONEeR?

- **18** university teachers from **8** different universities in **6** different countries
- Main **goals** of the project:
  - Maintain or further develop **competences** in **computational and experimental nuclear reactor physics and safety**
  - Deliver **top-class courses** using **state-of-the-art pedagogical methods** (active learning through flipping)
  - Create a **community** of **reactor physicists**

PEDAGOGICAL METHOD

- Flipping:



Sfard, A. (1998). On two metaphors for learning and the dangers of choosing just one. Educational researcher, 27(2), 4-13.

PEDAGOGICAL METHOD

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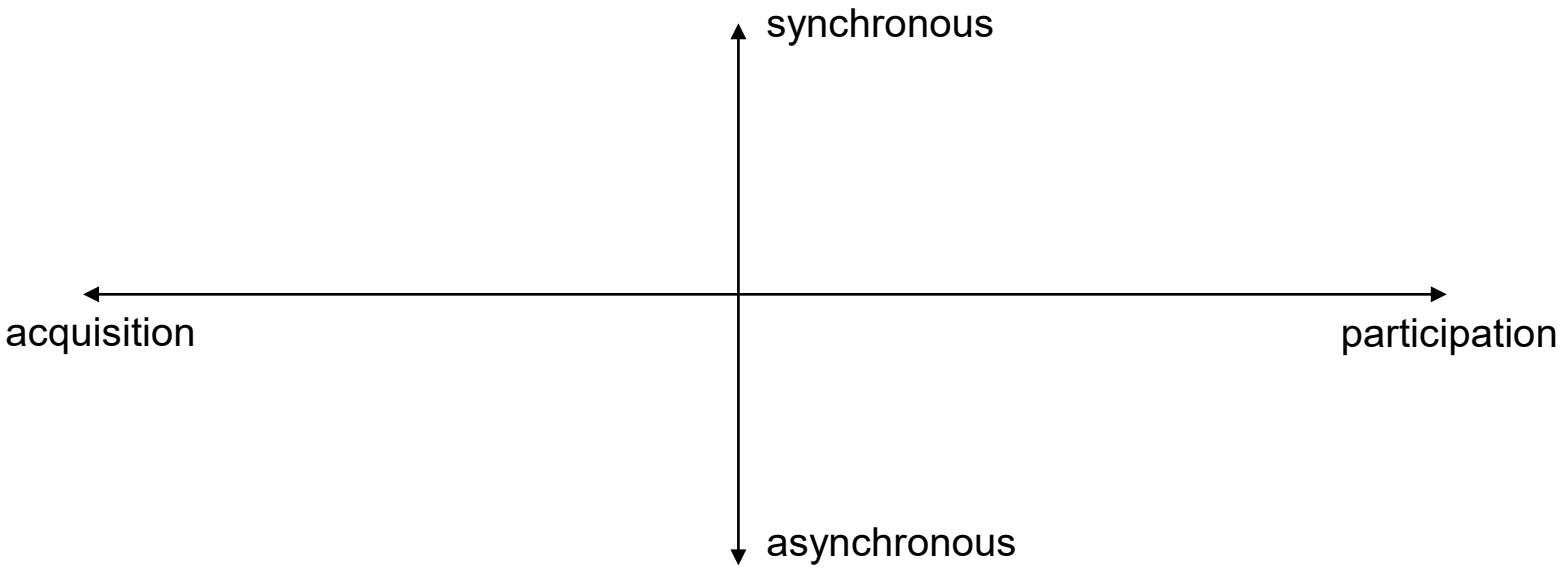

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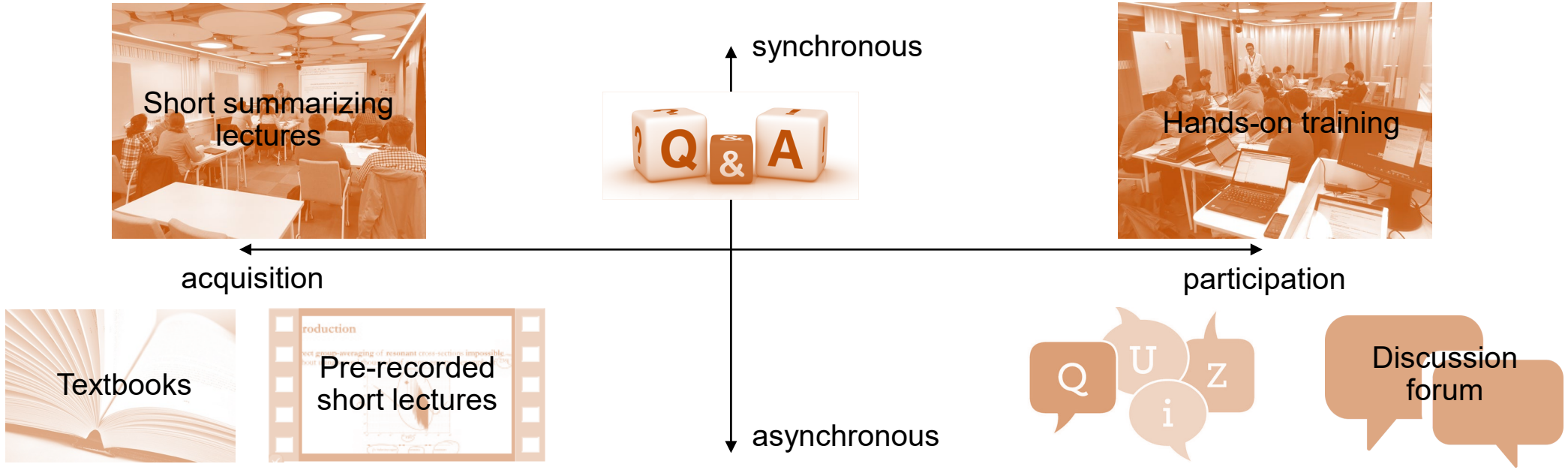

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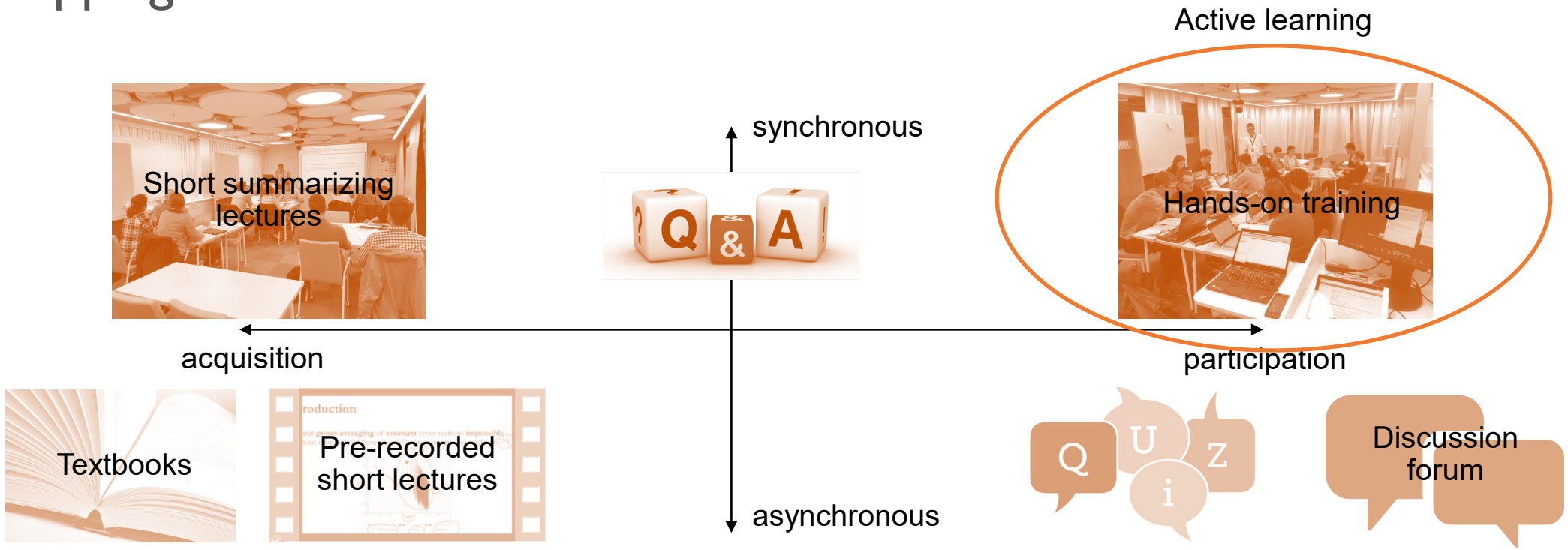

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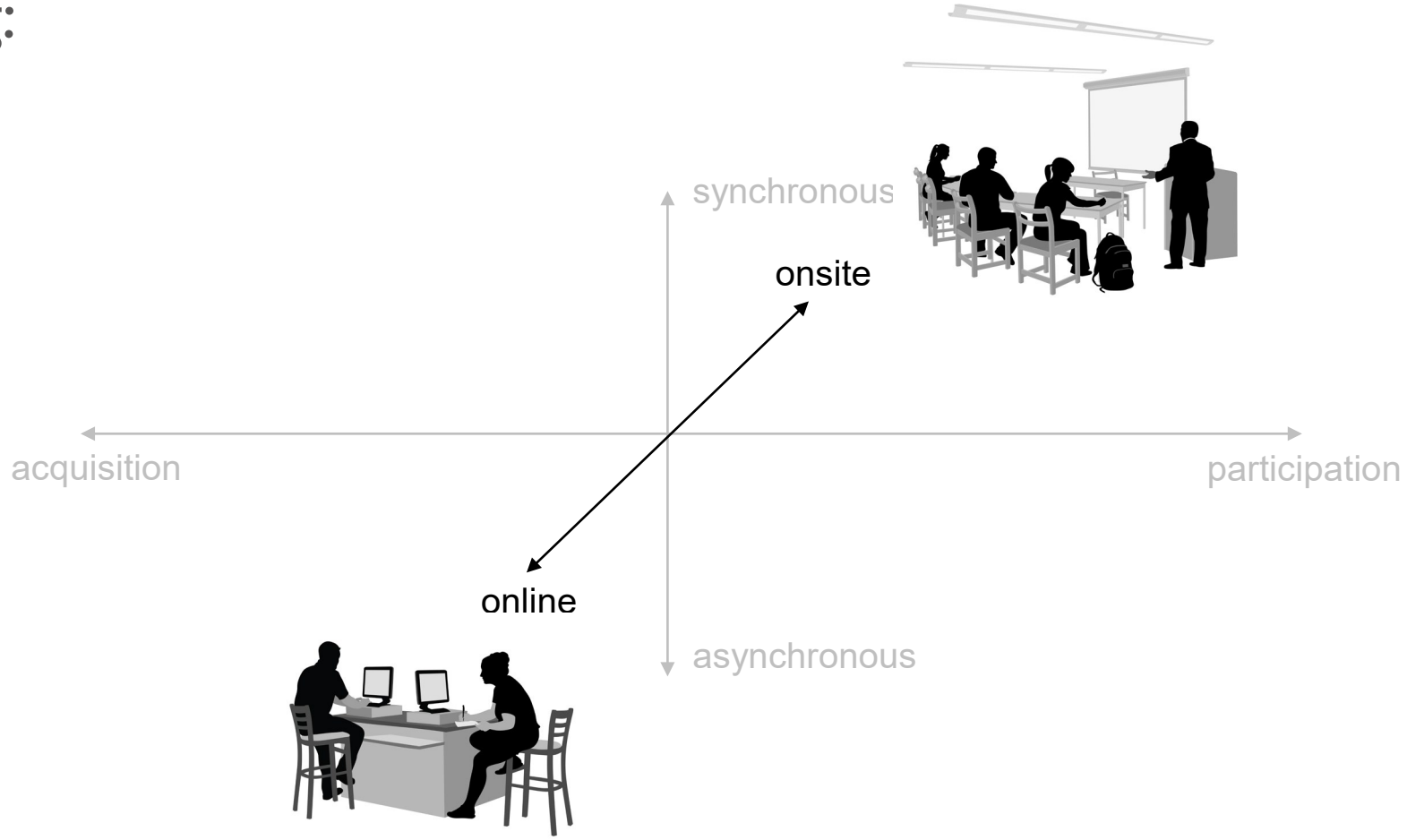


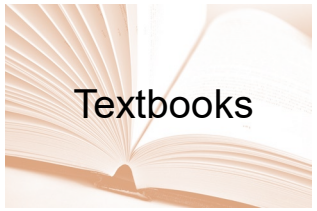
PEDAGOGICAL METHOD

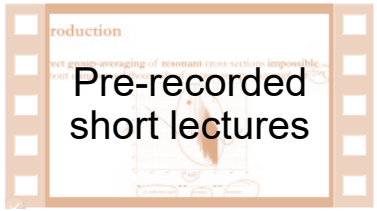
Synchronous hybrid learning phase concentrated on **5 consecutive days**

synchronous

acquisition

participation





asynchronous

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Asynchronous online learning phase spread on **4 weeks** (self-paced learning)

PEDAGOGICAL METHOD

- **Active learning** techniques used:
  - **Short summarizing lectures** followed by "**quizzes**", with or without prior group discussions
  - Heavy use of **computer simulation tools** with different objectives:
    - **Implementing** nuclear reactor **modelling techniques** introduced in the other course elements
    - **Checking** the proper **understanding** of key concepts via small assignments
    - **Checking** the proper **use** of third-party nuclear simulation software against some reference solutions

➢ **Highly-structured** sessions

PEDAGOGICAL METHOD

- Boundary conditions/set-up:
  - To be **accepted** to the **synchronous sessions**, the participants should watch at least 50% of the pre-recorded videos and take at least 50% of the quizzes
  - To obtain a **course certificate**, the participants should get at least 50 points (out of 100)
- **All activities** are delivered, monitored and graded via the **SOUL** Learning Management System (LMS) from Tecnatom

ANALYSIS

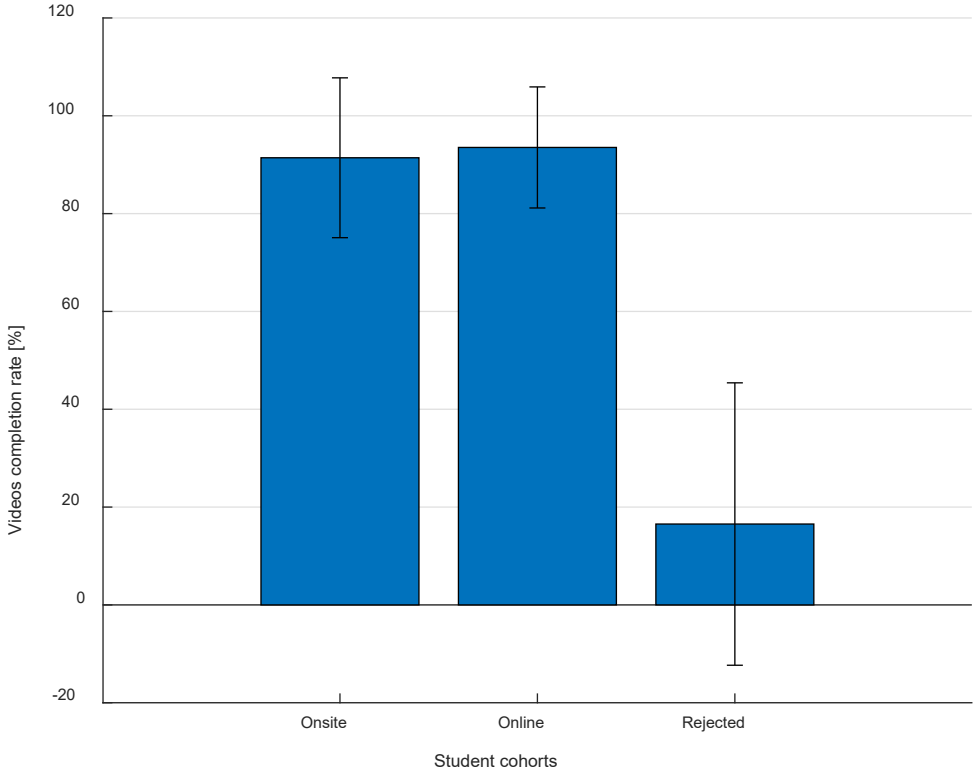
- Analysis of one of the courses: "Core modelling for core design"
- Timing:
  - **Asynchronous** learning phase: November 25, 2022 – January 8, 2023
  - **Synchronous** learning phase: January 9-13, 2023
  - **Extra time** to complete the synchronous activities: January 14-February 13, 2023

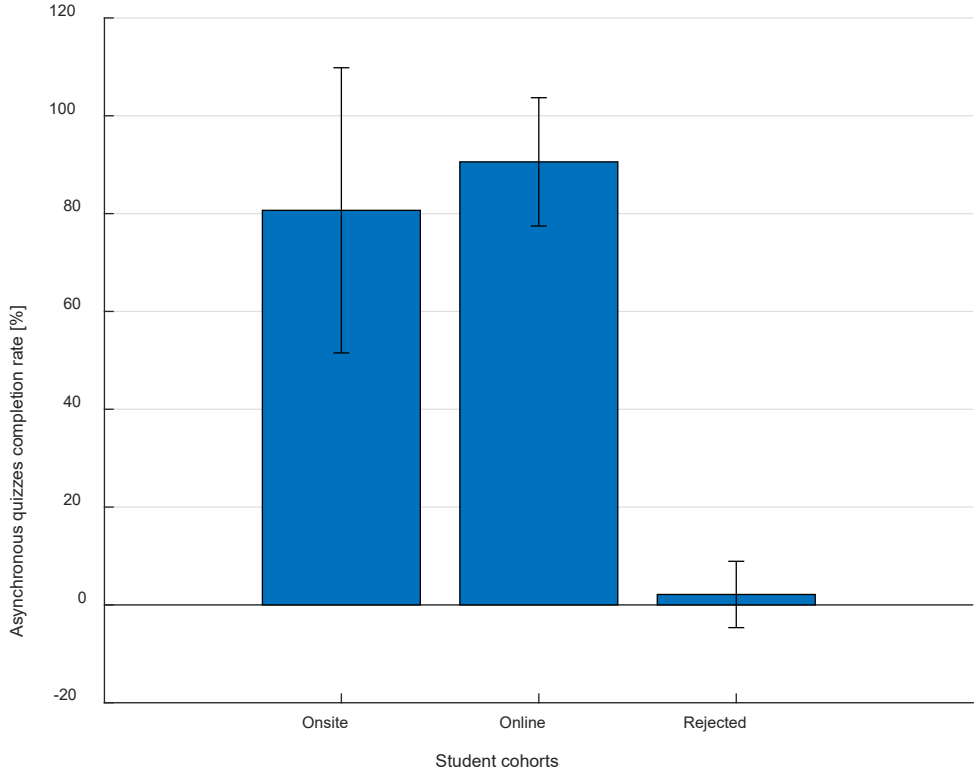
ANALYSIS

- Analysis of one of the courses "Core modelling for core design"
- Student statistics:
  - **58 applicants**
  - 6 rejected applications (upper limit for each course set to 50 participants)
  - **52 accepted applications** (12 onsite and 41 online) and granted access to the LMS
  - **31 participants qualified for the synchronous sessions** (with 12 onsite and 19 online)
  - **29 participants received a course certificate** (12 onsite and 17 online)
- Remark: all online participants took some of the first synchronous activities

ANALYSIS

- **Use** of the various teaching resources – **asynchronous** elements:





ANALYSIS

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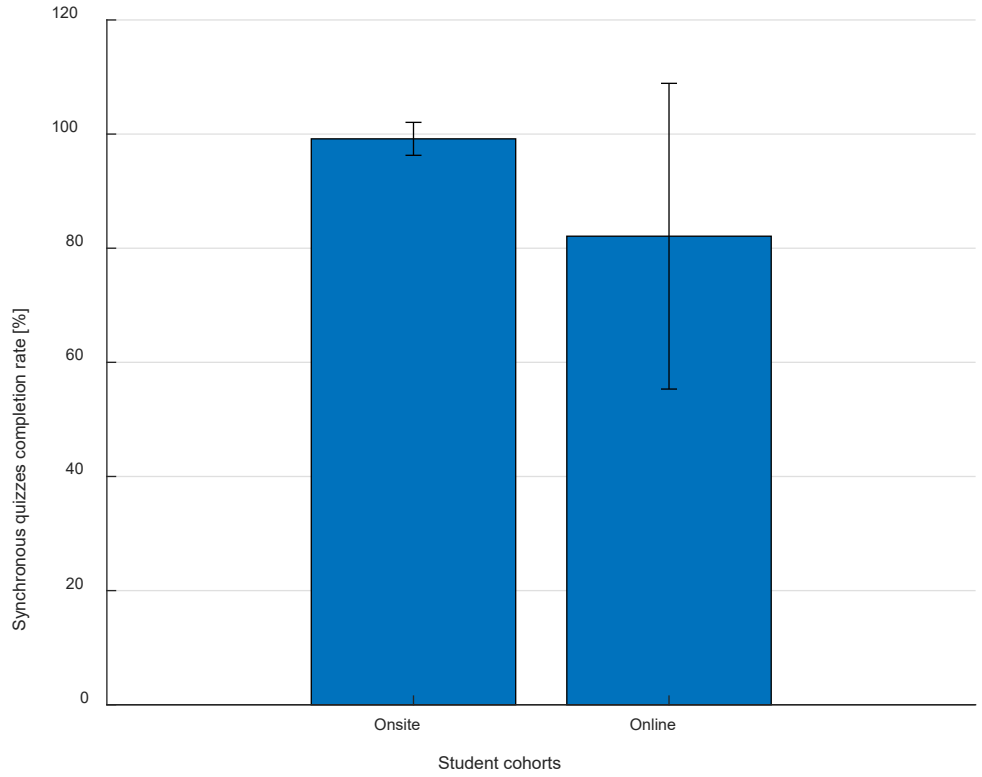
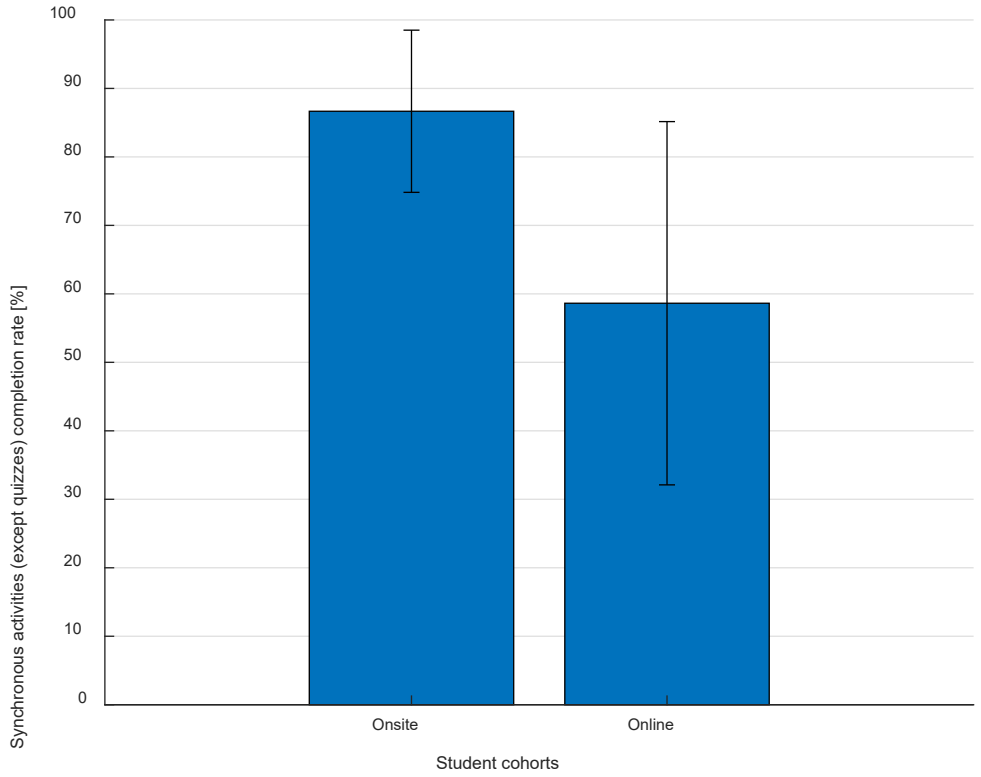
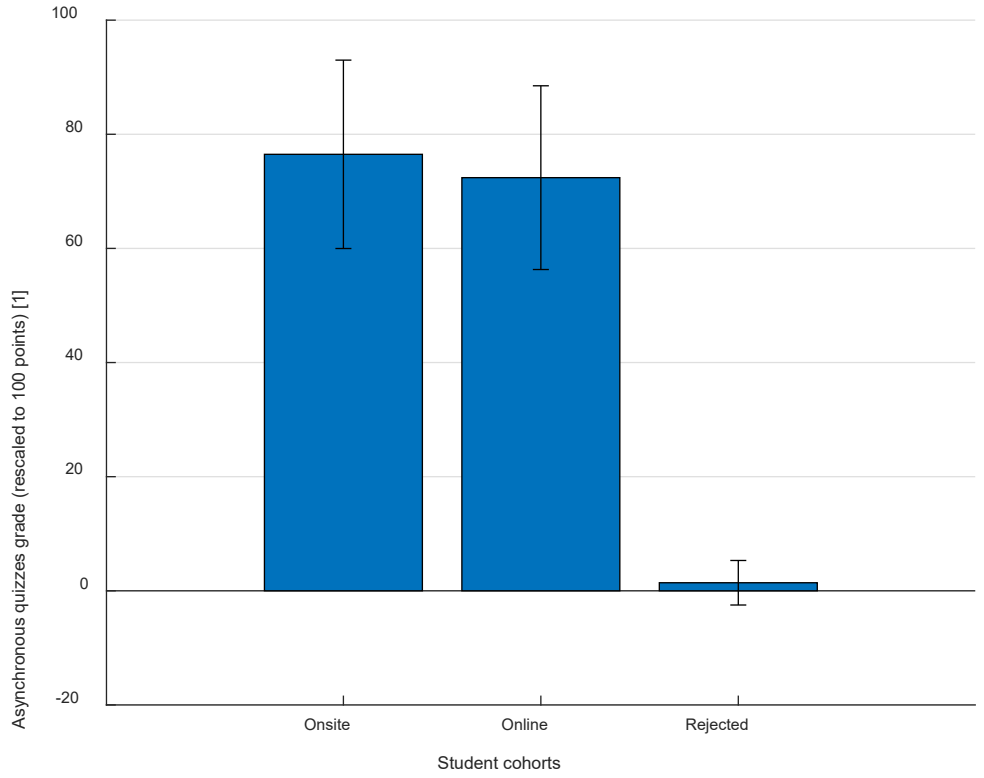
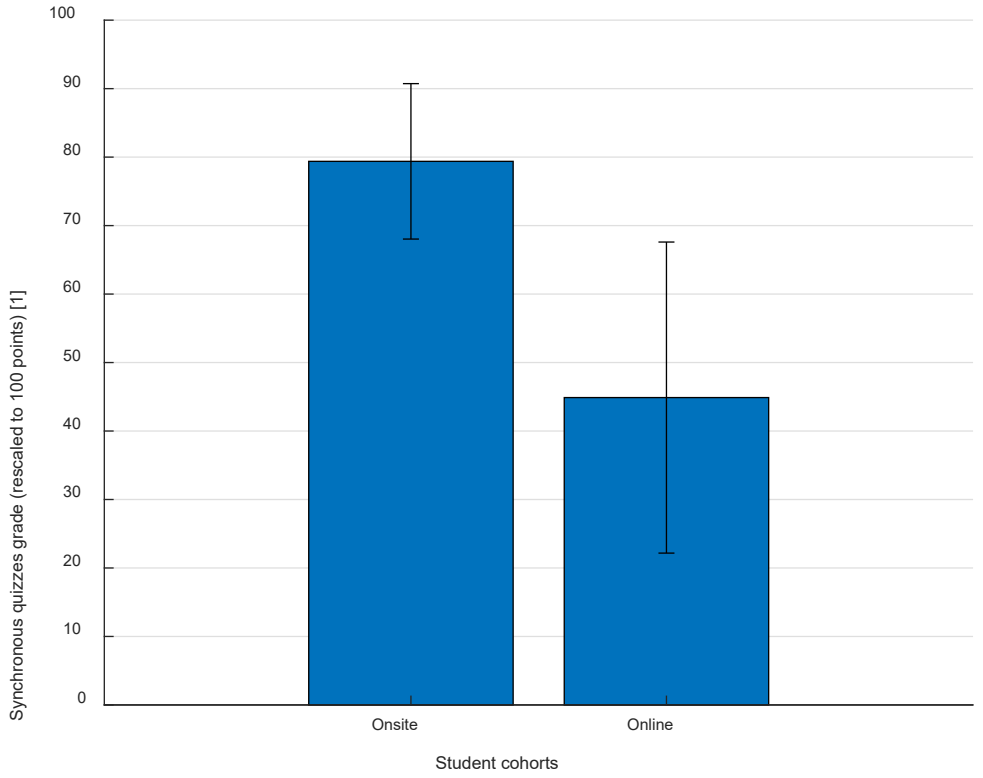




ANALYSIS

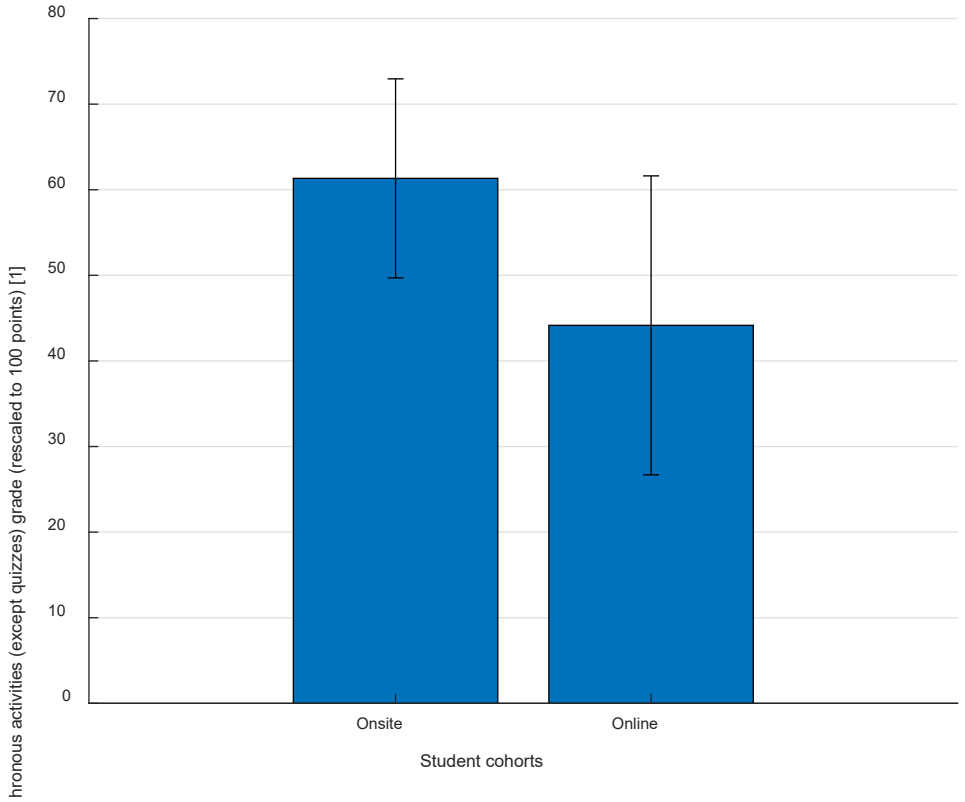
- **Learning** of the theoretical concepts – **asynchronous** + **synchronous** quizzes





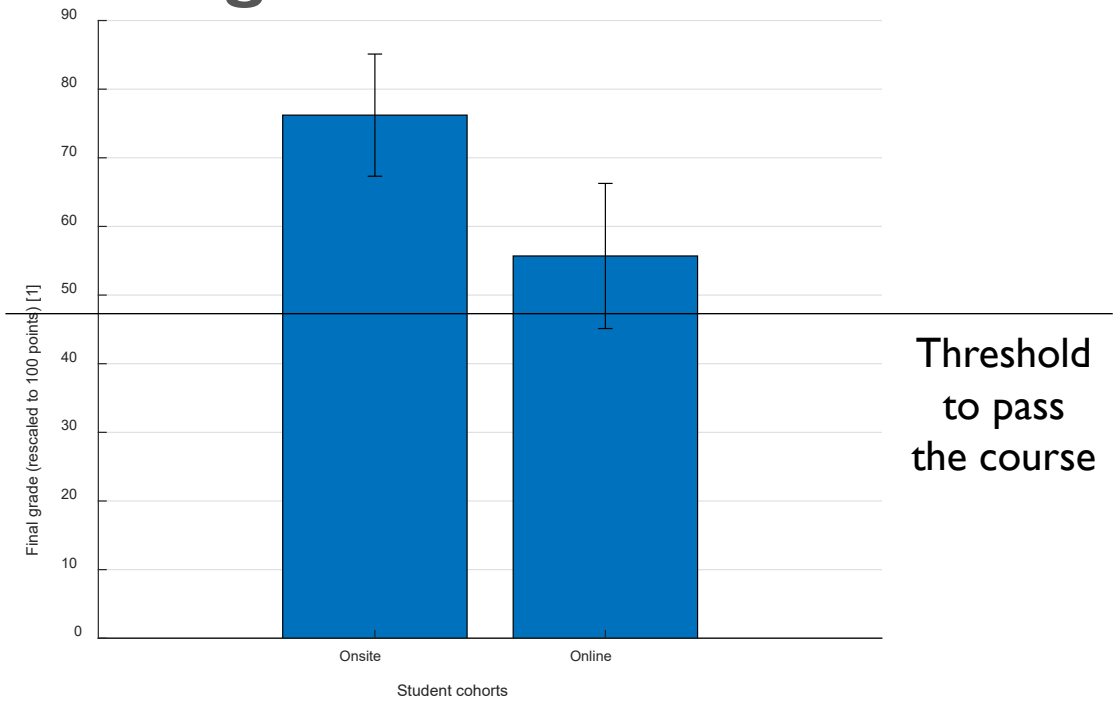
ANALYSIS

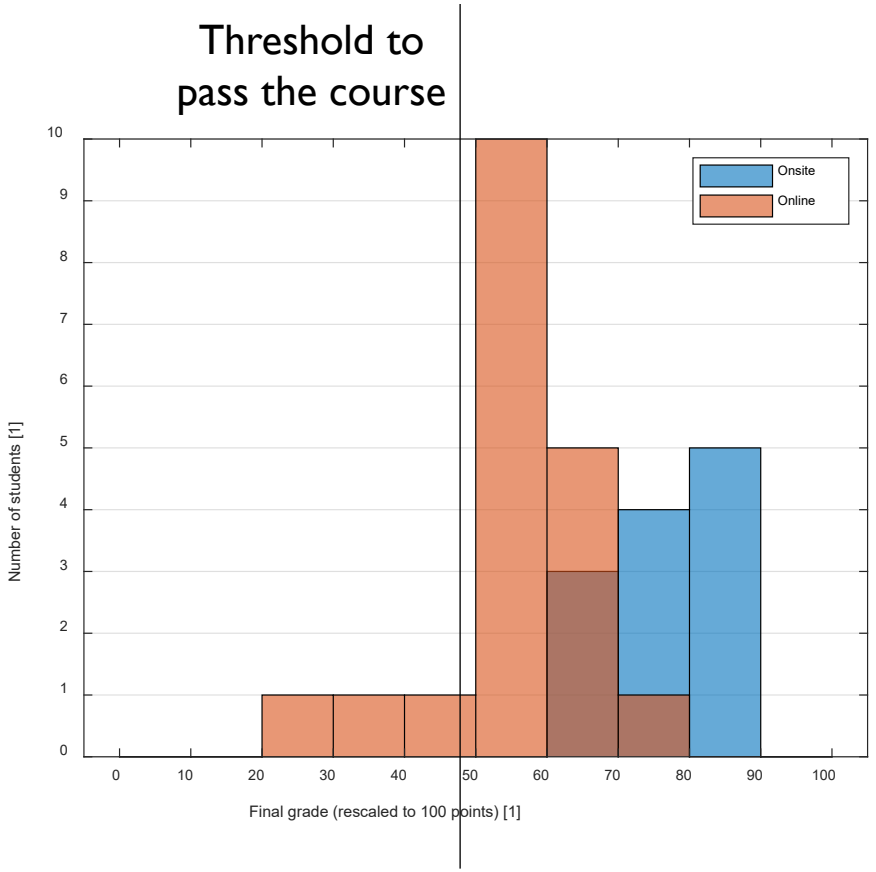
- **Ability to apply** the concepts in practical situations – **synchronous activities other than quizzes**



ANALYSIS

- **Final grades:**

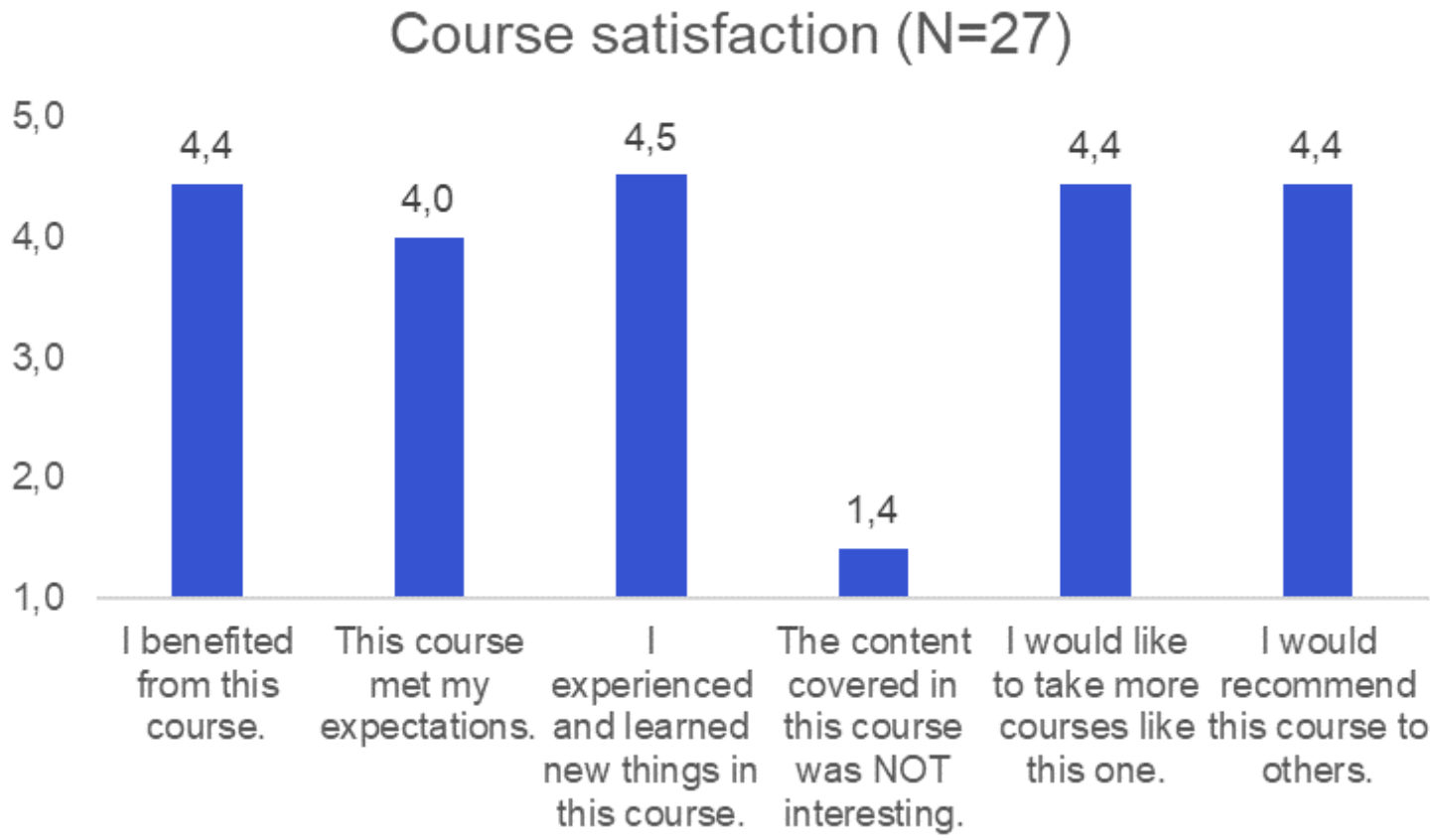




- All 12 onsite students passed the course
- 17 of the 19 online students passed the course

ANALYSIS

- Participants' own perception of the course



ANALYSIS

- Thematic analysis of "things" participant´s liked (N=27):

1. Practical Exercises / Tools / Codes / Software (16)
2. Course Materials / Handbooks / Slides / Sources (11)
3. Well-explained Topics / Quality of Teachers (9)
4. Organization / Course Structure / Preparation (9)
5. Networking / Interactions with Students and Professionals (6)
6. Inclusive Atmosphere / Support from Teachers and Students (5)
7. Flipped Classroom / Teaching Methods (3)
8. Flexibility / Pace / Online Learning (2)
9. Real-world Applications / Industry Relevance (2)
10. Multidisciplinary / Diverse Backgrounds (2)

ANALYSIS

- Thematic analysis of "things" participant´s did not like (N=27):

1. Time Constraints and Pace (17 items)
2. Content and Instruction (13 items)
3. Technical Issues and Software (11 items)
4. Course Structure and Topics (6 items)
5. Workload and Assignments (5 items)
6. Course Format and Recommendations (4 items)
7. Instructor-related Issues (3 items)

CONCLUSIONS

- **Very good outcomes** in terms of **participation, engagement** and **completion**
- **Significant differences** between **onsite** and **online** participants

➢ **"Strategic" learning** for the **online** participants?

➢ **High workload** to be combined with **other duties**?

- **Very rewarding** to reach such a high level of teachers-students interactions during the synchronous sessions, thanks to flipping

- Courses to be **re-offered** during the next academic year

Thank you!

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