

**GRE@T-
PIONEER**



Experience from the **GRE@T-PIONEER** project

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This project has received funding from the European Union's Euratom research and innovation programme 2014-2018 under the Grant Agreement n°890675. The content of this document reflects only the author's view. The European Commission is not responsible for any use that may be made of the information it contains.

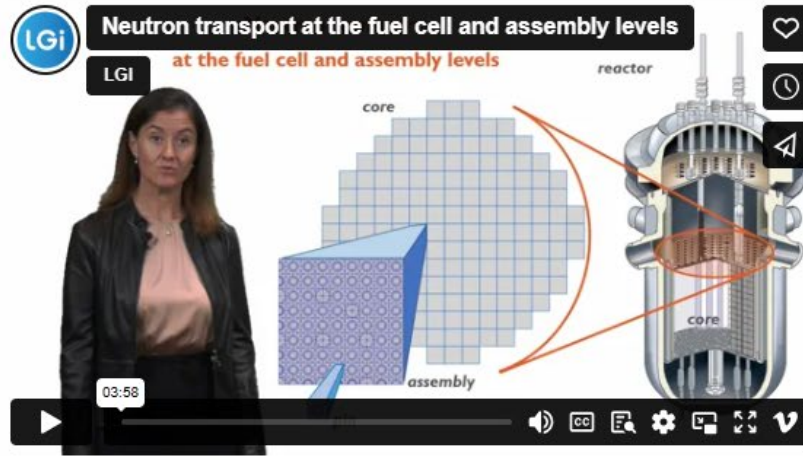


WHAT IS GRE@T-PIONEER?

- **Horizon 2020 project** running between 2020 and 2024
- **19** 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**

COURSE OFFERING

- **9 courses** offered:
 - Nuclear cross-sections for neutron transport
 - Neutron transport at the fuel cell and assembly levels
 - Core modelling for core design
 - Core modelling for transients
 - Reactor transients, nuclear safety and uncertainty and sensitivity analysis
 - Radiation protection in nuclear environment
 - Hands-on exercises on the AKR-2 training reactor
 - Hands-on exercises on the CROCUS training reactor (onsite only)
 - Hands-on exercises on the BME training reactor
- **More info and registration at <https://great-pioneer.eu/register>**

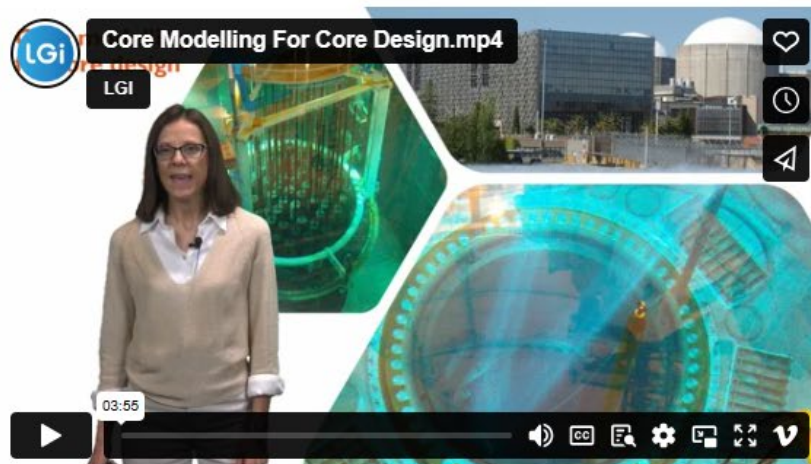


NEUTRON TRANSPORT AT THE FUEL CELL AND ASSEMBLY LEVELS

- The principles of probabilistic methods in steady-state conditions for fuel cell and assembly calculations.
- The principles of deterministic methods in steady-state conditions, their approximations, and their range of validity for fuel cell and assembly calculations.
- The use of those methods for macroscopic cross-section generation.

[DOWNLOAD COURSE LEAFLET](#)

[EXAMPLES OF COURSE VIDEOS](#)



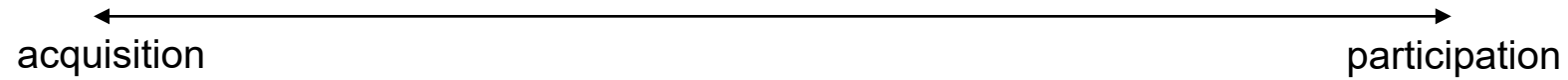
CORE MODELLING FOR CORE DESIGN

- The principles of probabilistic methods in steady-state conditions for core calculations.
- The principles of deterministic methods in steady-state conditions, their approximations, and their range of validity for core calculations.
- The use of those methods for reference calculations or for core design, operation and safety analysis.

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PEDAGOGICAL METHOD

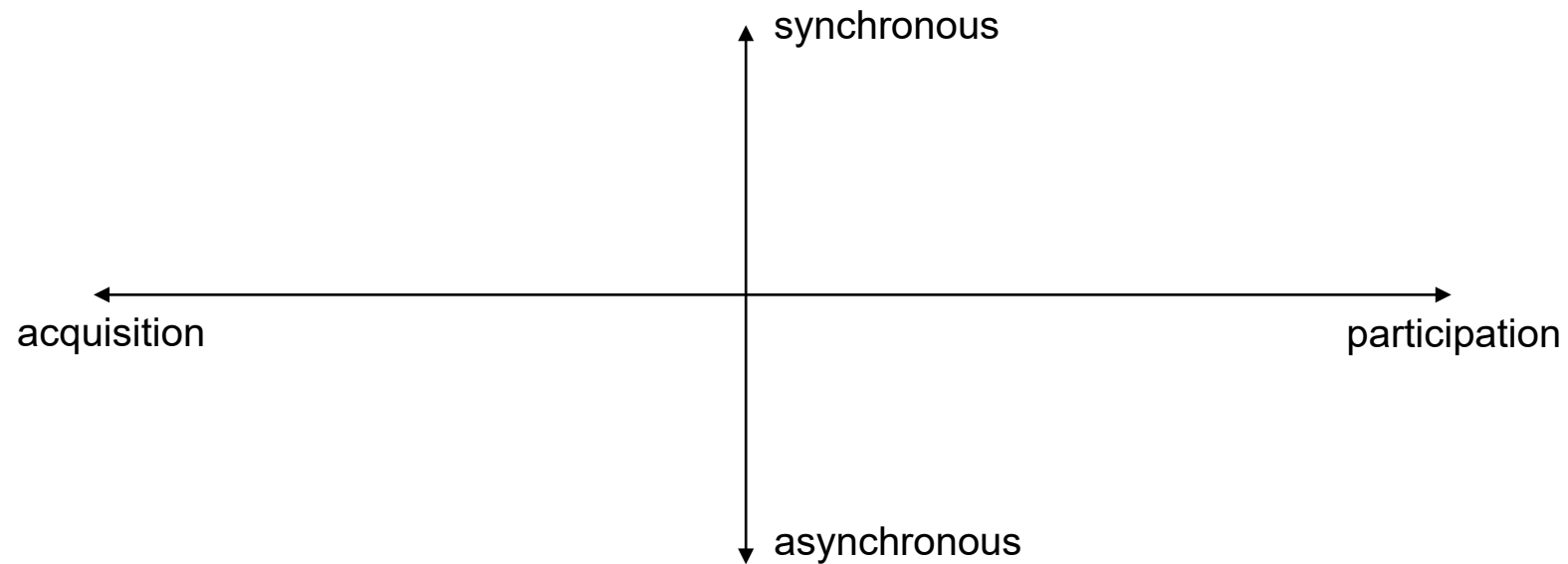
- Flipping:



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

PEDAGOGICAL METHOD

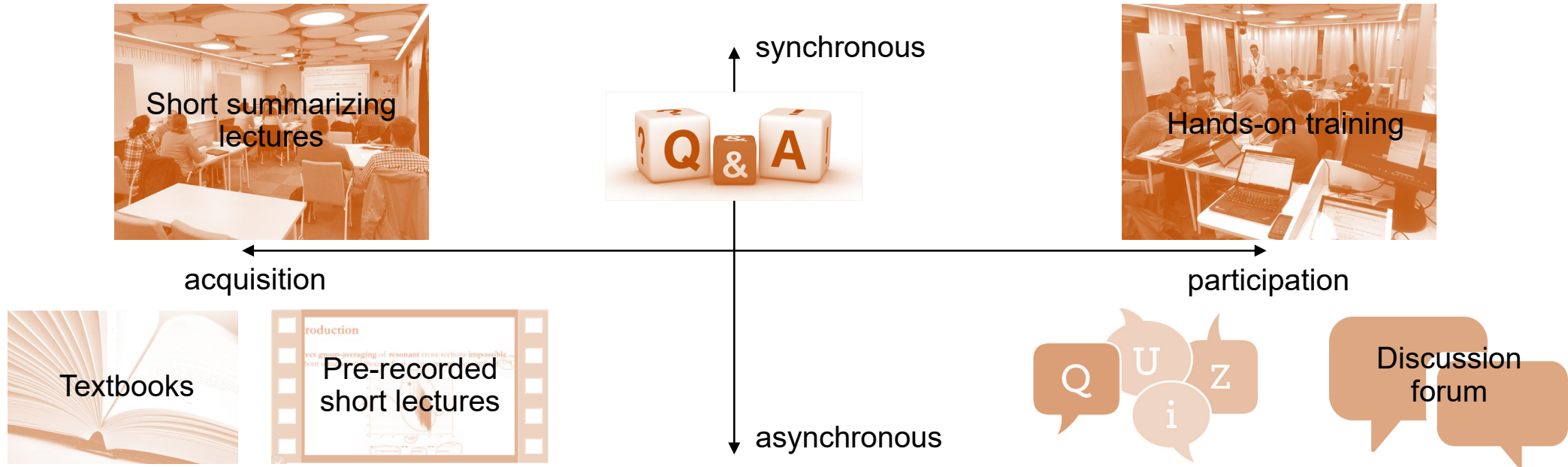
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Hrastinski, S. (2008). Asynchronous and synchronous e-learning. Educause Quarterly, 31(4), 51-55.

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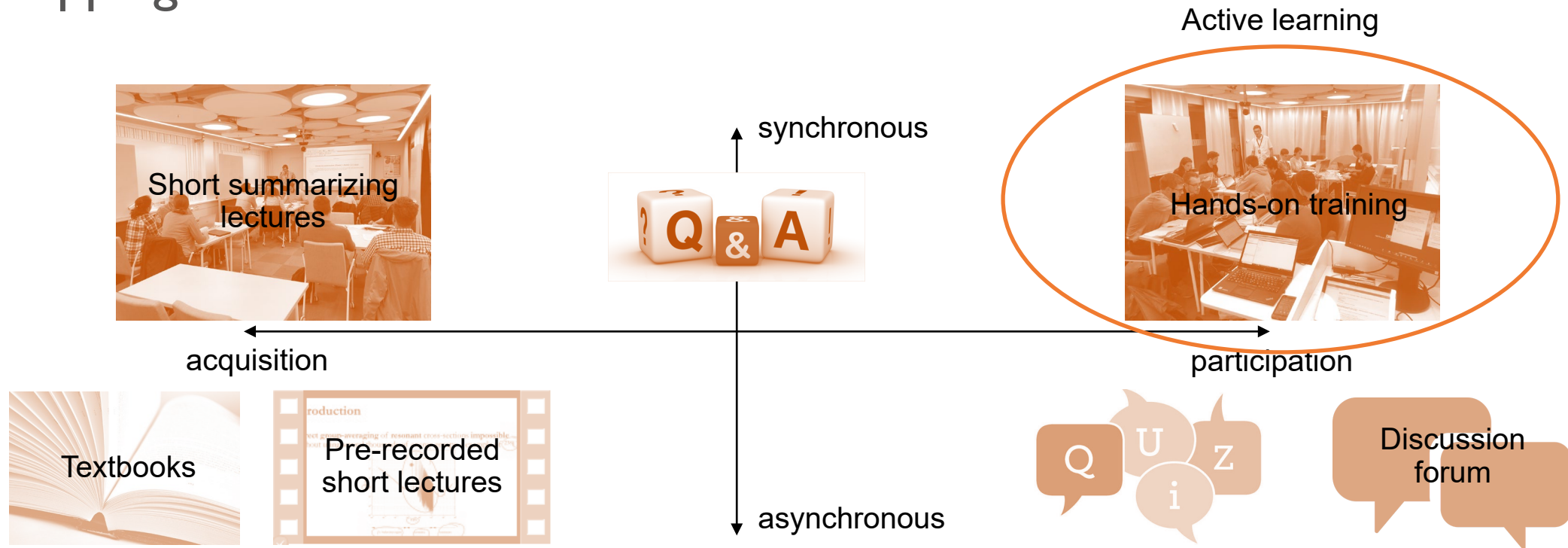
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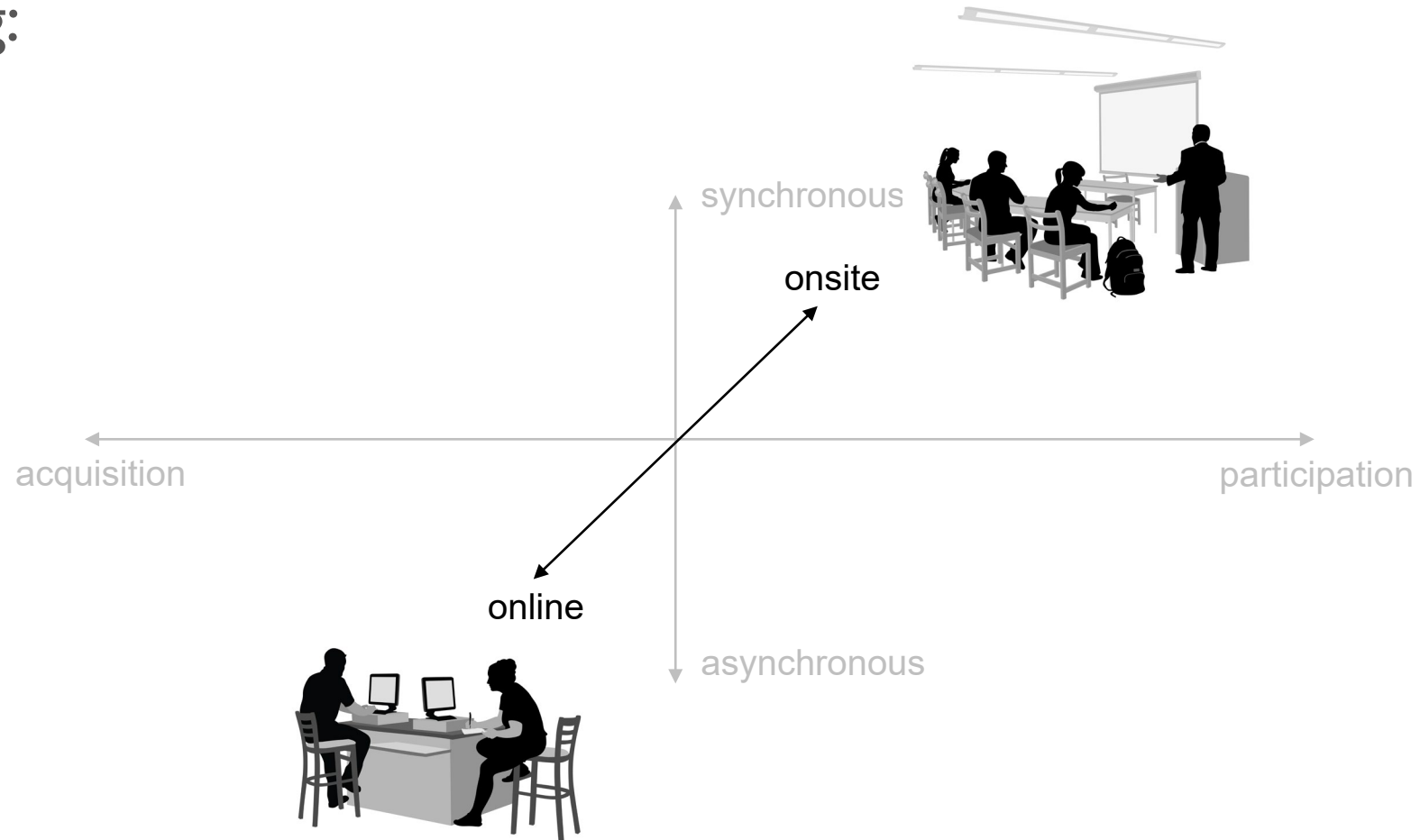
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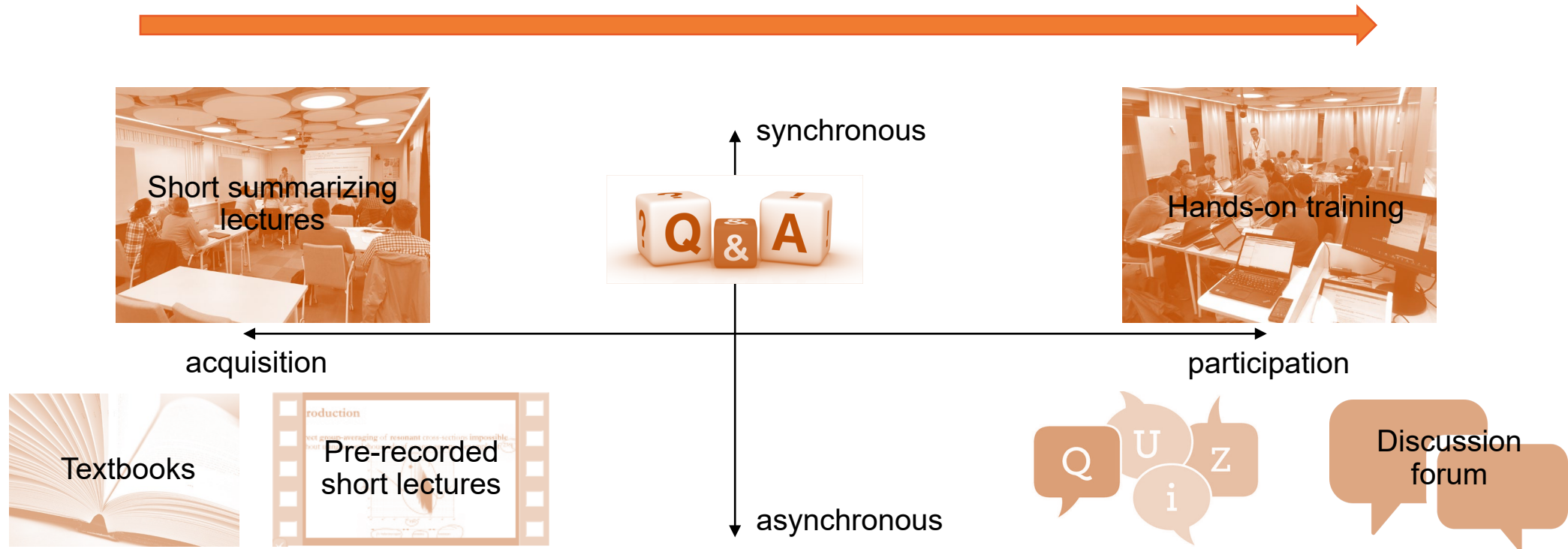
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PEDAGOGICAL METHOD

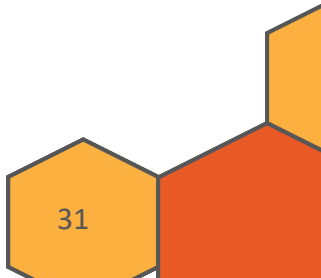
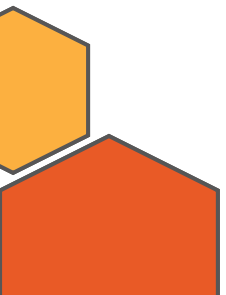
Synchronous hybrid learning phase concentrated on 5 consecutive days



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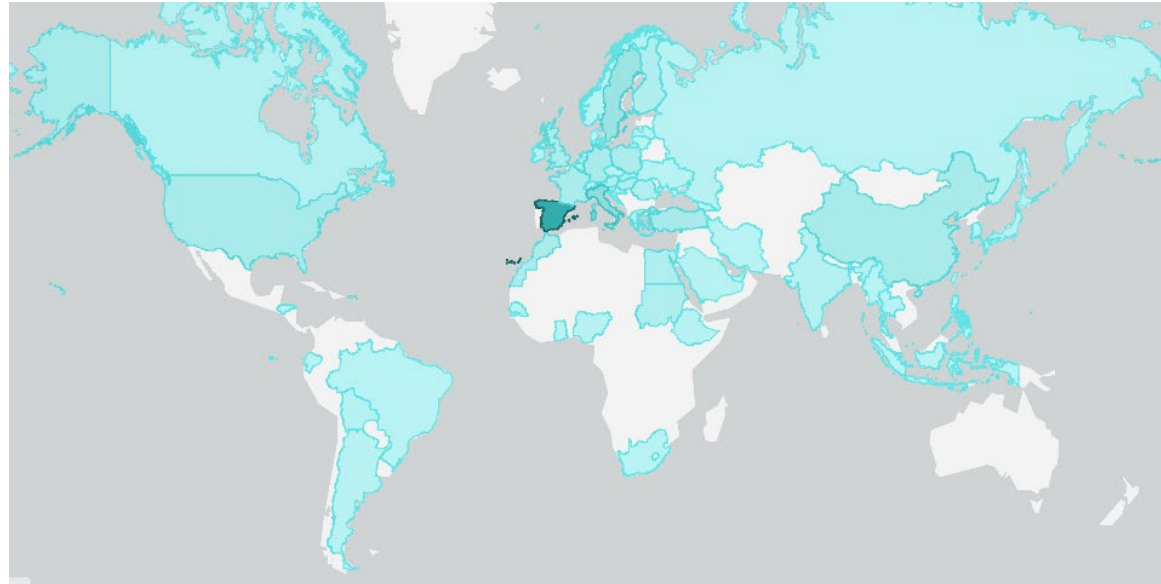
Asynchronous online learning phase spread on 4 weeks (self-paced learning)

OVERALL RESULTS



OVERALL RESULTS

- For the 8 courses delivered during the academic year 2022/2023:
 - **Origin** of the access to the Learning Management System (LMS):



➤ Almost worldwide coverage

OVERALL RESULTS

- For the 8 courses delivered during the academic year 2022/2023:
 - Completion rate of the participants granted access to the LMS: 55.3%
 - Completion rate of the participants qualified for the synchronous sessions: 75.6%
 - **Completion rate of the participants taking the first activity of the synchronous sessions: 91.5%** (100% for the onsite participants and 87.0% for the online participants)

CONCLUSIONS

- **Very good outcomes** in terms of **participation, engagement and completion**
- **Very good feedback** from **students**
- **Very rewarding** to reach such a high level of teachers-students interactions during the synchronous sessions, thanks to flipping
- Courses being **re-offered** during this academic year
- On-going efforts to maintain the courses **running on the long term**



Youssef Badr • 1st

Senior Nuclear and Radiation Engineering student at Alexandria...

1d •



I don't usually like posting course completion certificates, but this time in particular I feel like I have to. When I signed up for this course months ago I thought it's going to be a surface level introduction course, not because of the advertisement of the course, but rather because of the restrained time period of "5 days".

Not only was I proven wrong, this course ended up being one of the most challenging academic materials I had to face in quite sometime. I was absolutely blown away by the materials, and honestly a little taken aback by the resources and the exercises (Brush up on your Matlab skills, trust me). Some of them I still have to locate the time to try again later.

I am writing this to thank Prof. Demaziere, Prof. Sandra Dulla, Prof. Máté, and the amazing community of professional and graduate students I got exposed to and introduced to. It's amazing what GREAT-PIONEER is doing for Nuclear Education. I was very grateful for this opportunity, and will definitely be trying to take more Great-Pioneer courses in the future, and would recommend them to all my colleagues.



CERTIFICATE

OF COMPLETION

IS HEREBY AWARDED TO:

Youssef Badr

For successfully passing the course titled "Neutron transport at the fuel cell and assembly levels"

The course covered the following topics: analytical solutions of the neutron transport equation, deterministic modeling and Monte Carlo methods. The course was based on self-studies (preparatory work) and interactive sessions. The preparatory work, amounting to ca. 40 hours, consisted of reading a set of handbooks, watching video lectures, and answering quizzes. The interactive sessions were held between October 16 and October 20, 2023, and consisted of completing several exercises and quizzes, representing ca. 40 hours of work. The course is worth 3 ECTS credits (European Credit Transfer and Accumulation System).

Prof. Sandra Dulla
Politecnico di Torino, Turin, Italy

Sandra Dulla



Welcome to the final workshop, June 25-26, 2024, Sweden + online!



INNOVATING PHYSICS PEDAGOGY:

Lessons from GRE@T-PIONEER's Flipped Classroom in Hybrid and Online Modes

25-26 June 2024 at Stenungsbaden. More information: great-pioneer.eu



More info and registration at:

Registration to the GRE@T-PIONEER workshop



Thank you!

Contact details:



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