Full STEAM Ahead

Pupil Driven & Professional Network Toolkit

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

WWW.FULL-STEAM-AHEAD.EU

The "Full Steam Ahead" project has been funded with support from the European Commission. This document reflects the views only of the authors, and the Commission cannot be held responsible for any use, which may be made of the information contained therein

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

CONTENTS

ABOUT THE FULL STEAM AHEAD PROJECT

DREAM

"Ideal classrooms always change, are a mess & have no teacher desk. They encourage interactions & personalization." **[B. Arnold, 2017].**

CONTEXT

Despite the huge advances that we have seen in technology, not much has changed when it comes to how we view learning and how we design learning environments. The transmission model of education is still the name of the game, although in some circles there are signs of its erosion.

NEEDS

It's time to change the direction of teaching/learning by for once and for all turning it around and allowing it to originate from the student. Imagine a classroom where students are the ones driving the learning and are empowered to pursue things that matter to them. To let them employ multiple modalities as they are accessing human and digital resources to drive their own learning. In a 21st century learning model, learning extends beyond the classroom walls, and students are exchanging, discussing, questioning, reflecting and making connections anywhere, anytime. Most importantly, students are inspired and empowered to act, rather than sit back and have the knowledge brought to them.

AIMS AND OBJECTIVES

The aims of the project are changing the way classroom management is developed, the curriculum and even the students' behaviors, in these subjects. These changes will improve the employability, particularly in the technological jobs.

We purpose to implement in the classroom a new strategy to develop, beyond the knowledge of the disciplines, soft skills and positive behaviors facing collaborative work, work routines, new challenges, unpredictability, failure in work, and others.

The project should consider the classroom as a MakerSpace, an Innovation Lab promoting all the skills hard and soft, necessary to deal with world's challenges for our century.

With this project we would like to start changing the way to teach, to learn, to know, to do and to use knowledge in real life. It's important to rethink, remake, reorganize the classroom, not only the physical way, butmainly the pedagogical way

of working with and for each and every student. In fact, the classroom should be a place where every student can learn according his own skills, ways of organizing thinking, methodologies. The classroom must be a place for everybody, where each student learns according each one's abilities.

METHODOLOGY

STEAM AHEAD will create clear pathways for schools and teachers to adopt to this new way and help them arranging and aligning their policies, the classrooms, the lessons and approach to truly enable a student-driven 21st century learning model.

SYSTEMATIC GUIDELINES FOR SCHOOLS, TEACHERS AND COMPANIES

For a growing number of schools and areas, student-driven learning has become an aspiring framework for how educators, families, and communities partner to promote students' development. We realise it is a major task to create full student-driven facilities and curriculum within the project timeframe and possibilities.

Therefore, the emphasis of the project is on enabling schools to first review what they already do regarding student-driven learning and then identifying areas missing. The project will facilitate status quo review and further embedding in schools' strategic plans, staffing, professional learning, and budgets.

STEAM AHEAD drives many of their schoolwide practices and policies, creating a welcoming, participatory, and caring climate for (active) learning.

Concretely we will deliver five outputs, three for schools and their teachers, one directly at students (IO4) and one specifically aimed at employers (IO3):

- IO1 - The Classroom as a MakerSpace Toolkit;
- IO2 - FULL STEAM AHEAD - Best Practices guidebook;
- IO3 - Young Future Workers – Hosting Guidebook for employers;
- IO4 - European Student Resource Pack
- IO5 - Student driven Social & Professional Network Toolkit

IMPACT & LONG TERM BENEFITS

STEAM AHEAD shapes schools' partnerships with companies and other (regional) community members, highlighting engagement, trust, and collaboration.

Through STEAM AHEAD, young people will be aware of their desires to learn and the endless possibilities it brings. The project applies this awareness to develop all young people's social, emotional and digital competences, learning behaviour and consequently their media literacy and ability to make sensible decisions.

Furthermore, STEAM AHEAD will enhance the learning behaviour of ALL young people (including the disadvantaged or less performing), reducing disparities in learning outcomes. No student will be left behind.

IO5 - Student driven Social & Professional Network Toolkit Description

FULL STEAM AHEAD brings teachers and pupils closer to the world of work making sure schools and local businesses get connected, and stay connected, both locally and internationally. FULL STEAM AHEAD will consolidate a tridimensional network (pupils, teachers, employers) set-upaccording to EU aims: the free movement of goods, capital, services and people; shared practices by teachers, employers, etc. The IO5 Pupil driven Social & Professional Network will play an important role in both the lead up to it as the follow-up. Besides the Network itself, the accompanying result is the Pupil driven Social & Professional Network Toolkit, a practical toolkit for schools describing how to set up an integrated network of world of work stakeholders, locally and internationally. This toolkit will facilitate and stimulate organisations and individuals to cooperate and join forces to increase the impact and create an integrated approach to the delivery of the FULL STEAM AHEAD goals and deliverables.

ELEMENTS OF INNOVATION AND IMPACT

Innovative aspect of IO5 is that it not just enables teachers to set up or expand their world of work network, it shows them the way of how to do so pupil driven: using the abilities, exploration and networks of the pupils themselves. As the innovative concept of 'pupil driven' way of facilitating learning is central to the FULL STEAM AHEAD project, teachers need to understand how they can assist and facilitate the formation of these networks, without taking over from the pupil.Strong and lively relations between education and business stakeholders is of immense importanceas it safe guards a close connection of market demand and educational curriculum. All disciplines, from schools to business and government, are affected by labour market relevant secondary education and by competent pupils.

Topics that will be addressed in the Pupil driven Social & Professional Network Toolkit are :

- Empowering pupils. In the set-up of the pupil driven school-business partnerships, the initiative of involving world-of-work actors, is with the pupil. Led by experts at UMHAIHL, teachers will be provided with tools that enable them to empower pupils to investigate their own networks (via sportsclubs, family, friends, neighbourhoods, etc.). Teachers will learn how to empower pupils to take theinitiative.
- Organisation of the Pupil driven Social & Professional Network. The Toolkit will include all guidelines and tools necessary to practically implement the Network, e.g. organisation of meetings, how to create shared ownership of the network? How to keep the network alive and active?
- Evaluation of the Pupil driven Social & Professional Networks. Important to the quality of the Networks is evaluating all stakeholders views on the effectiveness and quality of the Network, without neglecting the importance of pupil-empowerment. The IO5 Toolkit will include a specific methodology, guidelines and a practical toolkit on how to do this.

MARKET DEMAND FOR STEAM WORKFORCE

Science, technology, engineering, and mathematics (STEM) occupations are projected to grow over two times faster than the total for all occupations in the next decade.

SITUATION IN EUROPEAN COUNTRIES:

Analysis by CEDEFOP shows that employment of STEM Professional and associate professionals in the European Union (EU) has increased since 2000 in spite of the economic crisis and demand is expected to grow until 2025.

- Demand for STEAM professionals and associate professionals is expected to grow by 8 % between 2013 and 2025, whilst the average growth forecast for all occupations is 3 %.
- Employment forecast in STEAM-related sectors shows a similar trend: it is estimatedto rise by 6.5 % between 2013 and 2025, although with huge differences across sectors. Whilst zero employment growth is expected in the pharmaceuticals sector,employment is expected to rise by 8 % in computing and by 15 % in Professional services.
- According to CEDEFOP's forecasting around two-thirds of the estimated job opportunities for STEAM-related professions will replace retiring workers.
- Employment in STEAM is male-dominated. Women account for just 24 % of science and engineering professionals and 15 % of science and engineering associate professionals

Current demand of STEAM skills concerns both upper-secondary and tertiary graduates and this trend is expected to persist. Currently 48 % of STEAM-related occupations require medium level qualifications which are mostly acquired through initial upper-secondary level VET. This figure is forecasted to fall just to 46 % in 2025.

Professionals account for 40 % of current STEAM jobs, whilst 60 % correspond to associate professionals. Table 1 shows the most salient employment trends and prospects for these occupations. Employment is expected to increase especially for professionals although similar job opportunities for both occupations are foreseen due to the need to replace retiring workers.

	STEM professionals	STEM associate professionals
Description	STEM professionals encompass a wide range of knowledge-intensive occupations including scientists (i.e. physicists, mathematicians and biologists), engineers and architects.	STEM associate professionals encompass technical occupations connected with research and operational methods in science and engineering, including technicians in physics, life science and engineering; supervisors and process control technicians in industry, ship and aircraft and ICT technicians.
Employment	There were 6.6 million workers in this occupation in the EU28 in 2013. They comprised 17 % of all professionals (ISCO-08 2) and 3 % of the total employment in the EU28.	There were 9.7 million workers in this group in the EU28 in 2013. They comprised 27 % of all associate professionals (ISCO-08 3) and almost 5 % of the total employment in the EU28.
Recent employment trends	Since 2008 employment in this occupation has slightly increased in EU28.	Since 2008 employment in this group has slightly declined in EU28. Demand has been highly volatile for some occupations.
Qualification levels	More than 80 % hold high level qualifications. 16 % hold medium level qualifications and 3.5 % low level qualifications. This qualification mix has remained stable over the past decade.	The majority hold medium level qualifications (52 %). 37 % hold high level qualifications and 11 % low level qualifications. The share of workers with high level qualifications has increased over the past decade.
Estimated employment growth (2013-2025)	Over 1 million additional jobs are expected to be created from 2013 to 2025 in EU28. This means that by 2025, there will be 7.7 million STEM professionals. This is double the rate of increase for professional occupations. Employment is likely to rise in all EU28 countries but six: Belgium, Bulgaria, the Czech Republic, Cyprus, and especially Romania and the United Kingdom, where substantial job losses are expected.	Almost 0.25 million additional jobs are expected to be created from 2013 to 2025 in EU28. This entails that STEM associate professionals will experience a declining share of overall EU28 employment. The number of STEM associate professionals is forecast to increase in 13 out of 28 EU countries. The majority of new jobs are likely to be created in France, Spain and Italy. Germany, Bulgaria and Romania are expected to experience the most important decline in the overall number of jobs.
Estimated job openings (2013-2025)	Around 3.4 million job openings are forecast from 2013 to 2025. This includes not only the recruitments for new jobs (over 1 million), but also for replacing workers who will retire or leave for other reasons. Job openings are anticipated to increase in all EU28 countries[9]. Slovenia, Malta, Austria, Hungary, Finland and Luxembourg are the countries in which the share of STEM professionals in total jobs openings by country is expected to be highest - ranging from 9 % to 5 %. In absolute numbers, the majority of job openings are forecast in Germany (19 %), France (16 %), Italy (12 %) and	Although employment growth is likely to be relatively small, 3.6 million job openings are forecast from 2013 to 2025, due to the need to replace workers who will leave for retirement or other reasons. Job openings are likely to rise in all EU28 countries. Czech Republic, Denmark, France are expected to have the highest proportion of job openings for STEM associate professionals - ranging from 10 % to 5 %. In absolute numbers, the majority of job openings are forecast in Germany (20 %), France (17 %) and Italy (13 %).

Source: EU Skills Panorama (2014a; 2014b); CEDEFOP Forecasts (2014)

SITUATION IN US.

The U.S. Bureau of Labor Statistics (BLS) 2019–29 employment projections show that occupations in the STEM field are expected to grow 8.0 percent by 2029, compared with 3.7 percent for all occupations.

Table 1. Projected employment by STEM occupational group, 2019–29

Occupation title	Employment		Percent change	Employment change
	2019	2029	2019-29	2019-29
STEM occupations	9,955.1	10,752.9	8.0	797.8
Computer occupations	4,633.4	5,164.6	11.5	531.2
Engineers	1,810.1	1,879.6	3.8	69.0
Life scientists	344.8	361.4	4.8	16.6
STEM post secondary teachers [1]	294.1	308.8	5.0	14.7
Physical scientists	276.6	291.4	5.3	14.7
Mathematical science occupations	211.7	267.8	26.5	56.1

[1] Aggregate employment for 11 different STEM post-secondary teacher occupations.
Notes: Employment numbers in thousands.
Not all STEM occupations are represented in the table above. A complete list of occupations included in the STEM definition is available at www.bls.gov/oes/stem_list.xlsx.
Source: U.S. Bureau of Labor Statistics.

STEAM SKILLS FOR FUTURE JOBS

Here are 10 skills students need to work on now to ensure their future success in STEAM-related jobs.

1. Critical thinking. Most of the companies nowadays look for candidates who have honed their critical thinking skills to make the best possible decisions. Therefore, early on in their education, students must learn to define and approach problems and situations from many different viewpoints and analyze every possible solution, as well as anticipate the consequences and outcomes of each option before taking action.
2. Analytical skills. It's important for students to develop skills to analyze data sets and to understand how they relate to other data, systems and processes. The ability to synthesize and interpret complex information from multiple sources is a huge indicator of success in our business.
3. Problem solving. Efficiency and value are paramount who want solutions that use the smallest amount of effort to the greatest effect and are able to solve multiple issues at the same time. In the interview process, it is becoming common that candidates are asked how they would go about solving a problem. An ideal job candidate demonstrates the ability to devise the simplest yet most effective solution.
4. Innovation. Another aspect students should develop for their future career is willingness to take risks and offering creative ideas. Ultimately, a fresh perspective and a spirit of inventiveness will outshine those that follow the same old path.
5. Collaboration. Working with others toward a shared goal is a crucial skills for the bussiness world. Students may not have extensive work experience to demonstrate this ability, but they can share a story about a time when they were part of a team or group at school or elsewhere. While doing a job interview, talking about how you contribute directly to your team's success, how you learn from challenges of working with others will definetely make a possitive impact to get the position you desire. This information helps recruiters understand how well you will relate to and collaborate with others in the workplace.
6. Communication. You may be an expert in your technical field, but you'll be at a major disadvantage unless you are able to communicate your ideas. Students should learn to convey complex ideas to people of varied backgrounds and job titles, including those who have less or more technical expertise than they do.

7. Customer orientation. The most successful businesses make the customer's needs priority number one. So it is crucial for STEM graduates to focus on: active listening to understand the needs, and going above and beyond the call of duty when it comes to customer service.
8. Adaptability. It's almost impossible to stay up to the minute with all of the skills and systems you'll need to be effective as you move from college to career, or when you land a job at a new company. What you can do is show how you have gained knowledge and new abilities quickly in past positions, and offer evidence of continual career development, such as recent education, certifications, promotions and training courses.
9. Social responsibility. Employers look for candidates who share their values and who can demonstrate consistency with those values in their decisions, their actions and the way they work with others.
10. Balance. Employees who have a passion outside of the workplace are more productive and more satisfied with their work, as well as more physically healthy. So try to keep active in your life to demonstrate crucial skills such as teamwork, leadership or perseverance

Figure 1: Importance of skills and attributes in the workplace

Respondents' rating of each of 13 different skills and attributes. Employers were asked to rate each skill's importance on the following Likert scale: Not important; A little important; Moderately important; Important; or Very important. The coloured bars represent the distribution of respondents between the response categories.

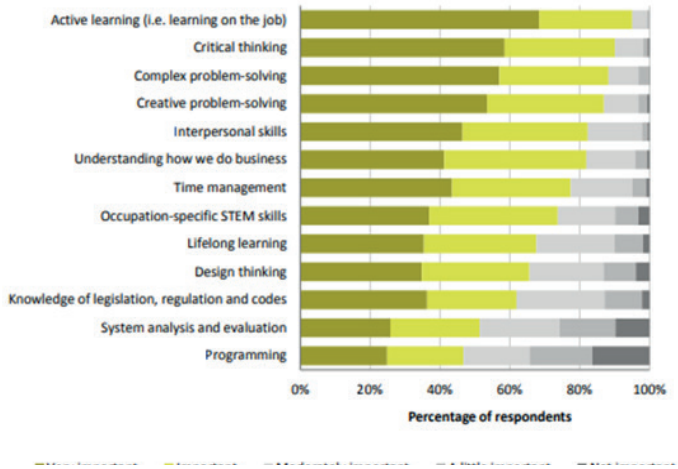


Figure 2: To what extent are the following skills and attributes important to your workplace?

Percentage of employers in each industry sector by skill level that answered 'important' or 'very important'. Cells below the 50th percentile of values in the table are coloured red and those above blue.

	Agriculture, Forestry & Fishing	Construction	Education & Training	Electricity, Gas, Water & Waste Services	Financial & Insurance Services	Health Care & Social Assistance	Information Media & Telecomms.	Manufacturing	Mining	Professional, Scientific & Technical Services	Public Admin. & Safety
Active learning (i.e. learning on the job)	96	100	83	100	98	82	96	93	94	97	94
Complex problem-solving	75	67	78	86	95	82	91	85	97	97	88
Creative problem-solving	88	89	89	100	83	64	91	87	88	97	76
Critical thinking	75	56	94	100	95	91	91	86	97	92	94
Design thinking	42	75	78	57	47	40	100	83	78	73	47
Interpersonal skills	79	78	94	86	75	91	91	75	71	87	88
Knowledge of legislation, regulation and codes	67	44	61	43	80	82	50	58	59	67	65
Lifelong learning	78	33	94	71	70	64	70	57	70	76	59
Occupation-specific STEM skills	77	56	59	100	78	45	78	71	71	79	76
Programming	14	25	44	57	48	30	86	44	44	41	25
System analysis and evaluation	32	29	56	71	44	60	83	55	47	52	44
Time management	75	78	76	71	70	55	87	78	67	86	71
Understanding how we do business	88	89	94	86	75	100	74	84	85	84	82

STEAM ENTREPRENEUR MINDSET

Entrepreneurship isn't just about starting companies; it is a skillset and a way of thinking. It involves identifying needs, brainstorming creative solutions, innovating, and taking calculated risks. In short, it's about having a vision and making it real.

Why an Entrepreneurial Mindset is important for students

Employability skills are rapidly changing within industries and employment opportunities. Future jobs will require tremendous adaptation. Narrowly focusing on one's skills can lead to a dead-end or jobs that no longer exist.

"65% of children entering primary school today will ultimately end up working in completely new job types that don't yet exist." January 2016, World Economic Forum

An Entrepreneurial Mindset (EM) enhances a student's education by teaching them perseverance, tenacity, creativity, problem-solving, and collaboration so they can identify problems and find solutions. Research shows that an entrepreneurial mindset is highly sought after by employers and improves student educational completion and achievement.

"Yesterday's 'soft' skills are the hard skills of the future." Supporting the next generation, The entrepreneurial mindset and the future of work, A research brief presented by EY and Network for Teaching Entrepreneurship, 2018

Developing an Entrepreneurial Mindset is about learning the skills, reflecting on the behaviors, and challenging the norms to empower oneself to persevere in the face of challenges.
Students with an Entrepreneurial Mindset focus their attention on creating value for others. This other-centered approach naturally adapts to a powerful approach to design called Design Thinking where the entrepreneur develops skills in deep listening, observation, and empathy to better design solutions to complex problems. Human-centered design focuses on deeply understanding the users' experiences and pain-points through building empathy, creative problem solving, testing, and iterating.

How to develop an Entrepreneurial Mindset in students

The entrepreneurial mindset can be implemented into a class, a lesson, or an activity. It starts by first recognizing the states of mind that an entrepreneur experiences along their journey toward creating value and finding opportunity.

According to the report by Harward Businness Publishing Education in February 2022, the interview done with top entrepreneurship professors at leading global institutions to understand the pedagogical approaches they use to cultivate this mindset in their students, six such teaching approaches was mentioned to create Entrepreneurial Mindset.

1. Encourage Students to Chart Their Own Course Through Project-Based Learning
   In your classroom: Send students on an unstructured journey. Dive right in by asking them to identify a challenge that will hone their problem-finding skills and encourage them to work in teams to find a solution. Do not give them a blueprint.
2. Help Students Think Broadly and Unleash Their Creativity
   In your classroom: In your classroom: Think about the concept of "unlearning." Ask yourself if students are entering your class with rigid mindsets or attitudes based on rules and structures that you would like to change. For example, they may be coming into your classroom with the expectation that you, the instructor, have all the answers and that you will impart your wisdom to them throughout the semester. Design your course so that students spend more time than you do presenting, with you acting more as an advisor.
3. Prompt Students to Take Bold Actions
   In your classroom: Invite students to bring their lived experiences and workplace knowledge into their studies. This can be just as powerful as the more famous exhortation to "get out of the classroom. Student-directed experiential learning provides a comfortable and relatable starting point from which they can then diverge their thinking.

4. Show Students What They Can Achieve

In your classroom: Design ways to nudge your students outside their comfort zones, while also providing support. You should set high expectations, but also adequately guide students.

5. Teach Students the Value of Changing Course

In your classroom: Build into your course some opportunities for students to make mistakes. Show them how mistakes are an opportunity to learn and improve. In entrepreneurship speak, this is called a "pivot." Can you build in opportunities for students to face challenges and have to pivot in your course?

6. Communicate with Students Regularly to Establish New Ways of Thinking

In your classroom: Communicate with your students outside the classroom with messages that reinforce the mindset change you are seeking to achieve in your course. Social media and apps such as WhatsApp and Twitter make it easy to do so.

DIGITILASATION AND STEAM EDUCATION

Digitalisation

Digitalization, as one of the most important mega-trends of the 21st century, will be one of the most effective building blocks of the developments that will occur in the coming years. New technological developments that occur with digitalization will determine the production and consumption balances in proportion to the supply-demand in the economy.

Digital transformation has changed society and the economy with an ever deepening impact on everyday life, and demonstrated the need for higher levels of digital capacity of education and training systems and institutions. To give an example of the place and effect of digitalization in our lives, artificial intelligence, 3D printers and crowdsourcing can be some of them.

The COVID-19 pandemic has further accelerated the existing trend towards online and hybrid learning. It uncovered new and innovative ways for students and educators to organise their teaching and learning activities and to interact in a more personal and flexible manner online. In parallel, the uptake of digital technologies for education revealed challenges and inequalities between those who have access to digital technologies and those who do not (including individuals from disadvantaged backgrounds); and challenges related to the digital capacities of education and training institutions, teacher training and overall levels of digital skills and competences.

These substantial transformations such digitalision in science, technology and society have significant implications for education, in general, for STEM education and STEM industry in particular. It is especially because STEM graduates will directly be faced with digital technologies which are at the heart of advanced production. STEM students should be ready for the widely used term "Industry 4.0" refers to a new paradigm in which all stages of manufacturing are controlled and/or connected by digital technology.

Developing digital skills

Digitalisation raises demand for digital skills. For example, rapid improvements in AI systems have led to an overall scarcity of AI skills. Occupations like "industrial data scientist" and "bioinformatics scientists" are recent, reflecting a rate of technological change that is generating skills shortages. A dearth of data specialists is impeding the use of data analytics in business. Some countries also have too few teachers of computer programming (Stoet, 2016). A shortage of cybersecurity experts has led at least one university to recruit students to protect itself against hackers (Winick, 2018). Furthermore, the general-purpose nature of digital technology means that skills required to be a good scientist are also increasingly attractive in industry, adding to competition for talent (Somers, 2018).

Rising demand for digital skills has implications for income distribution and economic productivity. In terms of income distribution, for instance, lack of ICT skills in low-skilled adult populations in semi-skilled occupations places this demographic group at high risk of losing jobs to automation. In terms of productivity, the ability of education and training systems to respond to changing skills demand affects the pace of technology adoption.

.

Education and training systems must draw on information from all social partners

Just a few years ago, few could have foreseen that smartphones would so quickly disrupt, and in some cases end, a wide variety of products and industries, from notebook computers and personal organisers to niche industries making musical metronomes and hand-held magnifying glasses (functions now available through mobile applications). Because foresight is inherently uncertain, education and training systems should draw on information about skills needs from businesses, trade unions, educational institutions and learners. Students, parents and employers also need access to data with which to judge the performance of educational institutions. In turn, resources in educational and training systems must flow efficiently to courses and institutions that best match skills demand.

The European Union is promoting the development of a high-performing European digital education ecosystem and is seeking to enhance citizens' competences and skills for the digital transition. The The Commission is addressing these issues through its flagship policy initiative in this domain – the Digital Education Action Plan (2021-2027).

The following actions also play a vital role

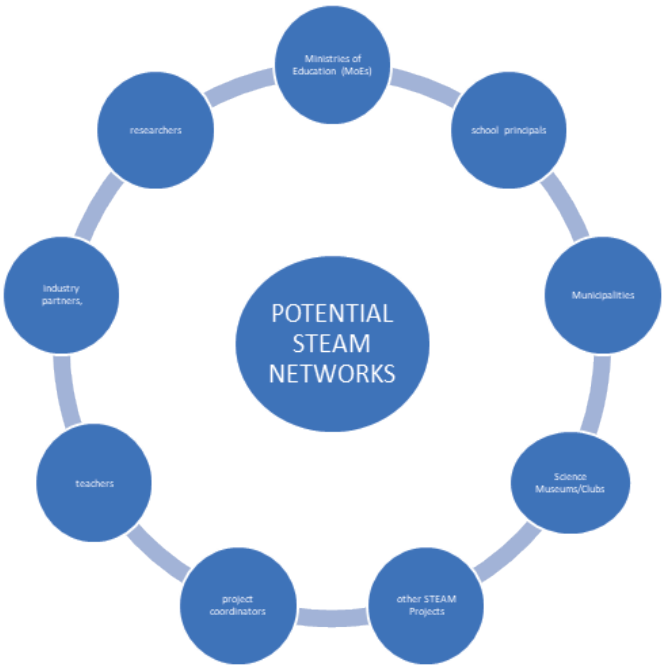
- The SELFIE tool (Self-reflection on Effective Learning by Fostering the Use of Innovative Educational Technologies)
- Collaboration with the European Investment Bank (EIB), for example through the InvestEU programme, to enable Member States access to funding for digital and physical infrastructure and to support the development of skills and innovative pedagogies
- The 2021-2027 Erasmus+ and European Solidarity Corps programmes have been made more green and digital
- The Recovery and Resilience Facility supports Member States in addressing their needs in digital education, following the COVID-19 pandemic
- The European Social Fund promotes the development of digital skills as a vehicle to ensure better and fairer job opportunities for European citizen
- The new Digital Europe Programme (DIGITAL) focuses specifically on boosting advanced digital skills

Ref: https://education.ec.europa.eu/focus-topics/digital-education/about

THE SIGNIFICANCE OF NETWORKING?

HOW TO CREATE AND REMAIN AN EFFECTIVE NETWORK?

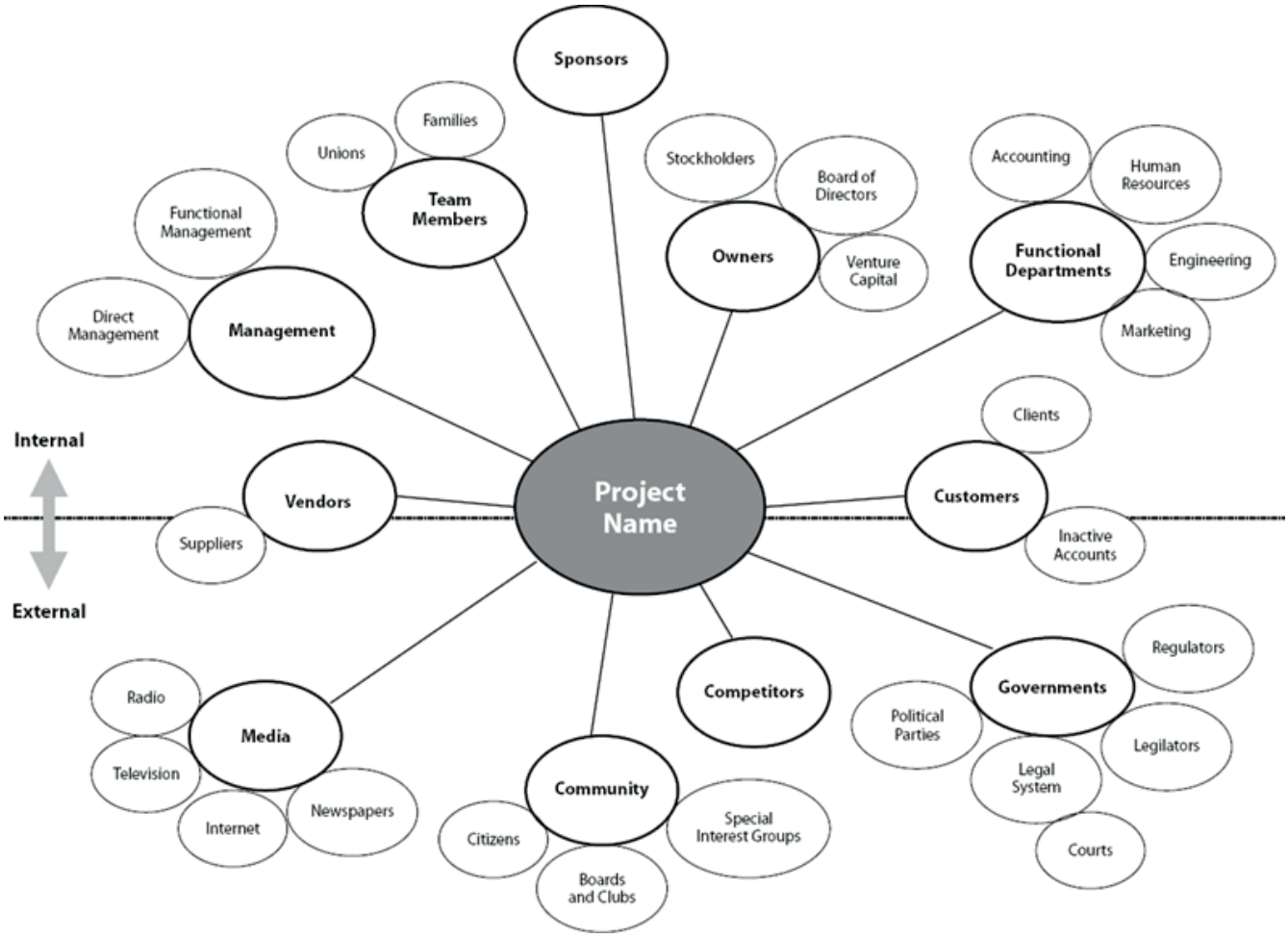
It is crucial for the schools to cooperate with all key stakeholders related with STEAM Education: Ministries of Education (MoEs), school principals, teachers, researchers, industry partners, project coordinators, managers, and other representatives from European and national science education projects can be considered as relevant stakeholders in STEAM Education. Collaborative STEAM Schools can focus on discussing relevant STEAM topics, identify barriers and opportunities, as well as define a set of recommendations or follow up actions to ensure better, high-equality outcomes for educational challenges. Through meetings and events organised by school, participants may have an opportunity to present their work, share, and exchange their experiences, and create new collaborations and partnerships.



HOW TO FIND A STEAM COMMUNITY

Networking is an important phenomenon as the focus of Steam Education is to develop a problem solving strategy and contribute to the solution of the problem with applications. The most important thing in building networking in an institution is to find answers to the questions of whom to be partner with and how to ensure the continuity of this partnership. In that point implementation strategies are of urgency.
Who should we be partner with? **STAKEHOLDER ANALYSIS**

In a partnership with schools in order to implement STEAM Projects, both parties must share the same need, which is facing the challenge with the willingness to cooperate for solving the problem.
When it comes to any organizational networking, all of the internal people and teams who the project will involve or affect are called its stakeholders. A stakeholder analysis is a process of identifying these people before the project begins; grouping them according to their levels of participation, interest, and influence in the project; and determining how best to involve and communicate each of these stakeholder groups throughout.



4 Steps for Stakeholder Analysis

Step 1: Identifying Stakeholders

- Who is positively or negatively affected by the Project/Issue? Who benefits? Who supports the project, who resists? Have vulnerable and vulnerable groups been identified? Who are the directly or indirectly affected groups?

Step 2: Identifying Stakeholder Interests and Expectations

- What can stakeholders expect? What are the potential benefits for stakeholders? Which stakeholders' interests conflict with the objectives of the project? What financial contribution can the stakeholders make to the project and what is their approach to it?

Step 3: Identifying Stakeholder Powers and Influence

- Have stakeholders been put in order of power? Which stakeholders have a direct or indirect link? Who sets or controls Prices, Resources? Who has the legal responsibility?

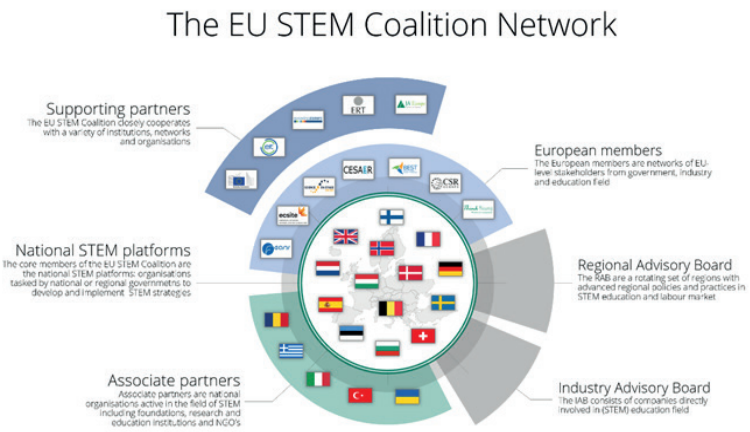
Step 4: Possible Actions Against Stakeholders

- The interests, benefits/harms, influence/powers of the stakeholders are determined. In process management, the process role and time in the relevant departments are determined. Obtained data are evaluated in the Project plan

Stakeholder Template Example

Stakeholder Name	Contact Person *Name, address, contact details*	Power *Their ability to stop or change the project*	Interest *The size and location of the overlap between their interests and the project goals*	Engagement Strategy *The type and frequency of communication*
Stakeholder 1				
Stakeholder 2				
Stakeholder 3				

BECOMING A PART OF A STEAM COMMUNITY



There are various projects and Networks related with STEAM Education. You may become a part of a big STEAM Community by following the events at links below:

http://www.scientix.eu/networking-event

https://www.stem.org.uk/stem-learning-network

http://www.eun.org/focus-areas/school-networking

https://www.stemcoalition.eu/

http://www.stemalliance.eu/home

References

1. http://www.cedefop.europa.eu/en/publications-and-resources/statistics-and-indicators/statistics-and-graphs/rising- stems4.
2. https://www.europarl.europa.eu/RegData/etudes/STUD/2015/542199/IPOLSTU(2015)542199_EN.pdf
3. https://www.bls.gov/
4. https://www.researchgate.net/profile/RoslynPrinsley/publication/320854621STEMSkills_in_the Workforce_What_do_Employers_Want.pdf
5. https://hbsp.harvard.edu/
6. https://education.ec.europa.eu/focus-topics/digital-education/about
7. https://www.researchgate.net/publication/313528178_Digital_Tools_and_Solutions_for_Inquiry-Based_STEM_Learning
8. https://www.oecd.org/education

WWW.FULL-STEAM-AHEAD.EU

The "Full Steam Ahead" project has been funded with support from the European Commission. This document reflects the views only of the authors, and the Commission cannot be held responsible for any use, which may be made of the information contained therein

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