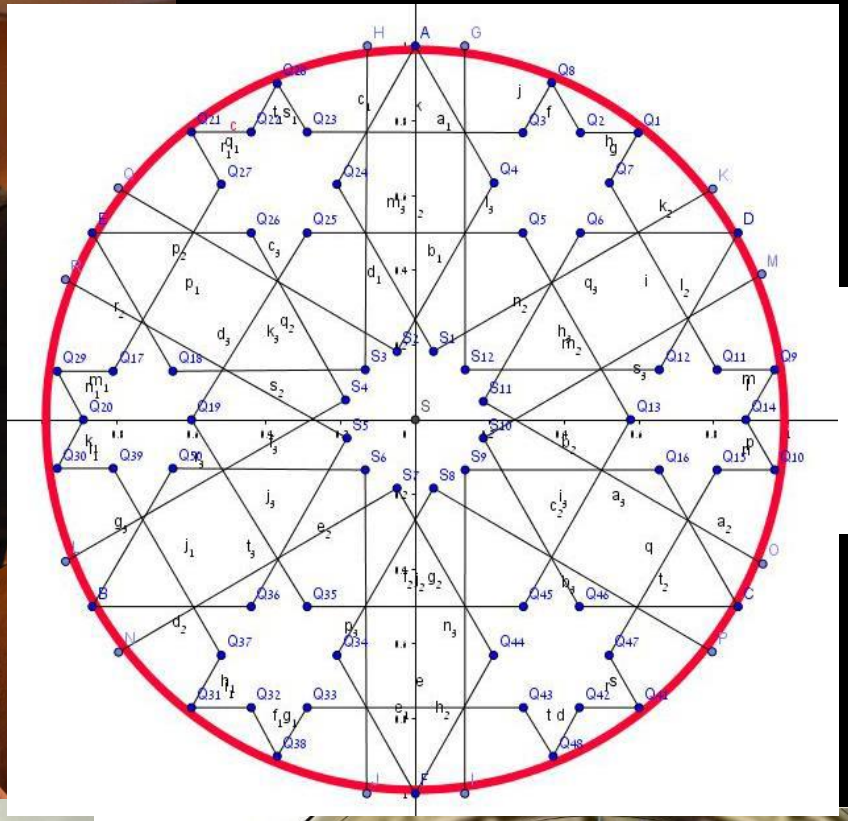
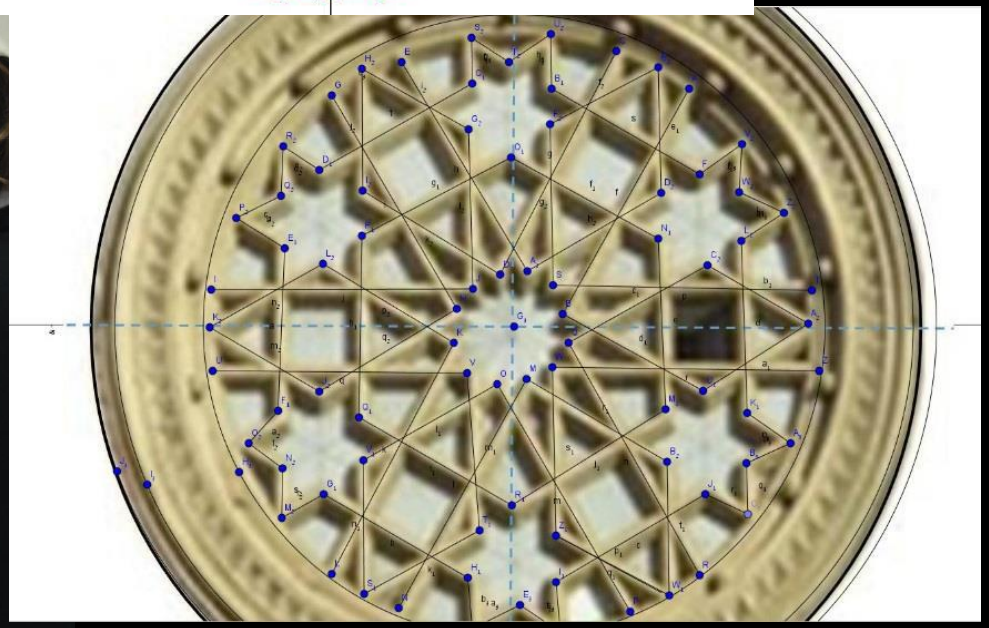
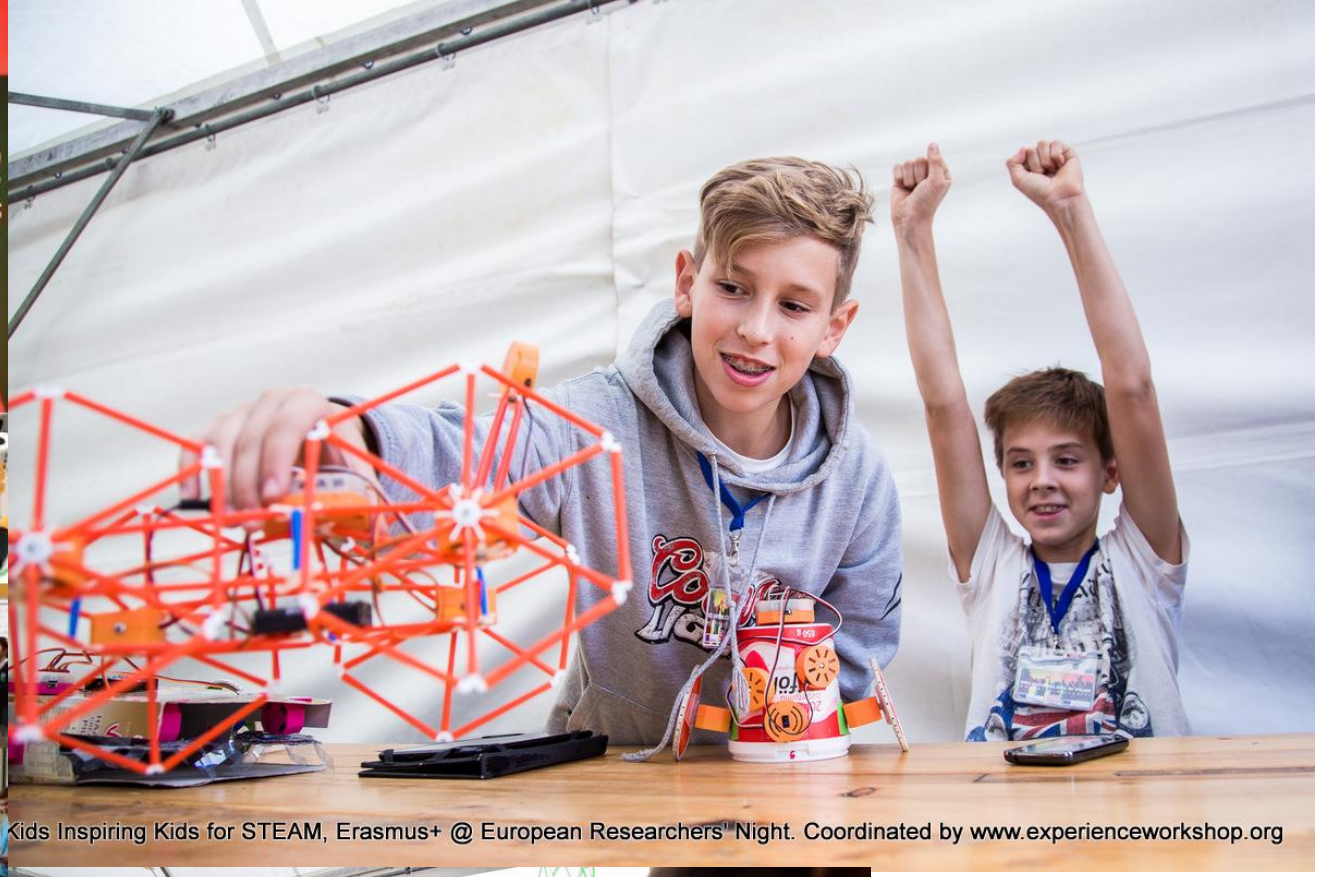
Multiple Creativities, Pro-sociality and Creative Ecologies for the Post-COVID Era through STEAM Education and Hybrid Learning

Dr. Kristóf Fenyvesi
Finnish Institute for Educational Research & Experience Workshop
Global STEAM Movement



JERUSALEM COLLEGE OF TECHNOLOGY



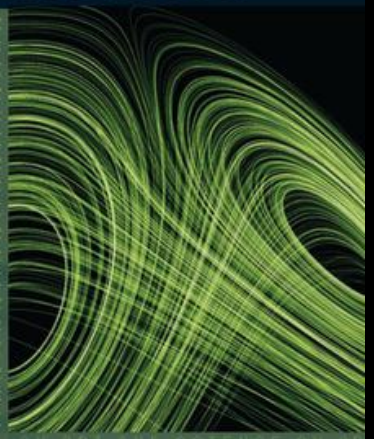

Kids Inspiring Kids for STEAM, Erasmus+ @ European Researchers' Night. Coordinated by www.experienceworkshop.org


Kids Inspiring Kids for STEAM, Erasmus+ @ European Researchers' Night. Coordinated by www.experienceworkshop.org

THE FRONTIERS COLLECTION

EXPERIENCE WORKSHOP

www.experienceworkshop.org



Shyam Wuppuluri
Dali Wu (Eds.)

ON ART AND SCIENCE

Tango of an Eternally Inseparable Duo

With an Afterword by Sir Martin Rees

Springer

CRITICAL ISSUES IN THE FUTURE OF LEARNING AND TEACHING

Why Science and Art Creativities Matter

(Re-)Configuring STEAM for Future-Making Education

Pamela Burnard and
Laura Colucci-Gray (Eds.)

BRILL | SENSE

Kristóf Fenyvesi and Tuuli Lähdesmäki (Editors)

Aesthetics of Interdisciplinarity: Art and Mathematics

This anthology fosters an interdisciplinary dialogue between the mathematical and artistic approaches in the field where mathematical and artistic thinking and practice merge. The articles included highlight the most significant current ideas and phenomena, providing a multifaceted and extensive snapshot of the field and indicating how interdisciplinary approaches are applied in the research of various cultural and artistic phenomena. The discussions are related, for example, to the fields of aesthetics, anthropology, art history, art theory, artistic practice, cultural studies, ethno-mathematics, geometry, mathematics, new physics, philosophy, physics, study of visual illusions, and symmetry studies. Further, the book introduces a new concept: the interdisciplinary aesthetics of mathematical art, which the editors use to explain the manifold nature of the aesthetic principles intertwined in these discussions.

ISBN 978-3-319-57257-4

birkhauser-science.com

Kristóf Fenyvesi and Tuuli Lähdesmäki (Ed.)

Aesthetics of Interdisciplinarity: Art and Mathematics

Kristóf Fenyvesi
Tuuli Lähdesmäki
Editors

Aesthetics of Interdisciplinarity: Art and Mathematics

Birkhäuser

JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

JYU.
SERVING THE FUTURE SINCE 1863.

UNIVERSITY OF JYVÄSKYLÄ

JYU
University of Jyväskylä
Finland

→One of the top universities in Finland

→Student recruitment across Finland and internationally

→The cradle of modern Finnish Education with more than 150-year history
(Teacher Seminary in 1863)

→Architecturally and environmentally unique campus near the city centre

Full correspondence between the thematic emphasis of LLL 4.0 and the strategic core research areas of the University of Jyväskylä

→Basic natural phenomena and mathematical thinking,

→Information technology and the human in the knowledge society,

→Language, culture and society,

→Learning, Teaching and interaction,

→Physical activity, health and wellbeing,

→Sustainable business and economics.

Finnish Institute for Educational Research (FIER)

Innovative Learning Environments Research Group

INNOVATIVE LEARNING ENVIRONMENTS (ILE)

ILE is a research and education group that focuses on the advancements of children's and young people's 21st century skills.

ILE's multidisciplinary (e.g educational, cognitive, computer, and language and communication sciences) research focuses on user-driven design, implementation, and evaluation of technologies and spaces fostering learning and wellbeing in all educational levels and contexts.

ILE group's current projects, funded by European and national agencies, deal with topics such as transversal and digital competencies, STE(A)M learning, computational thinking and modeling, and digital self-assessment and portfolios.

The ILE group has an extensive national and international network of research institutes, the public sector, and companies.

Many connections between the thematic emphasis of LLL 4.0 and the rfocus of our research unit at FIER.

https://www.jyu.fi/it/en/research/research-areas/cognitive-science-and-educational-technology/ile/projects


Marja Kankaanranta


Kati Clements


Kristof Fenyvesi


Tiina Mäkelä


Pieta Sikström


Saana Mehtälä


Mikko Muilu


Mimmu Alanko


Veera Kenttälä


Matias Mäki-Kuutti

UNIVERSITY OF JYVÄSKYLÄ

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LLL 4.0 focus in the Currently started Erasmus+ projects:

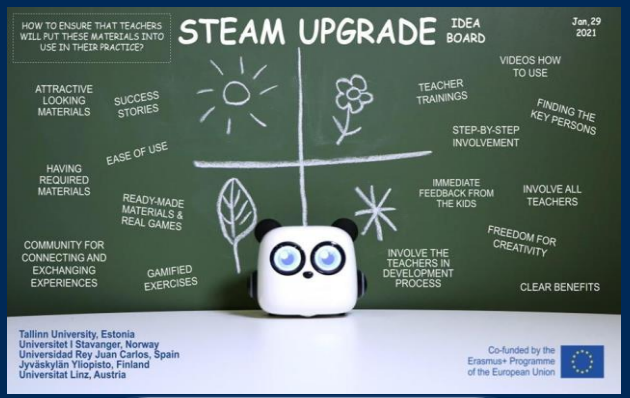
https://www.steamteach.unican.es/

STEAMTeach

Science | Technology | Engineering | Arts | Mathematics

STEAM-BOX

Courses, Tools, Resources for Teachers
Connecting Hands-on with Digital Modeling through Gamification



free 3D

A FRAMEWORK FOR EFFICIENT AND ENGAGING HYBRID EDUCATION IN LOWER-SECONDARY SCHOOLS

Digiloping Teachers:
Digital competences development and mentoring for teachers

Finnish Institute for Educational Research

Innovative Learning Environments Research Group

https://www.jyu.fi/it/en/research/research-areas/cognitive-science-and-educational-technology/ile/projects/steamnet

STEAMnet Education Network

STEAMnet Education Network is supporting future and in-service teachers in Finland and worldwide.

Multidisciplinary and phenomenon-based learning for developing transportable skills and key competencies are becoming increasingly important in Finland and around the world.

Our goal is the creative and collaborative, methodological and material enhancement of the integrated approach of Science-, Technology-, Engineering-, Arts- and Mathematics learning, known as STEAM.

STEAMnet's Services

STEAMnet is

- **developing cooperation** between teachers and experts in all of the STEAM-areas
- **upgrading curricula** through innovative **STEAM-projects, -tools and creative pedagogical methods** and approaches
- **coordinating STEAM communities** through several programs and events
- **conducting research & educational projects** focusing on STEAM

STEAMnet's Online Groups and Communities

Join right away to the

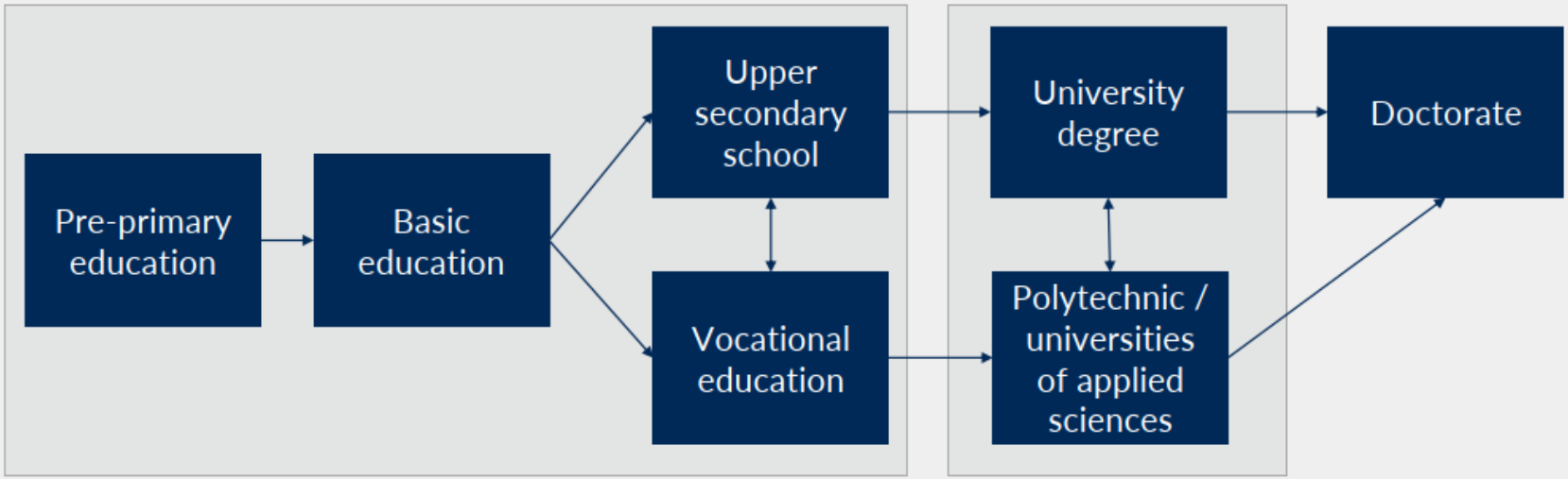
- International Coalition of STEAM Educators Google Group
- Math-Art-Learning Google Group
- GeoGebra Arts & STEAM Facebook Group

JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

Society and education in a digital world

- Major changes in society, individual lives and careers take place in 1 - 5 years instead of 5 - 20 years
- Transforming from service society to self-service society: Fewer jobs, less free time
  - AI based automatic services replacing many functions
- Technologies, such as robotics (service, industrial, software):
  - Available jobs require higher and up-to-date education
- Careers consist of multiple shorter, less structured jobs
  - Employees required to respond to changes quickly.
  - Society needs to support employees in transitions of employment.
- Aging society: more demand for services and care
- Digitalization demands a more agile education system.
  - Finland is developing this system
    - goal: 50% of population with a higher education
  - Digital education and innovation required to meet modern demands.

Finnish Education system



Mandatory until the age of 18.
Publicly funded, available for everyone.
Goal: 100% of the population

Publicly funded.
Available for everyone.
Goal: 50% of the population.

Extension of compulsory education in 2021:
The minimum school leaving age will be raised to 18 years.

Finnish public education system's response to Covid

- Due to robust public infrastructure response to the crisis has been largely successful
  - Difficult time for educators, learners and parents
  - New skills required by all

- Publicly supported, standardized systems have allowed for a rapid transition to digitally supported education.
  - Critical needs must be catered to, such as face to face contact with younger children

- Learning from the challenges and successes
  - New innovations in learning, such as interactive methods
  - Cultural changes, new views on education and involvement of digital systems
  - Acknowledging the importance of support, active coping methods and social interaction

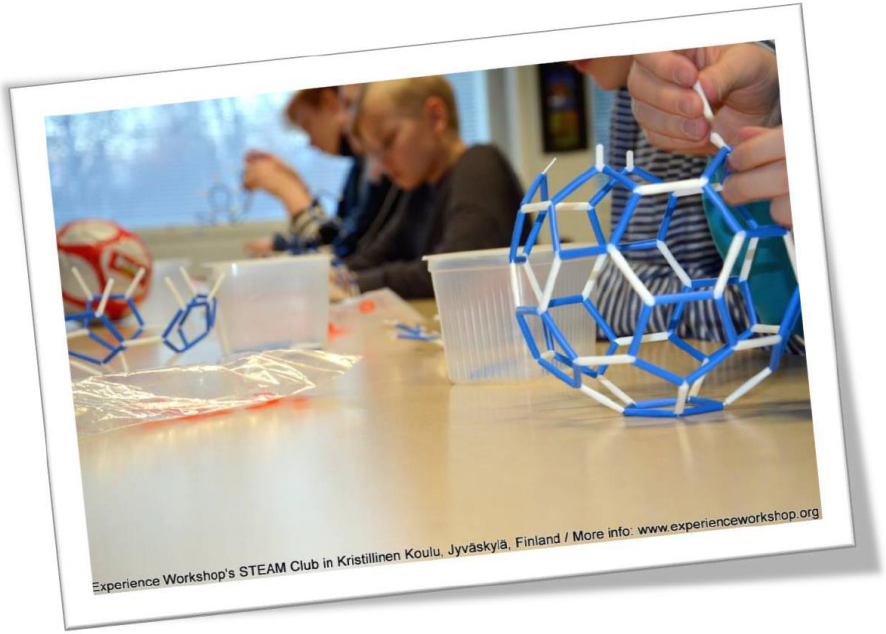
Key motivations for reforming and transitioning to digital education

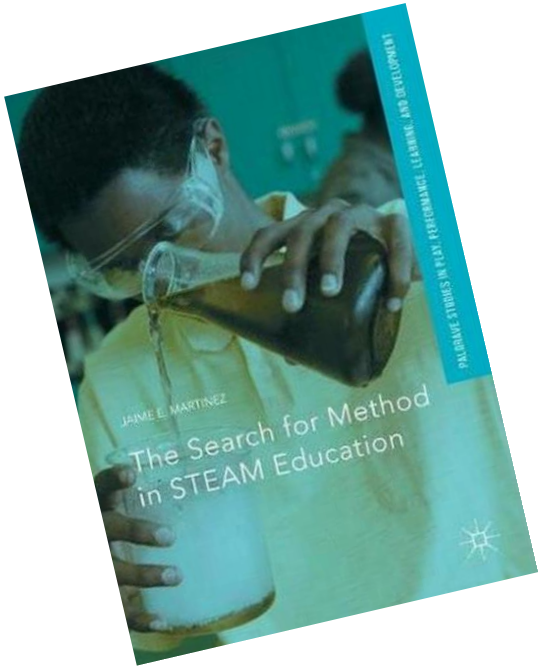
- AI supported individual career planning
  - Recognizing skill requirements
  - Recognizing and accepting unseen opportunities
  - Faster response time to changing situations
- Digital AI empowered education system
  - Promoting equality and research based best methods
  - Catering to individual needs and choices
  - Standardized learning outcomes
  - Supporting local economy through active responses to changes in skill requirements

United Nations Educational, Scientific and Cultural Organization

UNESCO Chair on Digital Platforms for Transforming Economies, University of Jyväskylä, Finland

https://ec.europa.eu/education/education-in-the-eu/european-education-area/a-european-approach-to-micro-credentials_en



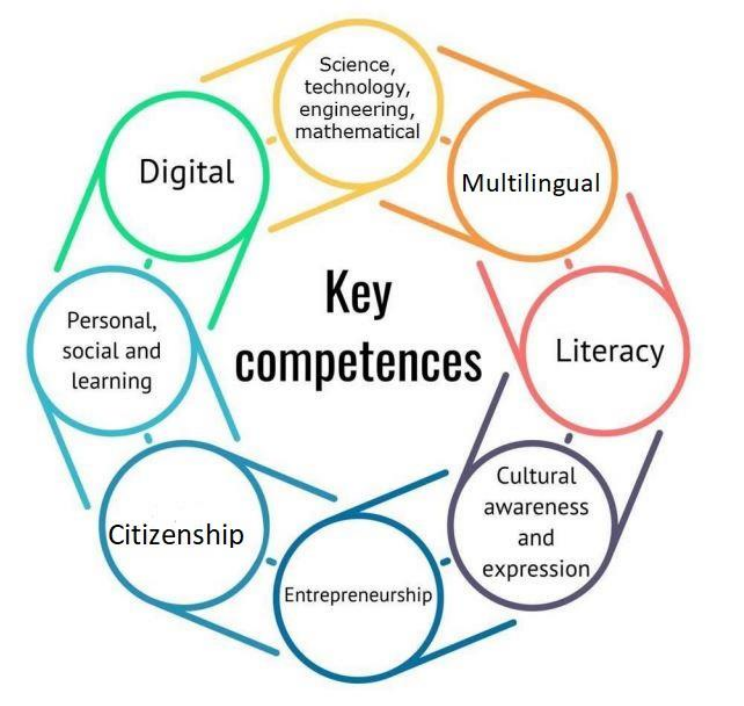


- The **Finnish National Core Curriculum** makes recommendations to teachers and schools about the development of *student-centered*, *multidisciplinary / phenomenon-based learning* programs and collaborative teaching.

- **STEAM** provides a reasonable basis to complete this requirement, as it means the *multidisciplinary* or *transdisciplinary integration* of **S**cience-, **T**echnology-, **E**ngineering-, **A**rts- and **M**athematics learning about various topics.

- **STEAM** is based on the collaboration between the teachers.

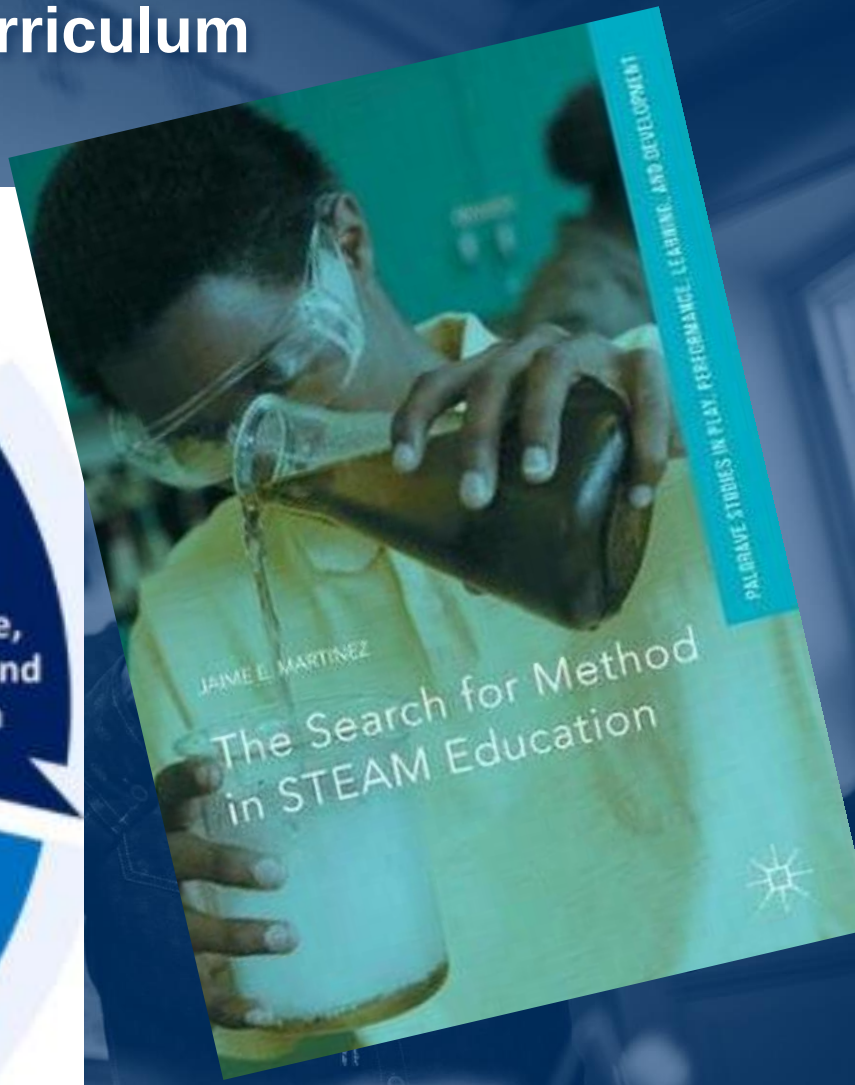
Creativity in Key competences for lifelong learning



- In **European Union's Commission** (2018) recommendations on "Key competences for lifelong learning", creativity is emphasized as a transversal component and an integrated aspect of all key competencies.

Euroopan Unionin Neuvosto (2018). Neuvoston suositus, annettu 22 päivänä toukokuuta 2018, elinikäisen oppimisen avaintaidoista, https://eur-lex.europa.eu/legal-content/FI/TXT/?uri=CELEX:32018H0604(01)

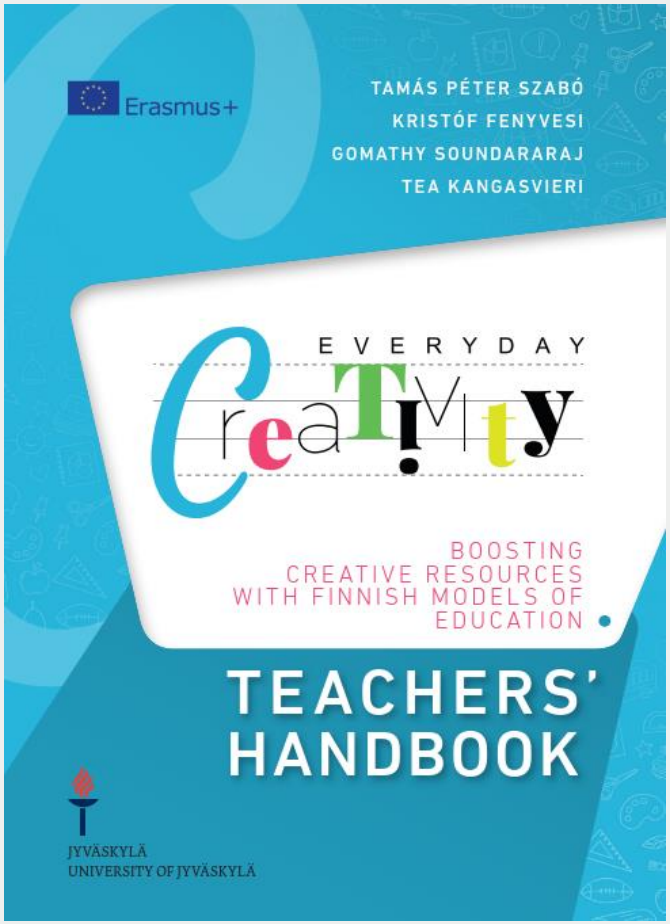
Finnish National Core Curriculum



Everyday creativity

- Creativity has also been studied from the **perspective of everyday school reality**:
  - Everyday creativity or 'little c creativity' is concerned with the agency of teachers and learners" as a democratic concept.
  - This means that everyday creativity is different from 'big C creativity,' which describes exemplary achievements in a given domain and entails some refashioning of the domain it contributes to.

Szabó, T. P., Fenyvesi, K., Soundararaj, G. and Kangasvieri, T. (Eds.) (2019). Everyday Creativity: Boosting Creative Resources with Finnish Models of Education. Teachers' Handbook. University of Jyväskylä.



Open Education materials published
in English, Romanian, Hungarian, Italian and Dutch

Applied models:

- creative ecologies framework
- teacher-researcher approach
- Finnish curricula

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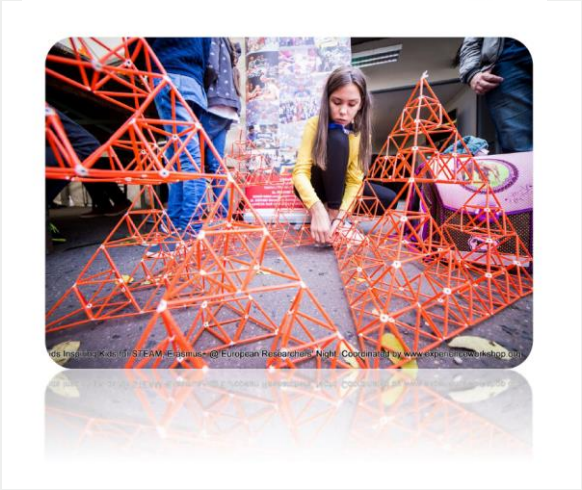
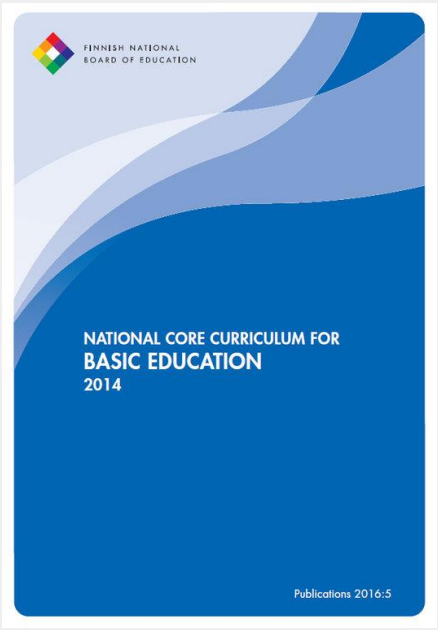
Szabó, T. P., Fenyvesi, K., Soundararaj, G. and Kangasvieri, T. (Eds.) (2019). Everyday Creativity: Boosting Creative Resources with Finnish Models of Education. Teachers' Handbook. University of Jyväskylä.

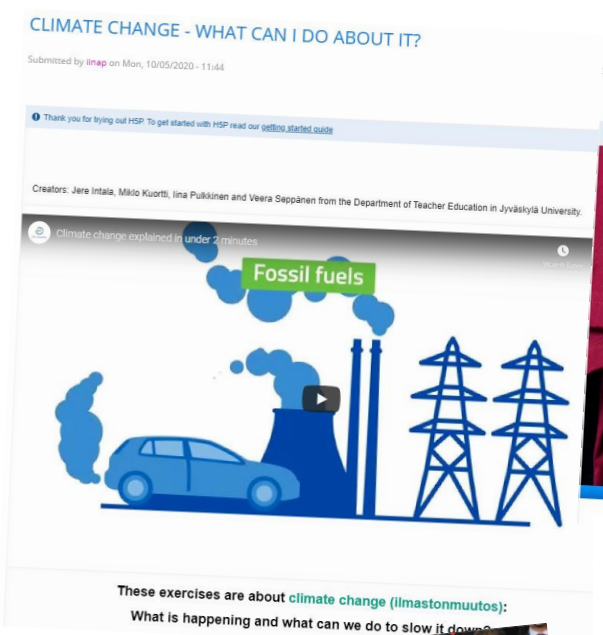
Creativity and innovativeness in the Finnish Core Curriculum for Basic Education

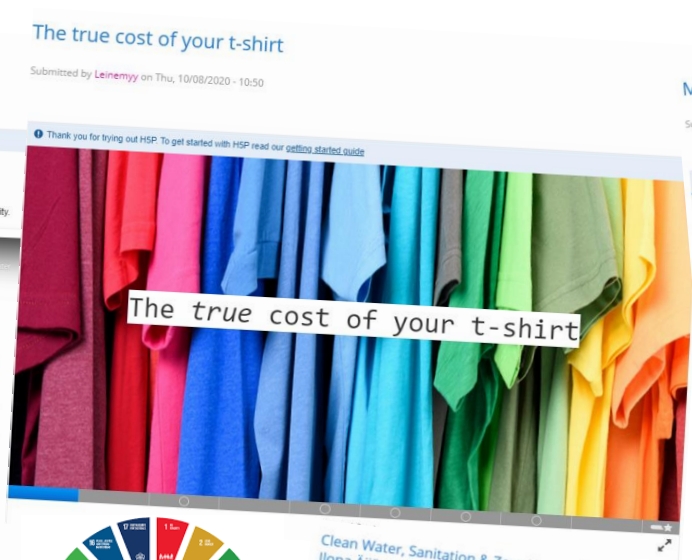


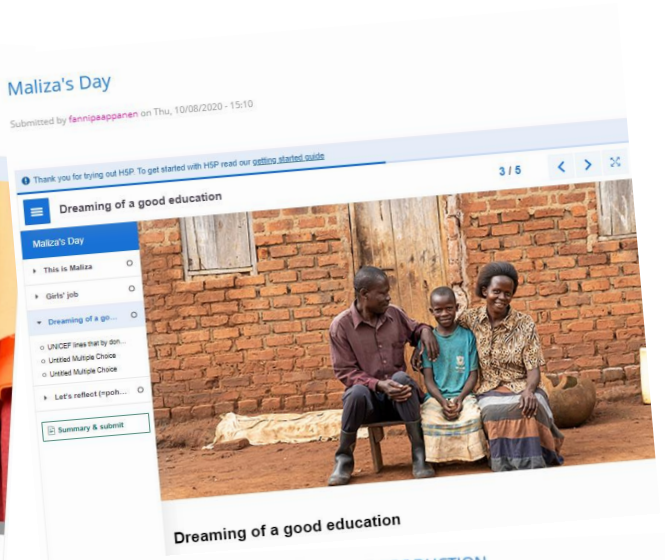


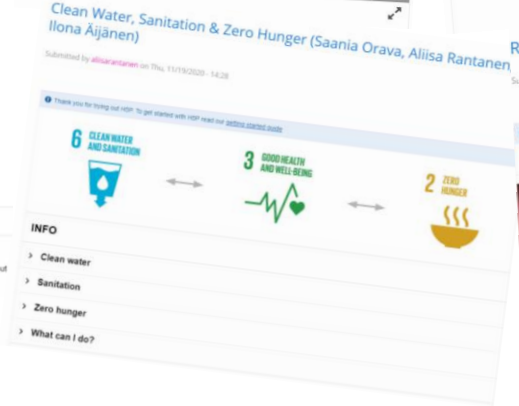
- Core curriculum for Basic Education mentions creativity more than 100 times.
- Innovativeness is mentioned less than 10 times.
- Curriculum also deals with (use of) imagination, discovery, inventions, constructing new knowledge and views and (self)-expression skills.

Interactive Digital Materials to Learn about Sustainable Development Goals in the Context of Mathematics – created by future teachers at the University of Jyväskylä









TEACHING AND ASSESSING TRANSVERSAL COMPETENCES IN FORMAL AND INFORMAL ENVIRONMENTS

STEAM workshops (basic education)

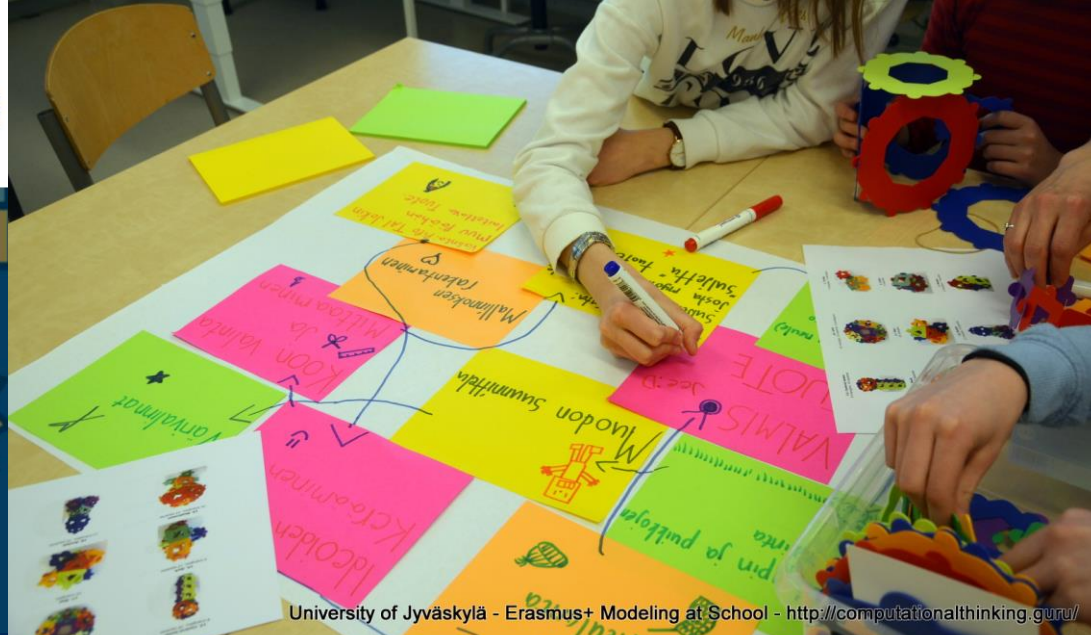
- 15 workshops with 5th and 6th graders in Tampere region in spring 2019
- Creative workshop activities with hands-on STEAM toolkit
- LTL assessment before and after the workshop

Co-funded by the Erasmus+ Programme of the European Union

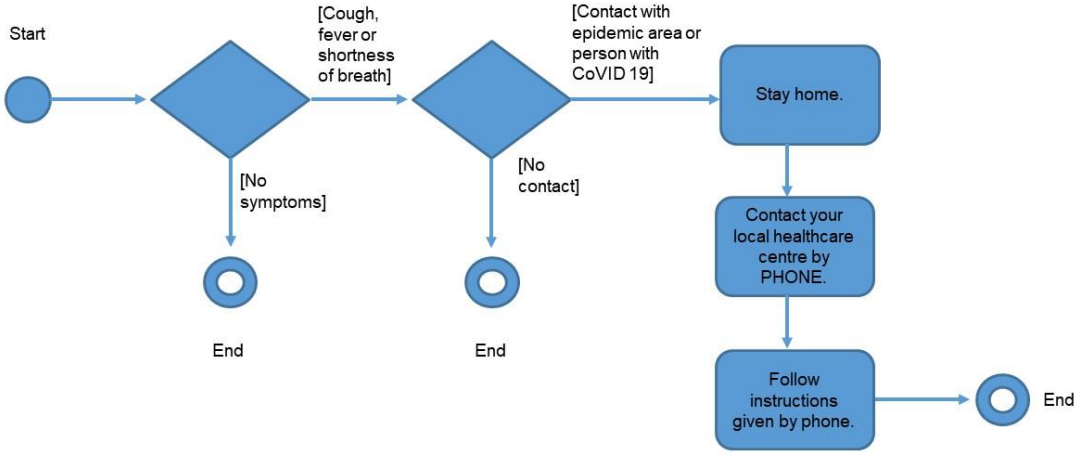
MODELING AT SCHOOL

Modeling at School

Learn more about our project.



If you suspect having Corona virus (CoVID 19) infection



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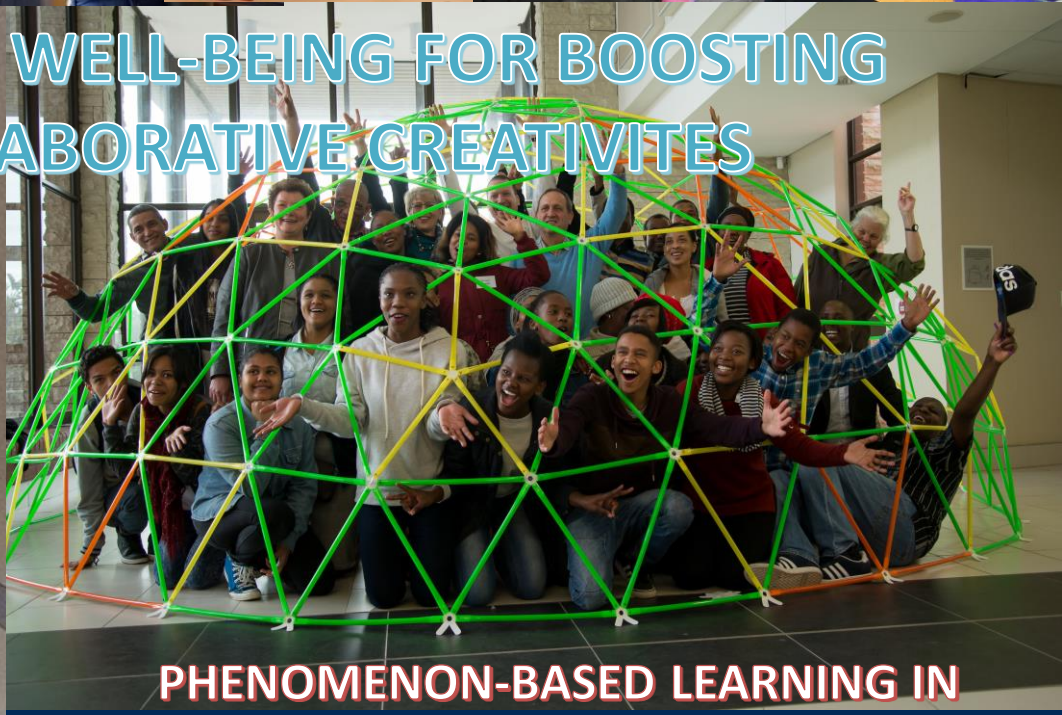
STEAM & WELL-BEING FOR BOOSTING COLLABORATIVE CREATIVITES



PHENOMENON-BASED LEARNING IN CREATIVE COMMUNITIES FROM FINLAND FOR THE CHILDREN, TEACHERS AND PARENTS AROUND THE WORLD

https://youtu.be/XNPDtbIbSts

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Natalia Budinski

CraftBot FLOW

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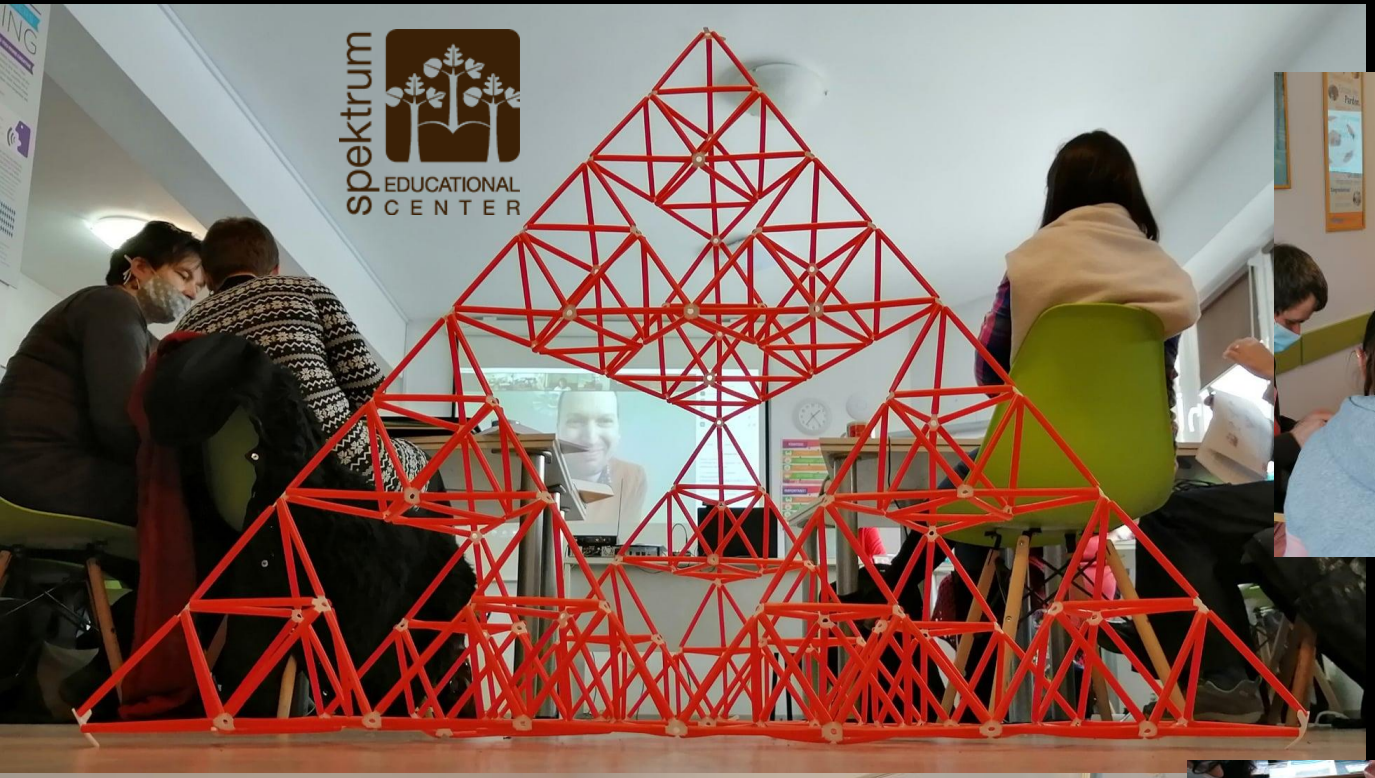

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INTERNATIONAL DAY OF MATHEMATICS
MARCH 14

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Contact: info@experienceworkshop.org