Prof. Marcelo Milrad

Marcelo Milrad is a Full Professor of Media Technology at Linnaeus University (LNU) in Sweden. His current research interests include the areas of Technology-Enhanced Learning (TEL), advanced human-computer interaction and novel uses of AI techniques and mobile technologies in the fields of Education & Health Care. In the Exten(DT)2 project, he acts as principal investigator coordinating the different scientific activities of the project. Professor Milrad conducts his research in very close collaboration with industrial partners and the public sector. Dr Milrad has also been presenting and giving lectures about his work in more than 45 countries worldwide.

Introducing Extended Squared

Prof. Chronis Kynigos

Chronis Kynigos is the head of the Exten(DT)2 scientific advisory board, Professor at the National and Kapodistrian University of Athens and Director of the Educational Technology Lab therein. Also, he is a member of the BJET editorial board. He is the head of a team which has developed the core of the Exten(DT)2 authoring tools for users to design and tinker with models and games. Students will engage in design thinking projects where their end products will be models and games built with these tools. The tools embed concepts and practices for the development of computational thinking. Three tools will be used; one for creating programmable animated graphical 3D models; one for creating 'choices with consequences' games for socio-scientific issues; one for creating tetris-like games embedding meanings for classification.

A critical perspective to design thinking

Dr Marianthi Grizioti

Marianthi Grizioti is a lecturer of computational literacy in education and a post-doc researcher in the Educational Technology Lab at the National and Kapodistrian University of Athens, Greece. Her interests include the design and development of constructionist technologies that promote the development of computational skills. In the Exten(DT)2 project, she is in charge of the extension of three digital learning tools with emerging technologies and their evaluation with students and teachers through empirical studies.

Emerging digital technologies

Prof. Christothea Herodotou

Christothea Herodotou is a Professor of learning technologies and social justice at the Open University UK. Her interests relate to the design and evaluation of technologies that promote equitable learning. In the Exten(DT)2 project, she is coordinating co-design activities with teachers, dissemination and impact.

Co-designing with teachers and innovation

Innovation in education:
Co-designing/creating with teachers

Christothea Herodotou
Prof. of Learning Technologies and Social Justice
The Open University UK

9 March 2023

WP3: Co-creation of educational resources and material with teachers

2) Bring together different stakeholders in rethinking the nature of emerging technologies for design thinking activities by co-creating Exten.(D.T.)² resources and technologies for inclusive learning. This will be done through:

- **Exten.(D.T.)²** experts co-designing with stakeholders, i.e. teachers and policy-makers, a set of DT activities and associated material (e.g., lesson plans) that will tackle current wicked problems such as biodiversity, climate change, gender roles and migration, and support the development of 21st-century skills.
- **Exten.(D.T.)²** experts actively involving 250-300 teachers in a participatory process of design, data collection, analysis and feedback for DT activities.
- **Exten.(D.T.)²** experts co-producing with stakeholders a set of digital resources (e.g., AR games, digital 3D printable artifacts) to support the digital implementation of DT activities, by utilizing the project's extended technologies.

- Co-design – define a problem and also define a solution
- Co-production – implement solution
- Co-creation – doing the above two

Co-production in research

- Time-demanding
- Option for interested teachers
- Ensures research impact
  - Research best addresses needs of individuals and communities
- Issues of responsibility, accountability, power and ethics should be discussed
- Equitable distribution of resources, responsibilities, efforts and benefits

"Co-production can take place throughout the project. It may encompass identifying research questions, design and priority setting, governance, co-delivery of research activities, communication of key findings and involvement in knowledge exchange".
UKRI.org

https://www.ukri.org/about-us/policies-standards-and-data/good-research-resource-hub/research-co-production/

Design Thinking review paper (2022) - K12 education

Exten DT²

"How do teachers choose or construct a design thinking model or framework that meets the needs of the teaching situation? In fact, it is difficult to construct a universal design thinking model to deal with a variety of complex educational scenarios. Therefore, to meet the teaching needs of more subject domains, **future study needs more exploration of the design thinking models that could be compatible with teaching practice in K-12 education.** Referring to the existing empirical research, it may be necessary to comprehensively **consider related factors such as students, teachers, and the school environments**.

"Future study could bring design thinking into both STEM and non-STEM curriculums to further verify how design thinking will help students build knowledge and skills in a wider range of domains. Furthermore, **teachers can make targeted combinations or adjustments** of elements in a design thinking model or framework to better **meet teaching needs.**"

Li, T. & Zhan, Z. A. (2022). Systematic Review on Design Thinking Integrated Learning in K-12 Education. *Appl. Sci. 12*, 8077.

https://doi.org/10.3390/ app12168077

Need to consider and understand the teaching context (teachers, students, environment) to design DT models compatible with the teaching practice.

Teachers as change agents

- Teachers initiate and implement change through personal interactions with others → development of teacher leadership

- The **Spheres of Teacher Leadership Action and Learning** framework (Fairman & McKenzie, 2012, 2015):

→teacher leadership may be formal or informal role - "did the work" of teacher leadership without holding formal positions of authority- with the aim to improve learning

→assumes that teachers have agency to lead change and to co-create conditions for further learning and improvement.

- **Co-design as a "a process of teacher leadership engagement"**

➢ active participation and dialogue between team members

➢ teachers bringing knowledge of their classroom contexts (lived experiences, "expertise by experience")

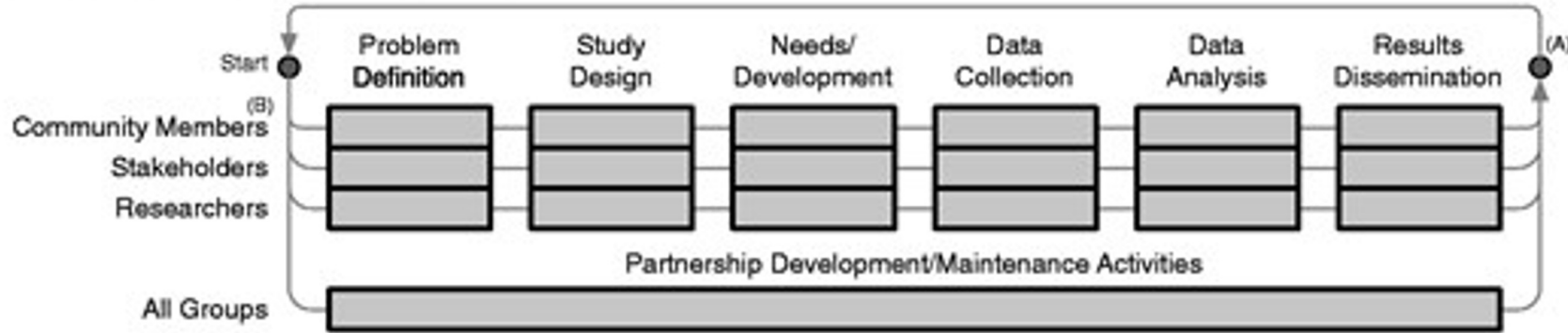➢ researchers offering expertise in the principles of innovation and research processes

(Fairman J., Mackenzie S. (2012). Spheres of teacher leadership action for learning. *Professional development in Education*, 38(2), 229–246)

What is co-design/co-creation?

- A collaborative approach to developing innovations that "fit" into real classroom contexts
- Teachers' everyday work practices at the centre
- Teachers "as professional contributors to reforms"
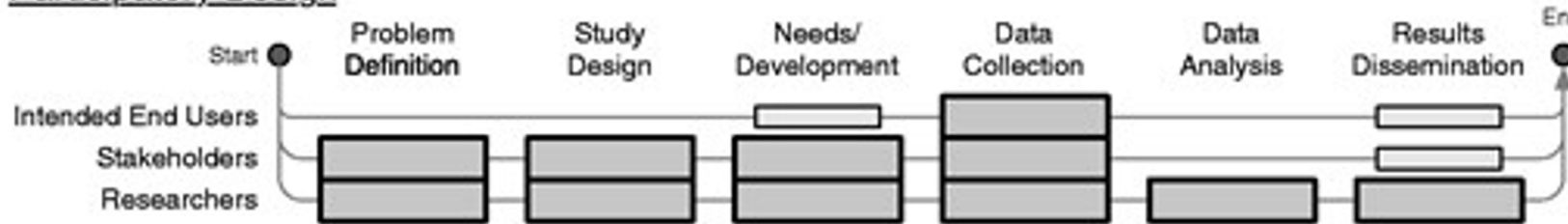- Shares values of *participatory design*

- Participatory methods….

  - voice and engagement (those with lived experience)
  - empowerment (individual and societal benefits)
  - advancement (improve as a result)

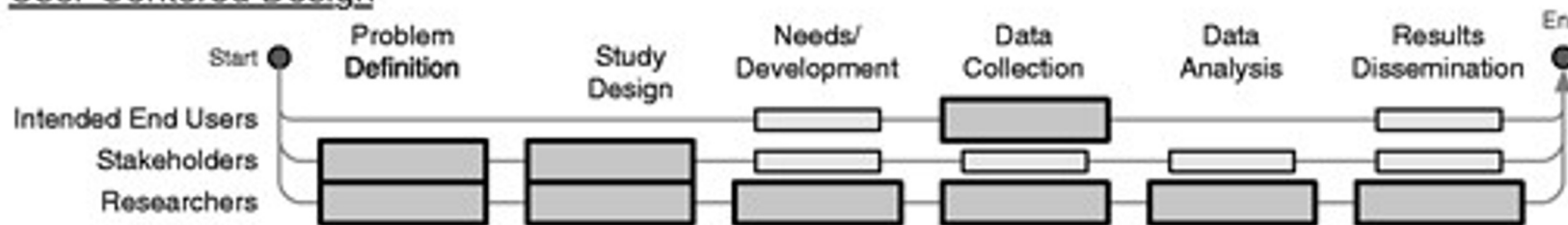- Student voices in the design of teaching innovation

https://dl.acm.org/doi/abs/10.5555/1150034.1150122,   https://mh.bmj.com/content/medhum/45/3/247.full.pdf

Community-Based Participatory Research

Participatory Design

User-Centered Design

LEGEND — No Involvement ——— Limited Involvement ⊏▭⊐ Significant Involvement ⊏▬⊐

- Different forms of participatory research
- How do we want to engage teachers with each phase of research?
- What level of involvement do we wish for?

Unertl, K. M., Schaefbauer, C. L., Campbell, T. R., Senteio, C., Siek, K. A., Bakken, S., & Veinot, T. C. (2016). Integrating community-based participatory research and informatics approaches to improve the Engagement and health of underserved populations. *Journal of the American Medical Informatics Association*, *23*(1), 60-73.

Principles of participatory research

Exten DT²

1. Defining and learning about the community to be researched, from the community's perspective, prior to initiating a study

2. Collaborating with community partners to ensure the involvement of diverse members of the community to be researched

3. Involving the community to be researched in identifying or refining a research question

4. Developing a research agreement to guide a partnership with community representatives

5. Building flexibility into the project to allow for meaningful community involvement/ consultation throughout all stages of the research

6. Incorporating opportunities for community capacity building into the project

7. Involving community members/people with lived experience in the interpretation of data prior to publication

8. Budgeting for the compensation of community members and/or organizations for their time contributed to the project

9. Sharing any products or gains associated with the research, including opportunities for academic publishing

10. Planning for knowledge sharing and community action

What do these principles mean for us?

1. Who are our teachers, their needs, requirements, skills, expectations, technology expertise etc?

2. What schools/socio-economic backgrounds do our teachers represent? Are they diverse?

3. How do we co-decide what topics to examine with DT? How do we involve students in this decision? How do we manage teachers with different subject expertise?

4. What are the norms guiding our co-design workshops?

5. How do we build for flexibility? Timing/dates of co-design workshops

6. How do we support the professional development of teachers in using DT and technologies?

7. Are teachers (and students, if applicable) involved in data interpretation?

8. What do we offer back to our teachers?

9. How do we engage teachers with dissemination products (publications etc)?

10. How can teachers/students help with knowledge sharing?

Ross, L., Brown, J., Chambers, J., Heath, M., Lindsay, S., Roche, B., & Voronka, J. (2015). Key practices for community engagement in research on mental health or substance abuse. *Centre for Addiction and Mental Health*.

Participatory research from a distance: Challenges to consider

Exten DT²

Hall, Johanna; Gaved, Mark and Sargent, Julia (2021). Participatory Research Approaches in Times of Covid- 19: A Narrative Literature Review. International Journal of Qualitative Methods (Early Access).	What do these issues mean for us?
Access to network and devices	Do our technologies work on any device? e.g., mobile devices?
Cost of data	Is there any cost of data for teachers to join the workshops?
IT literacy	How easy is it for teachers to understand and use our technologies? Have they got the needed skills?
Norms/guidelines for joining online meetings to avoid risks	How do we address issues such as participants entering discussions late, sharing confidential material?
Creating and maintaining interpersonal relationships from a distance	How do we develop trust and connection with our teachers to maintain engagement?
Privacy, confidentiality and data collection policies of the platforms we use (MS Teams, Skype or Zoom)	Sent invitations requiring them to sign into individually All personal identifiers should be removed during data collection to ensure data confidentiality (prevent any linkages between data collected and participant's email addresses)

Series of co-design/co-creation workshops (online and f-t-f)

Exten DT²

- **DESIGN THINKING:** Explain the co-design approach to teachers, ask for their expectations, and establish a common way of working

- **TECHNOLOGIES:** Explain the project's starting point: DT and tools available, allow teachers to use the tools and give feedback, ideas for further development
  - Identify their needs for effectively using the tools

- **CONTEXT:** Understand the school context, student needs, technology skills, and teachers needs related to teachers' knowledge/skills/attitudes about technologies and innovation, availability of infrastructure (hardware/software), everyday work practices and how DT would fit into that, general challenges faced at school

- **ACTIVITY PLAN TEMPLATE**: Review the activity plan template and amend based on teachers' feedback

- **TOPICS:** Teachers identify topics for DT projects after consultation with their students (if needed) so they are relevant to real needs. What is the connection to wicked problems?

- **DEFINE LEARNING OBJECTIVES**

- **DESIGN RELEVANT ACTIVITIES** and map to objectives: Teachers' co-design activities for each step of DT using the project tools (groupwork)

- **REVIEW:** Each activity is reviewed by at least one other group of teachers – based on which criteria?

- **IMPLEMENTATION:** Teachers implement the lesson plans
  - How are these evaluated?
  - Do we have capacity to be present at each lesson implementation to observe and collect data?

Tools to support co-design

Exten DT²

nQuire
EXPLORE YOUR WORLD

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The Open University

STATUS: PILOT MODE

Exten(DT)2: Activity plan for teachers
What activities will you design using design thinking and technology?

Created by Christothea Herodotou

Exten DT²

View mission brief   Add contribution

Contributions   List

What is the topic of your design thinking project?

We will display your responses here.
Be the first to contribute to this nQuire mission.

Discussion

Please sign in to add a comment.

Be the first to comment...

Mission brief   ✕

This mission is a teaching exercise targeting pre-service and in-service teachers. It aims to collect and make public Activity Plans produced by teachers who are participating in the Horizon Europe and Innovate UK project "Extending Design Thinking with Emerging Digital Technologies".

The Activity Plan can help teachers to define a set of activities they could implement with their students. These activities are structured around design thinking and make use of emerging digital technologies.

All responses to questions are made public for other teachers to read, comment and like.

Close

www.nquire.org.uk

Mission Brief

This mission is a teaching exercise targeting pre-service and in-service teachers. It aims to collect and make public Activity Plans produced by teachers who are participating in the Horizon Europe and Innovate UK project "Extending Design Thinking with Emerging Digital Technologies".

The Activity Plan can help teachers to define a set of activities they could implement with their students. These activities are structured around design thinking and make use of emerging digital technologies.

All responses to questions are made public for other teachers to read, comment and like.

General information

1. What is the topic of your design thinking project?

Type your answer here

2. Why did you choose this topic?

Type your answer here

3. Which technologies will you use in the project?

- ☐ Choico
- ☐ SorBET
- ☐ MaLT2
- ☐ nQuire
- ☐ Virtual robotics

Time

1. How many hours per week do you plan to dedicate to the project?

2. How many HOURS overall do you anticipate the project to last for?

3. How many WEEKS do you anticipate the project to last for?

Exten DT²

Teachers needed for European project - Get in touch now!

- Would you like to *co-define, shape and trial* a new teaching approach - based on **Design Thinking and digital technologies?**
- Would you like to help your students develop skills for solving everyday problems of benefit to them and their communities?
- Are you curious about how technologies such as Augmented Reality, Artificial Intelligence, 3-D printers and Virtual Robotics can enhance learning?
- Are you a secondary teacher at a school in the UK?

Who is the team?

We are researchers from three universities in England and Ireland (The Open University, UCL, Trinity College Dublin) looking for secondary teachers to co-define, shape, trial and apply a new teaching approach that can help students think critically, become responsible citizens and come up with solutions (services, products etc) to everyday problems and global challenges.

What will you be asked to do?

- Take part in a series of workshops (online or face-to-face) about:
    - a) what design thinking is and how digital technologies can support its delivery in the classroom
    - b) co-design with other teachers and researchers a set of learning activities using digital technologies and design thinking
    - d) give us your insights about how we could extend digital technologies to meet student needs and how design thinking should be used in secondary education.
- Trial learning activities with your students - insights will define their further development

What will you get out of it?

- Learn how to teach students to be creative and innovative in problem-solving tasks
- Support your professional development about how you can use design thinking in your teaching
- Access digital technologies you can use with your students in teaching
- Determine the development of an innovative approach to teaching that can help your students develop 21st century skills (e.g., critical thinking, creativity, collaboration)
- Meet and collaborate with teachers from across Europe
- Become part of an international group of researchers funded by the European Union to transform education in ways that are sustainable, future proof and enable growth of 21st century skills.
- Receive a university certificate evidencing your participation in the project.
- Get financial reimbursement.

extendt2@gmail.com

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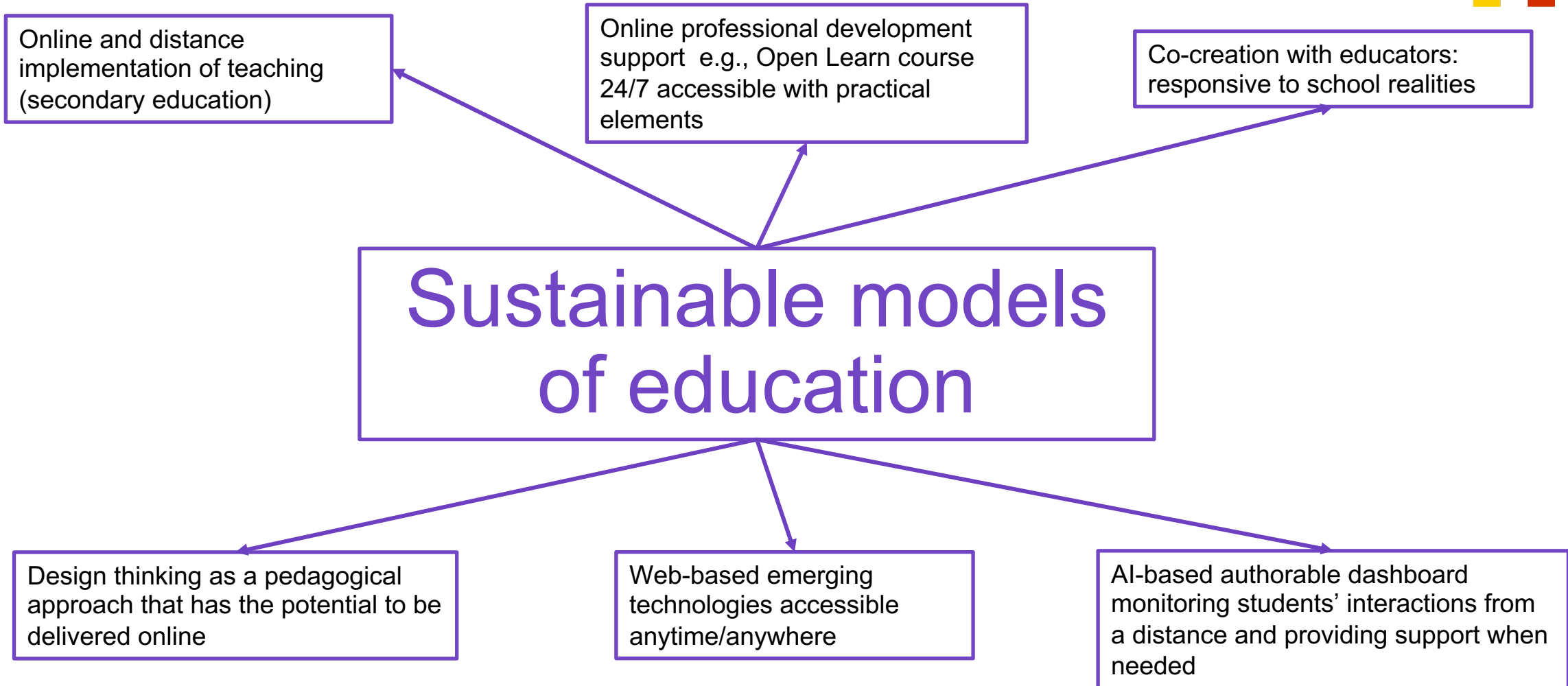
Thank you! your questions…

Visit the project website: https://extendt2.eu
Follow us: @extendt2

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