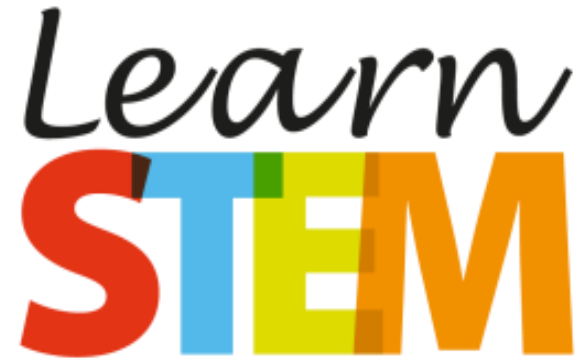


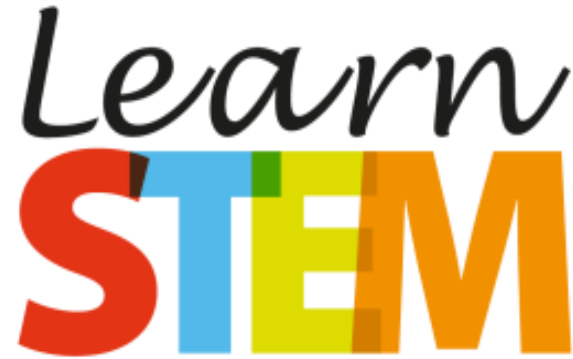
# Learn STEM Online Course



Week 1:

Innovative STEM Learning

# Learn STEM Online Course



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# Week 1: Innovative STEM Learning

1. Exploring innovative STEM education
2. Discussing the Pedagogical Model Learn STEM
3. Analysing own STEM education



# 1. Exploring Innovative STEM Education

# Exploring innovative STEM education

## Me, my school and STEM

1. How would you define STEM? Do you consider STEM as a cluster of different subjects or more as the full integration of subjects?
2. What kind of opportunities or pitfalls did you encounter while teaching STEM?
3. Has STEM teaching evolved and improved your (general) teaching method? If so, how?

# Exploring innovative STEM education

## Me, my school and STEM

Share your ideas on these questions (see slide before)  
and discuss them with your colleagues  
or with other participants here in the course  
using the discussion forum.

# Exploring innovative STEM education

## Me, my school and STEM

Watch the YouTube video below  
(the video titles mean: "World without Technology: No future")

<https://www.youtube.com/watch?v=Vi53WzYF6hY>

# Exploring innovative STEM education

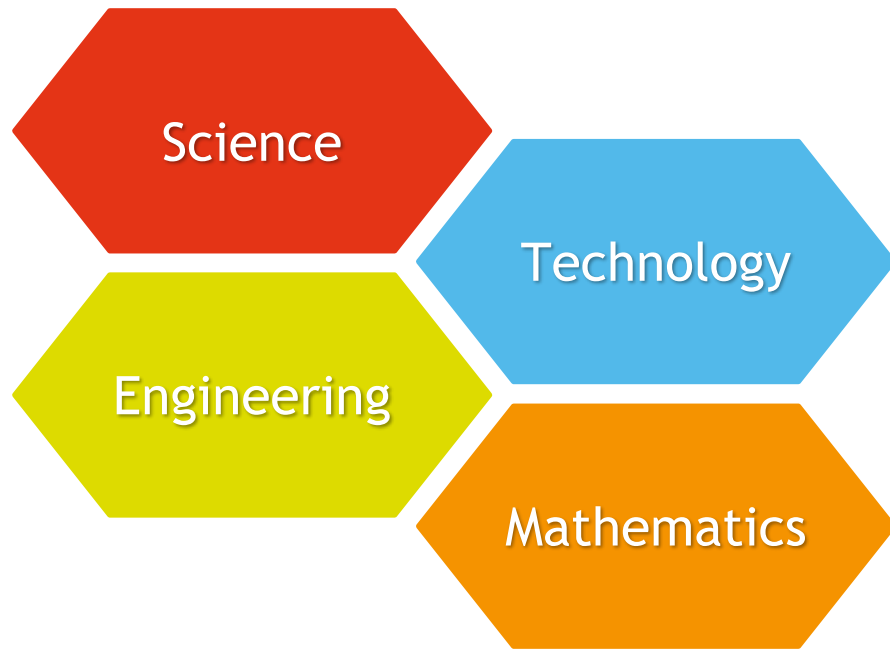
## Me, my school and STEM

After watching the video (see slide before):  
Debate the importance of STEM with your colleagues  
or with other participants here in the course  
using the discussion forum.



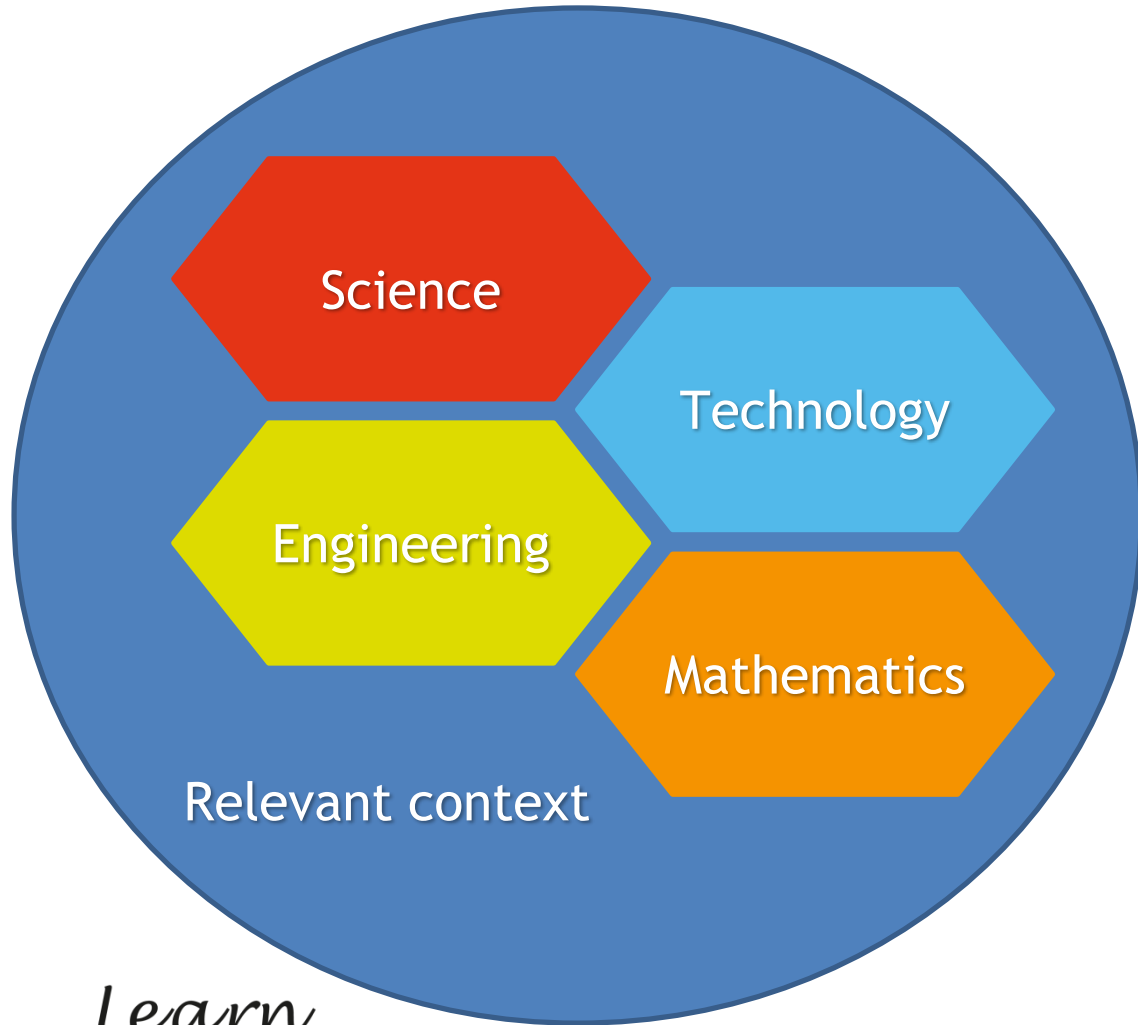
# Exploring innovative STEM education

STEM is an acronym used to group four subjects:



Those subjects have many elements in common; therefore, they can follow similar pedagogical approaches and teaching methods.

# Exploring innovative STEM education



It can even occur that other subjects are also included in a STEM project, just consider arts, economics, historic perspectives...



# 2. Discussing the Pedagogical Model Learn STEM

# The Pedagogical Model Learn STEM

5 characteristics of the Pedagogical Model Learn STEM:

1 - Complex



2 - Process-oriented



3 - Holistic



4 - Practical

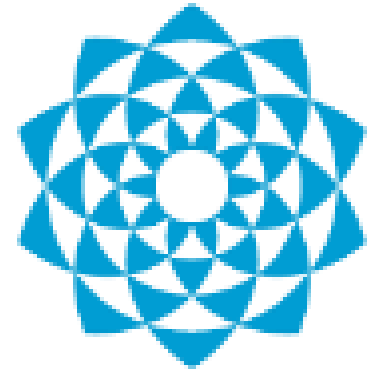


5 - Social



# Learn STEM is COMPLEX

- Is interdisciplinary and connects numerous subjects
- Underlines common principles and approaches
- Represents the complex relations between Science, Technology, Engineering and Mathematics
- Supports a complex growth of the learner: intellectual, emotional, and social development



# Learn STEM is PROCESS-ORIENTED

- Learners can explore STEM in a self-regulated and creative way
- Processes are iterative, focusing on:
  - *the learners' development*
  - *training basic skills*
  - *building profound knowledge*
- Practicing, repeated training and applying knowledge reinforce abilities, skills and competences



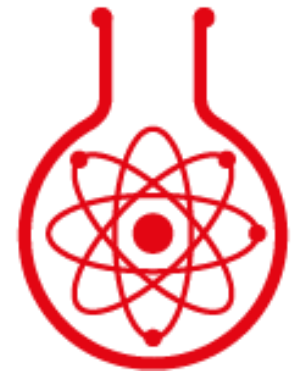
# Learn STEM is HOLISTIC

- Focuses on understanding STEM general idea in STEM rather than accumulating specialized knowledge
- Emphasizes the ethical component of STEM
- Contributes to the learners' personal development
- Explains and explores the environment on different levels using different models and even 'languages'
- Is not simply the sum of many components, but holistic for its various interrelations



# Learn STEM is PRACTICAL

- Supports learners in building knowledge, skills and competences through real-world experiences and observations
- Practical experiments are essential for the learning process and for the development of practical skills
- Practical lab work develops creativity and follows the iterative learning cycle
- Practical exercises stimulates learners' interest and engagement





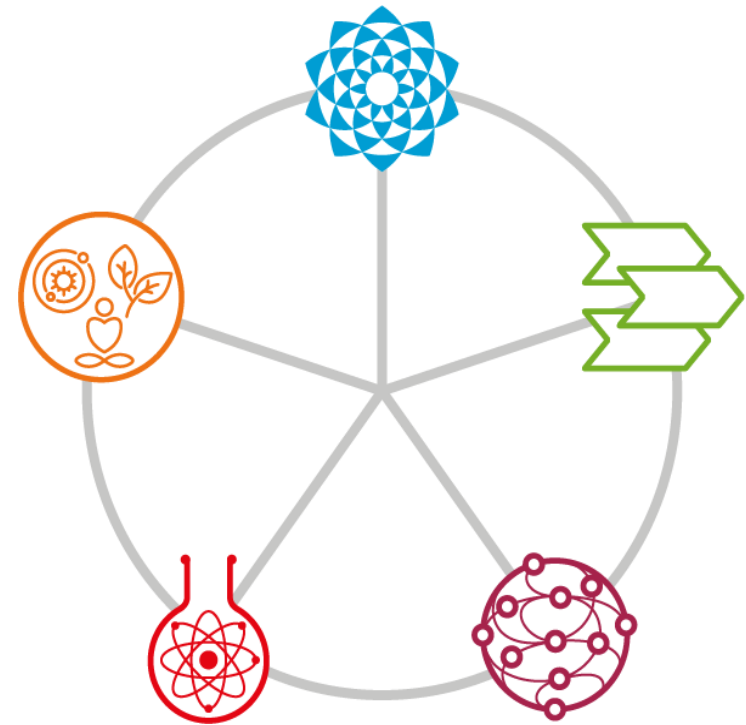
# Learn STEM is SOCIAL


- Is a Social activity with human interaction and emotional involvement
- Is learner-centered (*aiming to impact individuals and the society*)
- Is inclusive, gender balanced and values diversity
- It creates a trusted environment for the learning process, where human diversity and self-directed learning are core elements



# Explanation of the Pedagogical Model

Please write a brief comment about your understanding of the five characteristics. Share your views and discuss them with your colleagues or with other participants here in the course using the discussion forum.





# 3. Analysing own STEM education

# Analysing own STEM education

Think about your own STEM education: What are good examples from your lesson plans and learning tasks for your pupils?

Please select good practice examples and cases with interesting samples of learning activities and tasks from your own STEM education.

Or describe them using our Case template.

# Analysing own STEM education

Have a look on your good practice examples and cases:  
How much are they following and realizing the principles  
of innovative STEM education?

Take advantage of our Checklist for  
the Pedagogical Model Learn STEM:

Check your good practice examples and cases and clarify  
whether all five characteristics are covered by your  
examples and cases.

# Analysing own STEM education

Get inspiration from our collection of 27 good practice examples and cases for innovative STEM learning:

What are your findings if you compare these 27 examples with your own cases?


If you have analysed and maybe improved your own good practice examples and cases, then please upload and share them into the shared folder "Week 1 - Good practice examples and cases"

# Analysing own STEM education

Afterwards, please give feedback for at least one good practice example or case that your peers and colleagues have uploaded and shared with you in the folder.

Remember to refer to the checklist. Share your views and discuss them with your colleagues or with other participants here in the course using the discussion forum.

Finally: If you want, you can share your findings from the analysis of your own examples and cases and their comparison with our collection in the discussion forum.



# Literature and materials



# Literature

- Stracke, C. M., van Dijk, G., Daneniene, J., Kelmelyte, V., Lisdat, F., Wesolowski, A., Barreiros, A., Baltazar, R., Simoens, W., Desutter, J., Pascoal, A., Rimkevičė, A., Spatafora, M., Cotovanu, A. M., & Spatafora, A. (2019). *Learn STEM. The Pedagogical Model for Innovative STEM Learning and Teaching*. [Open Access] Retrieved from <http://www.Learn-STEM.org/Model>
- Stracke, C. M. (2014). How Innovations and Competence Development support Quality in Lifelong Learning. *The International Journal for Innovation and Quality in Learning (INNOQUAL)*, 2(3), 35-44. [Open Access] doi:[10.5281/zenodo.3608669](https://doi.org/10.5281/zenodo.3608669)
- Stracke, C. M. et al. (2019). A Holistic Pedagogical Model for STEM education in schools: Its Design and Evaluation through Mixed Methods Research with Surveys and Interviews. In *Proceedings of Learning Innovations and Quality (LINQ) 2019, EPiC Series 2* (pp. 40-48). [Open Access] doi:[10.29007/t43b](https://doi.org/10.29007/t43b)

# Literature

And some recommendations for further reading:

- European Commission (2007): Science Education NOW. A Renewed Pedagogy for the Future of Europe [Rocard-Report]. Retrieved from: [https://ec.europa.eu/research/science-society/document\\_library/pdf\\_06/report-rocard-on-science-education\\_en.pdf](https://ec.europa.eu/research/science-society/document_library/pdf_06/report-rocard-on-science-education_en.pdf)
- Harlen, W. (Ed.). (2015). Working with Big Ideas of Science Education. Trieste: Global Network of Science Academics (IAP) Science Education Programme. Retrieved from: [www.ase.org.uk/bigideas](http://www.ase.org.uk/bigideas)
- Weinert, F. E. (2001). Concept of competence: A conceptual clarification. In D. S. Rychen (Ed.), Defining and selecting key competences (pp. 45-66). Seattle: Hogrefe & Huber.

# Materials

You can find all materials of week 1  
in our shared online folder:

<https://surfdrive.surf.nl/files/index.php/s/SPbXJljstB1sRpN>

# Contact

Dr. Christian M. Stracke

Learn STEM Coordinator

Associate Professor for Open Education and Innovation

ICDE Chair in Open Educational Resources

Open University of the Netherlands

[Christian.Stracke@OU.NL](mailto:Christian.Stracke@OU.NL)

[www.Learn-STEM.org](http://www.Learn-STEM.org)