

***DIGITIZING PRODUCTS:
CREATING DEMONSTRATORS
FOR FUTURE EDUCATION***



A Pedagogic Framework for the DIGIDEMO Demonstrators

«TechTalk» Part 2

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Industry 4.0: Socio-multi-disciplinary model?

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- ❖ Customised production
- ❖ Dynamic, adaptable authentic tasks
 - Physical and virtual
- ❖ Technology augmentation and verification
- ❖ Task orientation
- ❖ Multidisciplinary groups/ networks



A hypothetical model for main features of skill training and professional theory in Industry 4.0

Characteristics	Socio-multi-disciplinary model
Industrial paradigm	Industry 4.0
Orientation of production	Customized small production runs
Processing (work techniques)	Highly flexible automated production technologies, in some cases working in close interaction with humans.
Planning of work/education	Dynamic and adaptable authentic tasks, physical and virtual. Plan verification through simulation on real-world data or digital twins
Organisational structure	Highly autonomous task-motivated groups, based on inter-disciplinary competence and springing out from multi-disciplinary networks, aided by non-human agents
Character of the tasks	Authentic or virtual tasks
Work mode	Group-oriented
Nature of communication	Personal and indirect communication augmented by technology according to subject

Sources:

- TEFFIC WP3 summarizing analysis (AAU)
- Blayone & van Oostveen (2019)

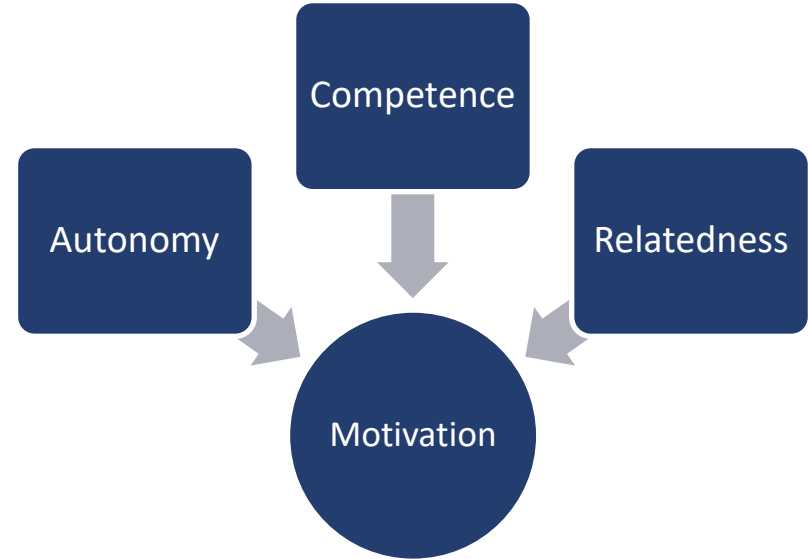


*“Vocational competence is a consequence of the human’s task-related professions... This implies that the nature of the tasks controls the nature of the competence’.”
(Freely translated from Nilsson 2000).*



Characteristics of Effective, Efficient and Engaging learning tasks

- ❖ Relevant for the competence needed
- ❖ Adequate professional level
- ❖ Complex enough to cater for different profiles in the team
- ❖ Autonomy in solving the task
- ❖ A result with a value
- ❖ **Authentic!**



Situated Learning

“A person’s intentions to learn are engaged and the meaning of learning is configured through the process of becoming a full participant in a sociocultural practice.”

(Lave & Wenger 1991)”



Design elements for authentic tasks

1. Authentic tasks have real-world relevance
2. Authentic tasks are ill-defined, requiring students to define the tasks and sub-tasks needed to complete the activity
3. Authentic tasks comprise complex tasks to be investigated by students over a sustained period of time
4. Authentic tasks provide the opportunity for students to examine the task from different perspectives, using a variety of resources
5. Authentic tasks provide the opportunity to collaborate

(University of Wollongong: “Authentic e-learning in higher education: Design principles for authentic learning environments and tasks”, Herrington 2006)



Design elements for authentic tasks

6. Authentic tasks provide the opportunity to reflect
7. Authentic tasks can be integrated and applied across different subject areas and lead beyond domain-specific outcomes
8. Authentic tasks are seamlessly integrated with assessment
9. Authentic tasks create polished products valuable in their own right rather than as preparation for something else
10. Authentic tasks allow competing solutions and diversity of outcome

(University of Wollongong: “Authentic e-learning in higher education: Design principles for authentic learning environments and tasks”, Herrington 2006)



Sum up – what do we know/think?

- ❖ Technology evolution is accelerating (leads to)
 - Knowledge of the various I4.0 technologies is of essence
- ❖ Short lifespan of training program (leads to)
- ❖ Short development cycles for development of training
- ❖ Multi-disciplinary competence
 - Multidisciplinarity is viewed as the enabler of implementing integrated systems rather than isolated stand-alone solutions
 - Business insight
- ❖ Social skills
 - Team based task centered problem solving

So – how can we implement this as Effective, Efficient and Engaging (EEE) learning?



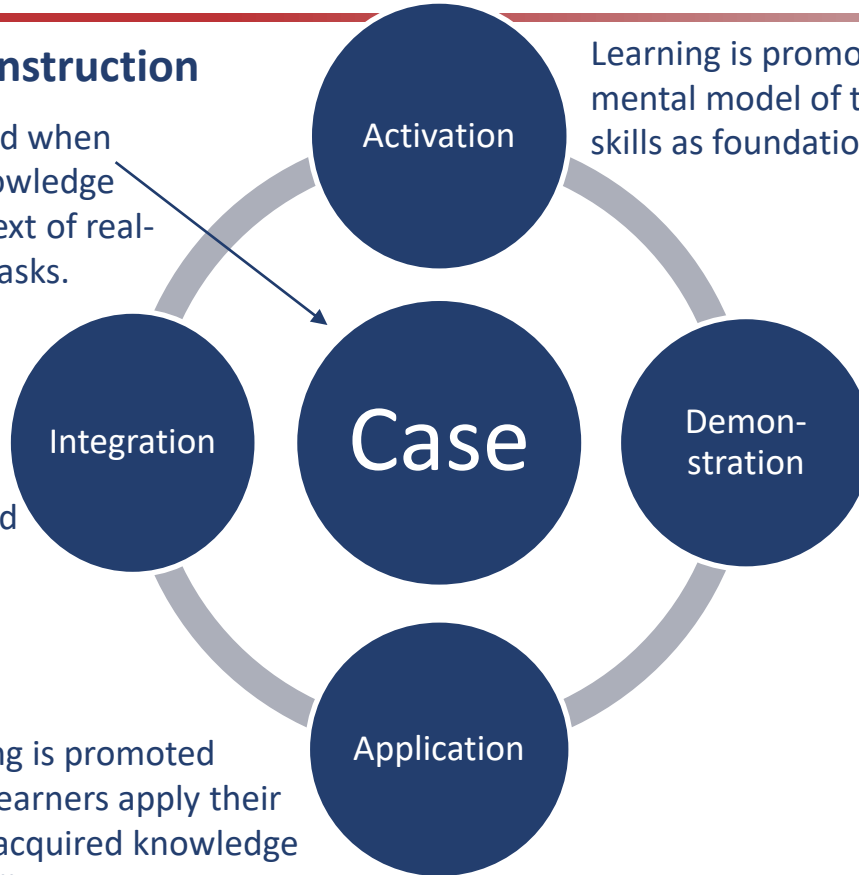
Identifying and Designing Effective, Efficient, and Engaging Instruction:

The First Principles of Instruction

Learning is promoted when learners acquire knowledge and skill in the context of real-world problems or tasks.

Learning is promoted when learners reflect on, discuss and defend their newly acquired knowledge and skill.

Learning is promoted when learners apply their newly acquired knowledge and skill.

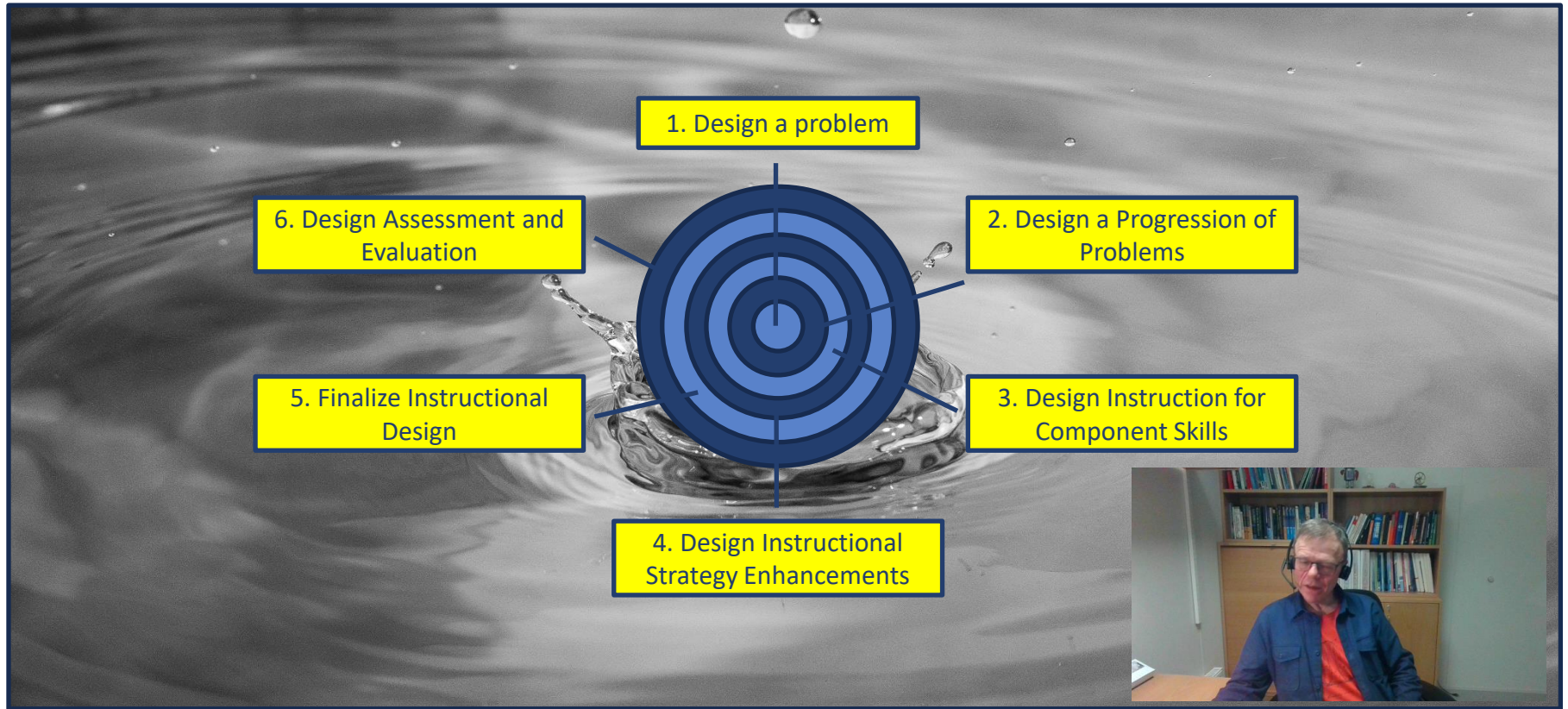


Learning is promoted when learners activate a mental model of their prior knowledge and skills as foundation for new skills.

Learning is promoted when learners observe a demonstration of the knowledge and skill to be learned.



A pebble-in-the-pond model for instructional design



Sources

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Thank you for your attention!

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