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Digital Pedagogy in the Age of AI

TWIN-IN in brief

Promoting responsible TWIN transitions in European agrifood systems through INnovation and learning alliances

Chrysanthi Charatsari

Aristotle University of Thessaloniki, School of Agriculture

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Promoting responsible TWIN transitions in European agrifood systems through INnovation and learning alliances

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Riga, Latvia

22 April, 2026

From Ideas to Impact: Erasmus+ Projects for the Twin Transition

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Twin transitions

The Twin Transition Century

The role of digital research for a successful green transition of society?

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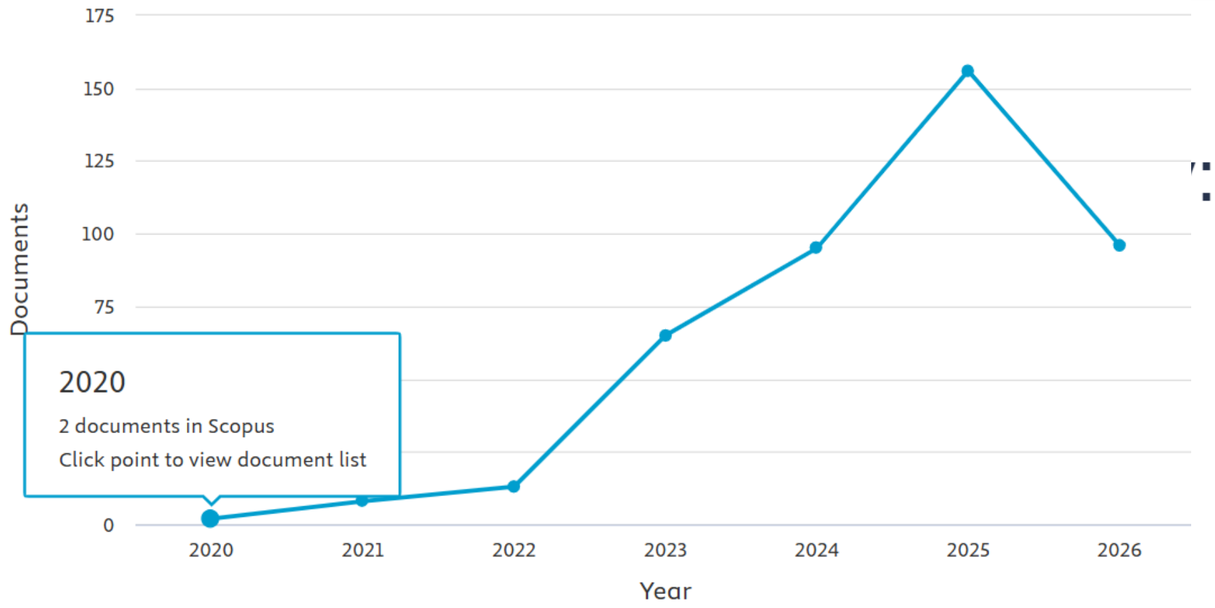

sitions" (p.

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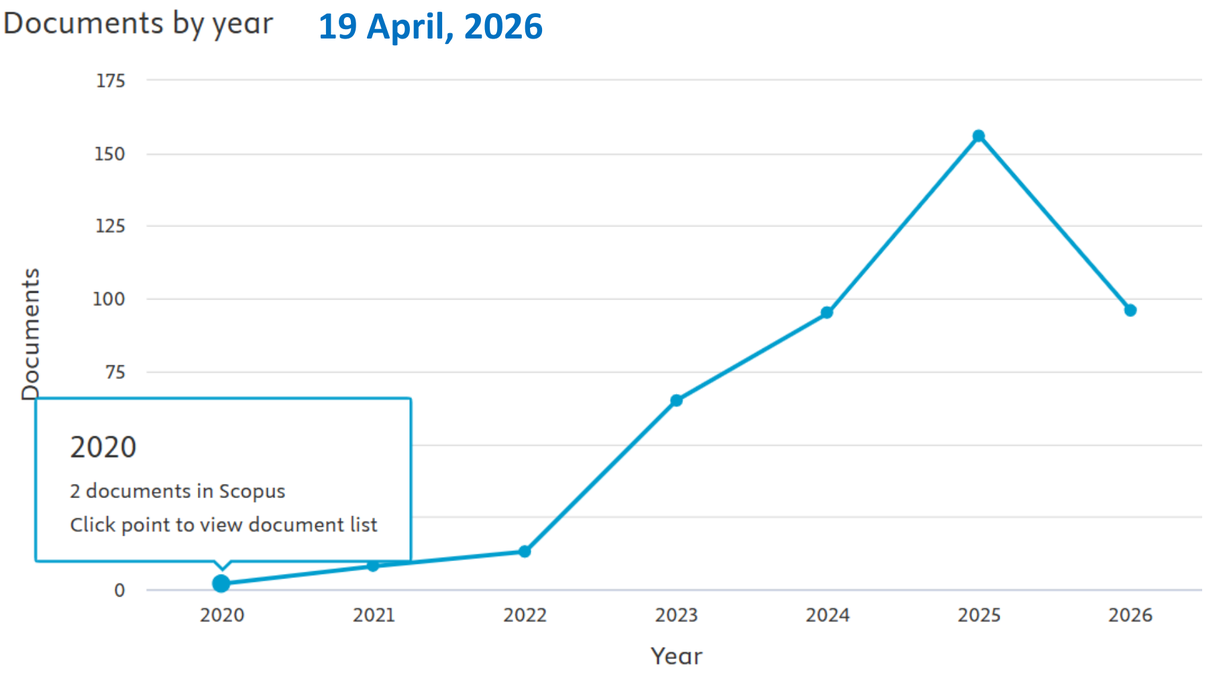
Twin transitions

- Purposeful paradigmatic shifts of complex systems (that contain social, technological,
- and natural elements) toward a more sustainable and digitalized future state.
- Digital innovation and the interconnected knowledge and organizational structures
- enable transitions to new forms of environmental, social, and economic sustainability, while sustainable thinking governs the process of digitalization (Lioutas et al., 2025).



Lioutas et al. (2025). *Responsible twin transitions: Definitions, praxis, and key issues*. TWIN-IN: D2.1.

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Twin transitions

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Characteristics of twin transitions

- Systemic processes
- Future-oriented processes
- High level of complexity
- Uncertainty
- Potential negative societal, economic, and environmental impacts
- Competence- and knowledge-demanding

Lioutas et al. (2025). *Responsible twin transitions: Definitions, praxis, and key issues*. TWIN-IN: D2.1.

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The competence-demanding nature of twin transitions

- Testing and exploiting innovation
- Extracting value from innovation
- Envisioning potential agri-digital futures
- Changing operational templates and production paradigms
- Collaborate with heterogeneous actors
- Maintaining resilience

Need to sharpen existing and develop new competencies

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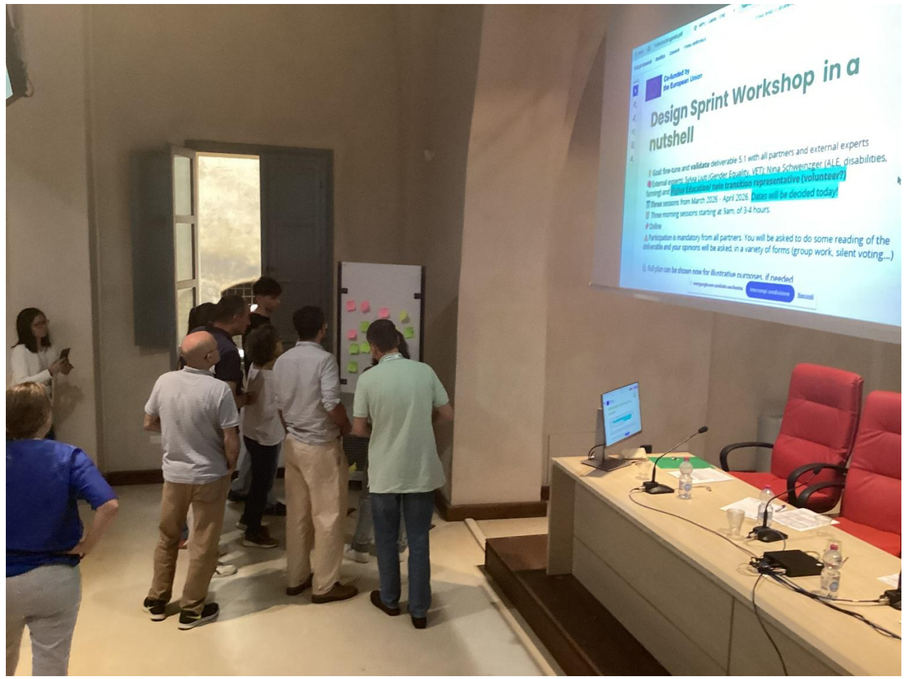

The project

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The TWIN-IN project

- **Project start:** 1/1/2025
- **Focus on:** Twin transitions, i.e., paradigmatic socio-technical shifts to a digitalized and sustainable future.
- **Actors involved:** Farmers, Farm advisors, Researchers, Students of Agronomy Departments, Vocational Education and Training providers, AgTech startups.
- **Central objective:** Designing, testing, validating, and optimizing a discovery-based and social learning-enhanced education/training model that will supply learners with sustainability and digital skills (**Twin Transition Schools**).

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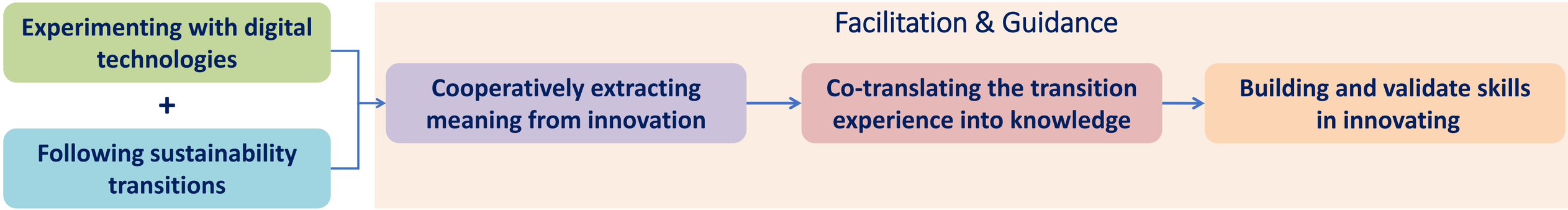
Twin Transition Schools (1)

- **Aim:** To enhance skills building within problem-based contexts by exploiting transition experiences.
- **Theoretical bases:** Participatory knowledge production, collaborative innovation, and user-centered research approaches
- **Participants:** Actors who engage in twin transition processes.



- **Key feature 1:** Knowledge is distributed across the social actors who co-innovate
- **Key feature 2:** Skills are socially constructed and validated in pragmatic situations

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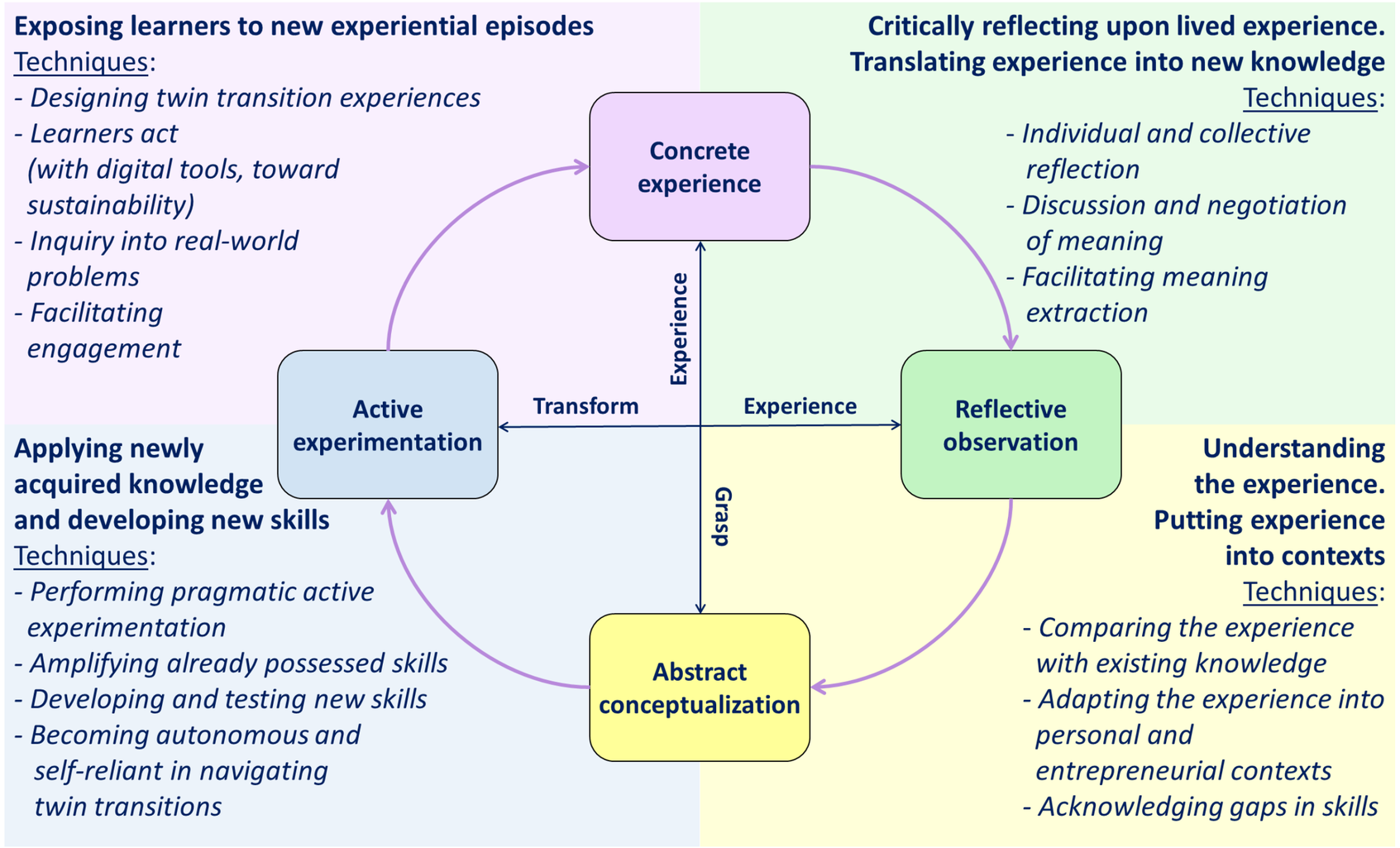
Twin Transition Schools (2)

- Leaning-by-innovating
- Following the Experiential Learning Cycle
- Doing and reflecting
- Social sense-making
- Exchange of knowledge and skills
- Applying the new knowledge



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The TWIN-IN alliance

- Aristotle University of Thessaloniki (GR)
- International Hellenic University (GR)
- Universita Degli Studi di Cassino e del Lazio Meridionale (IT)
- Universidad Politecnica de Madrid (ES)
- European Association for the Education of Adults (BE)
- Farming Advisors of Macedonia (GR)
- S.I.A. S.R.L. (IT)
- Academia Romana Filiala Iasi (RO)
- TEAGASC (IR)
- World Farmers Markets Coalition (IT)
- Aide a la Decision Economique (BE)
- Asociatia Producatorilor Locali Produs in Iasi (RO)
- Agricultural Cooperative of Fruits, Vegetables and Cotton of Pella (GR)
- Advanced Agricultural Measurement Systems Iberica S.L. (ES)
- Norges Forskningsrad (NO)

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Our approach

1. Forming a micro-ecosystem

2. Enabling the exchange of key recourses

3. Envisioning potential agri-digital futures

4. Identifying the skills needed to navigate these futures

5. Creating niches where actors co-create knowledge and co-shape skills

6. Facilitating the social distribution of knowledge

Being responsible

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Phase 1

Steps

1. **Identifying and selecting existing competency frameworks directly related to digital and sustainability transitions:**
    - DigComp
    - GreenComp
2. **Determining indirectly related competencies:**
    - EntreComp
    - LifeComp
3. **Developing new frameworks:**
    - DeepTech Competencies
    - Resilience Competencies
4. **Building upon experiences across the world:** Meta-competencies and meta-knowledge

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TWIN-IN's best twin transition practices

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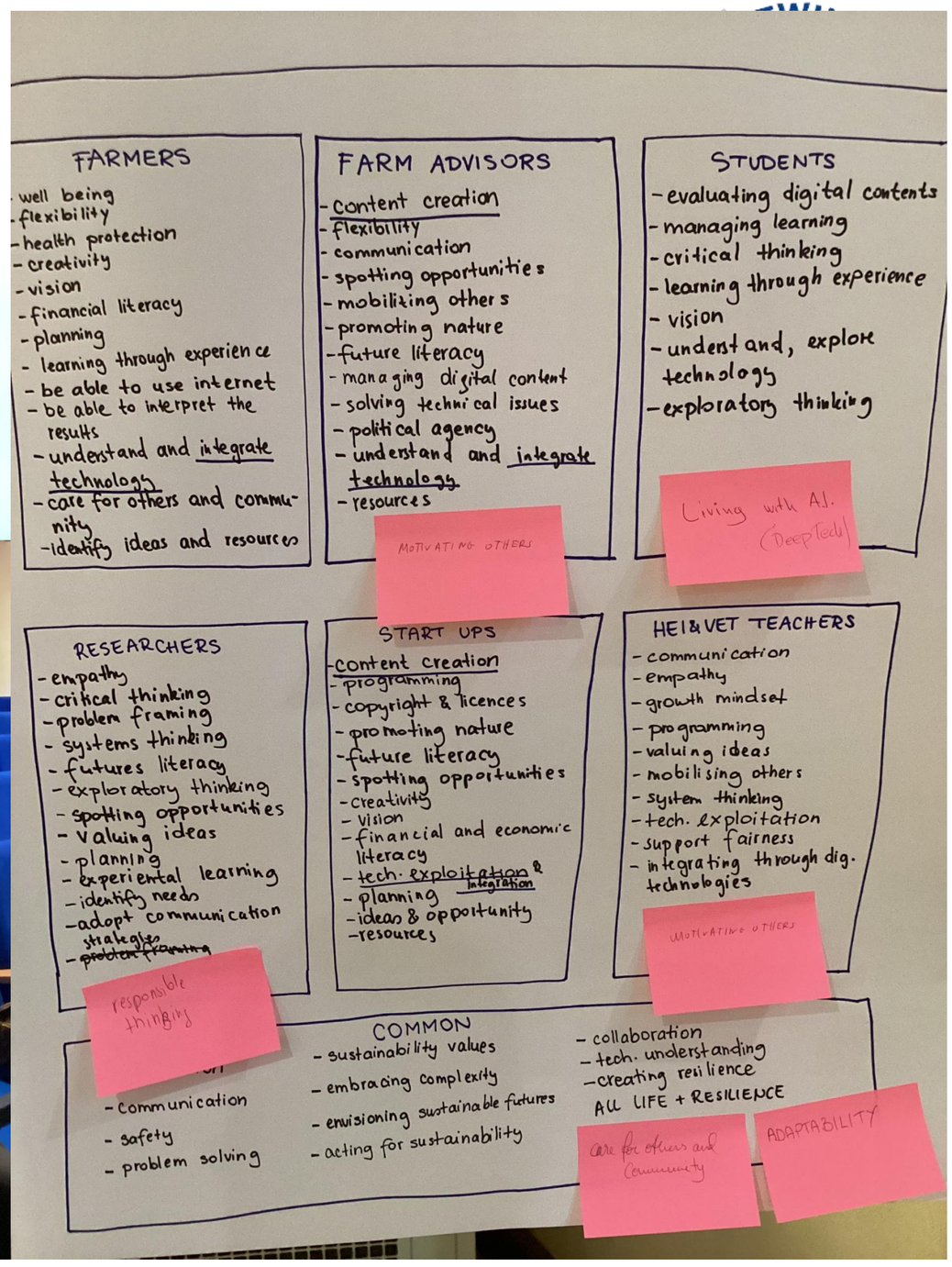
Phase 2

1.
2.
3.
4.



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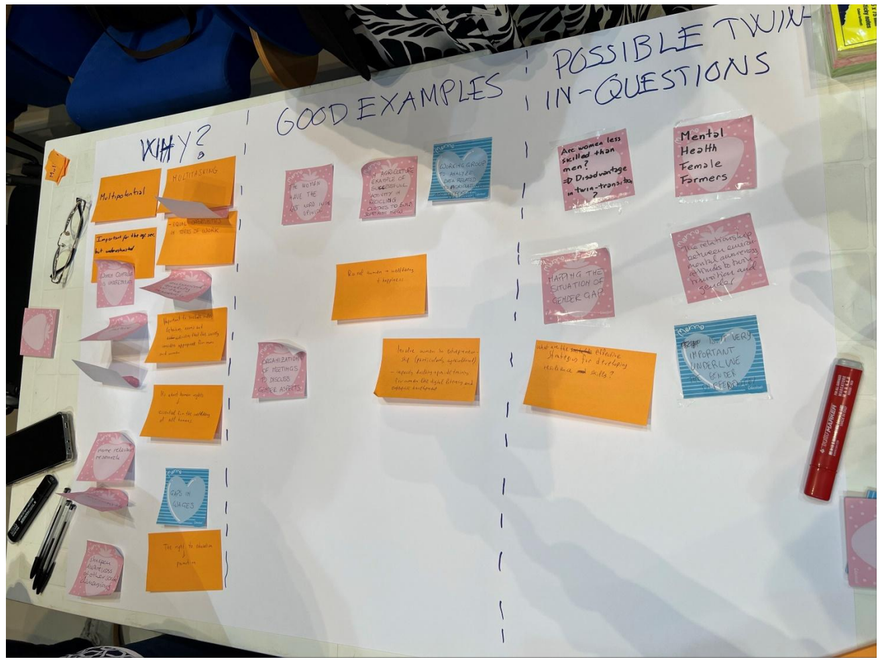

First results

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The TWIN-IN competency framework

Domain	Competences	Skills
Sustainability and Systems Thinking	Embodying Sustainability Values	Valuing Sustainability
		Ethical Commitment and Fairness
		Conceptual Clarity and Understanding
		Promoting Fairness and Justice
		Critical Self-Reflection
		Promoting Nature
	Embracing Complexity	Systemic Thinking
		Coping with Uncertainty and Risk
		Critical Examination of Trade-offs
		Interdisciplinary Understanding
		Adaptive Learning and Experimentation
	Envisioning Sustainable Futures	Future Thinking
		Scenario Planning
		Vision Communication
		Goal Alignment
		Foresight
	Acting for Sustainability	Promoting Sustainable Action
		Responsible Innovation Approaches
		Monitoring and Evaluation
		Participating in Collective Action
		Resource Efficiency
Entrepreneurship and Value Creation	Ideas and Opportunities	Spotting Opportunities
		Creativity and Idea Generation
		Curiosity and Openness to Innovation
		Vision and Purpose
		User-Centred Understanding
		Assessment of Ideas
	Resources	Mobilizing Resources
		Financial and Economic Literacy
		Digital and Material Resource Management
		Intellectual and Intangible Resources
		Planning and Organisation
		Simultaneous Allocation
	Into Action	Taking the Initiative
		Planning and Management
		Coping with Uncertainty, Ambiguity and Risk
		Working with Others into Action
		Mobilizing Others
		Responsible Innovation for Community Benefit
		Advocacy for Fairness and Inclusion
		Market and Investor Interaction

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Baseline competency zones

Sustainability Competence

- Reflecting on sustainability
- Developing sustainability values
- Understanding the complexity of sustainability
- Envisioning potential futures
- Acting pro-sustainably

Digital Competence

- Formulating queries
- Retrieving and storing data
- Interacting through digital tools
- Creating digital content
- Protecting digital devices and data
- Solving problems in digital contexts

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More advanced competency zones

DeepTech Competence

- Technology selection
- Understanding the potential of technologies
- Estimating the costs and benefits of technologies
- Integrating technologies
- Extracting value from technologies

Doing Entrepreneurship Competence

- Capability to generate, refine, and implement ideas
- Capacity to seize opportunities
- Ability to mobilize tangible and social resources
- Capacity to take entrepreneurial action

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Higher-order competency zones

Resilience Competence

- Dexterity to cope with challenges
- Capacity to help others
- Recovering after sustainability shocks
- Competency to learn while navigating transitions
- Translate failures and successes into actionable knowledge

Life Competence

- Capability to ensure personal wellbeing in a highly uncertain world
- Aptitude to empathize, communicate, and collaborate with others
- Learning to learn capacity

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Meta-competencies and meta-knowledge

Engageability

Capacity to be involved and committed to the process, motivation, and willingness to invest time and energy in pursuing twin transitions

Adaptability

The ongoing capacity to early detect and understand changes, and adjust actions, practices, modi operandi, and behaviors to new conditions

Collaboration capacity

Ability to work and communicate effectively with heterogeneous actors, develop shared visions, build trust-based relationships, and give up power

Meta-knowledge

Capability to acknowledge one's own gaps in knowledge, understand other actors' knowledge, and evaluate the reliability of knowledge

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Some takeaways

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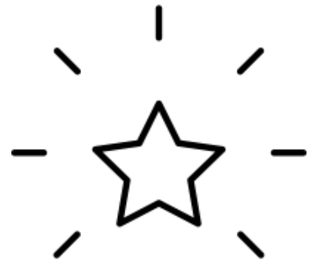
Lessons learned so far

Difficulties - Twin transitions

- Twin transition is easier said than done!
- Considerable lack of conceptual clarity concerning the term.
- Lack of ready-to-use practices.

Opportunities - Twin transitions

- Realization of the need to go green.
- Rapid development of digital technologies.
- Policy emphasis.



We are researchers and teachers.
We know how to teach!

Developing a new learning model…

is a challenging task, but…

- several adaptable frameworks exist,
- previous Erasmus+ projects offer critical insights,
- field-level actors are willing to improve their skillsets.

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