

EUROPEAN HIGHER EDUCATION IN 2050: THE VISION, THE EVOLUTION

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ABSTRACT

The European Higher Education and Research Area is going through a transformation process that will push Europe to a leading position on the way to a green digitalization of societies. The environment of learning, including methods and spaces is expected to change drastically. With knowledge of today's technologies we can only imagine the future but the way forward is almost clear. In this paper we will attempt to describe the learning in the future in both school and higher education as their evolution needs to develop in parallel. The paper will utilize results from several EU funded projects, including, STEAME, STEAME-Hybrid, ONLIFE, STEAME-Students, BYOD, FACILIATET-AI, STEAME Teacher Facilitators Academy, and more.

1. THE VISION BASE

The project "STEAME: Guidelines for Developing and Implementing STEAME Schools" that ended on 31 December 2021 provides the ground for building the learning of the future as a kick-off of a paradigm shift to Education 4.0. It provides what steps Education Systems all around the world could follow in order to escape from Education 2.0 and change to Education 3.0 and eventually to Education 4.0 with learning based on inquiry and project based learning. Literature and research has been showing for years now that this should be the way forward in order to help school students develop the needed competences and skills that appear to lack when they enter HE studies or enter the world of work. With today's development of digital learning most of the learning needed by school students can be easily accessible or retrieved at any time and place.

STEAME (Science - Technology – Engineering - Arts - Mathematics - Entrepreneurship) has been developed to support European teachers' knowledge and understanding of creating successful STEAME learning and creativity project activities. It offers approaches to teaching, teaching materials, entrepreneurship aspects, organizational suggestions for STEAME-oriented teaching, propositions and

analysis of STEAME-oriented curriculum. All the OERs of the project are available through the STEAME Observatory at www.steame.eu. As an observatory, it is designed to be adaptive and dynamic, able to support a dynamic and adaptive STEAME Curriculum in any school that needs to implement STEAME activities in the learning process.

The process of adding and updating the content is a continuous one, providing the opportunity to all teachers across the EU and beyond to be up to date and to share and publish their own work if they wish to.

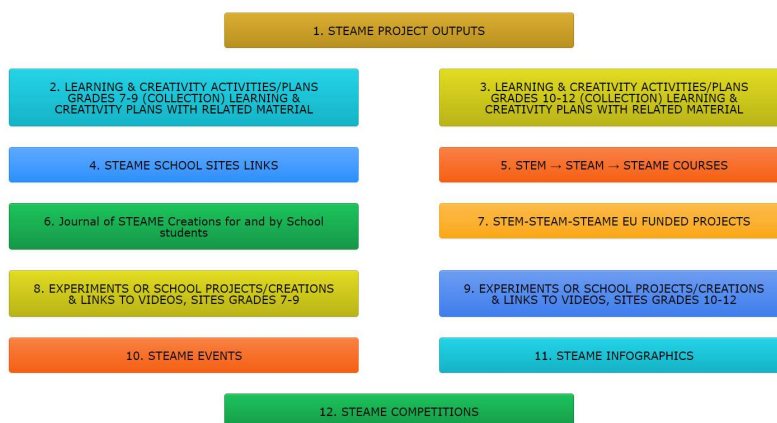


Fig 1: The structure of the STEAME Observatory

1.1 The STEAME Framework consists of the following elements:

1. Learning and Creative Methodologies (PBL-IBL-PSL)
2. Guide to Science Communication as a skill for students
3. Guide to Learning and Creative(L&C) Plan Development, including a L&C Plan Template in different languages
4. Evaluation Rubric for implementing a project
5. Observatory (Guide to dynamic and adaptive STEAME material)

1.2 Methodologies adopted by the STEAME framework (PBL, IBL, PSL)

The following four methodologies are adopted by the STEAME framework:

- A. Project-Based Learning Methodology (PBL)
- B. Inquiry-Based Learning Methodology (IBL)
- C. Problem Solving Learning Methodology (PSL)
- D. A guided method to L&C Plans development with an 18 steps prototype procedure in supporting project based work of student groups, moderated and supported by at least two teachers of different disciplines.

The STEAME project, based on an International investigation, a European wide survey and based on focus groups with teachers and experts, associate partners and through its consortium creative work, has developed guidelines for STEAME school organization structures covering actions for existing schools and actions for future schools. Below we present indicative photos of the design of the STEAME School of the future. In the project website www.steame.eu, one can find a full detailed content and designs of the STEAME School of the future.



Fig. 2: A top view of the design of the school fully energy self-sustainable with photovoltaics



Fig. 3: A side view of the school one basement, ground floor, first floor and roof

The basement main content is a full set of STEAME Laboratories, VR rooms and entrances to the main amphitheatre and sports centre.

The ground floor contains mainly satellite laboratories, open work space, learning stations and base entries into the small amphitheatres, reception entrance and main dual reception of the sports centre, one entrance for the school students during the day and another entrance for the community during the night, the access to the internal yard and cafeteria and more.

The first floor contains open work space, learning stations, learning centres, learning rooms, a slow moving train with space for group student work, entry into amphitheatres and more.

The roof contains, photovoltaics providing green sustainable energy to the school, pool recreation area, circular sport field, sports courts, roof cafeteria and restaurant and more.

The school provides the option to change colours every day with an app so students decide what will be the colour of their school every day.



Fig. 4 The logo of the project STEAME

2. THE EVOLUTION

2.1 The evolution of Lesson Plans from what is happening today in most education systems located as EDUCATION 2.0 is evolving into Learning Plans and eventually into Learning & Creativity Plans. The STEAME project has adapted and developed the Learning & Creativity Plans as a new name of Lesson Plans.

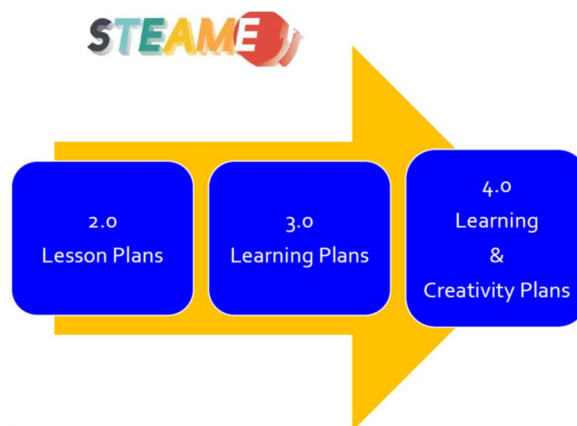


Fig. 5. The Evolution of Lesson Plans

2.2 The evolution of Pedagogy and Andragogy into Peeragogy & Heutagogy, the latter adapted by the STEAME projects.

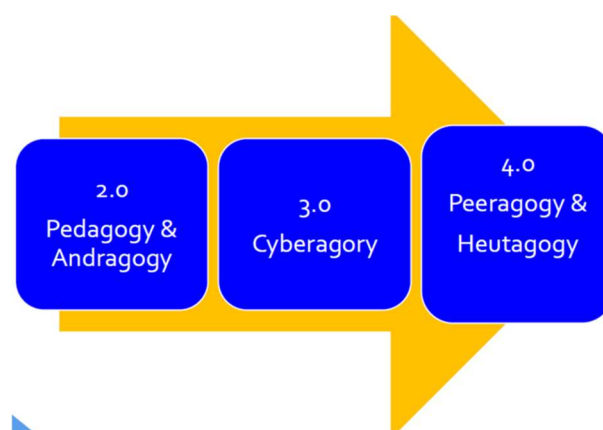


Fig. 6. The Evolution of Pedagogy and Andragogy

2.3 A second step development was the project STEAME-Goes-Hybrid where the PBL activity could be done remotely and online so students and teachers at distance (flip classroom or need due to lockdowns or need due to illness) can work on project work collaboratively and co-creatively. The platform access and guidelines of this solution can be found in www.steame-hybrid.eu



Fig. 7 The logo of the project STEAME-Goes-Hybrid

2.4 A third step development was the BYOD-Learning (www.BYOD-Learning.eu) where it is believed that all classroom learning can be transformed into video learning where each teacher can produce his/her teaching or facilitation of learning in to learning videos. These learning videos were originally planned to be of 45 min duration (usual classroom lesson duration) but also made available into more accelerated learning, that is 30 min and 15 min duration, supporting talented students in learning who could learn faster. Eventually and after reactions of students, the project adapted to the needs of students by supporting shorter videos, like 5 min each as smaller parts of a complete lesson plan duration. This will facilitate the learning at any place and anytime through an approach of Bring-Your-Own-Device (BYOD). The videos can also support the retrieving of knowledge and can save a lot of time from classroom learning so students can spend more time on applying knowledge through project work, thus developing competences and skills.



Fig. 8 The logo of the project BYOD_learning

2.5 The fourth step was to the need to support teachers in becoming adaptable to change and the project ONLIFE (<https://onlife.up.krakow.pl/>) has developed a special programme and module supporting teachers to develop competence in self-improvement and adapting to change without having to go through special trainings.



Fig. 9 The logo of the project ONLIFE

2.6 The fifth step was the need for teachers and students to understand the new tech environments governed by Artificial Intelligence (AI) . The project Facilitate-AI (www.facilitate-ai.eu) that started in February 2022 and will be completed in January 2023 aims to accomplish this in two main steps. In the first year the AI experts have trained teachers about AI and in the second year trained teachers are designing Learning & Creativity plans in support of facilitating the learning of AI by school students. During 2023 a training by teachers to teachers is planned for preparing teachers for a pilot learning activity.



Fig 10. The logo of the project Facilitate-AI

3. THE STUDENTS

Following collaboration work with experts, teachers, academics and students, a critical need became evident to generate on one hand a bottom-up approach in bringing changes in Education Systems in the future as policy recommendations do not seem to generate movements for change and on the other hand to support the wider preparation of teachers for such a change.

Changing from traditional classroom learning into an open space PBL environment is not something that could happen from one day to another or even from one year to another. This change has high cost and requires big efforts by service teachers, by student teachers, by HE institutions and by authorities.

3.1 The sixth step came in to play with the need to organize the European School students and to give them a voice. By supporting school students to get a voice it is an opportunity to put force into change as nowadays young students adapt to technology changes and grow much differently than the way their parents and teachers grew. The project STEAME-Students developed a platform of communication for school students and supported the kick-off of the first European STEAME School Students Network, with acronym E3SN. The first committee developed its first working statute and a Manifesto , which was presented publically on 14 March 2023 in Krakow, Poland, during the EUROMATH & EUROSCIENCE conference for school students. The project ended on 31 May 2023 and the results can be found in https://thalescyprus.com/?page_id=3386 . A new project proposal named STEAME-Students 2.0 has been submitted in 2023 proposing the further and wider expansion of the E3SN with more student participation.



Fig. 11 The logo of the project STEAME-Students

3.2 The seventh step and may be the most important is the project STEAME Teacher Facilitators Academy, which started on 1st June 2023 , coordinated by the Pedagogical University of Krakow, Poland with 14 partners and 19 associate partners.

The main innovations to be delivered by this project are during 2023-2026 are:

1. STEAME Teacher Facilitators Competence Framework for student and serving teachers
2. STEAME Teacher Facilitators Learning Modules/Workshops
3. International Sharing Observatory for STEAME Learning Facilitators
4. Development of the STEAME Facilitators Community of Practice/Mentoring and Certification Programme
5. Policy Recommendations – European Federation of STEAME Teacher Facilitators Academies

The website of the project is already published at www.steame-academy.eu and has created its logo shown here



Fig. 12 The logo of the project STEAME Teacher Academy

Schools, Universities, Researchers can become associate partners through the website. In addition, regions in Europe and beyond may express interest in becoming regional STEAME-Teacher Academies supported by the special observatory to be created by this project.

Several parallel proposed projects building on the learning of the future are in the pipeline to complement the missing dynamic puzzle for the evolution of education that is expected to be created by Higher Education support through research and innovations. Some examples of these new proposals either running or submitted in 2023 include the REVEALING (VR Classrooms), STEAME-Hybrid Labs, STEAME-Parents and more.

All projects mentioned in this paper are co-funded by the European Union.



Fig. 13 The logo of the funding authority

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*The Partners of all mentioned projects can be found in the corresponding websites of the projects as mentioned.

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