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

Evolution from Education 1.0 to Education 4.0 through Guidelines for Developing and Implementing STEAME Schools

Prof. Gregoris Makrides,
President, Cyprus Mathematical Society
President, European Association of ERASMUS Coordinators
President, European Association of Career Guidance

Project Number: 2019-1-CY01-KA201-058240

This project has been funded with support from the European Commission.
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CYPRUS MATHEMATICAL SOCIETY 1983 CY.M.S.

1921

2021

Thales Foundation

1950 With air-condition

2021 with air-condition

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1960 portability

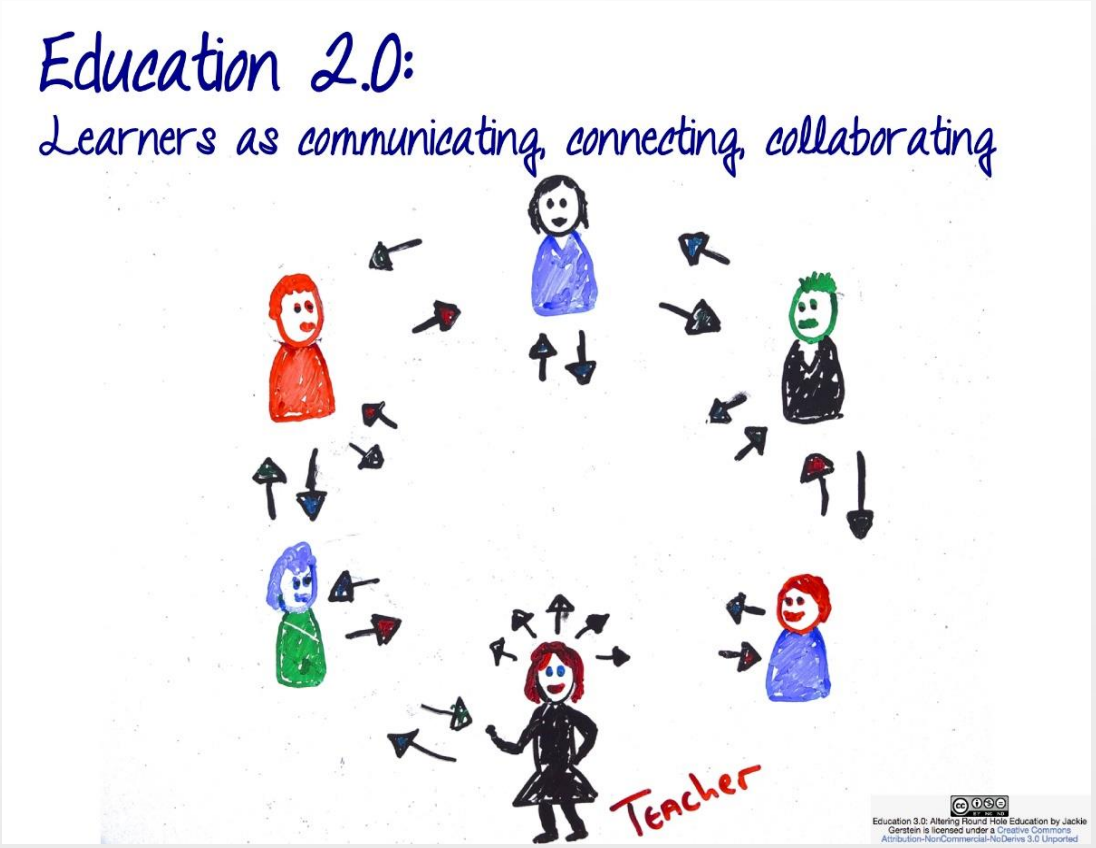
2020+ portability

EDUCATION 1.0

- Authoritarian
- The student is the passive recipient
- Teacher-centered system - the teacher gives knowledge as the absolute leader in the classroom
- Technology is forbidden in the classroom

EDUCATION 2.0

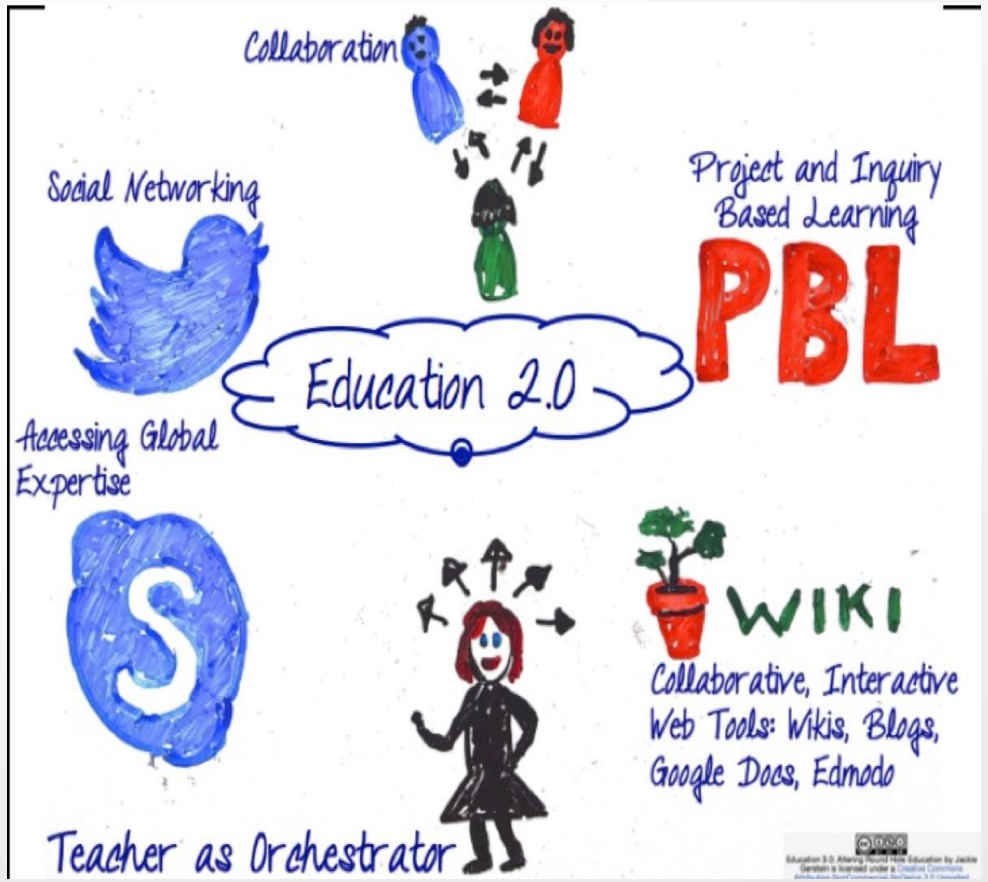
- Communication and collaboration are starting to grow
- Exam-based approach - the result is the examination - Memorization of knowledge
- An underestimated student-centered approach, we call it but do not apply it.
- the schools are still talking about hours of teaching ..... But they should talk about hours of learning !!!



Continue 2.0

EDUCATION 2.0

- Invasion of technology and social networking
- We apply technology to the classroom as a trend indicator, but ..... the class continues to have the same structure.
- Complete confusion ... .. students know the technologies better than teachers
- No design for what is used and what is not
- Many choices, there is no money for buying and applying, uncoordinated technology correlation with the curriculum ... .. the system can not properly follow the evolution of technology ... there is no teacher training ..... data is everywhere ... .. Google Search faster from traditional libraries ... the web knows more than our teacher ....**WE WERE NOT READY FOR COVID-19**
- Students give technical knowledge to their teachers ....



EDUCATION 3.0

- Student-Centered approach
- The teacher is transformed into a Coordinator/facilitator, advisor, learner and practice guide
- The student is researching
- Flip classroom method applies
- More dialogue, technology is everywhere, the student is self-learning and everywhere.
- The classical style classroom no longer exists
- Lesson Plans are now called…

… *Learning Plans*

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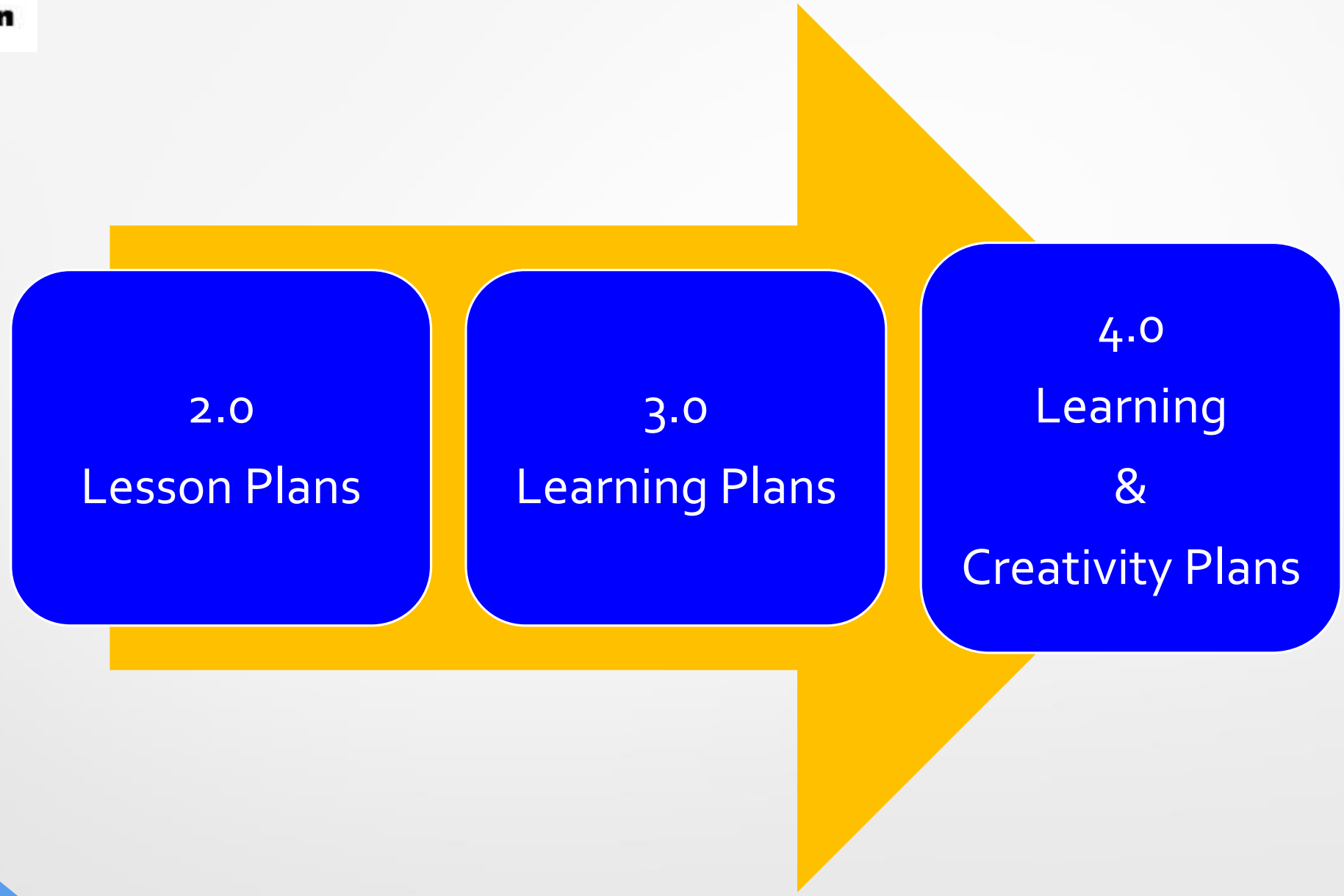
2030+

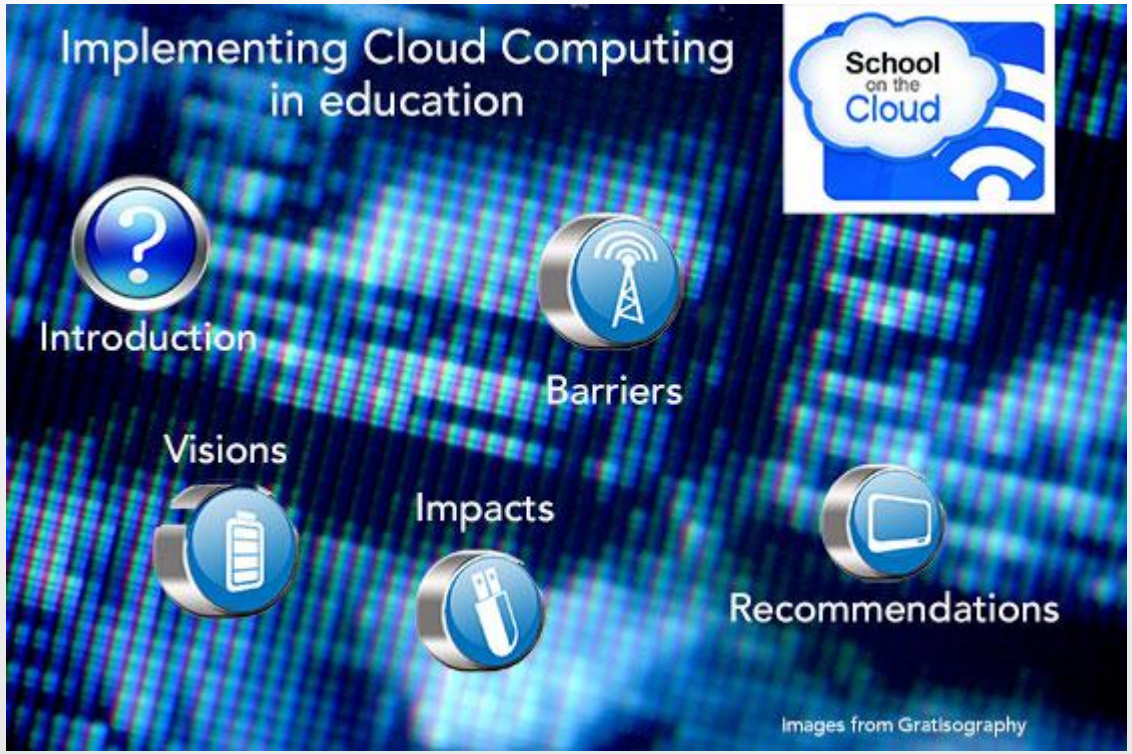
EDUCATION 4.0

- Co-creation and innovation in the centre
- Whenever and Wherever
  - Flipped classroom applied (Hybrid Learning Environments)
  - Interactive practical exercise – F2F or Distance
- Learning is done at home or outside school, while in school students develop skills
- Development of personalized teaching and learning
- Learning Plans are now called Learning & Creativity Plans
- The technology
  - Its free or/and easily accessible,
  - Increased use of virtual reality, artificial intelligence ,etc
  - Continuous evolution and innovation and therefore a need for development of Competences and Skills so people become Adaptable to Change


2.0
Lesson Plans
3.0
Learning Plans
4.0
Learning
&
Creativity Plans

What is needed?

The EU Funded Project : School on the Cloud (2013-2016)
(http://www.schoolonthecloud.net/)
has demonstrated that leadership for change is needed.
The main issue today is no longer access to technology, but the capability to establish meaningful leadership for Cloud-based learning, teaching and administration.



L-Cloud
Developing Tomorrow's Cloud Education Leaders

L-Cloud: Developing Tomorrow's Cloud Education Leaders
(EU funded project 1 October 2018 – 31 October 2020)

Cloud is designed to promote the leadership for change and is aiming at:

1. *Guidelines for Skills and Competences for **Adaptive Cloud Education Leaders***

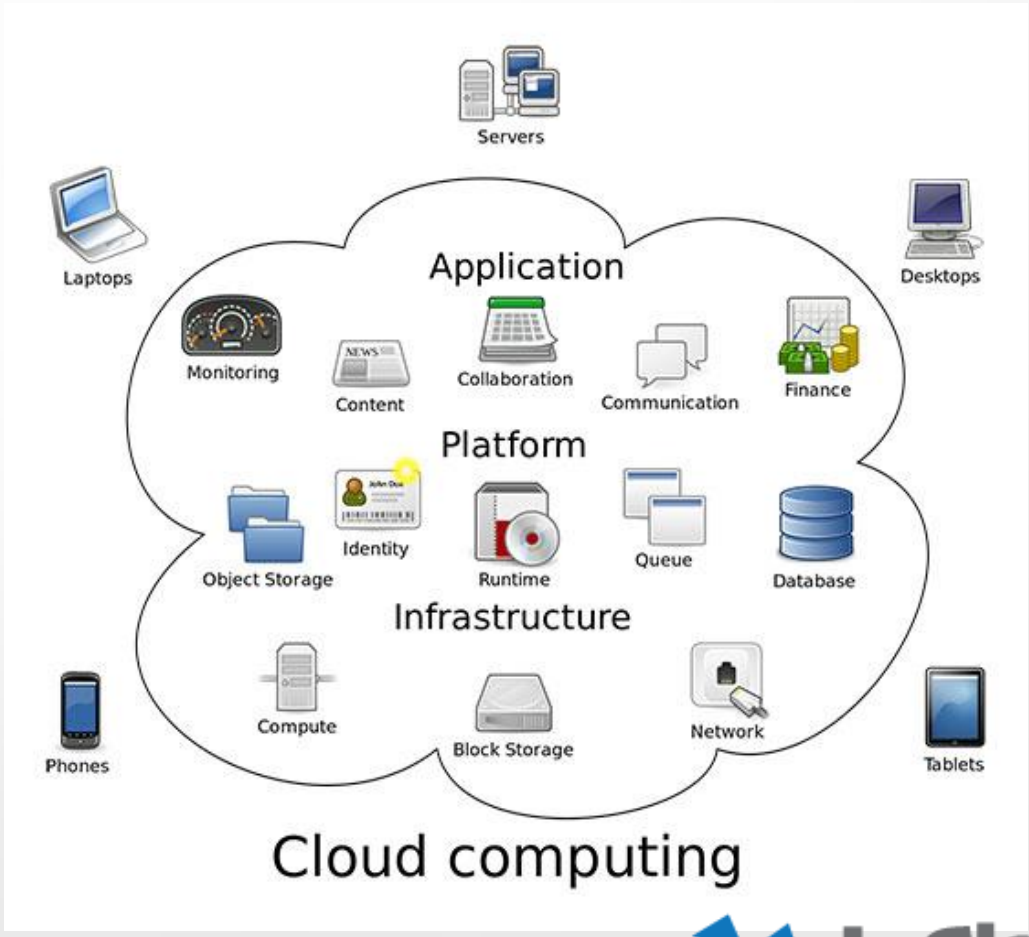
2. ***Qualification Framework for Education Cloud Leaders** based on Skills and Competence.*
   well as the definition of an International Professional Certification Programme.

3. ***MOOC Webinar Training Course** for developing adaptive cloud education leaders with a **Certification Programme***

VIDEO

www.L-Cloud.eu

All tools are moved into the Cloud



ON PREMISES CLOUD SERVICES

L-Cloud
Developing Tomorrow's Cloud Education Leaders

Simple as that…

BYOD

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Simple as that…

BYOD

Bring your own device

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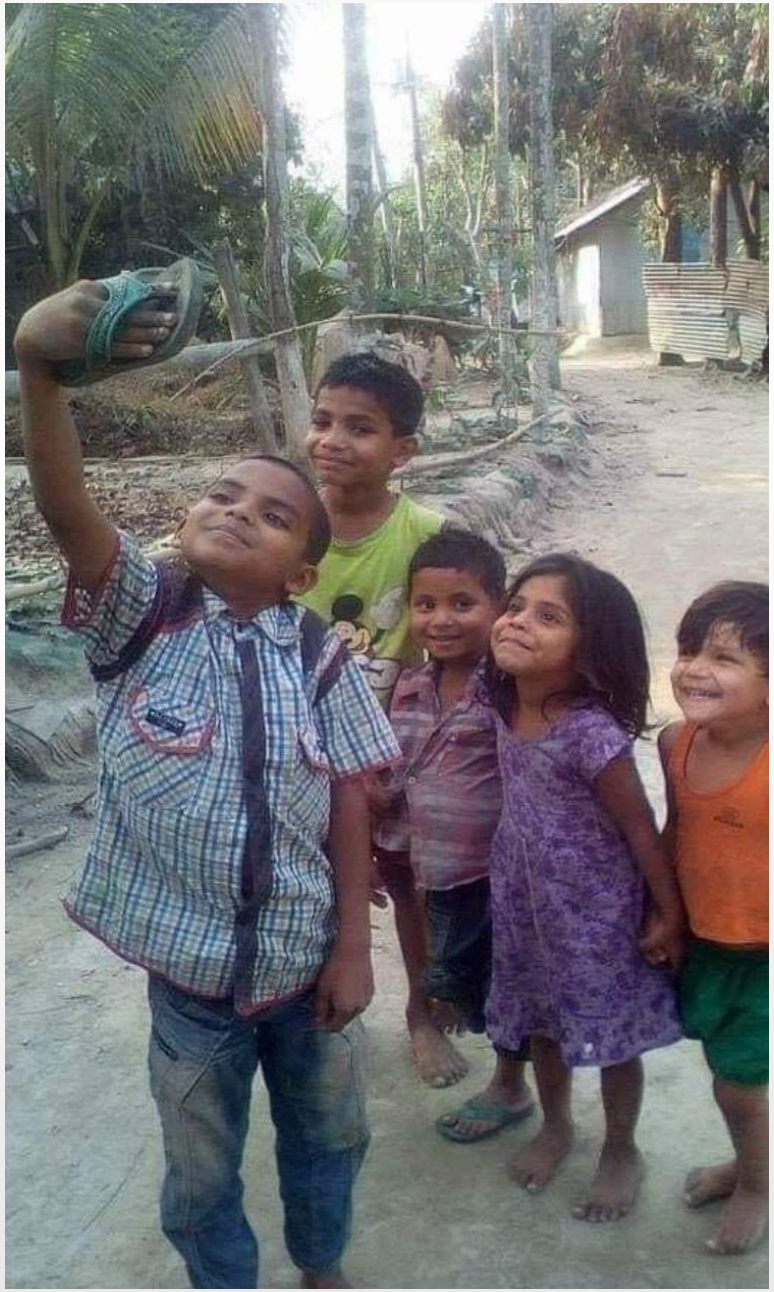
Smart Phones and internet is eventually going everywhere…



NEW RESULTS APPLIED TO SUPPORT EDUCATION 3.0 & 4.0

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STEAME

November 2019 – October 2021

STEAME : Science-Technology-Engineering-Arts-Mathematics-Entrepreneurship

What is needed?

Model of STEAME Schools

Guidelines for STEAME Activities in Schools

Guidelines for cooperation between teachers of different disciplines

New organizational structures for STEAME schools

Training of Teachers - help them to adapt

Dynamic Change in Curricula, Tools, Methods

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

Outputs

- O1. Guidelines for dynamic and adaptive STEAME curricula – published
- O2. Guidelines for STEAME Activities in Schools for two age groups - L&C Plans published
- O3. Guidelines for STEAME School Organizational Structure – in progress

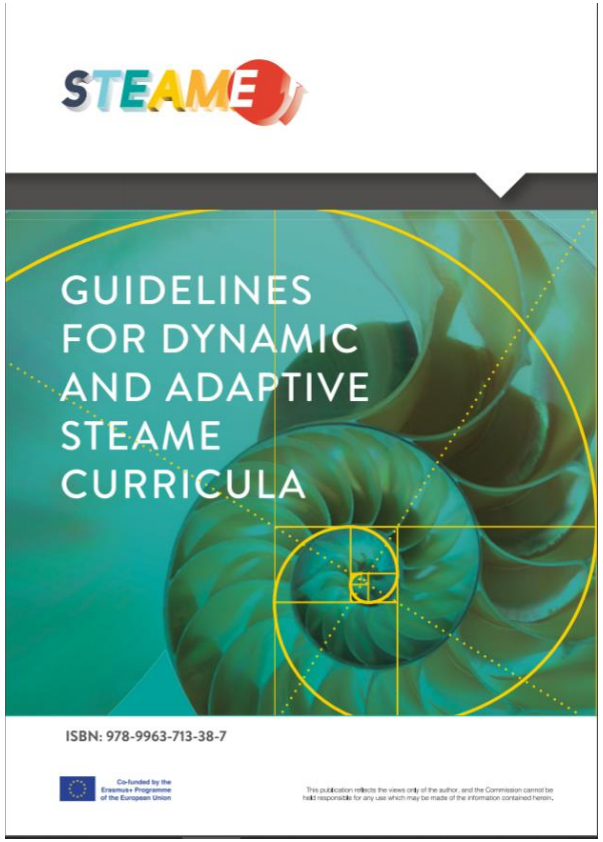
Science | Technology | Engineering | Arts | Mathematics | Entrepreneurship

Project Number: 2019-1-CY01-KA201-058240

O1. Guidelines for dynamic and adaptive STEAME curricula

- **Chapter 1 Approaches to teaching**
- **Chapter 2 Materials for teaching**
- **Chapter 3 Entrepreneurship aspects**
- **Chapter 4 Organizational suggestions for STEAME-oriented teaching**
- **Chapter 5 Propositions and analysis of STEAME-oriented curriculum-Adaptability and dynamics characteristics**

Peer Evaluation of projects and schools



Open the publication…

Reference files mentioned in the publication

https://drive.google.com/drive/folders/18OJyczG42HVtayfYe5XtH8vM_Y2vza8e

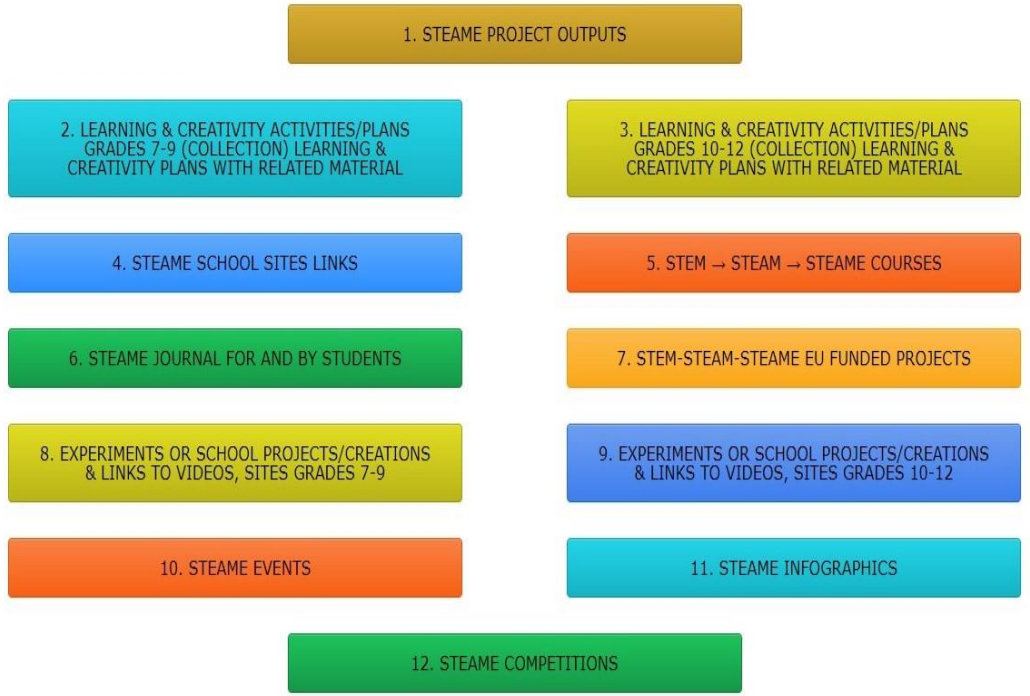
Project Number: 2019-1-CY01-KA201-058240

O2. Guidelines for STEAME Activities in Schools for two age groups

- **STEAME OBSERVATORY** - ACTIVE

https://steame.eu/steame-observatory/

*Observatory is a tool useful to school students and teachers in order to support a **dynamic and adaptive** STEAME Curriculum in their schools .



Project Number: 2019-1-CY01-KA201-058240

What is a STEAME Learning and Creativity Plan

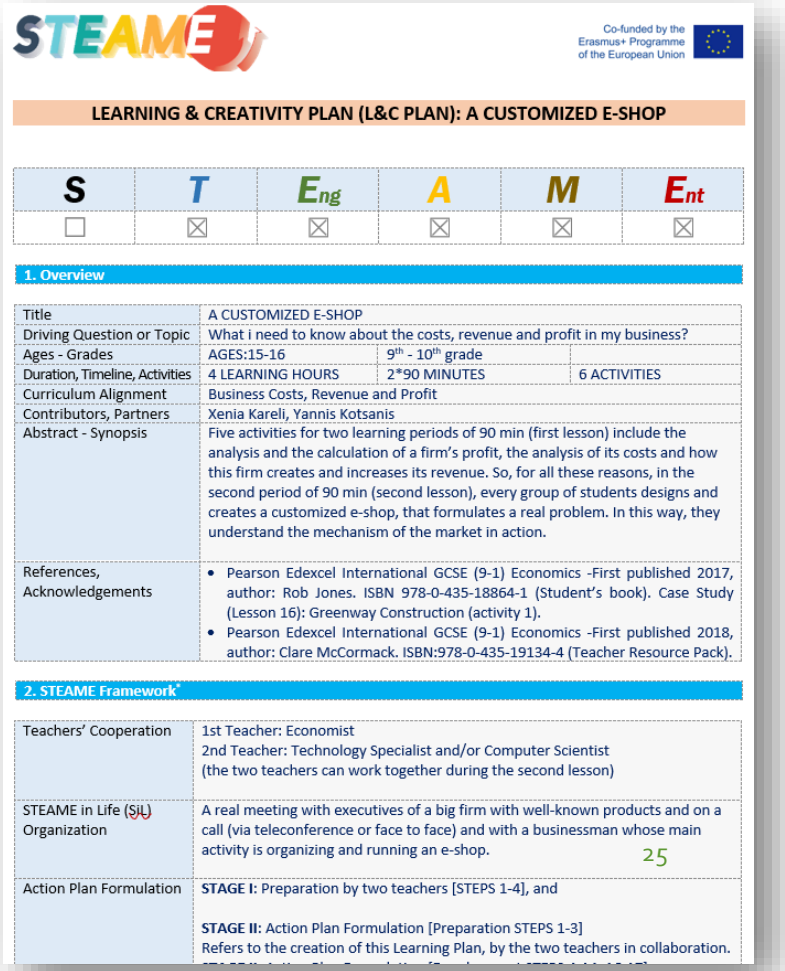
- **Developed by the STEAME project to serve the needs of teachers and students. Student centre approach focused on creativity and learning.**
- **Empty template available for use in the Observatory in EN, GR, IT, BG, PL**
- **Designed for minimum 2 teachers collaboration**
- **It includes the 18 steps prototype teacher cooperation for STEAME project activity**

STAGE	Activities/Steps Teacher 1 (T1) Cooperation with T2 and student guidance	Activities /Steps By Students Age Group: ____	Activities /Steps Teacher 2 (T2) Cooperation with T1 and student guidance
A	Preparation of steps 1,2,3		Cooperation in step 3
B	Guidance in step 9	4,5,6,7,8,9,10	Support guidance in step 9
C	Creative Evaluation	11	Creative Evaluation
D	Guidance	12	Guidance
E	Guidance	13 (9+12)	Guidance
F	Organization (SIL) STEAME in Life	14 Meeting with Business representatives	Organization (SIL) STEAME in Life
G	Preparation of step 15		Cooperation in step 15
H	Guidance	16 (repetition 5-11)	Support Guidance
I	Guidance	17	Support Guidance
K	Creative Evaluation	18	Creative Evaluation

STEAME Learning and Creativity Plan

- **STEAME Prototype 18 steps L&C Plan development/implementation and cooperation between teachers**

Lets review a STEAME L&C Plan



STEAME

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

LEARNING & CREATIVITY PLAN (L&C PLAN): A CUSTOMIZED E-SHOP

S	T	Eng	A	M	Ent
☐	☒	☒	☒	☒	☒

1. Overview

Title	A CUSTOMIZED E-SHOP		
Driving Question or Topic	What i need to know about the costs, revenue and profit in my business?		
Ages - Grades	AGES:15-16	9th - 10th grade	
Duration, Timeline, Activities	4 LEARNING HOURS	2*90 MINUTES	6 ACTIVITIES
Curriculum Alignment	Business Costs, Revenue and Profit		
Contributors, Partners	Xenia Kareli, Yannis Kotsanis		
Abstract - Synopsis	Five activities for two learning periods of 90 min (first lesson) include the analysis and the calculation of a firm's profit, the analysis of its costs and how this firm creates and increases its revenue. So, for all these reasons, in the second period of 90 min (second lesson), every group of students designs and creates a customized e-shop, that formulates a real problem. In this way, they understand the mechanism of the market in action.		
References, Acknowledgements	• Pearson Edexcel International GCSE (9-1) Economics -First published 2017, author: Rob Jones. ISBN 978-0-435-18864-1 (Student's book). Case Study (Lesson 16): Greenway Construction (activity 1). • Pearson Edexcel International GCSE (9-1) Economics -First published 2018, author: Clare McCormack. ISBN:978-0-435-19134-4 (Teacher Resource Pack).		

2. STEAME Framework*

Teachers' Cooperation	1st Teacher: Economist 2nd Teacher: Technology Specialist and/or Computer Scientist (the two teachers can work together during the second lesson)
STEAME in Life (SiL) Organization	A real meeting with executives of a big firm with well-known products and on a call (via teleconference or face to face) and with a businessman whose main activity is organizing and running an e-shop. 25
Action Plan Formulation	**STAGE I:** Preparation by two teachers [STEPS 1-4], and **STAGE II:** Action Plan Formulation [Preparation STEPS 1-3] Refers to the creation of this Learning Plan, by the two teachers in collaboration.

STEAME in Life (SiL)

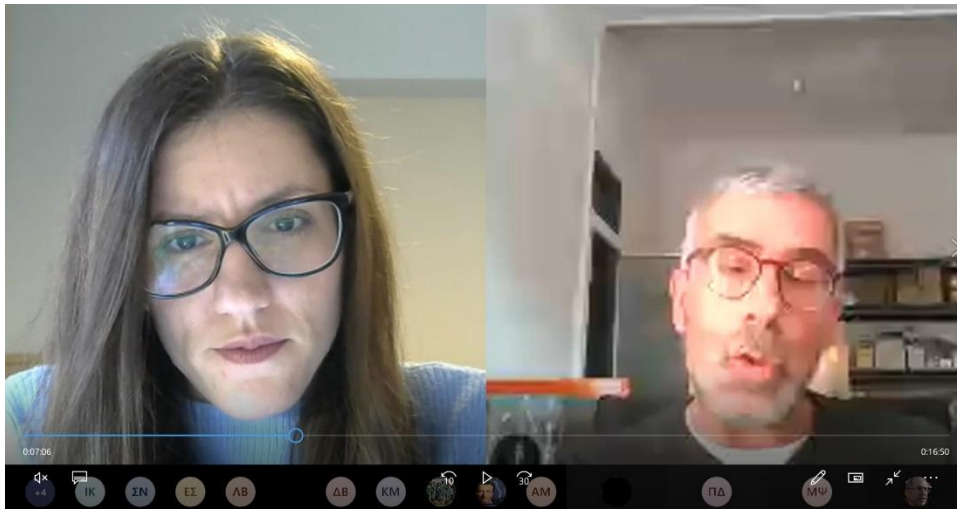
1. Overview
Title
Driving Question or Topic
Ages, Grades
Duration, Timeline, Activities
Curriculum Alignment
Contributors, Partners
Abstract - Synopsis
References, Acknowledgements

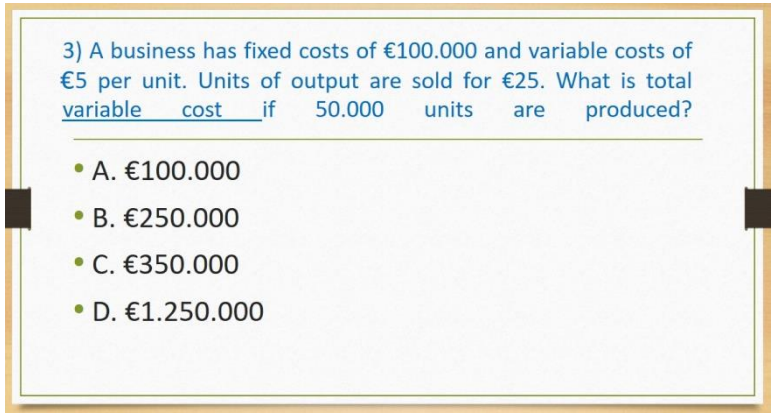
2. STEAME Framework*
Teachers' Cooperation
STEAME in Life (SiL) Organization
Action Plan Formulation

3. Objectives and Methodologies
Learning Goals and Objectives
Learning Outcomes and expected Results
Prior Knowledge and Prerequisites
Motivation, Methodology, Strategies, Scaffolds

4. Preparation and Means
Preparation, Space Setting, *Troubleshooting Tips*
Resources, Tools, Material, Attachments, Equipment
Safety and Health

5. Implementation
Instructional Activities, Procedures, Reflections
Assessment Evaluation
Presentation - Reporting - Sharing
Extensions - Other Information





STEAME Examples: 3 Projects

1. Overview

- Title
- Driving Question or Topic
- Ages, Grades
- Duration, Timeline, Activities
- Curriculum Alignment
- Contributors, Partners
- Abstract - Synopsis
- References, Acknowledgements

2. STEAME Framework*

- Teachers' Cooperation
- STEAME in Life (SiL) Organization
- Action Plan Formulation

3. Objectives and Methodologies

- Learning Goals and Objectives
- Learning Outcomes and expected Results
- Prior Knowledge and Prerequisites
- Motivation, Methodology, Strategies, Scaffolds

4. Preparation and Means

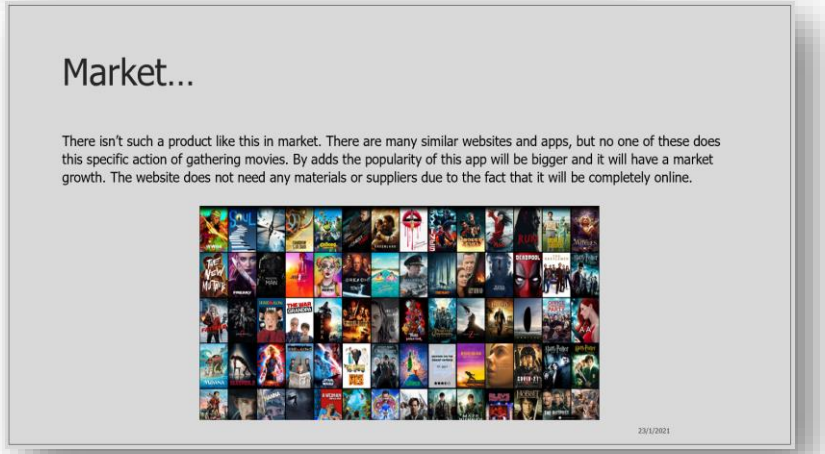
- Preparation, Space Setting, *Troubleshooting Tips*
- Resources, Tools, Material, Attachments, Equipment
- *Safety and Health*

5. Implementation

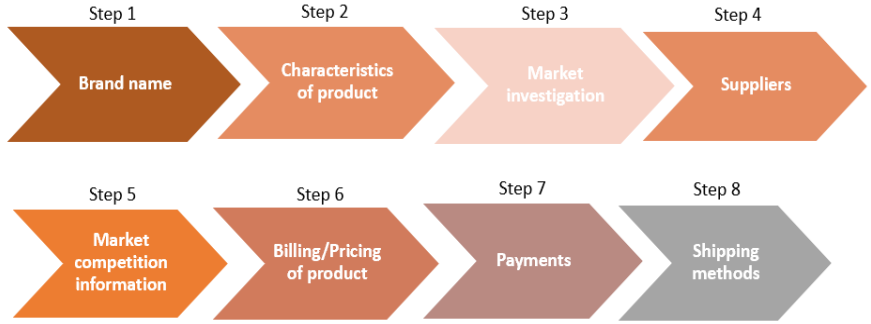
- Instructional Activities, Procedures, Reflections
- Assessment Evaluation
- Presentation - Reporting - Sharing
- *Extensions - Other Information*

1

2



SRUCTURE



BILLING AND PRICING

❖ Total revenue
Neclaces→ 20 x 100= 2.000€
Rings→ 15 x 100= 1.500 €
Earings→ 20 x 100= 2.000
Bracelets→ 12 x 100= 1.200

2.000+1.500+2.000+1.200=6.700

Total revenue: 6.700 € per/month

❖ Total cost
TC= (150+70+80+50)+(2.000+150+250+600)
TC=350+3000
TC= 3.350 € per/month

❖ Profit
Profit=6.700-3.350
Profit= 3.350 € per/month

3 STEAME: e-Shop Creation (shopify)

1. Overview
Title
Driving Question or Topic
Ages, Grades
Duration, Timeline, Activities
Curriculum Alignment
Contributors, Partners
Abstract - Synopsis
References, Acknowledgements

2. STEAME Framework*
Teachers' Cooperation
STEAME in Life (SiL) Organization
Action Plan Formulation

3. Objectives and Methodologies
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Preparation, Space Setting, *Troubleshooting Tips*
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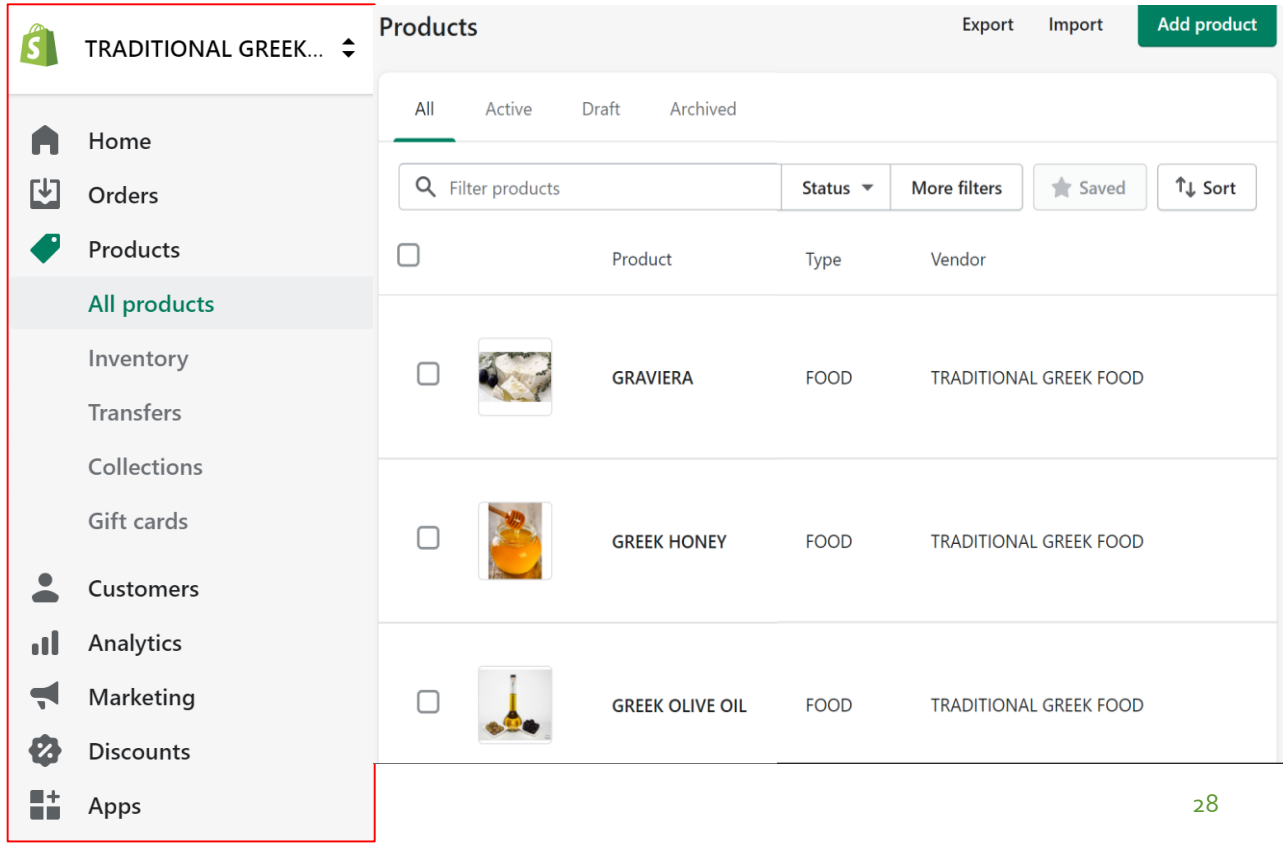
5. Implementation
Instructional Activities, Procedures, Reflections
Assessment Evaluation
Presentation - Reporting - Sharing
Extensions - Other Information



Evaluation Rubric

- **STEAME student evaluation rubric**

1. STEAME Subjects *(overall performance of respective concepts/discipline/content of K-12 level)*					
	0 - N/A	1 - beginning	2- developing	3 - advanced	
☐ Science	☐ Technology	☐ Engineer	☐ Arts	☐ Mathematics	☐ Entrepreneurship

2. Competences *(knowledge, skills, values-attitudes)*				
	basic/beginning	emerging/developing	accomplished/strong	exemplary
creativity, innovation				
critical thinking				
collaboration				
digital skills				
oral - written language				
presentation skills				
social & emotional competences				

3. Project Management, Development and Realisisation Processes				
	basic/beginning	emerging/developing	accomplished/strong	exemplary
goal achievement and motivation				
inquiry-based process				
problem-based process				
project-based and timeline process				
resources, references				
construction, artifacts, production outputs				
Entrepreneurship				

4. Formative Assessment (specified at each L&C)				
	D - limited/poor	C - adequate/good	B - substantial/great	A - detailed/excellent
Student Assessment by Teacher				
Self - Group*				
Self - Student*				

Erasmus+

O3. Guidelines for STEAME School Organizational Structure – *in progress*

- **TYPE A: How we can run STEAME activities in current school infrastructures ?**
- **TYPE B: What should a school look like in order to best run STEAME activities?**
- **KA1 four days training course for teachers**

- **Lets see what the running survey is saying so far…**

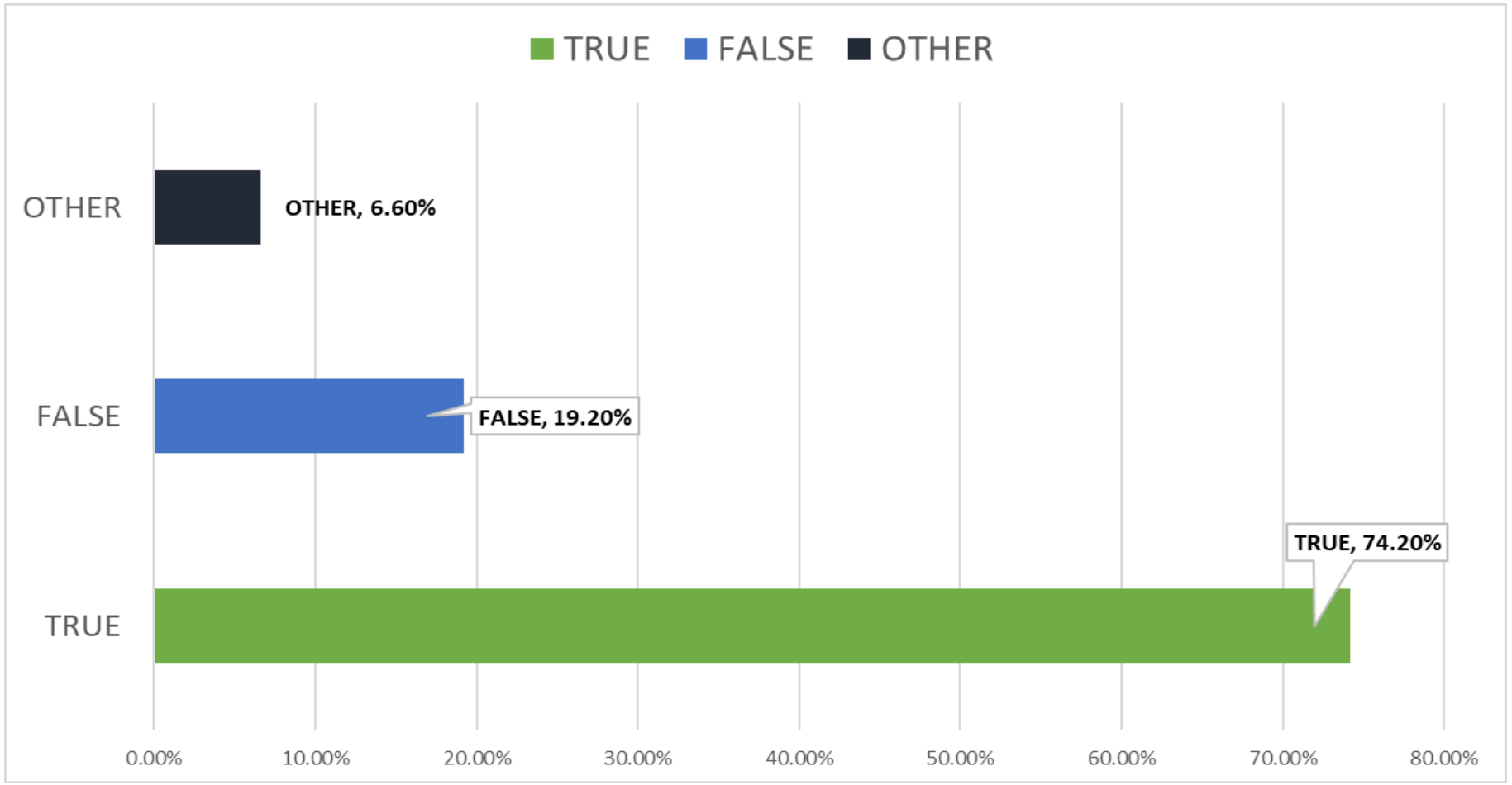
January 2021

Some survey results from 120 replies…

- This is on-going and you are all invited to make your contribution

  In the NEWS of www.steame.eu 
- Most replies (81 out of 120) were from teachers.
- 120 people have spoken…

The STEAME program should shape the education process of the school and the classroom design, not the other way around



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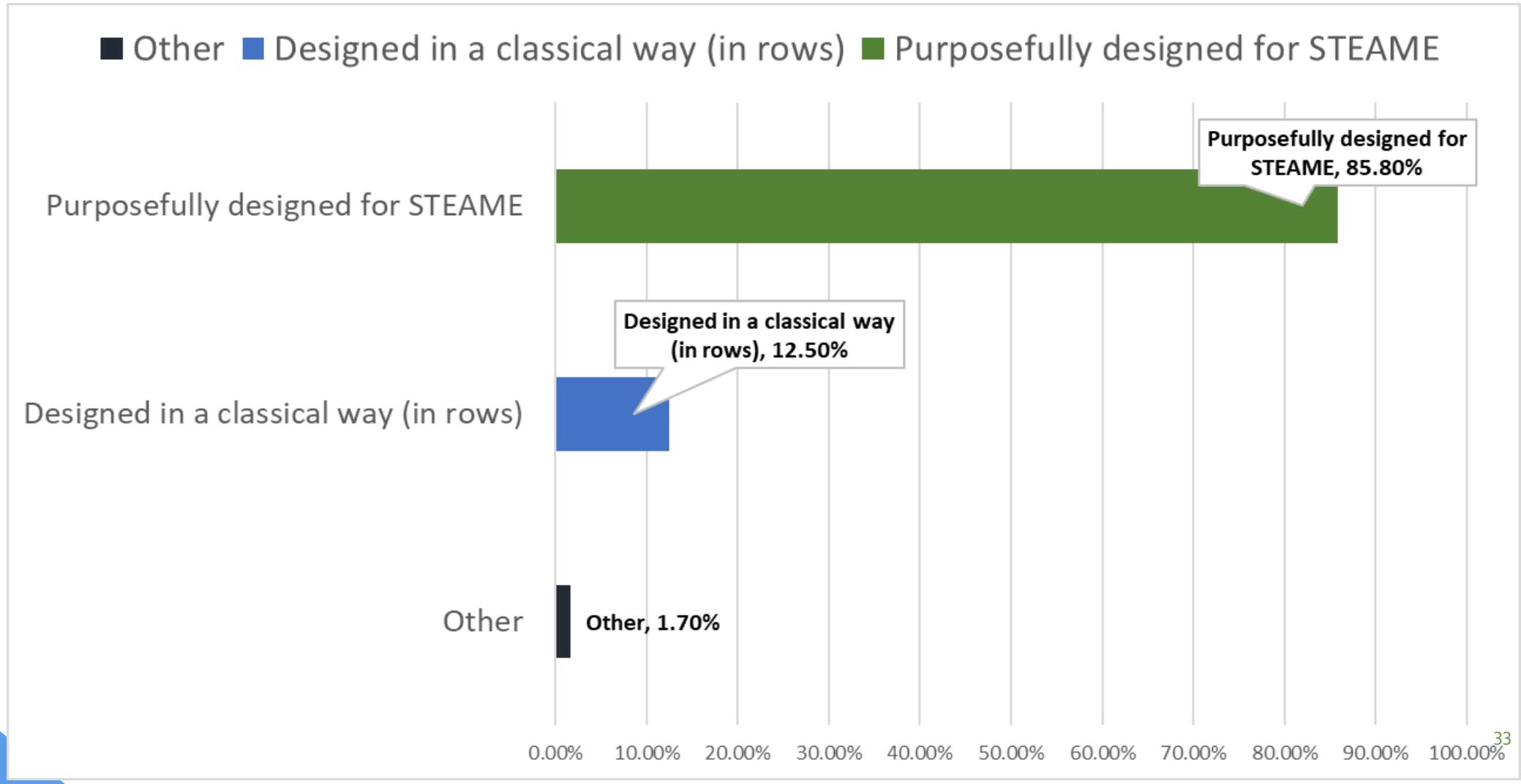
The classroom should be:



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…and what will we do with the survey results ?

We will organize Focus Groups with experts, teachers and students in order to put in a design plan what the teachers and students need

and then we will ask an architect to implement the design plan and give us a virtual vision and tour of a suggested future school

first draft expected to be presented during the European STEAME Conference and the STEAME Training Course in June 2021

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THE STEAME HEXAGON SCHOOL

The School without classrooms, see video 3 m:

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Where could students publish their STEAME project work?

- **Journal of STEAME Creations for and by School Students – ACTIVE**

(https://steame.eu/journal-of-steame-creations-for-and-by-school-students/)

Project Number: 2019-1-CY01-KA201-058240

STEAME Course for teachers

22-25 June 2021, in Paphos , Cyprus

(co-funding available)

STEAME Course Modules

4 days course

- **Module 1 -2 . How to construct L&C plans**
- **Module 3. How teachers can work together (18 steps prototype and other aspects)**
- **Module 4. How to help teachers and students work online (Hybrid environments)**
- **Module 5. How to support students in making oral presentations**
- **Module 6. How to write papers/reports (journal etc)**
- **Module 7. How to work on projects (Inquiry Based Learning, Project Based Learning)**
- **Module 8. How to work on projects (peer questions….)**
- **Module 9. How to develop STEAME schools (Type A and Type B Schools, survey results)**
- **Module 10. Evaluating STEAME project/activities work of students (Evaluation rubrics)**
- **Module 11-12: Course Assignment hands on development of a L&C Plan**

Coming Events

EUROMATH
&
EUROSCIENCE
Conference for pupils
21-26 June 2021
in Cyprus

Watch Video – 60 sec

www.euromath.org

Project Number: 2019-1-CY01-KA201-058240

European STEAME Conference
Hybrid Event

- **Cyprus, 22-24 June 2021**
- **Limited Co-funding Available by the STEAME project – Apply here**

Condition for funding

Project Number: 2019-1-CY01-KA201-058240

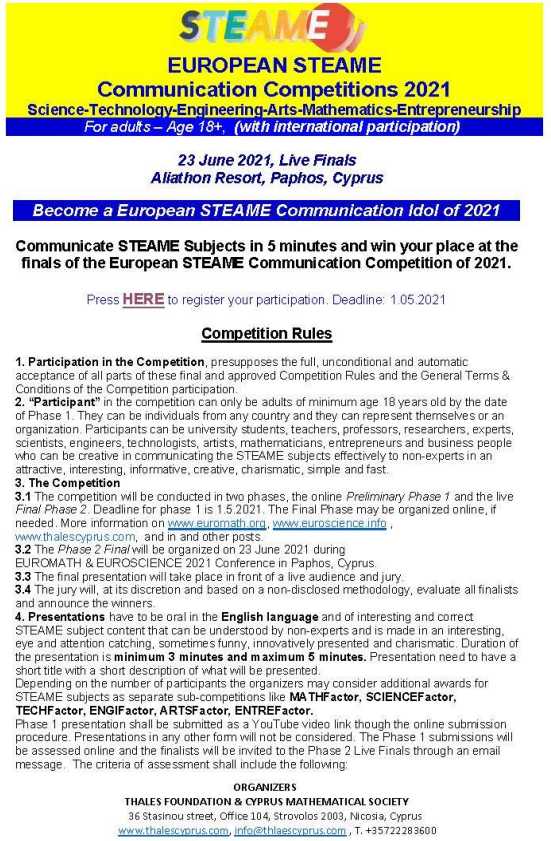
More STEAME Opportunities and challenges

EUROPEAN STEAME Communication Competitions 2021

- For adults, with international participation
- Physical/online Finals on 23 June, 2021

Pre-video submission for phase 1 is required

- **Communicate STEAME Subjects in 5 minutes and win your place at the finals of the European STEAME Communication Competition of 2021.**



STEAME

EUROPEAN STEAME
Communication Competitions 2021
Science-Technology-Engineering-Arts-Mathematics-Entrepreneurship
For adults – Age 18+, (with international participation)

23 June 2021, Live Finals
Aliathon Resort, Paphos, Cyprus

Become a European STEAME Communication Idol of 2021

Communicate STEAME Subjects in 5 minutes and win your place at the finals of the European STEAME Communication Competition of 2021.

Press HERE to register your participation. Deadline: 1.05.2021

Competition Rules

1. Participation in the Competition, presupposes the full, unconditional and automatic acceptance of all parts of these final and approved Competition Rules and the General Terms & Conditions of the Competition participation.
2. "Participant" in the competition can only be adults of minimum age 18 years old by the date of Phase 1. They can be individuals from any country and they can represent themselves or an organization. Participants can be university students, teachers, professors, researchers, experts, scientists, engineers, technologists, artists, mathematicians, entrepreneurs and business people who can be creative in communicating the STEAME subjects effectively to non-experts in an attractive, interesting, informative, creative, charismatic, simple and fast.
3. The Competition
3.1 The competition will be conducted in two phases, the online *Preliminary Phase 1* and the live *Final Phase* 2. Deadline for phase 1 is 1.5.2021. The Final Phase may be organized online, if needed. More information on www.euromath.org, www.euroscience.info , www.thalescyprus.com, and in and other posts.
3.2 The *Phase 2 Final* will be organized on 23 June 2021 during EUROMATH & EUROSCIENCE 2021 Conference in Paphos, Cyprus.
3.3 The final presentation will take place in front of a live audience and jury.
3.4 The jury will, at its discretion and based on a non-disclosed methodology, evaluate all finalists and announce the winners.
4. Presentations have to be oral in the **English language** and of interesting and correct STEAME subject content that can be understood by non-experts and is made in an interesting, eye and attention catching, sometimes funny, innovatively presented and charismatic. Duration of the presentation is **minimum 3 minutes and maximum 5 minutes.** Presentation need to have a short title with a short description of what will be presented.
Depending on the number of participants the organizers may consider additional awards for STEAME subjects as separate sub-competitions like **MATHFactor, SCIENCEFactor, TECHFactor, ENGIFactor, ARTSFactor, ENTREFactor.**
Phase 1 presentation shall be submitted as a YouTube video link though the online submission procedure. Presentations in any other form will not be considered. The Phase 1 submissions will be assessed online and the finalists will be invited to the Phase 2 Live Finals through an email message. The criteria of assessment shall include the following:

ORGANIZERS
THALES FOUNDATION & CYPRUS MATHEMATICAL SOCIETY
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www.thalescyprus.com, info@thlaescyprus.com , T. +35722283600

Criterion 1: Content, Criterion 2: Clarity, Criterion 3: Charisma/Talent
5. Media: The use of audiovisual tools during the presentation, such as PowerPoint, projectors, videos, audio and other is strictly prohibited. Participants are allowed to use small items that they can hold in one hand. A small table (of up to 1 square meter), a microphone and microphone stand or wireless microphone will be provided. Using a second person during the presentation to assist or otherwise is also prohibited.
6. The finalists will have to confirm their participation and to accept the GDPR rules during submission for allowing the use of their personal data, photo and videotaping in relation to this competition, for broadcasting, announcements or samples. Participants in the live final will require a registration at the ASTUCON event with a special fee that covers some meals also.
7. **Competition prizes**:
7.1 The first prize will be 500 euro. A relevant certificate and trophy will be awarded.
7.2 The second prize will be a tablet and a relevant certificate.
7.3 The third prize will be a relevant certificate plus a book.
Additional prizes may be awarded per STEAME subject categories.

Organizers

Collaborators and Sponsors

ORGANIZERS
THALES FOUNDATION & CYPRUS MATHEMATICAL SOCIETY
36 Stasinou street, Office 104, Strovolos 2003, Nicosia, Cyprus
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Mathematics Journalistic Article Competition 2021

- **For students of ages 10-19**

THEME
"The Role of Mathematics in STEAME Education"

European Comic Poster Competition in STEAM 2021

- **For students of age 14-18**

https://steam-edu.eu/#competitions

STEAME SUMMER CAMP 2021

26-31 July 2021, Agros, Cyprus

For grades 4-9 (Ages 10-15)

VIDEO

NEXT CHALLENGE

STEAME GOES HYBRID

Blueprint Guidelines and Policy Recommendations

Starting on 1 May 2021

STEAME GOES HYBRID

Blueprint Guidelines and Policy Recommendations

- **O1: Blueprint Guidelines for Hybrid STEAME activities**
- **O2: Training Programme for facilitating the implementation of STEAME L&C Plans by SE teachers and Piloting the Blueprint Guidelines**
- **O3: STEAME HYBRID Blueprint at a glance : Policy Recommendations and School Label Development**

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