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SUNRAISE

SUNRAISE - Stem UNlimited Raise thanks to Arts at School in Europe

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EUROPEAN REPORT

about the achievement of STEM skills in EU and the need for a more interactive approach

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based on
5 National Reports

ICIMSS

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1. Introduction

The report on the achievement of STEM skills by students from European Union countries is the first planned result of the SUNRAISE (Stem UNlimited Raise thanks to Arts at School in Europe) project, funded by the ERASMUS+ program, grant agreement 2021-1-IT02-KA220-SCH-000032579. The project coordinated by the Italian organization **Nazareno Societa' Cooperativa Sociale** involves 7 partners from 5 countries.

The project, designed for 24 months, officially launched on 01-02-2022, with a planned completion on 31-01-2024, started with a delay (due to some administrative issues) in May with a kick-off meeting in Carpi, Italy, the coordinator's headquarters. During the meeting, all issues were discussed with partners.

The analysis of students' STEM skills achievement was carried out by the project partners in their environments. This was planned as the first main task of the project, providing the basis for further work, such as the creation of an educational platform and a series of innovative online courses in STEM subjects.

The leading partner in this task was Polish organization **Stowarzyszenie Miedzynarodowe Centrum Zarzadzania Informacja (ICIMSS)** closely cooperating with the secondary school **Zespół Szkół Drogowo-Geodezyjnych i Licealnych im.Augusta Witkowskiego w Jarosławiu (ZSDGiL).**

During the online sessions, ICIMSS, referring to the project application, presented the methodology and criteria to be used in the research. All partners contributed to these suggestions and it was agreed that in order to gain knowledge about the situation in the field of STEM education a) desk research will be conducted in all partner countries, b) a survey of 30 teachers from each country c) a focus group consisting of 20 teachers and experts in STEM education will be surveyed in each country.

The following partners were involved in all stages of this research:

- **Nazareno Societa' Cooperativa Sociale,** supported by **Cooperativa Sociale La Carovana (La Carovana) –** responsible for presentation situation in **Italy**
- **CSI Center For Social Innovation Ltd (CSI)** - responsible for presentation situation in **Cyprus**
- **Theatro Atomon Me Anapiria (Theama)** - responsible for presentation situation in **Greece**
- **Esciencia Eventos Cientificos (Esciencia)** - responsible for presentation situation in **Spain**, and
- **Stowarzyszenie Miedzynarodowe Centrum Zarzadzania Informacja (ICIMSS)** supported by **Zespół Szkół Drogowo-Geodezyjnych i Licealnych im.Augusta Witkowskiego w Jarosławiu (ZSDGiL) -** responsible for presentation situation in **Poland** and the final **European Report**.

During the online meetings called by the Coordinator, the project partners agreed that even major research should focus on the achievement of secondary school students, information on the situation in primary schools will also be added, as well as the general situation of education in individual countries will be presented. The situation of students with special needs and their achievements in STEM was also discussed, as well as the changing terminology regarding people with disabilities.

Prior to the start of the research, ICIMSS prepared questionnaires for general research and for use by partners in the focus group, including formulas regarding the rights of respondents. All this has been

discussed in detail with the project partners. Finally, the format for presenting the results of national surveys conducted by partners in their countries has been created by ICIMSS. ICIMSS has also developed an online questionnaire template available in a shared space. This provided project partners with an easy tool to visualize the results of the survey.

The partners then translated the questionnaires into their own languages for use in their environment. The first survey included teachers and educators dealing mainly with lower and upper secondary school students and a small number of teachers and educators dealing with primary school students.

Almost all partners had trouble finding the right number of respondents. A similar or even more problematic situation occurred with the focus group. This will be presented in detail in the following chapters.

As a result, project partners produced **5 National Reports**. Based on the National Reports, this general report was drafted within the agreed deadline, i.e. by the end of December 2022, and submitted to the project partners for further discussion and possible enrichment.

Below we present the final agreed version of the **Analysis of the achievement of STEM skills in the EU**, with the conclusion of the need for a more interactive approach, as a basis for further project activities, such as developing a curriculum for selected modules.

This Analysis is the result of the joint work of the SUNRAISE project partners, whom we would like to thank for their joint constructive and fruitful work.

2. General information

The SUNRAISE report on STEM education includes information from the following partner countries:

Italy, project coordinator with a population of 59 million people;

Cyprus, with a population of 1,22 million people;

Greece with a population of 10,6 million people;

Poland with a population of 37,8 million people, and

Spain with population of 47,3 million people

3. Education system

In this chapter, we briefly present basic information about the education system in the partner countries. There are differences in the education systems in the partner countries. Moreover, the education system may differ even within the regions of the country, with the greatest differences being in Spain, which has 17 autonomous regions with their own legislation.

Compulsory education in partner countries is divided into stages: kindergarten (compulsory only in Greece), primary school, lower secondary school (dissolved in Poland in 2018) and upper secondary school. The compulsory school age also varies in the partner countries in Greece: 4-15; 6-15 in Spain, 6-16 in Greece and Italy, 7-18 in Poland.

Here we compile data on the education system in the form of two tables. Detailed information is presented in partner's National reports.

Table 1: Education in numbers: Schools

Country	Kinder gartens	Primary schools	Gymnasiums	High Schools	remarks
Italy	**22,117**	**17,678**	**8,453** [this number refers to lower secondary school in Italy]	**11,065**	4.648 lyceum 6.417 technical
Cyprus	**455 (272 public,183 private)**	**363 (329 public,34 private)**	**62**	**96**	38 lyceum 12 technical 8 joint Gim+ lyceum 38 private
Greece	**5,626**	**4,402**	**1,825**	**1,355**	

Poland	-	**14, 144**	**7, 465** (abolished in 2018)	**6, 678**	**+ 1, 357** (post secondary schools)
Spain	-	**10,305**	**2,024** joint primary & secondary schools in which 520 are public and 1,504 private	**5,095**	9,819 public primary schools 486 private primary schools 4094 public high schools 1001 private high schools

Table 2: Education in numbers: Students

Country	Kindergarten students	Primary school students	Gimnasium students	High School students	remarks
Italy	**1,450,793**	**2,713,373**	**1,725,037**	**2,690,676**	**8,5 million**
Cyprus	**28.331**	**58,763**	**26,965**	**28,169**	
Greece	**175,108**	**606,400**	**328,582**	**230,295**	
Poland	**-**	**376,000**	**-**	**1,547, 500**	**+ 232,700** (at postsecondary schools)
Spain	**-**	**2,907,214**	**-**	**2,012,829**	**1,967,841 -** in public primary schools **939, 373** - in private primary schools **1,331,636** - in public high schools **681,193** - in private high schools

4. Students performance according to PISA 2018 report

The achievements of students from different countries are checked in various international competitions. However the most respected is the PISA (Programme for International Student Assessment) report, which aims to assess the level of education in a similar and centralized way, so that it is possible to verify those methodologies that most effectively implement knowledge in students. The Pisa Report survey measures the literacy, mathematics and science skills of 15-year-old students from 79 participating states, including 37 OECD states.

Reports are prepared every three years. However, due to the pandemic, the last PISA report was published in 2018. Below is a scoring table. Source: https://doi.org/10.1787/888934028140

Table 3: PISA results for 2018

	Mean score in PISA 2018		
	Reading	Mathematics	Science
	Mean	Mean	Mean
OECD average	487	489	489
B-S-J-Z (China)	555	591	590
Singapore	549	569	551
Macao (China)	525	558	544
Hong Kong (China)	524	551	517
Estonia	523	523	530
Canada	520	512	518
Finland	520	507	522
Ireland	518	500	496
Korea	514	526	519
Poland	512	516	511
Sweden	506	502	499
New Zealand	506	494	508

United States	505	478	502
United Kingdom	504	502	505
Japan	504	527	529
Australia	503	491	503
Chinese Taipei	503	531	516
Denmark	501	509	493
Norway	499	501	490
Germany	498	500	503
Slovenia	495	509	507
Belgium	493	508	499
France	493	495	493
Portugal	492	492	492
Czech Republic	490	499	497
Netherlands	485	519	503
Austria	484	499	490
Switzerland	484	515	495
Croatia	479	464	472
Latvia	479	496	487
Russia	479	488	478
Italy	476	487	468
Hungary	476	481	481
Lithuania	476	481	482
Iceland	474	495	475
Belarus	474	472	471
Israel	470	463	462
Luxembourg	470	483	477
Ukraine	466	453	469
Turkey	466	454	468
Slovak Republic	458	486	464
Greece	457	451	452

Chile	452	417	444
Malta	448	472	457
Serbia	439	448	440
United Arab Emirates	432	435	434
Romania	428	430	426
Uruguay	427	418	426
Costa Rica	426	402	416
Cyprus	424	451	439
Moldova	424	421	428
Montenegro	421	430	415
Mexico	420	409	419
Bulgaria	420	436	424
Jordan	419	400	429
Malaysia	415	440	438
Brazil	413	384	404
Colombia	412	391	413
Brunei Darussalam	408	430	431
Qatar	407	414	419
Albania	405	437	417
Bosnia and Herzegovina	403	406	398
Argentina	402	379	404
Peru	401	400	404
Saudi Arabia	399	373	386
Thailand	393	419	426
North Macedonia	393	394	413
Baku (Azerbaijan)	389	420	398
Kazakhstan	387	423	397
Georgia	380	398	383
Panama	377	353	365
Indonesia	371	379	396

Morocco	359	368	377
Lebanon	353	393	384
Kosovo	353	366	365
Dominican Republic	342	325	336
Philippines	340	353	357
Spain	m	481	483

Spain is at the bottom of the list due to the lack of a reading grade, while Spanish students do quite well in math and science. The high rating of Polish students is surprising compared to the situation of schools that are subject to constant systemic changes and underinvested.

5. Investment in school innovations

In the early 21st century a rapid development of ICT services and electronic devices took place, in which the Internet servers multiplied by a factor of 1000 to 395 million and it is constantly increasing. On 21 December 2001, the United Nations General Assembly approved Resolution 56/183, endorsing the holding of the World Summit on the Information Society (WSIS) to discuss the opportunities and challenges facing today's information society. According to this resolution, the General Assembly related the Summit to the United Nations Millennium Declaration's goal of implementing ICT to achieve Millennium Development Goals. The United Nations Educational, Scientific and Cultural Organisation

(UNESCO), a division of the United Nations, has also integrated ICT into education as part of its efforts to ensure equity and access to education.

The European Commission, issuing the "Information Society for All" (European Commission, 2000, 2004), emphasized the need to bring every company, school, home and citizen to the digital age. Also national programs for Information for All have been issued.

Among the number of European Commission acts devoted to ICT and education the one issued in 2017 refers to “Strengthening European Identity through Education and Culture’. The Digital Education Action Plan follows up on that political agreement.

During the recent changes in education caused by COVID restrictions, education around the world has changed dramatically. Teachers and students had to learn new teaching methods - distance learning. It became obvious that the needs of students and teachers for hardware, software and high-speed connectivity increased dramatically. One computer for the needs of the family was no longer enough.

In September 2020, the European Commission outlined its renewed vision for the European Education Area and the concrete actions to achieve it by 2025. Schools are a focus area for cooperation to make the European Education Area a reality, to support Europe’s recovery from the COVID-19 pandemic.

Source: https://digitallibrary.un.org/record/455403 ttps://digitallibrary.un.org/record/425914?ln=en https://commission.europa.eu/about-european-commission/departments-and-executive-agencies/education-youth-sport-and-culture_en

6. Some programs supporting digital education and STEM in partner countries

It is impossible to list here all the initiatives supporting distance learning and STEM education in the countries of the project partners. More details are provided in the National Reports, although even there is only a selective list.

Italy underlines the following

LS-OSA (2013) - promoting and developing laboratory teaching and skill-oriented teaching in schools; **Ministerial program (2021)** to support 6,500 institutions with more than €100 million to set up new laboratories and spaces dedicated to STEM subjects.

Cyprus presents

Cyprus' Recovery and Resilience Plan 2021 - 2026 with a budget of EUR 13.8 million to digitally transform schools and improve science, technology, engineering and mathematics (STEM) skills.

Greece gives an overview of projects

Among the listed initiatives the most complex looks "**Upgrading the Study Programs and Creation of Educational Materials for Primary and Secondary Education"** co-financed by Greece and the European Union within the Operational Program "Human Resource Development, Education and Lifelong Learning 2014-2020".

Poland presents

The "**Digital School"** initiative in 2012-2013 (worth 60 mln PLN); **e-handbook** (2012-2015) supported with 50 mln PLN; **Nationwide Educational Network** (895 mln PLN) initiated in 2017 and **Laboratories of the future,** currently implemented project worth 1 billion PLN.

Spain describes

Initiative of the **Spanish Foundation for Science and Technology** supporting projects to improve the science culture of the general public with a budget of €3,940,000

7. STEM, STEAM STREAM in School Curricula

STEM – Science, Technology, Engineering, (Ecology) Math
STEAM – Science, Technology, Engineering, Art, Math
STREAM – Science, Technology, Robotics, Engineering, Art, Math

The STREAM model focuses not only on supporting science. In addition to mathematics and engineering, students broaden their knowledge of biology, computer science, programming, the use of new technologies in everyday life, and appreciate the role of art and design as important components of the project. All this affects the acquisition of such skills as: the ability to think logically and creatively, develop computational thinking and the ability to cooperate in a team, which is very desirable by employers Source:.https://streamedukacja.pl/

In Europe, the Scientix program, implemented since 2010 on the initiative of the European Commission, is important for the promotion of STEM. The program is coordinated by European Schoolnet, a consortium of 34 ministries of education in Europe.

In the first phase of operation, Scientix created an online portal to collect and present European STEM educational projects and organized several workshops for teachers. Between 2013 and 2015, the project reached out to national teacher communities and contributed to the development of national strategies for wider use of inquiry-based and other innovative approaches to teaching science and mathematics. Later, the program was also funded by the European Union's Horizon 2020 program for research and innovation. Studies funded by the European Commission or conducted by Science, Technology, Engineering and Mathematics (STEM) communities such as the STEM Alliance have highlighted major issues regarding the situation of STEM in European education systems: the low attractiveness of STEM studies and careers, or the unmet labor-market needs in STEM-related sectors that are expected to grow in the future. To help share Scientix activities at a national level and to play an active role in supporting innovation in STEM education in their countries, a country-specific list of Scientix Ambassadors has been established.

Source: European Schoolnet (2018). Science, Technology, Engineering and Mathematics Education Policies in Europe. Scientix Observatory report, October 2018, European Schoolnet, Brussels., (source http://www.scientix.eu/observatory/stem-education-practices-europe) and http://www.scientix.eu/in-your-country/scientix-4-teacher-panel##GR

8. Out of school support for STEM education

Among the many local initiatives organized in the project partner countries to promote STEM, the following international initiatives were mentioned in the reports.

Researchers' Night - European Researchers Night, initiated in 2005 and financed by the European Commission, is always held on the last Friday of September, simultaneously in all European Union countries. In 2020, over 2 million people took part in it. Its aim is to promote science and encourage young people to become interested in research. It includes exhibitions, competitions, shows, lectures, trips, etc.

L'Oreal – UNESCO For women in Science - international program with aims to raise awareness of women scientists working in the Physical sciences, Formal sciences and Life sciences. In more than 20 years, the program has reached 110 countries through 52 national and regional programs, supporting over 3,900 alumni, five of whom have won Nobel Prizes.

The World Robot Olympiad (WRO) is a global robotics competition for young people. The World Robot Olympiad competition uses Lego Mindstorms manufactured by LEGO Education. First held in 2004 in Singapore, it now attracts more than 28,000 teams from more than 85 countries.

Kangourou Sans Frontières - Competition for students in math organized since 1990 in Australia, and internationally. Over 4 million students from 37 countries take part in the annual competition.

The International Young Physicists' Tournament (IYPT), sometimes referred to as the "Physics World Cup", is a scientific competition between teams of secondary school students.The IYPT is a week-long event in which currently around 150 international pre-university contestants participate. IYPT is associated with The European Physical Society (EPS) and in 2013, IYPT was awarded the medal of The International Union of Pure and Applied Physics (IUPAP) "in recognition of its inspiring and wide-ranging contribution to physics education that has touched many lives and countries, over the past 25 years.

9. STUDENTS WITH SPECIAL EDUCATIONAL NEEDS

According to Eurostat statistics from 2012, there were 73,030,600 disabled people over the age of 15 in the EU, of which 26,974,200 required assistance and 46,056,400 did not. In the countries participating in the SUNRAISE project, the data from EUROSTAT for 2012 are as follows. In Italy, there were a total of 7,399,500 people with disabilities, of which 3,938,600 required assistance and 3,460,900 did not. Spain had a total of 6,551,100 disabled people, of whom 3,302,200 required assistance and 3,249,000 did not. There were 5,805,100 disabled people in Poland, of which 1,669,400 required assistance and 4,135,800 did not. There were 1,686,600 disabled people in Greece, of whom 680,300 required assistance and 1,006,400 did not. And Cyprus had 104,100 people with disabilities, of which 34,000 needed assistance and 70,100 did not.

Source: https://ec.europa.eu/eurostat/databrowser/view/hlth_dpeh130/default/table?lang=en

Information about students with special educational needs is collected and provided by the Agency for Special Needs and Inclusive Education. The latest available data for the 2019/2020 school year are presented in the table below. We have included here both information on the number of students in individual countries and students with disabilities

Table 4: Actual population of children/learners with an official decision of SEN in the typical ISCED age ranges

Country	Age 3-5	Age 6-11	Age 12-14	Age 15-17	Comments
Italy – all student	1,454,141	1,306,536	1,706,425	2,846,183	Age 3-18
Students with SEN	19,007	106,364	60,916	26,299	
Cyprus – all students	28.331	58,763	26,965	28,169	
Students with SEN	950	5,553	2,716	2,576	
Greece – all students	174,702	619,496	336,030	320,560	
Students with SEN	4,190	34,002	29,520	23,201	
Poland – all students	1,509,748	1,622,248	1,569,437	1,414,295	Age 3-18
Students with SEN	39,117	54,211	79,471	34,473	
Spain – all students	1,315,753	2,907,823	1,510,131	1,448,603	
Students with SEN	19,007	106,364	60,916	26,299	

Source: https://www.european-agency.org/data/poland/datatable-overview#tab-official_decision_on_sen_v3

Situation of students with special education needs vary. To make it better it's important to have legislation supporting education of people with SEN. On an international level there were a number of attempts to improve the situation of students with SEN. Some of the acts include:

- United Nations (UN) Convention on the Rights of the Child (UNCRC), 1989 – Article 23: assistance to ensure access to education for disabled children, although contingent on 'available resources';

- EU Council resolution on equal opportunities for pupils and students with disabilities in education and training, 2003 (2003/C 134/04) – called on support for the integration of children and young people with SEN in society through appropriate education and training;
- UNESCO Salamanca Statement, 1994 – called on support for inclusive education;

And a more recent commitment by the European Commission includes:

- EC communication on a European Disability Strategy 2010–2020: A Renewed Commitment to a Barrier-free Europe, 2010 (COM(2010) 636 final) – 'education and training' is recognized as a priority area;
- EC and EU Council Joint Report on the implementation of the strategic framework for European cooperation in education and training (ET 2020), 2015 (2015/C 417/04) – highlights imperative actions to develop inclusive education systems

But at the national level, the situation is different in each country. For Italy the rate of inclusive education for children with SEN is above 90%.

Source: Access to quality education for children with special educational needs. Luxembourg: Publications Office of the European Union, 2018

When comparing data in National Reports, it can be seen that the support provided to a student with SEN varies from country to country. An overview of the situation is given below, while more details can be found in the National Reports.

Italy

School integration of students with disabilities is the strength of the Italian school, which aims to be a friendly community where all students, regardless of their abilities, can experience individual and social development. As indicated in the EC communiqué quoted above, over 90% of students with SEN are subject to inclusive education in Italy. The full inclusion of students with disabilities is the goal pursued by the autonomous school through intensive and precise planning, making full use of the internal professionalism and resources offered by the territory.
In an Italian school, a disabled student has adapted and/or individualized learning paths, prepared by class teachers as part of the Individual Educational Plan (IEP). It is drawn up jointly by the school and the services (psychosocial services team) with the cooperation of the family. Each year this plan describes the educational and didactic activities intended for the student, specifying the objectives, methods and assessment criteria.
In order to enable the implementation of these tasks, each school has an Institute Working Group on Handicaps, an inter-institutional group open to all institutions competent in this matter: schools, parents, ASL (local health care company), local authorities, as well as representatives of the associative reality of the territory. The class in which there are students with SEN has an assigned teacher of support activities. This is a specialist teacher assigned to a disabled student's class in order to support the integration process.
However, supporting STEM education for students with disabilities is more difficult and requires more effort. Attention is given to this topic, but where possible, it remains in the hands of teachers and school principals. There are several proposals, but it is mainly about providing tools for inclusive teaching.

Cyprus

Information about students with disabilities is based mostly on individual examples. In Cypriot schools, there is no such comprehensive support for students with disabilities as in Italy, where these activities are at an exceptionally high level. Students in Cyprus with significant learning and/or cognitive difficulties do not have significant support in schools, but they do have a pedagogical 'accompanist'. This is a tutor who teaches the student privately while the rest of the class has a lesson. Teaching students with disabilities takes place without the use of any particularly different learning techniques or specialized equipment. It is mainly a repetition of the content of the lesson in the same way as it was already taught in class. There are also special schools for people with disabilities in Cyprus.

Greece – Special education in Greece is considered insufficient in terms of quantity and quality. Not keeping up with the directives of the European Union. Regulations, declarations, laws or plans drawn up by the Ministry of Education apply to the general population of children, not including students with special needs. There is a lack of adequate and equitable special education for children who need it.

Table 5: The statistics available on Special Education are given below and are based on figures of the years 2018/2019

Educational Level	Number of schools	Number of students	Number of educators
Kindergarten	114	673	241
Primary schools	180	4,250	1,750
Middle School	8	238	105
Middle School - Vocational	52	3,168	1,367
High School	5	110	44
High School - Vocational	39	995	47

Data on the use of STEM in the Greek special education system is incomplete. It is mainly the initiative of individual teachers to use STEM methods in their classes. There are occasional recorded cases of incorporating educational robotics and STEM activities into education with significant benefits in terms of mobilization, participation, sociability, communication and overall cognitive performance for people with learning disabilities, ADHD and autism.

By comparing the levels of education, it is apparent, to a small extent, that the benefits are greater for special education students in the primary level of education in relation to secondary education. This may be due to the fact that secondary school subjects present an increasing degree of complexity. Special Education in Greece applies the biomedical model of disability- looks at the effects of being ill- symptoms, infirmities and treatment, in contrast to the updated and widely accepted social model of disability- which addresses the environmental and social factors that inhibit the functionality of disabled persons/students.

The SUNRAISE research has shown that STEM methods, although not routinely used in special education classrooms, are nevertheless a very useful and relevant tool.

Poland

According to recent studies, the number of students with special educational needs is increasing dramatically. There are up to 2 million students with SEN in Poland. There are, on average, eight students for every 25-person class. These students require an individualized approach to teaching and emotional development support. The expert points out that the Alpha generation born after 2010, which has already entered primary schools, is a generation of growing neurodiversity. Students need

individualization, empathy and a diverse approach to teaching. This is where digital technologies, when properly used, help.
Source: https://biznes.newseria.pl/news/technologicznie-polskie,p984003041

Unfortunately, the support given to students with SEN is far from sufficient. Polish schools do not have enough teachers to teach classes in overcrowded classrooms. Most students take advantage of paid tutoring. Nevertheless, students who need support can benefit from individual home lessons. With an insufficient number of teachers and psychologists, there is no support for students with more serious health problems. In some cases, special schools may be the solution.

The school for the blind in Laski near Warsaw, founded in 1921 by the blind Countess Róża Czacka (who founded the Society for the Care of the Blind in Warsaw in 1911), enjoys particular recognition. It is a complex offering education tailored to the abilities of individual students, at all stages of education. The comprehensive care provided prepares graduates for independent living and working.

An example of a center that takes care of students with hearing impairment is the oldest and best-known center in Bydgoszcz. The school was founded in 1871. Students were prepared mainly for useful professions. The first exams took place in May 1999. Currently, some of the graduates of this school are studying at universities in Bydgoszcz.

For students with mental disabilities, training is mainly organized to help them find a job. An example is the Kuyavian-Pomeranian Special School and Educational Center in Toruń. The school opened in 1964 as a primary school, but a vocational school was added in 1971. Initially, vocational training was offered there: tailoring and locksmithing. In the following years, further fields of vocational education were developed, such as cook, wallpaperer and green area restorer.

We do not have a well-recognized situation in STEM education for people with SEN. In a technical school for people with disabilities, STEM education is at a low level. Only math is at the high school level. There are no guidelines for teaching in the field of Geography, Biology, Physics, Chemistry. In a technical school for people with disabilities, STEM education is at a low level. Only math is at the high school level. There are no guidelines for teaching subjects in the field of geography, biology, physics and chemistry, apart from the general information that all of them can be taught 3 hours a week in accordance with the decision of the school head in consultation with the interested parties.

However, it is obligatory to allocate at least 8 hours a week of revalidation classes for disabled students in a special school. And in the integration class - 2 hours of revalidation classes per student.

Source: Ramowy plan nauczania dla technikum, w tym technikum specjalnego dla uczniów w normie intelektualnej: niepełnosprawnych, niedostosowanych społecznie oraz zagrożonych niedostosowaniem społecznym. Dziennik Ustaw - rok 2022 poz. 658, Załącznik 2.

Spain

It was estimated that in the last academic year more than 730,000 students needed educational support. This number includes all types of support, from disabilities and disorders to late entrants and high abilities.

There are 476 special education schools in Spain. In total 38,000 students attended special schools, which is only 17% of all students receiving special education.

The current system of Special Education in Spain has many critics, particularly among parents and guardians of people with special educational needs. Criticism focuses mainly on the lack of resources and

the need for additional teacher training, but also on the vagueness of some points concerning the future role of special education institutions.

Criticism of this system has also reached court cases, in which the courts have ruled in favor of parents with regard to the segregation produced by special education centers. According to Spanish law, a pupil's attendance at one of these centers should be the last measure to be taken, although the reality is that this is not always the case. As an additional support to all these criticisms and claims, in 2018 the United Nations created a report in which it urged Spain to put an end to special education centers. This measure has not yet been implemented, although work is being done in this direction through the latest education law, which focuses on integration, even though it does not state that schools for special needs have to close.

The last educational law approved (LOMLOE, 2020) tried to include the UN demands on its 2018 report regarding special needs education, stating that as of 2030 “all the ordinary schools should have the necessary resources to provide the best possible care for students with disabilities” attending to the best interest of the student and the will of the parents. The State Committee of Representatives of Persons with Disabilities (CERMI in Spanish) considers that the law may be the first step to closing special needs schools and there currently is no alternative to them in ordinary schools that is viable and inclusive and ask for further investment to end the current segregated system.

On the other hand, Platform for Inclusive Education Yes, (*Inclusiva si, especial también*) consider that there are not two different education systems and that it is not segregating for students who require special help in their schooling to attend a special school where they are cared for in an individualized way, so the current system should be maintained and provided with more support.

The Ministry of Education has insisted that the law indicates that "the educational administrations will continue to provide the necessary support to special education centers, so that these, in addition to providing schooling for students who require highly specialized attention, will act as reference and support centers for ordinary centers", which does not threaten their continuity, nor does it mean their closure. This group includes not only students with disabilities, but also those who need additional support when, for example, they are temporarily excluded from education, as in the case of, for example, a broken leg in an accident. Unfortunately not all people with disabilities can attend regular classes, especially on the secondary school level. Some of them are getting individual support at their homes from teachers. Others can benefit from education in special schools, where they are taught in sign language or in Braille with the support of speech synthesizers. Vocational schools for people with various disabilities, including intellectual disabilities, are also available.

Unexpectedly, the time of the pandemic, when education has changed dramatically by switching to distance learning, can be a solution for students with mobility problems. This can improve the situation of students with disabilities.

10. RESULTS FROM RESEARCH CARRIED OUT BY THE SUNRAISE PARTNERS

According to the application, all project partners were required to conduct 30 surveys among secondary school teachers and educators from organizations supporting education in schools. The study was conducted on the basis of a standardized questionnaire agreed by the partners. Respondents' answers were anonymous. However, two partners from Greece and Poland reported problems with this task. Nevertheless, the goal was achieved and the partners collected a total of 168 responses, i.e. 18 more than required. The number of respondents in each country was more or less similar (35 in Italy; 34 in Cyprus; 32 in Greece (out of 135 invitations sent); 36 in Poland (out of around 300 invitations sent); 31 in Spain.

Detailed answers to all questions, including formal information, are presented in the National Reports. Below we present the results of the survey in a nutshell.

The initial questions, allowing to recognize the degree of the respondent's knowledge of STEM, and at the same time probably discouraging those invited to participate in the study, was a request to solve the acronyms STEM and STEAM.

In Italy, 34 people out of 35 correctly deciphered the STEM acronyms. Only 17.6% did not know the difference between STEM and STEAM.

In Cyprus, only 1 out of 34 respondents had not come across the abbreviation STEM. 12 respondents did not know the difference between STEM and STEAM.

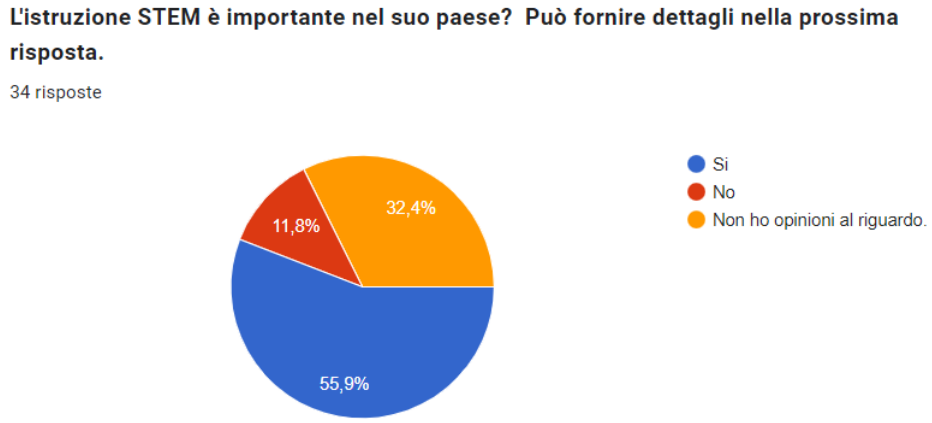
In Greece, all 32 respondents correctly solved the STEM acronym, while 26 people correctly decoded the A in STEAM as Art.

In Poland, 31 out of 36 people who completed the online survey answered the question of what the acronym STEM means, while 3 out of 31 people answered that they had not come across the acronym STEM. 12 out of 36 people could not decipher the acronym STEAM.

In Spain, all 31 respondents were able to decipher the STEM acronym, although there was a significant difference in conceptualization of what STEM education is, as can be seen in the survey results. 75% of people were able to recognize the difference between STEAM and STEM.

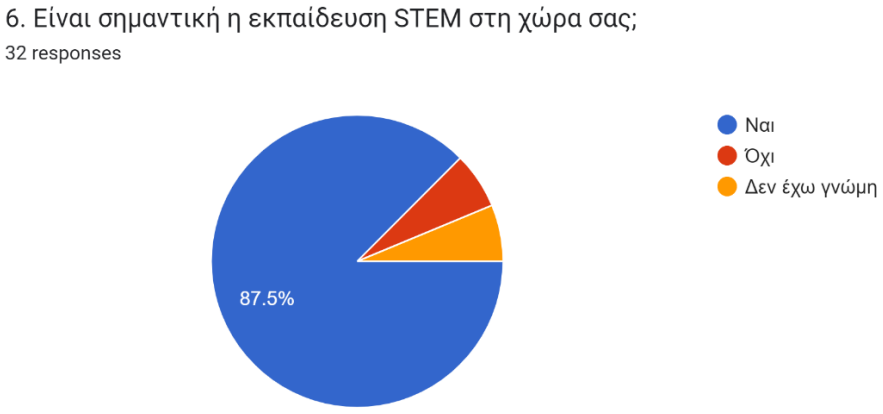
Answers to the question of whether STEM education is important

Italy: More than half of respondents (55%) say STEM education is important; 32% have no opinion and 11% consider it irrelevant, as the didactic tradition is based rather on the primacy of humanities.

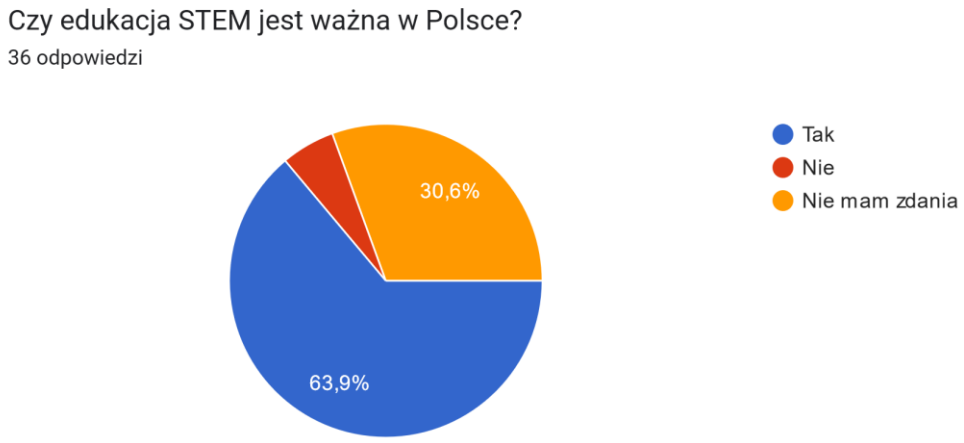


Cyprus: When asked "why is STEM education important to the education system and society?", 11 respondents (32.4%) said that STEM is important because it helps people become complete, productive and informed citizens. Nine respondents said that STEM is critical in supporting the needs of an ever-changing world. Only 4 participants said that the economy needs financial and technological security supported by STEM education, and 5 participants agreed that society needs technological and scientific progress supported by STEM education.

Greece: 87% of Greek respondents considered STEM education important, citing the following factors: creative approach to educational concepts; promotes critical thinking and creativity; promotes the use of technology; is constructive, collaborative, exploratory learning, with an emphasis on research and interdisciplinary work and activities.



Poland: The answer to the question whether STEM education is important in Poland 23 (64%) of respondents believe that it is, 2 people think that it is not, and 11 have no pinion.

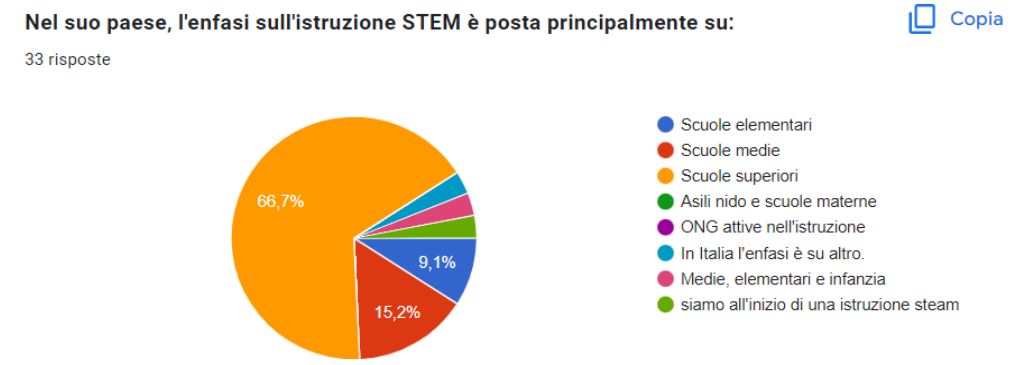


Spain: Responding to the importance of STEM education, the majority of respondents, around two-thirds, said it was important. Seven respondents said they had no opinion on the matter. The explanations of why they consider this important focus mainly on UVI's current care of science and technology and the need to understand them in order to properly relate to the environment. It is also repeated many times that schools try to focus on this type of methodology and that it is the natural evolution of humanity.

However, criticisms of this importance are that STEM education should be more important than it is today and that it is not being given the attention it deserves. One respondent stated that education regulations focus on the humanities. From the point of view of compulsory teaching hours for subjects common to all groups, only language, history and philosophy are compulsory at all levels, while science is not compulsory at upper secondary levels. This situation has historically been criticized by many scientific circles.

Answers to the question at which level of education there is the greatest emphasis on STEM education.

Italy: Most respondents believe that the emphasis on STEM education is mainly in upper secondary schools (66.7%) and lower secondary schools (15.2%).



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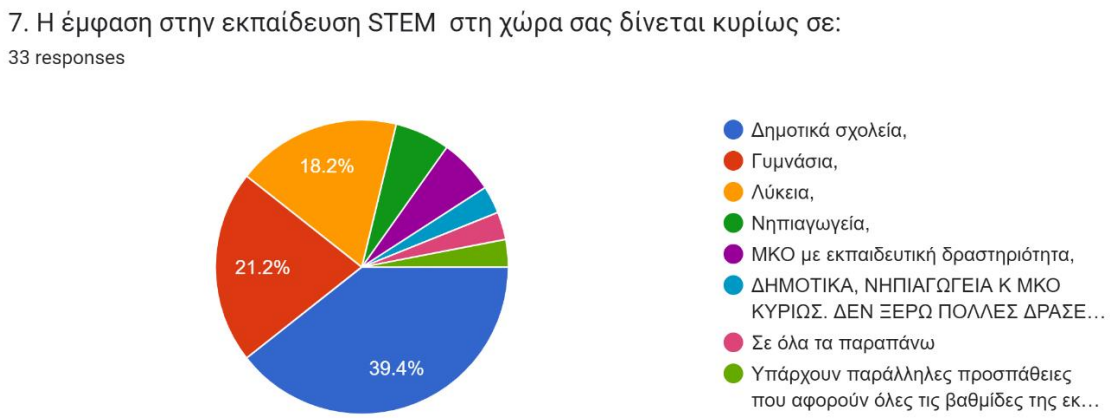
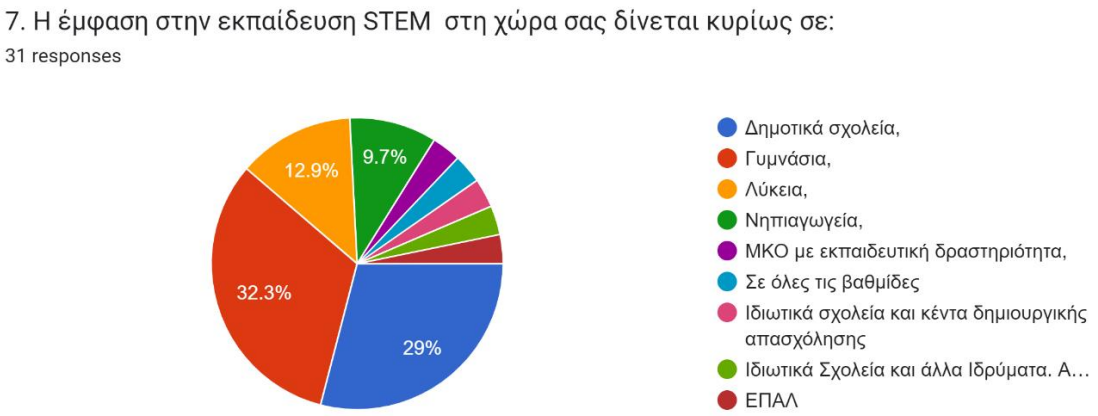
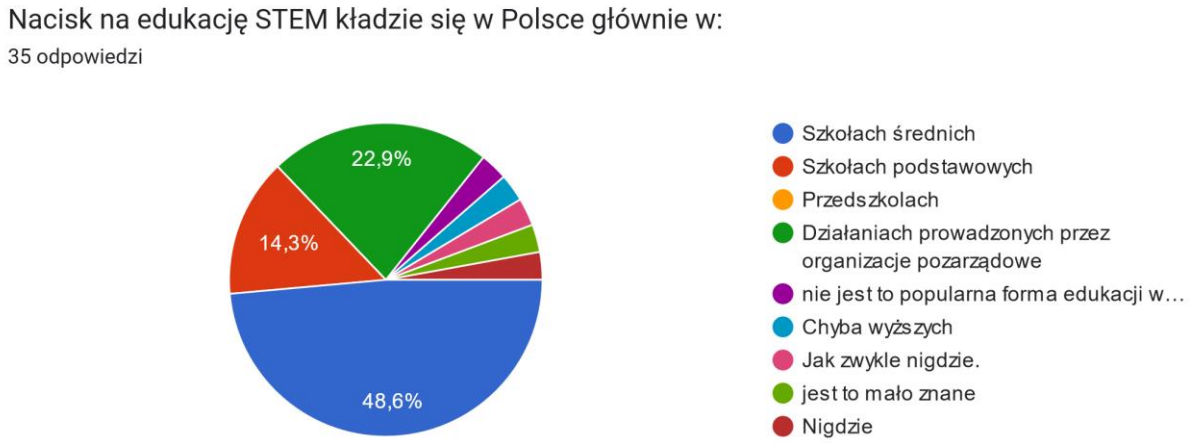
Cyprus: Fourteen participants (42.4%) said that more emphasis was placed on primary education, seven respondents (21.2%) said that more emphasis was placed on lower secondary schools, while three respondents indicated kindergartens. Three people mentioned non-governmental organizations that undertake educational activities. Two respondents (6%) said that campaigns run throughout the school years, from preschool to high school.



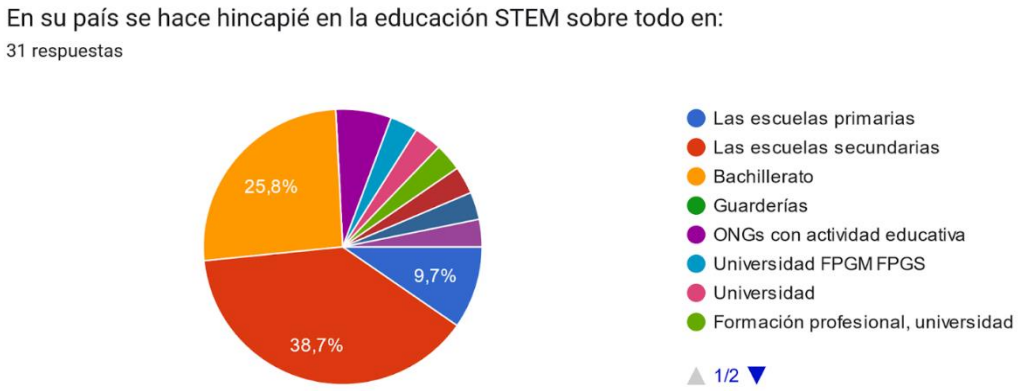
Greece: From the responses it is apparent the emphasis is given at the elementary level of education, less at middle school level and decreasing even more for the last 3 years of formal education at high school level.



Poland: Respondents believe that the emphasis on STEM education in Poland is mainly in: secondary schools (17); activities organized by NGOs (8); in primary schools (5). The others said nowhere, because this methodology is little known.



Spain: Of the education levels where STEM is more important, more than half of respondents agree that in Spain it is the period between secondary and upper secondary education (Bachillerato).



When it comes to the question related to STEM education for people with disabilities, the answers vary.

Italy: Most respondents (61%) share the opinion that school staff is actively involved in working with students with disabilities to help them in their STEM education. The others are divided into "agree" and "disagree", probably also in relation to personal experiences in the institutions in which they work. 31% believe that the staff is also not very active due to the lack of STEM teaching tools for students with SEN, the lack of trained staff (not only teachers, but also support staff). 8% believe there is an opportunity to use new tools and technologies and inclusive teaching strategies and methods.

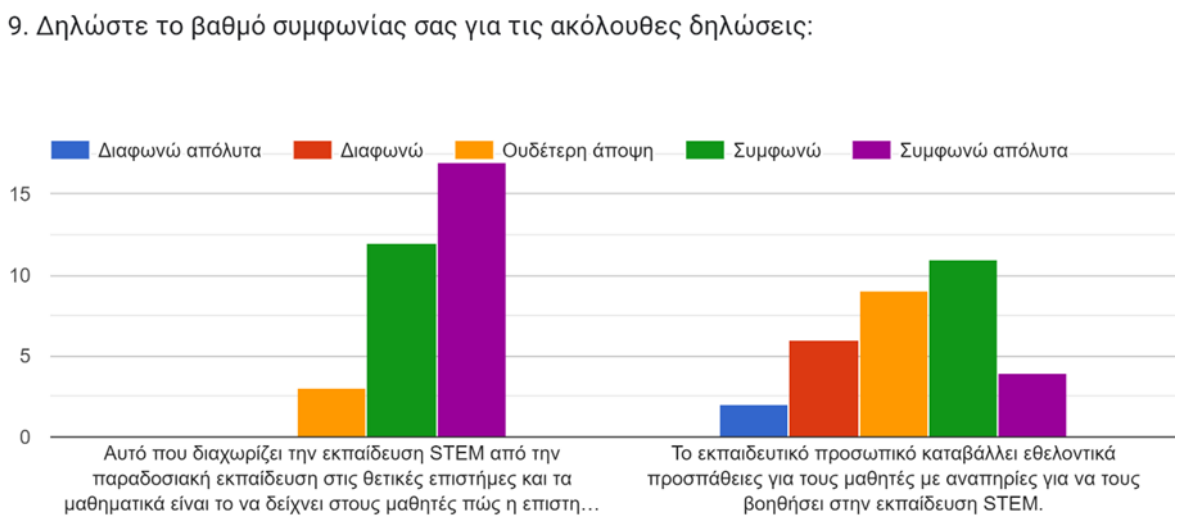
Respondents believe that the teacher should design activities that will reveal the skills of students with disabilities so that the student with disabilities must be seen as an essential member of the group. Half of the respondents indicated that school staff did not have much knowledge in their areas of STEM education. The other half has no definite opinion (neither agree nor disagree); only a small proportion believe that teachers have such knowledge.

Cyprus: Respondents were asked to indicate to what extent they agreed with the statement "the education staff in your school tries to support the STEM education of students with disabilities". Ten respondents answered "agree" and 9 answered "disagree", while the majority (14 respondents) had a neutral opinion, neither agreeing nor disagreeing.

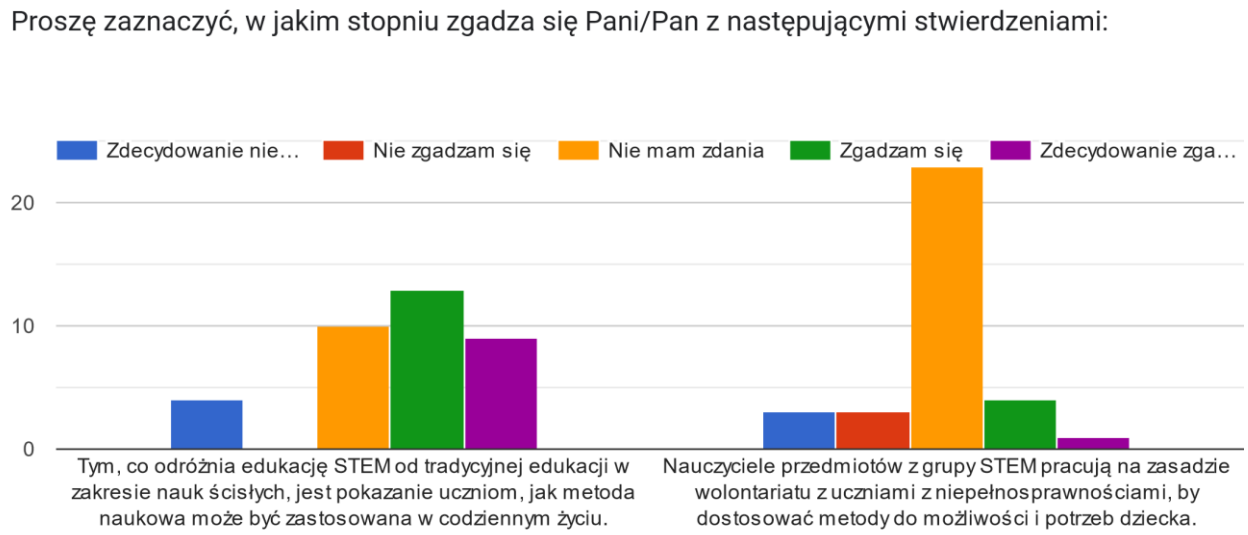
In order to indicate specific activities that support students with disabilities in STEM learning, four respondents answered that they had not heard of such attempts, but indicated that it always depends on the specific disability. Other respondents provided some insights into current techniques or methods. It was mentioned that there is software for students with visual impairments and books with modified font for students with visual impairments. Reference was made to supplementary material for students with learning disabilities, as well as additional time for teachers to assess students with learning disabilities. Another respondent stated that the educational staff does not voluntarily support students with disabilities, but makes such attempts because it is part of their responsibility and duties and is mandatory in the education system, as mentioned by the Ministry of National Education. The last argument presented was the use of experiential learning based on experiments.

Greece: Respondents were asked to indicate to what extent they agreed with the statement "the educational staff in your school tries to support the STEM education of students with disabilities". Their answers are shown in the bar chart on the right. Seven participants added a comment, stating that the

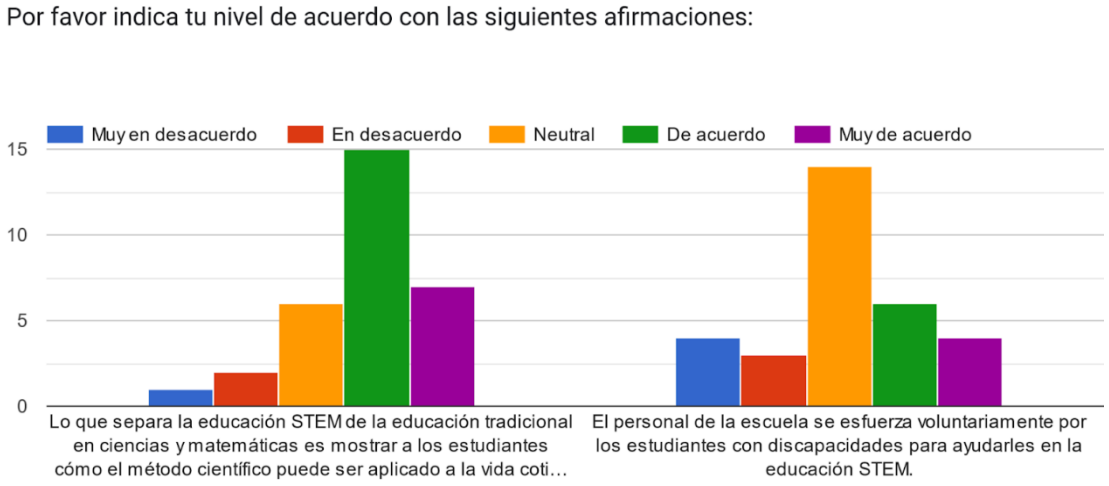
lack of resources, materials and education is a major obstacle to implementing STEM for students with disabilities.



Poland: Respondents stated that they did not know much about teaching disabled students (23). 5 people believe that STEM teachers work with students with disabilities on a voluntary basis to adapt methods to their needs. On the other hand, 6 people believe that it is the other way around (one person indicates that these activities are paid extra).

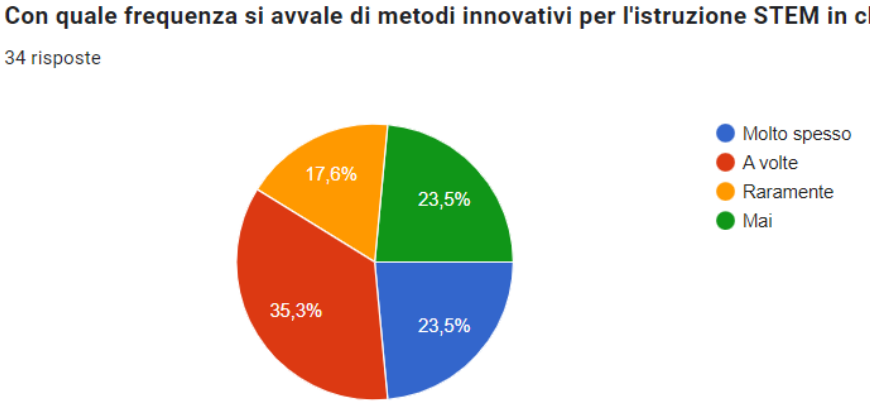


Spain: There is no consensus on the efforts made by teachers and school staff to help students with disabilities develop STEM learning. Most of the responses are neutral, either because of the lack of exposure and thus specific cases to build on, or because the efforts made in this regard do not go beyond what is done for all students.



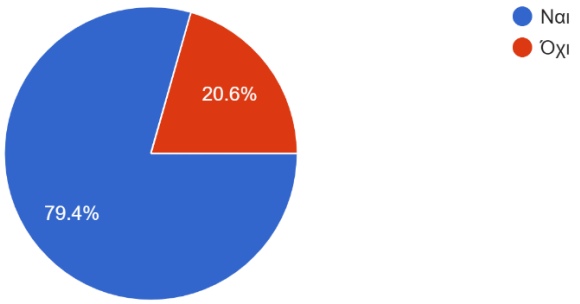
The question about introducing innovative methods into their own lessons was answered as follows.

Italy: More than half of the participants (54.5%) have never tried innovative methods for better STEM learning.



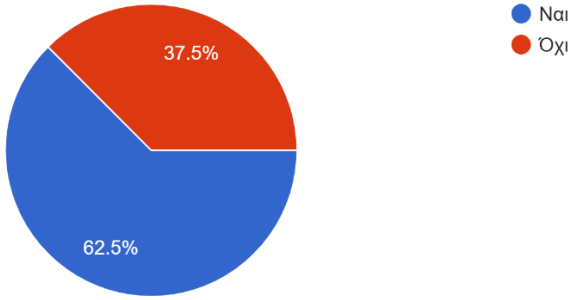
Cyprus: The majority of respondents (74%) said they use innovative methods to improve STEM teaching. However, 20.6% (7) of the surveyed educators stated that they do not use such methods when teaching.

12. Έχετε δοκιμάσει καινοτόμες μεθόδους για καλύτερη μάθηση στο STEM;
34 responses



Greece: 15 participants indicated as innovative methods introduced by them: robotics, radio programs about the European Schools Network, participation in eTwinning projects.

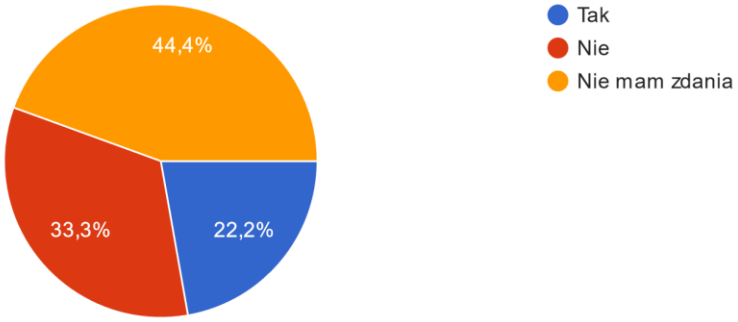
12. Έχετε δοκιμάσει καινοτόμες μεθόδους για καλύτερη μάθηση στο STEM;
32 responses



Poland: Only 8 people said they had the opportunity to innovate in STEM teaching and 12 did not. The others had no opinion because they probably taught other subjects or, as they stated at the beginning, they might not know that their subject belongs to the STEM group.

Czy ma Pani/Pan możliwość tworzenia i stosowania innowacyjnych metod nauczania STEM w instytucji, w której Pani/Pan pracuje?

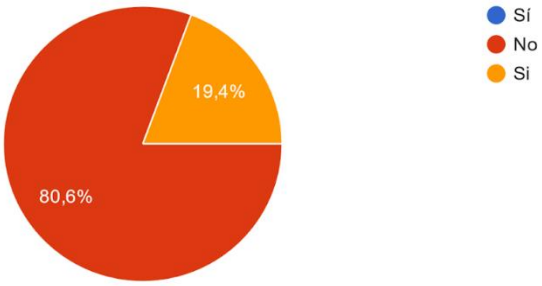
36 odpowiedzi



Spain: These responses are also reinforced by the responses to the question 'Have you ever tried new innovative methods to improve STEM learning?' where the majority of respondents say they have never tried such methods (around 80%).

¿Has probado alguna vez nuevos métodos innovadores para mejorar el aprendizaje en STEM?

31 respuestas

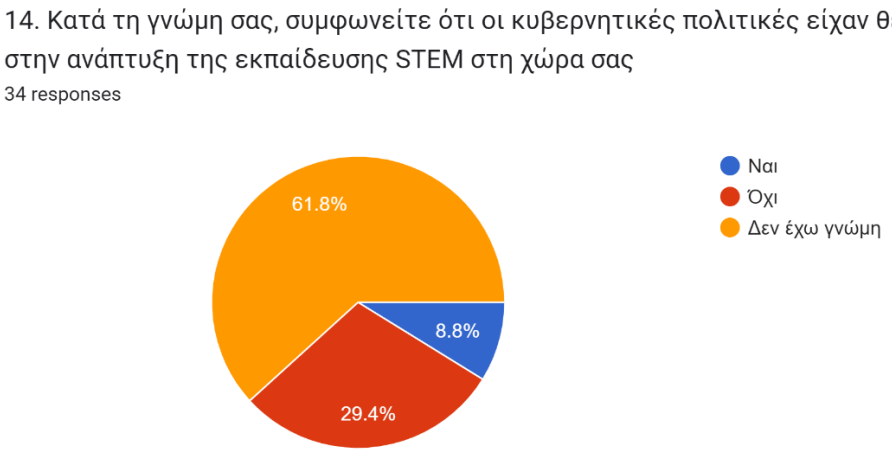


When asked about the role of government in STEM development, the answers were as follows.

Italy: 20% of respondents indicated government involvement in allocating funds to schools to create digital learning in STEM education. However, most of the funds were allocated to equipment and little to people and their training and support in the design of activities. 35% underline that there is little development, and more is said about the implementation of innovative activities and methodologies than is done. In addition, a strong regional gap was highlighted and the fact that there are still several issues to be addressed such as a lack of space for STEAM education and practical activities.

Cyprus: The majority of respondents, 21 (61.8%), answered "no opinion". 10 respondents answered negatively, while only 3 out of 34 respondents said that government policies are beneficial for STEM education. Two participants, when asked to elaborate on their views, said that they were not aware of any policies favorable to STEM education in Cyprus, 1 respondent mentioned that they were not aware of any seminar or teacher-led activity on STEM, and 1 participant said that they did not consider any significant STEM education policy in Cyprus.

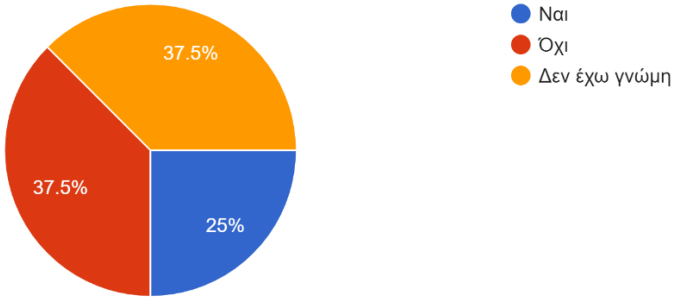
Three respondents highlighted that there is a very extensive curriculum and assessment system for STEM subjects, especially in high school, which limits teachers in improving STEM education.



Greece: Only 25% of the respondents stated that the government policies positively affect the propagation of STEM educational methodology. The remaining respondents are divided into equal parts of those who answered negatively and those who had no opinion on this subject.

14. Κατά τη γνώμη σας, συμφωνείτε ότι οι κυβερνητικές πολιτικές είχαν θετικό αντίκτυπο στην ανάπτυξη της εκπαίδευσης STEM στη χώρα σας

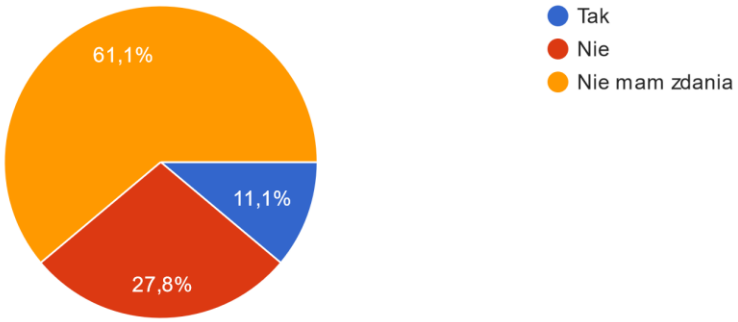
32 responses



Poland: In the current situation in Poland, when education is under pressure and treated by the Ministry of National Education as an environment that has become too modern in expectations and actions, only 4 people indicated that the government's actions support STEM education.

Czy zgadza się Pani/Pan z twierdzeniem, że polityka rządu miała pozytywny wpływ na rozwój edukacji STEM w Polsce?

36 odpowiedzi



Spain: When asked about the impact of government education policy on the development of STEM education, most of the responses related to the frequency of changes in legislation, which makes it impossible to properly adapt the curriculum used by teachers. Lack of teacher training and pupil numbers were pointed out. In most cases, a general lack of investment.

11. RESULTS OF THE FOCUS GROUP STUDIES

Following the completion of desk research and interviews with school teachers and educators, experts were consulted. An online session with a target group of 20 experts in each country was planned. The

interviews were divided into groups. However, each country reported problems with recruiting the planned number of interviewers.

Italy

In Italy, two focus groups were organized to which 10 and 17 people signed up for the activity. Eventually, the total number of participants was 13. They were STEM teachers, educators specialized in STEM and STEAM education, educators and artists specialized in performative arts (music and dance).
Various experiences cited by teachers and educators show that the STEM approach is used in an interdisciplinary way, and skills from different subjects (major, but not only humanities) are combined. There is a contamination between theory and practice, where often subjects such as science, mathematics, chemistry, which are the expression of the field of pure research, are combined with the tools, resources and skills of technology and engineering, which instead have a more applied dimension. The STEAM approach, that is, the incorporation of creative thinking and the Arts to the STEM approach, is undertaken in some schools, less widespread. It is mainly concerned with Art understood as visual art (art digital, painting, graphics etc.), less as performance art (theater, dance, music). However, art is recognized as functional to the learning of subject science.
For both approaches (STEM and STEAM), potential is recognized and the added value that is brought to classrooms: more stimulated students, engagement from multiple perspectives, increased curiosity, strengthening of the pupil-teacher relationship and among students (peer education dynamics are created), development of soft skills (critical thinking, problem solving etc.) in students, bringing out the talents of students that usually do not emerge with traditional approaches, inclusion of students with learning difficulties. What arose as important is the transversality of the approaches.
Difficulties encountered by teachers in proposing and implementing STEAM activities were also pointed out. They included, among others, widespread resistance from teachers who claim that these projects delay the curricula, so often the STEAM method is described as a waste of time. Not everyone has the appropriate predispositions for this type of teaching. There was also resistance from families.

Cyprus

Over 60 educators were invited to focus groups. Finally, four experts took part in 2 focus groups.
The importance of STEM in schools in Cyprus is generally assessed as something 'theoretical'. However, the focus groups found, which may apply to all countries, that many teachers use STEM education without being fully aware of it or without knowing the term. It has been mentioned that the way elementary and high school teachers ask questions often helps STEM skills development, even when "the STEM etiquette is not used."

It has also been found that there is often a lot of pressure on students who overachieve in STEM subjects, as these subjects are often seen as the most important for success in the future. However, STEM subjects often use traditional techniques rather than being seen as subjects that can be used to develop skills such as critical thinking or problem solving that are listed as essential in STEM learning.

The methods used in STEM education include games for all age groups, as well as the very widespread and recently used robotics in Cyprus. Robotics is actually very useful in developing problem solving skills as it forces students to use their brains to come up with a solution to a problem. It was mentioned that the use of gamified learning and STEM techniques is more time-consuming and challenging in high school due to the limited time and extensive curriculum of STEM subjects.

Among the STREAM methods, Reading and Arts were used. As a unique example that can help teach from history to mathematics, the creation of a pyramid with noodles was pointed out. One of the STEM learning ideas proposed by the focus group experts was the flipped classroom. Instead of reading books and delivering material in the form of a lecture, students could be given videos to watch at home as many

times as they like, and then benefit from more interactive activities during classroom discussions. Another idea for creative reinforcement in STEM teaching was the use of storytelling and role-playing in STEM teaching.

Greece

In Greece, 14 experts attended two focus group sessions, one of which was a Scientix STEM ambassador. Participants said that in the current curriculum, even in special education, STEM is not part of the learning process. All efforts to apply STEM clearly belong to the individual teacher.

Although none of the experts used the arts in their activities, they pointed to many interesting possibilities for incorporating it into STEM teaching.
Some suggestions included: a) Role play in teaching math through painting; b) A board game covering the disciplines of Computer Science, Engineering and teaching foreign languages; c) Construction of ramps for disabled students in wheelchairs; d) Visiting museums to observe and study ancient mechanisms and recreate them in the classroom; e) In Robotics and Mathematics, creating a game based on the ancient theater, e.g. recording voices and sounds, giving the coordinates of the seats, experimenting with the Chorus; f) Using theatrical techniques to teach mathematics and chemistry; g) Student-teacher role reversal through theatrical improvisation techniques.

Poland

The Polish focus group was attended by 10 experts in two sessions. One focused on a group of teachers who bring the ideals of STEM education into school practice, and a group of educators and experts who promote STEM ideas to the general public. In addition, requests to complete a questionnaire were also sent. We received 2 responses out of 20 additional requests. One from a person who is considered significant for innovation in education. The second answer we put in the Summary section.

STEM classes in Poland are optional. Teachers introducing STEM methods pointed to the use of modern information technologies in extracurricular activities. However, the preparation of STEM teaching materials is time-consuming and teachers in Poland have a heavy workload. So even if students are happy with the STEM approach and would like to have more STEM activities, this is not possible. The teacher is obliged to implement the curriculum of the subject preparing for the final exam.

Teachers pointed out two main problems in STEM education. In order to teach STEM well, teaching infrastructure is important – this is often the biggest problem for schools. STEM education requires laboratories, computers, IT tools, computer programs that will be made available to students for free.

Another problem in the implementation of STEM methods are parents of students who prefer that their children, instead of discovering new things, pass their final exams and get into the best university in Poland.

Experts as well as teachers pointed to the difficulties encountered in proposing and implementing STEAM activities. The most important were: a) Lack of funds for additional activities of the school and teachers in order to improve and implement STEM education; b) Overburdening teachers with curricular work and bureaucracy in schools; c) Little interest of parents who studied in traditional schools and do not always understand the value of STEM, treating it not as learning, but simply as fun. And besides, they pointed to the lack of state policy in the field of STEM education and the very low number of women in computer science, technical sciences and experimental sciences. However, STEM teaching is recommended at every educational stage. It is a paradigm shift in which the development of the student's curiosity, experimentation, and achievement of results through the active inclusion of the student in the learning process are the first priority. There is a lot of evidence that STEAM helps to develop their own innovative

solutions to everyday problems, engage in creative problem solving and increase students' intrinsic motivation, which is especially desirable.

Spain

The people attending focus groups were secondary school teachers working mainly in the science streams. The majority of people in the focus groups did feel that teachers made a special effort to help students with special needs. This is probably due to the fact that some of the people involved in these focus groups are part of special needs education centers.

As a problem with the introduction of STEM teaching in schools, university entrance examinations based on more traditional content assessment have been identified. Therefore, using innovative teaching methods can lead to lower scores on exams important for their adult life. Among the indicated difficulties in teaching STEAM, attention was drawn to the need to have the necessary materials to be able to conduct these workshops. Another of the most frequently commented problems is the fact that teachers devote their free time to this type of training. And one of the most frequently discussed issues is preparation for teaching and curriculum content.

Some interesting examples of introducing art into STEAM teaching, several have been identified. Plasticine cells in which different parts of a cell, whether animal or plant, had to be shown. This exercise has also been used in a representation of a planetary model or an atomic model. Another activity was to create a series of engravings and drawings using copper plates, to later make cyanotypes from them and thus explain the chemical basis of this type of reaction, which can also be linked to photosensitivity and the development of the first cameras. Thus, it covers both physics and chemistry as well as fine arts.

12. Summary

The conducted research confirmed the fact that people in all participating countries are reluctant to complete surveys. This is due to many reasons, mainly too much workload.

There was consensus that most of the educators and experts who participated in the research agreed on the value of STEAM education. From the research carried out, interviewed participants generally believe that using a STEAM approach and teaching students to think critically and creatively can be the key to the development of a society that understands and is fully engaged with the world around it, and in planning and creating a better future. The holistic approach that includes STEM subjects and the Arts enables students to perform better in every area of their lives, by understanding STEM as something very much related to the real world, encouraging creativity and innovation and increasing curiosity, making STEM subjects more relevant and inclusive for students who usually find them boring and daunting.

Among the commonly identified obstacles to implementing STEAM as a teaching method was the need to follow a compulsory curriculum. There is still a tendency to see the STEAM approach as a waste of time, and many teachers still prefer using traditional methods. Other problems pointed out by the majority of educators was the lack of appropriate legal regulations and financial resources allowing for the purchase of equipment necessary to introduce STEM education.

Another problem identified is that the student-to-teacher ratio is too high. There is also a lack of teacher training in introducing new working methods. Here the main obstacle is the need for teachers to invest both time and training costs.

When compiling National Reports, we noticed that both the surveyed respondents and focus group experts emphasized that students appreciate the STEM and STEAM methods.

However, we did not include comments from students in planning the report. We decided to make up for this lack. We asked a student who participated in our virtual exhibition project a few years ago for her own comments. We worked with her when she was a student of an academic gymnasium, repeatedly rated as the best in Poland. As an outstanding person, she continued her studies at an English high school. She is currently finishing her studies at Cambridge University. Apart from that she is Co-Founder at The Neurodiverse - a social initiative aimed at raising awareness about neurodiversity in Poland, which reached over 400 000 people within the first year of its existence. She is a member of Polish Educational Society in Cambridge, took part in Summer Intern at the Polish Ministry of Education, as well as at Legislative Internship at the U.S. House of Representatives. She has learnt sign language. Since we reached only one student, we quote this statement in the original.

"Given the centrality of STEM subjects in today's technology-given economy, access to good-quality STEM education has the potential to determine future economic and career status. For example, ability grouping was a common practice at my school: students who were labeled as being good at a STEM subject, such as math, would be put in a different class than their peers labeled as being less skilled. While in theory being a good way of supporting students' interests, this practice is problematic for a couple of reasons. Mainly, it does not account for the fact that students arrive in secondary education already with a baggage of experience (both from home and previous educational institutions). Consider a child who was very passionate about science at age 5, but didn't have access to resources allowing him/her to develop those passions due to socioeconomic reasons (e.g. lack of exposure to scientific resources such as books, museums, etc.). By age 15, he/she will likely lag behind peers who had the chance to develop those skills and - due to ability grouping - her/his further STEM development at a secondary level is unlikely to take place.

This phenomenon is further exacerbated by the so-called profilowanie (tracking), another common practice in Polish secondary education: the process of organising education around a predetermined profil (e.g. a maths-physics track, a bio-chemistry track, a humanistic track). Here again, the idea is not inherently flawed: profilowanie can in theory support students' individual interests. In my experience, however, the practice lacked flexibility and therefore did not grant equitable access to STEM education. For instance, at 16 I was interested in both History and Maths/Science, but the profilowanie practice did not allow me to pursue both. I ended up in a humanistic track with very few hours of science and maths and therefore had to end my STEM "career" at that stage. Note that there are educational systems (e.g. British A-Level or International Baccalaureate) where students can explore both STEM and non-STEM subjects at the same time.

I see two main solutions to the issues discussed:

- *Holistic approach starting in early education, as to avoid gaps in students' "abilities" (determined largely by exposure to resources) by the time they reach secondary education. Example: invest in programs popularising STEM education in pre-school/elementary schools in areas that are likely to lack access to it (rural, post-industrial).*
- *Find a balance between allowing students to follow their interests through tracking/ability grouping and a flexible system where students with a diverse range of abilities and interests can learn together and from one another. Example: allow for movements between profile; limit ability grouping to minimum and replace it with a universal design for learning approach."*

Zuzanna Campalastri de domo Kotrych.

A special issue is STEM education for students with disabilities. Just Italy has a well-designed policy for training people with disabilities, but not quite in STEM. This fact has not yet been fully recognized. We generally know that the situation of people with disabilities is very difficult. So maybe the modules supporting the teaching of STEAM subjects prepared in the SUNRAISE project will be of some help to students with special needs and their teachers.

13. APPENDICES

- National report from Italy

- National report from Cyprus

- National report from Greece

- National report from Poland

- National report from Spain