SCIENTIX

The community for science education in Europe

3rd Scientix Conference

Full Programme

4 - 6 May 2018 > Brussels
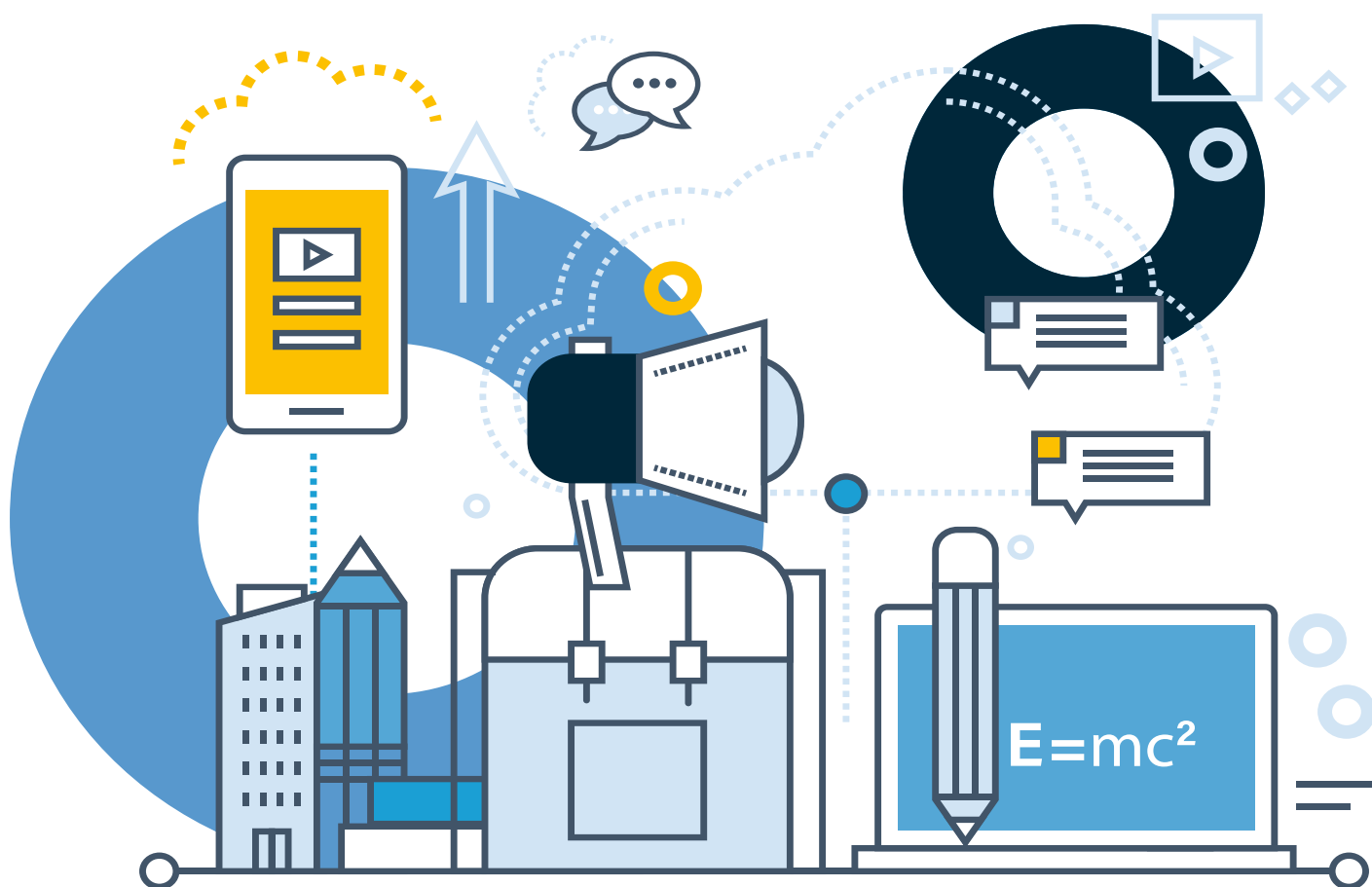
#ScientixConf

$$E=mc^2$$

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European Schoolnet

CONTENTS

PROGRAMME

Friday 04 May 2018

Time	Type	Room: Ballroom
15:00 – 17:00	Registration	
17:00 – 18:00	Conference Opening	**Marc Durando**, Executive Director, European Schoolnet, BE
		Jean-David Malo, European Commission, Director - Directorate B - Open Innovation and Open Science, DG Research and Innovation
		Carlos Cunha, Escola Secundária Dom Manuel Martins, PT and **Svetla Mavrodieva,** Centre for Innovation in Education, BG, Scientix Ambassadors
18:00 – 19:30	Posters and exhibitions session	
19:30 – 21:00	**Networking Reception: STEM Education everywhere in Europe** *(Ballroom)*	

Saturday 05 May 2018

Time	Type	Room: Ballroom		
08:30 – 09:00	Registration			
09:00 – 09:10	Plenary session 1	**Dr Àgueda Gras-Velázquez**, Scientix Project Manager, Science Programme Manager at European Schoolnet, BE "Scientix until now"		
09:15 – 09:50 (30'+5')		Keynote speech: **Svein Sjøberg**, professor in science education at Oslo University, NO "The importance of Inquiry-Based Science Education: nurturing motivation, joy and interest in science – or improving standardized test scores?"		
09:55 – 10:30 (30'+5')		Keynote speech: **Beth Healey**, Doctor expert in space and extreme environments, International Space University, London, UK "WhiteSpace"		
10:30 – 11:00	Coffee Break / Posters and exhibitions session			
11:00 – 12:30	Plenary session 2	**EU projects for teachers:** 3' presentation of stands from 20 STEM projects. **Moderated by Karen Slavin,** European Commission		
		1. Connecting science with the daily life via hands-on activities 2. Bringing the InSight mission into the classroom 3. "Codex on the Flight of Birds" of Leonardo da Vinci 4. STEM FOR ALL 5. MaST Networking 6 Les Saventuriers 7. I&R European Industrial Technology and Robotics	8. Science on Stage Europe 9. SCORE 10. eHAND 11. eCraft2Learn 12. STEM Alliance 13. Edu-Arctic and ERIS 14. Universe in the Classroom	15. STEM4YOUTH 16. ER4STEM 17. OSOS 18. School Education Gateway and eTwinning 19.Scientix 20.The European Commission
		Stands in Room Harmony	*Stands in Room Creativity/Exploration*	*Stands in Room Evasion*
12:30 – 13:45	Lunch / Posters and exhibitions session			

Parallel sessions I: 13:45 – 15:15 (90') // Each talk: 15'+5'(Q&A) // 20' x 4 = 80'						
Room	**Ballroom I**	**Ballroom II**	**Vision**	**Clarity**	**Serenity**	**Infinity**
13:45	1. Research into the classroom	2. Curriculum implementation	3. Tools and schools	4. Mobile learning and technologies	13:45 – 14:25 (40')	
13:50	1.1 Enriching STEM education projects by adding a citizen science dimension (ROEDUSEIS, MOBE and SERA) (T42)	2.1 Contours of Scientific Literacy and the Assessment of Science Education Practice in Europe and Beyond (T10)	3.1 Introducing Coding in Primary Education: Methodology and Tools (T47)	4.1 The PDF (Pensar Digital E Fazer) Project. A proof of concept in progress (T16)	Workshop A.I R2T2 – A collaborative Mars mission using the Thymio educational robot (WS13)	Workshop B.I Codinc, peer to peer coding for inclusion (WS02)
14:11	1.2 Do you speak science? How researchers and pupils can learn from each other about science (T17)	2.2 Informatics in primary education and integral science education in lower secondary education: the Lithuanian experience (T49)	3.2 Enhancing students' motivation to learn STEM: educational technology (T23)	4.2 Digital Earth: GI Learner creating a learning line for GI Science in education (T19)		
14:32	1.3 Mediatheque of the Lindau Nobel Laureate Meetings (T20)	2.3 Teacher professional learning model for disseminating innovative practice (T08)	3.3 Working towards a gender inclusive STEM education in Europe (T11)	4.3 D3Mobile Metrology World League (T24)	14:35 – 15:15 (40')	
14:53	1.4 From MatLan to M&L – exploring new horizons (T48)	2.4 Applying mathematics to electrical engineering subjects (T40)	3.4 Dr. Scratch: Assessing Scratch projects for Computational Thinking skills (T51)	4.4 Motivating youth towards STEM education and careers through the UMI technologies (T54)	Workshop A.II Developing Students 21st Century Skills with Go-Lab (WS03)	Workshop B.II STEM in the classroom: How DIY water quality sensors bring science to our students (WS10)
15:15	Coffee Break / Posters and exhibitions session					

Parallel sessions II: 15:45 – 17:15 (90') // Each talk: 15'+5'(Q&A) // 20' x 4 = 80'						
Room	Ballroom I	Ballroom II	Vision	Clarity	Serenity	Infinity
15:45	5. Contextualisation of STEM teaching	6. Gaming, robotics and computational thinking	7. Nano, bio and more	8. School projects	15:45 – 16:25 (40')	
					Workshop C.I Drones at School (WS04)	Workshop D.I Learning Science Though Theatre: hands on! (WS08)
15:50	5.1 "STEM in aquaculture immersion" – To enthuse today's youth and foster tomorrow's workforce (T21)	6.1 Computational Thinking in Primary Schools – Pilot project on successfully combining teacher training and innovation in the classroom (T07)	7.1 Research-School Collaboration: involving pupils in the development of a toolkit to increase their understanding of protein chemistry (T02)	8.1 STIMEY – A Generic Multichannel Hybrid e-Learning Platform for STEM-Education (T30)		
16:11	5.2 Surprising and simple devices to study forces and their laws (T15)	6.2 O Robot Ajuda! (The Robot Helps!) (T46)	7.2 World Biotech Tour: teaching biotechnology (T06)	8.2 Walking through the nature (T03)		
16:32	5.3 Lifting the Classroom into Space – Pupils observe the Earth by analysing remote sensing data (T29)	6.3 Unplugged activities for coding and algorithmic thinking (T36)	7.3 NanoInventum: Introducing Nanotechnology in primary school (T18)	8.3 Happy Channel presents Space News by Space Scoop (T33)	16:35 – 17:15 (40')	
					Workshop C.II First Steps in Scratch (WS01)	Workshop D.II Society/ Board games in learning STEM subjects (WS11)
16:53	5.4 Connecting STEM to Industry through Industry expert – teacher mentorship (T38)	6.4 Educational Math Games for Two Players (T53)	7.4 Escape rooms in the service of science (T56)	8.4 Taking science classes across borders (T37)		
17:15 – 19:00	Posters and exhibitions session					
19:00 – 20:00	Free time (walk around Brussels recommended)					
20:00 – 22:00	Networking dinner: Strengthening the community for science education in Europe (Ballroom)					

Sunday 06 May 2018

Parallel sessions III: 9:00 – 10:30 (90') // Each talk: 15'+5'(Q&A) // 20' x 4 = 80'						
Room	Ballroom I	Ballroom II	Vision	Clarity	Serenity	Infinity
09:00	9. Earth and the environment	10. IBSE	11. Strengthening teacher & school competences	12. Science and inclusion	09:00 – 09:40 (40')	
09:05	9.1 Marine Litter Solutions Through Learning by Doing (T26)	10.1 Examining the added value of computer-supported inquiry learning with embedded virtual experimentation on students' attitudes and motivation on STEM education (T27)	11.1 Data-driven STEM teaching: The presentation of the JOBSTEM research project experiences (T12)	12.1 Effects of problem-solving and epistemology beliefs on academic performance. Differences according to academic level and gender (T01)	**Workshop E.I** ORT Makers: Doping STEM with the Makers' spirit and practice (WS12)	**Workshop F.I** Aura-virtual reality (WS05)
09:26	9.2 Preparing the World for Tomorrow (T55)	10.2 Novel ways to promote Math, Science and Technology education through international StarT (T31)	11.2 The STEM School Label - how to apply for my school (T09)	12.2 Science for ALL children: giving new opportunities to the less privileged (T05)		
09:47	9.3 Extending NetLogo "climate change" model (T25)	10.3 ICSE International Centre for STEM Education (ICSE, Freiburg, Germany) (T45)	11.3 Changing Places and Changing Teaching in STEM Education (T35)	12.3 Supporting and Teaching Visually Impaired Pupils (VIPs) (T34)	09:50 – 10:30 (40')	
10:08	9.4 SOS Pollinators (T52)	10.4 The "Science, Technology, Society" course for high school students in Estonia (T44)	11.4 Make Tomorrow – Turkey Programme (T14)	12.4 The TEC model for Teacher Training and Social Inclusion (T22)	**Workshop E.II** Light-interacting materials: Science meets Beauty (WS09)	**Workshop F.II** Secret of the mobile phone (WS07)
10:30	Coffee Break / Posters and exhibitions session					

Parallel sessions IV: 11:00 – 12:30 (90') // Each talk: 15'+5'(Q&A) // 20' x 2 = 40'						
Room	Ballroom I	Ballroom II	Vision	Clarity	Serenity	Infinity
11:00	13. Supporting gifted students	14. Out of school learning	15. STEM + Arts	16. Remote and digital	11:00 – 11:40 (40')	
					Workshop G.I Mobile phone for lessons (WS14)	Workshop H.I Astro party (WS06)
11:05	13.1 Be STEMpatic! (Budi STEMpatičan!): the project of identification, guidance and teaching of STEM gifted students (T13)	14.1 The Formula 1 competition in Junior High School (T04)	15.1 Particle Physics and Creativity in Primary Education (T28)	16.1 The use of immersive Virtual reality in the Mathematics classroom (T32)		
11:26	13.2 Launching a gifted children programme (T43)	14.2 The Open Science Internships (T41)	15.2 Learning Science Through Theatre (T39)	16.2 Simplifying the use of IoT for STEM primary education (T50)		
11:46	Change of rooms					
11:50 – 12:30 (40')	Round Table (RT1) Initial Teacher Training	Round Table (RT2) The limited information on STEM careers	Round Table (RT3) How to make research results more accessible to teachers	Round Table (RT4) The importance of supporting primary schools with the teaching of STEM	Round Table (RT5) Getting leading schools from different countries to work together and share expertise	Round Table (RT6) STEM education practices: transferring between National and European level
12:30 – 13:45	Lunch / Posters and exhibitions session					

13:45 – 14:30	Conference closing	Poster competition awards and Scientix conference Twitter awards
14:30 – 14:45		Ana Arana Antelo, DG Research & Innovation of the European Commission
14:45 – 15:15		Evarist Bartolo, Minister for Education and Employment, Malta
15:15 – 15:30		Dr Àgueda Gras-Velázquez, Scientix Project Manager, Science Programme Manager at European Schoolnet

Rooms

Location of the different rooms:

Room	Location	Maximum occupancy
Ballroom	Ground floor	650
Ballroom I	Ground floor	150
Ballroom II	Ground floor	150
Vision	8th floor	130
Clarity	8th floor	70
Serenity	2nd floor	35
Infinity	2nd floor	35
Posters exhibition	Ground floor	
Stands exhibition	1st floor	

Lunches

Lunch will be served in two different locations. Your badge indicates which restaurant you have been allocated to:

Colour	Restaurant
Blue	Klimt Lunch
Yellow	Restaurant Lunch

Scientix Ambassadors will help you get to the correct restaurant.

Posters

Id	Title	Last Name	First Name
P01	STEM in my school backyard	Saraiva	Elisa
P02	Coding in my school	Melniciuc	Maria Eugenia
P03	CSI - Popular themes for education	Özdemir	Özgür
P04	Collaborative learning of an academic MOOC by middle school students in the Educational team model	Ben Shitrit Haimi	Limor
P05	Make An Easy Drone	Erken	Mustafa

Id	Title	Last Name	First Name
P06	Municipalities and business by sciences through MUDIC-VBS-CV.	Carnicer	Jesús
P07	Work- Based Science Learning : Connection Schools with Industry	Argyri	Panagiota
P08	STEMigrants.eu - A repository of STEM activities for Education & Integration of refugees and migrants	Lefkos	Ioannis
P09	Measuring primary children's confidence in science	Carroll	Sarah
P10	Earth and space in classroom activities	Anghel	Cristina Iulia
P11	Life in a Bottle	Ruotolo	Angela
P12	From windmills to wind turbines	Thoma	Ralia
P13	World Population Global Project	Pomohaci	Argentina-Monica
P14	Education and industry to improve STEM - Two weeks as pharmacist	Zambrotta	Maria
P15	Teaching chemistry using online labs	Blazhevska	Aleksandra
P16	botSTEM: Robotics and STEM education for 4-8 y.o children	Greca	Ileana
P17	Professionals Go Back to Petro Kuzmjak School	Budinski	Natalija
P18	Inspire students to study STEM by using of COMPASS project	Hristova	Tsetsa
P19	Why Collaborative Learning for Teachers is important?	Farkas	Bertalan Péter
P20	STEM for daylighting rivers: understanding the dynamic of rivers and the impact of urban sprawl for increasing civic ecology	Ugolini	Francesca
P21	Teen Science Café	Scicluna Bugeja	Desiree
P22	An example of teacher training: astronomy education with STEM	Arslan	Ayşe
P23	Analysis of the pedagogical use of programming in a virtual reality environment for the development of STEAM competences in primary education	Robles	Ascensión
P24	Pre-service physics teachers' STEM perspectives and STEM integrations	Caner	Fatma

Id	Title	Last Name	First Name
P25	Cell EXPLORERS- a growing network of Higher Education Institution teams delivering STEM outreach and engagement in schools	Grenon	Muriel

Workshops

ID	Title	Facilitator(s)	Session
WS01	First Steps in Scratch	Mihai Agape	CII
WS02	Codinc, peer to peer coding for inclusion	Veronique de Leener and Yannick Michaux	BI
WS03	Developing Students' 21st Century Skills with Go-Lab	Rosa Doran	AII
WS04	Drones at School	Liliana Fernandes and Jorge Reis	CI
WS05	Aura-virtual reality	Marija Gaurina and Ivana Marić Zerdun	FI
WS06	Astro party	Ivo Jokin	HI
WS07	Secret of the mobile phone	Sladana Jovic and Bojana Mitriceski Andelkovic	FII
WS08	Learning Science Though Theatre: hands on!	Alexandros Koukovinis and Menelaos Sotiriou	DI
WS09	Light-interacting materials: Science meets Beauty	Annamaria Lisotti and Rui Baptista	EII
WS10	STEM in the classroom: How DIY water quality sensors bring science to our students	Paulo Lourenço and Gonçalo Azenha	BII
WS11	Society/Board Games In Learning Stem Subjects	Cristina Nicolaita and Cornelia Melcu	DII
WS12	ORT Makers: Doping STEM with the Makers' spirit and practice	David Rossenberg	EI
WS13	R2T2 – A collaborative Mars mission using the Thymio educational robot	Paolo Rossetti and Christian Giang, Evgeniia Bonnet and Morgane Chevalier	AI
WS14	Mobile phone for the lessons	Rigonda Skorulskienė	GI

Presentations

ID	Title	Last Name	First Name	Session
T01	Effects of problem-solving and epistemology beliefs on academic performance. Differences according to academic level and gender	Alabau-Gonzalvo	Javier	12.1
T02	Research-School Collaboration: involving pupils in the development of a toolkit to increase their understanding of protein chemistry	Aluigi	Ann	7.1
T03	Walking through the nature	Andonoska	Aleksandra	8.2
T04	The Formula 1 competition in Junior High School	Angelopoulos	Panagiotis	14.1
T05	Science for ALL children: giving new opportunities to the less privileged	Balli	Enrico Maria	12.2
T06	World Biotech Tour: teaching biotechnology	Barciela	Patricia	7.2
T07	Computational Thinking in Primary Schools – Pilot project on successfully combining teacher training and innovation in the classroom	Bauer	Martin	6.1
T08	Teacher professional learning model for disseminating innovative practice	Bertule	Dace	2.3
T09	The STEM School Label - how to apply for my school	Billon	Noëlle	11.2
T10	Contours of Scientific Literacy and the Assessment of Science Education Practice in Europe and Beyond	Bolte	Claus	2.1
T11	Working towards a gender inclusive STEM education in Europe	Bronzwaer	Lisanne	3.3
T12	Data-driven STEM teaching: The presentation of the JOBSTEM research project experiences	Burusic	Josip	11.1
T13	Be STEMpatic! (Budi STEMpatičan!): the project of identification, guidance and teaching of STEM gifted students	Burusic	Josip	13.1
T14	Make Tomorrow-Turkey Programme	Caner	Fatma	11.4
T15	Surprising and simple devices to study forces and their laws	Cassinello	Pablo	5.2
T16	The PDF (Pensar Digital E Fazer) Project. A proof of concept in progress	Pinto Miranda	José Carlos	4.1
T17	Do you speak science? How researchers and pupils can learn from each other about science	Cocea	Madalina	1.2

ID	Title	Last Name	First Name	Session
T18	NanoInventum: Introducing Nanotechnology in primary school	Díaz-Marcos	Jord	7.3
T19	Digital Earth: GI Learner creating a learning line for GI Science in education	Donert	Karl	4.2
T20	Mediatheque of the Lindau Nobel Laureate Meetings	Edema	Patricia	1.3
T21	"Stem in aquaculture immersion" – To enthuse today's youth and foster tomorrow's workforce	Ernstberger	Pamela	5.1
T22	The TEC model for Teacher Training and Social Inclusion	Ganayem	Asmaa	12.4
T23	Enhancing students' motivation to learn STEM: educational technology	Gateva	Stanislava	3.2
T24	D3Mobile Metrology World League	Gil Docampo	Mª de la Luz	4.3
T25	Extending NetLogo "climate change" model	Gkaras	Georgios	9.3
T26	Marine Litter Solutions Through Learning by Doing	Gravina	Teresita	9.1
T27	Examining the added value of computer-supported inquiry learning with embedded virtual experimentation on students' attitudes and motivation on STEM education	Kapartzianis	Achillefs	10.1
T28	Particle Physics and Creativity in Primary Education	Lampou	Ourania	15.1
T29	Lifting the Classroom into Space – Pupils observe the Earth by analysing remote sensing data	Lindner	Claudia	5.3
T30	STIMEY – A Generic Multichannel Hybrid e-Learning Platform for STEM-Education	Mäkiö	Juho	8.1
T31	Novel ways to promote Math, Science and Technology education through international StarT	Markula	Anette	10.2
T32	The use of immersive Virtual reality in the Mathematics classroom	Molina Ayuso	Álvaro	16.1
T33	"Happy Channel presents Space News by Space Scoop"	Molla	Marina	8.3
T34	Supporting and Teaching Visual Impaired Pupils (VIPs)	Nerantzis	Nikolaos	12.3
T35	Changing Places and Changing Teaching in STEM Education	Walden	Richard	11.3
T36	Unplugged activities for coding and algorithmic thinking	Njegovanović	Gorica	6.3

ID	Title	Last Name	First Name	Session
T37	Taking science classes across borders	O'Donnell	Benedict	8.4
T38	Connecting STEM to Industry through Industry expert – teacher mentor ship	Sanghvi	Kavita	5.4
T39	Learning Science Through Theatre	Sotiriou	Menelaos	15.2
T40	Mathematics through application to the electrical engineering teaching subjects	Šumonja	Sonja	2.4
T41	The Open Science Internships	Svobodova	Katerina	14.2
T42	Enriching STEM education projects by adding a citizen science dimension (ROEDUSEIS, MOBE and SERA)	Tataru	Dragos	1.1
T43	Launching a gifted children programme	Tiks	Luise	13.2
T44	Course "Science, Technology, Society" for high school students in Estonia	Timakova	Katrin	10.4
T45	ICSE International Centre for STEM Education (ICSE, Freiburg,Germany)	Törner	Günter	10.3
T46	O Robot Ajuda! (The Robot Helps!)	Torcato	Paulo	6.2
T47	Introducing the Coding Subject in Primary Education: Methodology and Tools	Trajkovik	Vladimir	3.1
T48	From MatLan to M&L – exploring new horizons	Vacaretu	Ariana-Stanca	1.4
T49	Informatics in primary education and integral science education in lower secondary education: the Lithuanian experience	Vaidelis	Giedrius	2.2
T50	Simplifying the use of IoT for STEM primary education	Vakaloudis	Alex	16.2
T51	Dr. Scratch: Assess Scratch projects for Computational Thinking skills	Vargas Alba	Ángela	3.4
T52	SOS Pollinators	Vignolo	Clara	9.4
T53	Educational Math Games for Two Players	Vondráková	Petra	6.4
T54	Motivating youth towards STEM education and careers through the UMI technologies	Walterova	Iva	4.4

ID	Title	Last Name	First Name	Session
T55	Preparing the World for Tomorrow	Yavas	Timur	9.2
T56	Escape rooms in the service of science	Peleg	Ran	7.4

KEYNOTES

Prof Svein Sjøberg

Professor in science education at Oslo University, Norway

His current research interests are the social, ethical and cultural aspects of science education, in particular the impacts and influence of large scale assessment studies like PISA and TIMSS. He has worked extensively with international and comparative aspects of science education through e.g. UNESCO, OECD, ICSU and the EU. He has won several prizes and awards for his research, teaching and promotion of science literacy and public understanding of science. He is elected member of the two Norwegian academies: Norwegian Academy of Science and Letters and Norwegian Technical Science Academy. He has also been on the expert committees of the EU FP6 Science in Society program and the Eurobarometer studies.

Dr Beth Healey

Doctor expert in space and extreme environments, International Space University, London, UK - Former ESA MD Spaceflight Analogue Concordia

Beth's interest in extreme and remote environments has led her to work as part of medical and logistical support teams for ski mountaineering expeditions and endurance races from Greenland to the North Pole. She also overwintered as research MD for the European Space Agency at spaceflight analogue Concordia 'White Mars'. Now based in Chamonix, France, she is learning medical French and furthering her experience of mountain trauma while on placement at Sallanches A&E department.

Special guests

And the interventions of

Jean-David Malo, European Commission, Director - Directorate B - Open Innovation and Open Science, DG Research and Innovation

and

Evarist Bartolo, Minister for Education and Employment, Malta, MT

STANDS: DEMONSTRATIONS AND HANDS-ON ACTIVITIES

1. Connecting science with the daily life via hands-on activities

Organisations: **University of Vigo, Technical University of Madrid and Spanish Royal Societies of Physics and Chemistry**
Funding scheme: N/A
Presenters: **José Benito Vázquez Dorrío, Gabriel Pinto**

Connecting daily life and investigation with simple hands-on activities

José Benito Vázquez Dorrío presents hands-on activities that can be used to learn/teach physics by doing, including topics such as: mechanics, electromagnetism, thermodynamics, optics, waves and fluids.

Visit the Scientix blog for more information about hands-on physics resources:
http://blog.scientix.eu/2017/08/where-do-i-find-hands-on-physics-resources/

and the reference webpage of the Teaching Innovation Group at University of Vigo:
http://www.clickonphysics.es/cms/en/

Activities for inquiry-based STEM education through a magical substance: water!

A series of contextualised experiments and inquiries about STEM topics are proposed. The main objective is to provide tools and sources for inspiration to teachers, in order to encourage active learning and critical thinking among students from different educational levels. A common point of all activities is that water, the most known substance to everyone, plays an important role in them. Various topics are covered during this demonstration, including physicochemical properties (e.g. density, miscibility, evaporative cooling), chemical reactions and technical applications. All of those give reasoning to effects, such as ocean thermohaline currents, with influence on climate, the correct way to extinguish fire from oil in the kitchen or the osmotic flow through semi-permeable membranes, just to name a few examples. Many of the proposed inquiries are based on commercial information of everyday products and on the use of inexpensive materials.

2. Bringing the InsSight Mission into the classroom

Coordinator: **Institut de Physique du Globe de Paris**
Funding scheme: N/A
Presenter: **Fatima Moujdi-Menauge and Jeremy Camponovo**

SEIS INSIGHT will involve a generation of school kids, teenagers and students, who, like scientists, will follow a live mission. It will be a unique opportunity to develop a specific scientific programme for schools and the general public! During this demonstration, the presenter will show examples of hands-on resources developed in relation to the project, based on the INSIGHT space mission, and how the education programme can bring a space mission directly into the classroom, thus giving school pupils and their teachers the opportunity to make a link with on-field scientists. The activities include, for example:

- a live observation of seismic activities on another terrestrial planet.

- an exploration and study of planets using an approach that is less virtual.

- tests of hypotheses through fun hands-on experiments.

- workshops for teachers to explore some innovative activities in geophysics.

Project website:	Project on the Scientix portal:
https://insight.oca.eu/	http://www.scientix.eu/projects/project-detail?articleId=674641

3. "Codex on the Flight of Birds" of Leonardo da Vinci - The man and his era, from the myth of Icarus to Space Mission and to Robotics

Organisation: **Liceo Scientifico Galileo Galilei di Perugia MIUR**
Funding scheme: N/A
Presenter: **Daniela Ambrosi**

The "Codex on the Flight of Birds" is a relatively short publication from around the year 1505 by Leonardo da Vinci. It comprises 18 folios in the size of 21 × 15 centimetres. Now stored at the Biblioteca Reale in Turin, Italy, the codex includes an examination of birds' flight behaviours and proposes different mechanisms for designing mechanical flights. Leonardo constructed a number of these machines himself and attempted to launch them from a hill near the city of Florence. However, he failed in his efforts. In the codex, Leonardo notes for the first time that the centre of gravity of a flying bird does not coincide with its pressure centre. From the study of anatomy to the making of da Vinci's machines, pupils can study various subjects through project-based learning. This STEAM work is organized over three years. 2018 was the first year and students made small models, passing from the Leonardo code to the geometric mathematical graphic code. As an example of coding, students have created a simple mechanical hand. Next year, students will visit the PERCRO Laboratory of the Sant'Anna Institute of Pisa, a real world excellence in the field of robotics and sensory perception with new digital technologies, led by Prof. Massimo Bergamasco.

4. STEM FOR ALL

Coordinator: Sarıyer District National Education Directorate
Funding scheme: Erasmus+
Presenters: Sibel Saygin and Emre Yamac
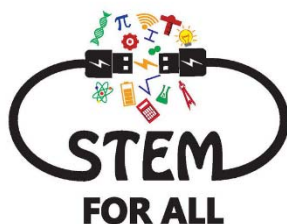
In times of rapidly evolving technology, it should be taken into account what the globalised world needs and what should be done to meet its emerging needs. In this respect, Science, Technology, Engineering and Mathematics (STEM) education has become a necessity for all countries of the world. STEM FOR ALL encourages currently enrolled students, as well as future generations of students, to understand and embrace the technology that affects them every day in their lives. STEM FOR ALL aims at addressing these issues by motivating teachers to keep up to date and enrich their professional skills. STEM FOR ALL believes that subjects related to STEM topics should be taught by engaged and enthusiastic teachers, using hands-on and minds-on activities. By making STEM-related subjects enjoyable and exciting, they help students not only to learn and make connections with real life but also take a step towards a future career in the field of STEM. Students develop basic skills in mathematics and science, as well as 21st century skills such as creative and critical thinking, problem-solving, information literacy and communication.

Project website:
https://erasmusproject.wixsite.com/stemforall

Project on the Scientix portal:
http://www.scientix.eu/projects/project-detail?articleId=720148

5. MaST Networking: Innovation and Creativity Workshops for Students

Coordinator: School Inspectorate of the Calarasi County
Funding: European Social Fund
Presenters: Nicolae Micescu and Viforel Dorobantu

The MaST Networking project laid the foundations of a concept for the Innovation and Creativity Workshop in the fields of Science, Technology, Engineering and Mathematics (STEM) in Romania. The project started in September 2010 in 5 counties in Romania and continues still today with events, such as exhibitions that take place in various localities of the country. Starting in 2017, the project operates a Romanian-Bulgarian cross-border partnership comprising schools from 3 Bulgarian cities and 3 cities in Romania. MaST Networking wants to present information about the project's evolution at the Scientix conference. The project's stand includes promotional materials, images of its activities and layouts. Images from relevant activities will be projected to give an insight into what is happening at these workshops, STEM exhibitions and competitions.

At the same time, we will bring some samples of models made by students of our own initiative in STEM fields that are of great interest to them. The freedom of students to choose any kind of themes brings a surplus of enthusiasm and creativity. In the past 3 years, STEM workshops have attracted talented students in the field of arts who have tried to trace natural phenomena through the eye of the artist.

Project website:
http://www.mastnet.ro/

Project on the Scientix portal:
http://www.scientix.eu/projects/project-detail?articleId=420063

6. Les Saventuriers

Coordinator: **Center for Research and Interdisciplinarity**
Funding scheme: N/A

Presenters: **Eleni-Aikaterini Moraitopoulou, Julia Blumental**

Savanturiers - École de la Recherche is an educational programme developed by the Center for Research and Interdisciplinarity (CRI - Paris-Descartes University) that aims to encourage education through research in preschools, primary, middle and high schools. The main goal of this programme is to build a precise and productive learning process around the methods and issues of research. Education through research develops students' critical thinking, their urge to explore the unknown and their propensity for teamwork.

Savanturiers has a triple vocation:

- Set up education through research projects in classes with scientific mentors;
- Organize teacher training and MOOCs;
- Conduct research and studies in the educational sphere.

Project website:
https://les-savanturiers.cri-paris.org/

7. I&R European Industrial Technology and Robotics

Coordinator: **IES Alpajés**
Funding scheme: **EC (Lifelong Learning Programme)**
Presenter: **Leopoldo Mosquera**
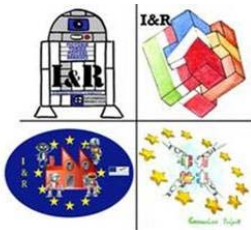
Robotics is fast becoming an integral part of the school curriculum with its ability to integrate a broad range of subjects, most notably in technology, science and mathematics. Teamwork and co-operation are a cornerstone of any Robotics project. It can encourage students to think creatively, analyse situations and apply critical thinking and problem solving skills in real-world situations. The I&R project aims at developing these main areas:

• The evolution of the European industrial world and the job possibilities offered.

• Robotics: the role of robots in industry and other fields of human life.

• Analyse the state of robotics research and its tendency.

• Plan educational robotics for specific tasks to enhance students' creativity, skills and self-learning.

Project website:	Project on the Scientix portal:
http://www.europeansharedtreasure.eu/detail.php?id_project_base=2013-1-FR1-COM06-49477	http://www.scientix.eu/web/guest/projects/project-detail?articleId=593872

8. Science on Stage Europe

Coordinator: Science on Stage Europe e.V.
Funding scheme: EC (FP6), think ING.
Presenters: Daniela Neumann and Lisa Ehrlich

The main focus of Science on Stage, the European science teachers' network, is on the personal international exchange of best-practice ideas from teachers for teachers. Through various activities such as cross-border teacher-trainings, international working groups or educational festivals the non-profit association offers STEM teachers a platform to share their ideas and experiences. Its current activities include "Coding in STEM Education", in which 23 teachers from all over Europe develop teaching materials detailing how coding and ICT can be implemented in STEM education. The project "Lilu's House – Promoting Language Skills with Experiments" combines short stories with experiential learning and age appropriate research tasks to create an inclusive learning environment. The 2019 edition of the European Science on Stage festival will take place in Portugal and teachers from all over Europe are encouraged to apply for the pre-selection events in their countries. At the Scientix conference, the network presents its activities and how teachers can get involved in their countries.

Project website:

https://www.science-on-stage.eu/

Project on the Scientix portal:

http://www.scientix.eu/projects/project-detail?articleId=37890

9. SCORE-Student Competences as Outputs of Research-based Education

Coordinator: Colegio Pureza de María, Spain
Funding scheme: EC (Erasmus+)
Presenters: Helena Capela and Teresa Pereira

A multifaceted consortium, based in three countries, is working together to tackle inefficient use of ICT and low achievement in mathematics and science. The SCORE project builds on the results of the MUST project (2014-16), by promoting a culture for evaluation that emphasises evidence-based decision-making, making use of learning analytics and increasing impact through Learning Tools Interoperability (LTI). The project's main target groups are lower secondary school students, especially those with low achievement levels in the subjects of Science, Technology, Engineering and Mathematics (STEM), school teachers and teacher trainers, software developers, university professors and educational researchers. The project's main objective is to help improve students' achievement and attitude towards STEM subjects. More than 150 people are expected to participate in SCORE's teacher training activities, thus reaching more than 1,500 students at schools. SCORE makes use of the online learning platform Moodle, which has more than 100 million registered users.

Project website:

http://scorepro.eu/

Project on the Scientix portal:

http://www.scientix.eu/projects/project-detail?articleId=720031

10. eHAND (effects of Human Activities on Natural Disasters)

Coordinator: Liceo Statale Scientifico e Classico "Majorana"
Funding scheme: Erasmus+
Presenters: Franca Sormani and Christos Alexakis

According to recent research studies, it is very likely that human activities will affect future catastrophes. Meanwhile, population growth and urbanisation make communities much more vulnerable to natural hazards than before. Several studies confirm that an effective learning can be obtained in this field by combining direct experience, observation, discovery and action, so disaster and risk education should be part of the national schools curricula and be included in school subjects. The Erasmus+ funded project eHAND involves seven partners and aims at arming students with the necessary skills to be "good citizens" in the future. eHAND contributes to the goals expressed by the Europe 2020 strategy, focusing sharply on more complex social issues, such as the links between environmental quality, human equality, human rights and peace, and on the critical role of science and technology in understanding and mitigating the effects of extreme natural events.

Project website:	Project on the Scientix portal:
https://twinspace.etwinning.net/15801/pages/page/8552	http://www.scientix.eu/projects/project-detail?articleId=627045

11. eCraft2Learn

Coordinator: University of Eastern Finland
Funding scheme: EC (Horizon 2020)
Presenter: Stela Shiroka

The consortium behind the eCraft2Learn project is researching, designing, piloting and validating an ecosystem that is based on digital fabrication and making technologies for creating computer-supported artefacts. The project aims at reinforcing personalised learning and teaching in Science, Technology, Engineering, Arts and Mathematics (STEAM) education. The project supports the development of 21st century skills that promote inclusion and employability for youth within the European Union. The eCraft2Learn ecosystem supports both formal and informal learning processes by providing the appropriate digital fabrication. eCraft2Learn is based on learning principles through the act of making and the do-it-yourself (DIY) philosophy. DIY technologies emerge as unique making tools that can create a learning ecosystem for attracting and keeping learners interested and motivated. The ecosystem starts with students' own ideas, gained by exploring the world (Stage 1). Then, a planning stage follows where the students explore the resources available and needed for the realisation of their idea (Stage 2). The students then engage in a making process that includes brainstorming, iterative designs, trial and errors and reflection upon designs (Stages 3 and 4) and finally share their finished projects with the open community (Stage 5).

Project website:	Project on the Scientix portal:
https://project.ecraft2learn.eu/	http://www.scientix.eu/projects/project-detail?articleId=623603

12. STEM Alliance

Coordinator: **European Schoolnet**
Funding scheme: **Privately funded**
Presenters: **Maïté Debry, Anastasiya Boiko and Adrienn Pap**

The STEM Alliance – inGenious Education and industry, brings together Industries, Ministries of Education and education stakeholders to promote Science, Technology, Engineering and Math education and careers to young European's and address anticipated future skills gaps within the European Union. The STEM Alliance builds on the success of the inGenious initiative (2011-2014) to increase the links between STEM education and careers, by involving schools throughout Europe. With the support of major industries and private partners, the STEM Alliance for inGenious Education and Industry activities promote STEM jobs in all industrial sectors and contribute to build a STEM-skilled workforce.

Project website:	Project on the Scientix portal:
http://www.stemalliance.eu/	http://www.scientix.eu/news/news-all/news-detail?articleId=269730

13. EDU-ARCTIC and ERIS

Coordinator: **Institute of Geophysics Polish Academy of Sciences**
Funding scheme: EC (Horizon 2020 and Erasmus+)
Presenter: **Piotr Stankiewicz**

ERIS – Exploitation of research results in school practice (ERIS) is a project funded by the Erasmus+ programme of the European Union, aiming at increasing the interest of students in junior high and high schools in Science, Technology, Engineering and Mathematics (STEM), and in pursuing a scientific career. The ERIS project is divided into two parts: a testing and a dissemination phase. During the testing phase, teaching materials in national languages and in English for students in junior high and high schools are prepared and then tested in selected schools. During the dissemination phase, all participating schools in the partner countries, but also elsewhere in Europe, will have the opportunity to freely participate in the project. They will use the packages during their lessons and take part in the webcasts of online lessons conducted by scientists in the project's national languages and in English.

Project website:	Project on the Scientix portal:
http://eris-project.eu/index.php/en	http://www.scientix.eu/projects/project-detail?articleId=693704

EDU-ARCTIC is a project funded by the Horizon 2020 framework of the European Union. EDU-ARCTIC uses innovative, interactive and openly accessible online tools to link Arctic research and school education in Europe. It provides direct contact between students and specialists of advanced subjects in a variety of scientific disciplines, thus helping students to develop their scientific interests. The programme, which is currently used in 48 countries, is dedicated to young students aged 13 to 20 and their teachers. The project deals with a wide range of topics, including lesson on natural sciences, polar research and important challenges in today's society.

Project website:	Project on the Scientix portal:
http://edu-arctic.eu/	http://www.scientix.eu/projects/project-detail?articleId=577260

14. Universe in the Classroom

Coordinator: **Astronomy & Society Group, Leiden Observatory, Leiden University**
Funding scheme: **EC (FP7)**
Presenters: **Mahbobah Ahmadi and Pedro Russo**

Leiden University's Astronomy & Society Group is involved in several global educational programmes in astronomy. With its considerable experience in scientific outreach and education, it has initiated several programmes for children and teenagers in collaboration with key international organizations.

The Universe Awareness (UNAWE) project uses the grandeur of the Universe to inspire children and to encourage them to develop an interest in STEM fields. The programme is active in over 60 countries and has a global network of more than 1,000 astronomers, teachers and educators. The project has produced educational resources such as 'Universe in a Box', which was honoured with the Scientix Resources Award for 'STEM Teaching Material Addressed to Teachers' in 2015. In 2016, UNAWE also initiated the Discovery Club, an educational programme for children at refugee camps in the Netherlands.

Other interesting initiatives involve the Space Awareness project that aimed to attract young people to science and technology and to stimulate European and global citizenship. Over the course of the project, Space Awareness developed around 300 high-quality space-related educational resources; the IAU astroEDU platform comprising astronomy educational activities peer-reviewed by both astronomers and educators; and the Space Scoop, a news service in a child-friendly language for children aged 8 and above, including articles about astronomical discoveries accompanied by a stunning astronomical image.

Educators can benefit immensely from the projects by taking advantage of the wide array of free high-quality resources and tools produced as well as the large international networks created.

Project website:

http://www.unawe.org

Project on the Scientix portal:

http://www.scientix.eu/projects/project-detail?articleId=42901

15. STEM4YOUTH

Coordinator: **Warsaw University of Technology**
Funding scheme: **EC (Horizon 2020)**
Presenter: **Alessandro Vitale**

STEMFORYOUTH promotes STEM education by key specific challenges and their impact on our life and career perspectives. The project produces a comprehensive, multidisciplinary series of courses presenting key STEM discipline challenges to support young people in their education. Contents are organised around six STEM disciplines: Mathematics, Physics, Astronomy, Chemistry, Engineering and Medicine, and one trans-disciplinary module (Citizen Science at Schools, i.e. scientific projects created by students with no specialised training in science, based on their concerns on everyday aspects of science).

Project website:
http://www.stem4youth.eu/

Project on the Scientix portal:
http://www.scientix.eu/projects/project-detail?articleId=593987

16. ER4STEM

Coordinator: TU Wien
Funding scheme: EC (Horizon 2020)
Presenters: Julian Angel-Fernandez and Georg Jaeggle

The partners behind the Educational Robotics for STEM (ER4STEM) project creatively use educational robotics to maintain children's curiosity about the world. They do this by critically using robotics to connect pedagogical methodologies with 21st century skills. To achieve this, during the first two years of the project, there were 118 workshops organised in total and 60 more will be organised during the project's third year. Each workshop is evaluated, using a strict protocol, to collect quantitative (e.g. pre and post-questionnaires) and qualitative (e.g. interviews and videos) data. The data is evaluated to determine the impact of each workshop and identify best practices. Moreover, an activity template has been created as a design tool that facilitates different stakeholders to come up with learning activities for different robotic toolkits. This template has been used as the basis for developing a web-repository meant to help various stakeholders share their activities.

Project website:

http://www.er4stem.com/

Project on the Scientix portal:

http://www.scientix.eu/projects/project-detail?articleId=483752

17. Open Schools for Open Societies (OSOS)

Coordinator: Ellinogermaniki Agogi
Funding scheme: EC (Horizon 2020)
Presenters: Katerina Riviou

Our schools should be incubators of exploration and invention. They should be accelerators of innovation and promote Open Schooling. School leaders should set a vision for creating learning experiences for all learners to thrive and teachers should be collaborators. A holistic approach to innovation is needed. The role of OSOS is to describe and implement at scale a process that facilitates the transformation of schools to innovative ecosystems, acting as shared sites of science learning for which leaders, teachers, students and the community share responsibility and from which they all benefit through the increase of their communities' science capital and the development of responsible citizenship. In this framework OSOS supports European schools by a) developing a model that promotes such a culture, b) offering guidelines on issues such as staff development and c) suggesting a range of possible implementation processes from small-scale prototypes through to setting up an "open school within a school" while testing and assessing them in over 1,000 school environments in 12 countries. The themes of the project activities developed and pursuit in participating schools focus on areas of science linked with the Grand Societal Challenges as shaped by the EC and RRI. The consortium of OSOS partners includes 19 universities, research and science centres, schools, policy makers, companies and organisations representing school heads around Europe and beyond. OSOS is currently at its first year of implementation and over 130 schools are participating with the creation and sharing of Open Schooling accelerators within online communities of practice.

Project website:
https://www.openschools.eu/

Project on the Scientix portal:
http://www.scientix.eu/projects/project-detail?articleId=689474

18. eTwinning and School Education Gateway

Coordinator: European Commission
Funding scheme: **EC (Erasmus+)**
Presenter: **Elina Jokisalo**

The eTwinning community for schools provides teachers across Europe with the opportunity and the tools for collaboration in maths, science and technology education projects.

eTwinning promotes collaboration between schools in Europe through the use of Information and Communication Technologies (ICT). The community provides support, tools and services to make it easy for schools to form short or long term partnerships in any subject area, and thus to improve and develop teachers' practices and education in Europe.

Project website:	Project on the Scientix portal:
https://www.etwinning.net/	hhttp://www.scientix.eu/projects/project-detail?articleId=30518

Presented in 23 European languages, the School Education Gateway is a single point of entry for teachers, school leaders, policy makers, experts and other professionals in the school education field. The School Education Gateway is funded by Erasmus+, the European programme for Education, Training, Youth and Sport. It is operated for the Directorate General for Education and Culture of the European Commission by European Schoolnet, an international partnership of 34 European Ministries of Education developing learning for schools, teachers and pupils across Europe. The School Education Gateway is linked to eTwinning, the community for schools in Europe.

Project website:
https://www.schooleducationgateway.eu/

19. Scientix

Coordinator: **European Schoolnet**
Funding scheme: **EC (Horizon 2020)**
Presenters: **Gina Mihai and the Scientix Ambassadors**

Scientix promotes and supports a Europe-wide collaboration among STEM (science, technology, engineering and maths) teachers, education researchers, policymakers and other STEM education professionals. Scientix was originally born at the initiative of the European Commission and has, since its inception, been coordinated by European Schoolnet, a Brussels-based consortium of thirty-four ministries of education, which is a driving factor for innovation in teaching and learning and fosters pan-European collaboration of schools and teachers.

Project website:
http://www.scientix.eu

PARALLEL SESSIONS I

1. Research into the classroom

Moderator: Erramun Martiarena Sarasola

1.1 Enriching STEM education projects by adding a citizen science dimension (ROEDUSEIS, MOBE and SERA) (T42)

Presenter: Dragos Tataru

The learning and doing approach in STEM helps develop key skills and prepare students and citizens to recall, use and most importantly apply the knowledge. Thus, a strong and continuous STEM education is already recognized as a driven force for new opportunities and career success. The Romanian Educational Seismic Network was a national project integrated in a larger European initiative (The Seismology and Earthquake Engineering Research Infrastructure Alliance for Europe - SERA) that not only introduced science based resources and activities in schools but also highlights the unexplored role of citizen science in the classroom, from K-12 to higher education.

1.2 Do you speak science? How researchers and pupils can learn from each other about science (T17)

Presenter: Madalina Cocea

RESEARCHERS' NIGHT in ROMANIA. Do you speak science? (H2020-MSCA-NIGHT-2014 Project ID: 633311, RoTalkScience), a EU funded project through Horizon 2020, is one of the few opportunities in Romania to present science in an accessible, fun and interactive manner to children. Our presentation will focus on the strategy of the Researchers Night event, how we involved schools and science teachers so that the audience was mainly pupils, the development of our awareness campaign and the design of activities. We will also show how we managed to sustain the event each year, even after the exhaustion of the Horizon 2020 funding.

1.3 Mediatheque of the Lindau Nobel Laureate Meetings (T20)

Presenter: Dr. Patricia Edema

With unique content dating back to 1952, the Lindau Nobel Mediatheque (http://www.mediatheque.lindau-nobel.org/) of the Lindau Nobel Laureate Meetings maps the Lindau Meetings' rich history of scientific dialogue. The mediatheque's aim is to get teachers, pupils and university students engaged with Nobel Prize related research and innovation. Animated learning videos, Nobel Labs 360° and Topic Clusters on STEM topics and key social issues are specially designed for use in schools. The enhancement of the mediatheque is generously supported by the German Federal Ministry of Education and Research, the Carl Zeiss Stiftung, the Gerda Henkel Stiftung and the International Lake Constance Conference.

1.4 From MatLan to M&L – exploring new horizons (T48)

Presenter: Ariana-Stanca Vacaretu

The Learning math and languages through research and cooperation - MatLan project (2014-1-RO01-KA201-002699) built on the experience gained by the French partner in the MATh.en.JEANS (MeJ) workshops. Building on the methodology of MeJ workshops, and on the results of the MatLan project, the Maths&Languages – M&L,a KA2 Erasmus+ project, was born from the desire to share, improve and develop the MATh.en.JEANS approach with (and for) mathematics teachers, foreign language teachers and researchers all over Europe, by pairing 10 European high-schools.

2.   Curriculum implementation

Moderator: Angeliki Karageorgopoulou

2.1 Contours of Scientific Literacy and the Assessment of Science Education Practice in Europe and Beyond (T10)

Presenter: Claus Bolte

Authors: Claus Bolte, Marlies Gauckler, Theresa Schulte, Sabine Streller

Science education is generally considered important for young people, but current science education is often criticized as unsatisfactory. The question arises how science education might be changed to fulfil its role in helping young people find their place as citizens of tomorrow's society, and how to secure the future of science research and innovation based on science applications and technology. In our presentation, we introduce the purpose and method of the International Curricular Delphi Study on Science Education in Europe carried out within the PROFILES project and present selected results from the meta-analysis based on the eighteen national reports produced.

2.2 Informatics in primary education and integral science education in lower secondary education: the Lithuanian experience (T49)

Presenter: Giedrius Vaidelis

Lithuania started preparations for updating the curriculum from 2016. Curriculum developers, together with the educational community are discussing key changes, what decisions are needed and what the expected projects for updating curriculum are. The Ministry of Education and Science together with the Education Development Center initiated the project "Informatics in primary education", whose aim is to create informatics educational content in primary education and test it in ten schools. Another initiative – the project "Piloting the programme of Integral Science course for grades 5-8", aims to pilot a new programme for integral science education, to prepare teaching and learning material.

2.3 Teacher professional learning model for disseminating innovative practice (T08)

Presenter: Dace Bertule

The key focal point of the new educational curriculum reform started in Latvia in 2016 lies on the ideas of competency-based learning. This implies educators should bring changes to their practice from the present worldview of acing various new systems of sorting out and driving instruction through immersing into their own practices. The project presented in this talk looked for solutions to assist primary educators to minimize the gap in implementing the teaching of 21st-century skills within the classroom and to supply insights for teacher educators and people who implement education reforms.

2.4 Applying mathematics to electrical engineering subjects (T40)

Presenter: Sonja Šumonja

At the Electrotechnical School Nikola Tesla, Nis, Serbia, the teaching subject Mathematics is represented in all four years (I-IV) with four lessons a week. Although the representation of mathematical concepts in the group of electrical engineering teaching subjects is very large, an essential connection with mathematics almost does not exist. The teachers in our school took the initiative to organize activities related to cross-curricular teaching, working out collaborative lessons for their students. In this presentation, we are going to mention a few examples of cross-curricular and collaborative teaching in our school.

3.   Tools and schools

Moderator: Tiina Kähärä

3.1 Introducing Coding in Primary Education: Methodology and Tools (T47)

Presenter: Vladimir Trajkovik

In the last few years, the subject "Learning to Code" was introduced starting from 3rd grade in primary education in the Former Yugoslav Republic of Macedonia. This new policy has different implications, and creates both challenges and opportunities for the primary education system. This work presents a methodology to deliver "Learning to code" subjects in primary schools addressing various stakeholder perspectives and needs. The proposed methodology uses different educational paradigms and digital tools in achieving the needed skills set among students.

3.2 Enhancing students' motivation to learn STEM: educational technology (T23)

Presenter: Stanislava Gateva

Khan Academy (en.khanacademy.org) is a free, Internet-based learning environment which contains adaptive problem sets, instructional videos in Mathematics, Engineering, Programming, Computers Science, Chemistry, Physics, Astronomy, Cosmology and others. During the presentation, we will introduce Khan Academy, explore possible solutions for increasing students' motivation to learn and develop STEM skills, explore how the platform could help teachers in Europe turn the traditional classroom into a digital one and fit better to the needs of the students, and highlight best practices of the use of Khan Academy around the world.

3.3 Working towards a gender inclusive STEM education in Europe (T11)

Presenter: Lisanne Bronzwaer

Hypatia aims towards a European society that communicates science to youth in a gender inclusive way in order to realise the full potential of girls and boys around Europe. Lead by the NEMO Science Museum in the Netherlands and involving partners in 14 countries, Hypatia has produced guidelines for schools, museums and industries on gender inclusion. Hypatia also offers a toolkit - an accessible, practical and ready-to-use digital collection of innovative activities aimed at teenagers. The collection contains workshops, speed dating, card games, debate scenarios and plays drawn from good practices across Europe.

3.4 Dr. Scratch: Assessing Scratch projects for Computational Thinking skills (T51)

Presenter: Ángela Vargas Alba

Dr. Scratch is a web platform that allows learners to analyse their Scratch projects for their Computational Thinking skills. Scratch is the most widely used programming language oriented to education in the world. Build by the MIT Media Lab, it can be used for free, is Multilanguage and highly recommended for the initiation in the world of programming. Its use has intensified in recent years, with millions of projects in the Scratch on-line platform that can be shared and viewed by other Scratch users.

4. Mobile learning and technologies

Moderator: Carlos Cunha

4.1 The PDF (Pensar Digital E Fazer) Project. A proof of concept in progress (T16)

Presenter: José Carlos Pinto Miranda

Authors: António Castro, José Carlos Pinto Miranda

The paper presents a development project (PDF project) from a Portuguese context, to review the articulate way in which people apply technological education and take it further, in small and protected environment from a public school. Underpinned by the new Raspberry PI phenomena, this proposal's focus is twofold - on teacher training and on the dogmatic teaching technologies paradigm. The project converges with the movement that takes the work of putting digital know-how in everyone's hands so as to change and shape our growingly digital world, as well as our ability to solve problems.

4.2 Digital Earth: GI Learner creating a learning line for GI Science in education (T19)

Presenter: Karl Donert

It is generally agreed that spatial thinking is one of the fundamental forms of intelligence needed to function in modern society. The GI Learner Project was developed from the Digital Earth concept introduced by former US Vice President Al Gore, who envisioned the opportunity to explore science across the world through innovations in mapping and related technologies. GI-Learner is a three-year project, with seven partners from five European countries supported by a Key Action 2 grant from the Erasmus Plus programme. The purpose is to help teachers implement learning lines for spatial thinking in secondary schools, using GI Science.

4.3 D3Mobile Metrology World League (T24)

Presenter: Mª de la Luz Gil Docampo

Three dimensional (3D) models are becoming as popular as photography or video as they are employed by amateurs and a wide variety of professionals. Our project, entitled D3mobile Metrology World League is a 3D modelling championship developed by the research group of CIGEO at the University of Santiago de Compostela (Campus of Lugo - Spain), aimed at promoting interest in science in students born between 2000 and 2005, from all over the world. It is an international school championship for scientific experimentation in which participants learn to make virtual figures, which faithfully represent reality, with high visual and geometric quality.

4.4 Motivating youth towards STEM education and careers through the UMI technologies (T54)

Presenter: Iva Walterova

Today's changing world of work needs employees who are able to think creatively, apply new knowledge in an effective way, become continuously competitive in a highly demanding working environment and are able to stand up to the challenges of work based learning. The presentation builds on the work in the UMI-Sci-Ed project (Exploiting Ubiquitous Computing, Mobile Computing and IoT [UMI] to promote STEM education), which has been developing hardware and software tools and innovative educational approaches and career services. The intervention demonstrates how conference participants can benefit from learning about the UMI-Sci-Ed approaches, services and tools and from getting involved.

WORKSHOPS A

Moderator: Ivo Jokin

A.I R2T2 – A collaborative Mars mission using the Thymio educational robot (WS13)

Paolo Rossetti and Christian Giang (at the Scientix 3 Conference), Evgeniia Bonnet and Morgane Chevalier (at EPFL)

During the R2T2 workshop, participants will connect to a damaged power station on Mars (simulated at EPFL in Switzerland) and will remotely program Thymio robots to rescue the station. The difficulty of this activity lies in the fact that participants have no physical access to the robots, and they can see the impact of their program only after a time lag of 30-40 seconds, due to the video streaming delay simulating the control on another planet. A mistake in programming can cause large damages bringing the robot in uncomfortable positions, hitting other robots and endangering the whole mission. Therefore, participants must predict remotely what their programs will do, and come up with a good strategy to plan the whole operation. Through the given circumstances, the mission offers favourable conditions to develop computational thinking skills. Indeed, participants will have to contemplate many important questions: how to decompose the whole task in such a way that it becomes feasible? How to ensure that the program will do what it is planned for? How to coordinate the mission with other teams to avoid collisions? Which algorithms should be used to program the robot if the results cannot be observed right away? Participants will have to find the right answers to these questions, while keeping in mind that time is limited…

A.II Developing Students 21st Century Skills with Go-Lab (WS03)

Rosa Doran

Many countries around Europe are changing their education system moving towards a more student centred model and using Inquiry Based Learning as a mean to speed up the shift from traditional teaching towards active learning solutions. The general idea is powerful and is very easy to find consensus among teachers about its importance and relevance. The problem starts when trying to put this vision into practice. How and where to start integrating the change in daily classrooms? Go-Lab is a powerful project that aggregates innovative solutions, allowing educators to prepare inquiry-based scenarios enriched with online labs and modern apps. More than 200 000 users over 190 countries are exploring the Go-Lab portal. From those over 19 000 have created Inquiry Learning Scenarios (ILSs). The Go-Lab authoring tool is a powerful solution that enables teachers to gather in the same space a large quantity of different tools and resources allowing also a graceful personalization of spaces to adapt each ILS to the specific needs of each student. During this workshop, we intend to present an overview of Go-Lab, its main features and characteristics. Participants will have the opportunity to experience an ILS as a student and from there move towards the creation of their own scenario. During the session, participants will have the opportunity to explore the different laboratories being offered in the portal, learn about different apps that can be integrated in their lessons and navigate through an already existing collection of ILSs, created by teachers from all over Europe.

WORKSHOPS B

Moderator: Dalibor Todorovic

B.I Codinc, peer to peer coding for inclusion (WS02)

Veronique de Leener and Yannick Michaux

In its Capital Digital project, MAKS trains 16-20 year old youngsters form disadvantaged backgrounds, migrants and asylum seekers. These young people acquire the technical and pedagogical skills to teach coding and programming to their younger 10-12 year old peers in neighbourhoods of Brussels with a low socio-economic status. Our young e-facilitators learn to engage children in STEAM and coding activities in a playful way. This first work experience enhances the youngster's confidence to choose a fitting career and to find a job. It allows them to connect with each other in a constructive way and to enjoy the role of educating their younger peers. Moreover, the project encourages young children to enjoy and enhance their IT skills, which are becoming ever more important in the labour market. In this workshop we will explain the methodology used in formal and non-formal education in order to engage children in such STEM activities.

B.II STEM in the classroom: How DIY water quality sensors bring science to our students (WS10)

Paulo Lourenço and Gonçalo Azenha

How can we make science more exciting, accessible and meaningful to our students? Open Science Hub (Plataforma de Ciência Aberta, PCA) makes science inspiring and reachable for schools and communities by bringing technology and innovation to their daily lives. PCA's educational programme stimulates curiosity and engagement in students by providing them a real, hands-on challenge, which addresses a tangible issue in their environment.

The latest PCA's activities involve using DIY air, water and soil quality sensors to make students think critically about their surroundings and to use science to address local issues, such as air, water and soil pollution. These sensors were adopted from international projects "Smart Kids Lab" and "Fresh Water Watch" and they were adapted to our community's culture, schools and general population, providing a medium through which students learned about mankind's impact on nature and how it can affect climate change. The sensors are made from easy obtainable materials, most of which come from objects present in our daily lives and can be used at home, school and in the wider region. The aim of this workshop is to teach its participants how to use existing STEAM education resources and how to apply them in their classrooms. Furthermore, we will work out possible applications in schools and communities, according to the background of the participants. This workshop is an excellent opportunity to review the best practices on an international level and to develop methods for their application in diverse realities and contexts.

PARALLEL SESSIONS II

5. Contextualisation of STEM teaching

Moderator: Nada Dzmbova Doneva

5.1 "STEM in aquaculture immersion" – To enthuse today's youth and foster tomorrow's workforce (T21)

Presenter: Pamela Ernstberger

Exploring Diversity in Aquaculture (EDinAqua) is a blended programme that is aimed at high school students to stimulate interest and inspire students in the science of aquaculture. Students are given the opportunity to explore the aquaculture industry in a wider context, through a practical approach using inquiry based science, study society and culture through an online platform, therefore offering a more holistic approach to its instruction and learning. For students learning English, this will provide an alternative language immersion opportunity through guided instruction.

5.2 Surprising and simple devices to study forces and their laws (T15)

Presenter: Pablo Cassinello

We introduce a series of entertaining and simple experiments to explain what the forces are like and how they act. Different devices are used in each experiment; experiments include forces of all kinds such as magnetic, electrostatic, elastic and crash force among others. Students must see in each experiment that there are no isolated forces. Whenever a force acts, there must be another (reaction) that they must seek and identify.

5.3 Lifting the Classroom into Space – Pupils observe the Earth by analysing remote sensing data (T29)

Presenter: Claudia Lindner

The projects "FIS – Remote Sensing in School Lessons" and "KEPLER ISS" try not only to enable pupils to experience the overview effect on their own but also to work with scientific earth observation data in order to answer real-world problems. The presentation demonstrates how curriculum-oriented teaching units are developed based on data of Copernicus' Sentinel satellites (ESA) and remote sensing sensors attached to the International Space Station (ISS). In the light of the Copernicus services, it is explained how Sentinel-based teaching units can be developed to communicate knowledge about natural and man-made phenomena in times of global change.

5.4 Connecting STEM to Industry through Industry expert – teacher mentorship (T38)

Presenter: Kavita Sanghvi

With trending Industries like Artificial Intelligence, Augmented reality, Virtual reality, Genomics, space tourism and drones, is our curriculum ready to support this learning? Are our teachers equipped with the skills to prepare our students for the future? Will our students be ready for tomorrow's Industries? The presentation focuses on an action research to get STEM teachers mentored by Industry experts over specific topics and observe their lessons to see if they are more experiential with their curriculum teaching, have more practical knowledge to share with their students and test students to see if they perform better academically.

6. Gaming, robotics and computational thinking

Moderator: Svetla Mavrodieva

6.1 Computational Thinking in Primary Schools – Pilot project on successfully combining teacher training and innovation in the classroom (T07)

Presenter: Martin Bauer

The Federal Ministry of Education, Science and Research (Austria) has initiated a pilot project on teaching computational thinking in Primary Schools (years 1 to 4, age 6 to 10) which successfully combines teacher training and innovation in the classroom. The project is called "Denken Lernen, Probleme lösen" (Learning to think and to solve problems) and focuses on introducing basic thought patterns in terms of problem solving and computational thinking through the use of BeeBots, LEGO WeDo and Scratch.

6.2 O Robot Ajuda! (The Robot Helps!) (T46)

Presenter: Paulo Torcato

The use of Educational Robotics has a strong practical and experimental component. The O Robot Ajuda! Project is using robots as educational aids, with the aim of taking advantage of students' curiosity towards the discovery and learning of basic concepts of STEM. In 2017, we started a new programme - ATTiTude3D, developed to improve low student achievement reflected in high retention rates and consequently in early dropout. The methodology was based on three distinctive dimensions that complement each other: aTTitude Classrooms (i.e new environments with future classrooms); Robotics Education (i.e. applying the methodology of "O Robot Ajuda!") and Mentoring.

6.3 Unplugged activities for coding and algorithmic thinking (T36)

Presenter: Gorica Njegovanović

What happens when a school has little or no technology? Or when there is technology in school, but it is mostly reserved for older students? The presentation will focus on a number of activities, which can be used to develop algorithmic thinking without the use of a computer, including algorithms from everyday life, examples of how they are presented to students and examples of outdoor activities. Of course, computers and their use should not be ignored, but the lack of technology should not be an excuse for not working on developing these skills.

6.4 Educational Math Games for Two Players (T53)

Presenter: Petra Vondráková

The team of teachers from the Department of Applied Mathematics, VŠB - Technical University of Ostrava, created a broad set of mathematical games, which allow to easily organise a competition in class and letting two players, or two teams of players test their mathematical skills and compete with their classmates. The aim of the contribution is to introduce these interactive mathematical games created with the support of the STEM4YOUTH project. These educational games can be used for remarkable training mathematical skills in the class or for training at home.

7. Nano, bio and more

Moderator: Achillefs Kapartzianis

7.1 Research-School Collaboration: involving pupils in the development of a toolkit to increase their understanding of protein chemistry (T02)

Presenter: Annalisa Aluigi

Authors: Annalisa Aluigi, Alessandra Degli Esposti, Giovanna Sotgiu, and Armida Torreggiani

During the session, an educational toolkit will be presented, designed for teaching the proteins chemistry within the biochemistry course in high schools. This toolkit is the result of a collaboration process between school (students and teachers from high schools) and research (National Research Council of Italy), carefully planned to stimulate interest and motivation during the learning process. The activities of students in the realization of this toolkit has stimulated them to make connections between the experimental observables and the theories studied in the textbooks, thereby developing greater interest and a deeper understanding of base concepts about protein behaviour and chemistry.

7.2 World Biotech Tour: teaching biotechnology (T06)

Presenter: Patricia Barciela

The World Biotech Tour (WBT) highlights the role of science centres in bringing together key stakeholders to promote understanding of a relevant societal issue: biotechnology. By involving students, teachers, science centre professionals and the general public in hands-on activities and discussions about key issues pertaining to biotechnology, the WBT will demonstrate the relevance, excitement and wonder of biotechnology in a fun and exciting way.

7.3 NanoInventum: Introducing Nanotechnology in primary school (T18)

Presenter: Jordi Díaz-Marcos

Nanoinventum is a project of scientific co-creation, based on STEAM disciplines, to introduce nanotechnology in primary. The main objective is to create a nanobot mock-up, thanks to different scientific concepts adapted to curriculum, and present it to other schools in a final scientific workshop. The model is made using a methodology based on design thinking, assigning roles and promoting creativity based on directed activities. The activities will be based on collaboration, observation, experimentation, enhancing the game and participation.

7.4 Escape rooms in the service of science (T56)

Presenter: Ran Peleg

Escape rooms are (non-virtual) games in which the participants solve puzzles to successfully escape a closed room within a certain time frame. Escape rooms have become extremely popular in some countries and are becoming so in many others. Can this attraction for escape rooms be harnessed into science education? Over the last two years I have worked with colleagues to build escape rooms that bring the fascination of commercial escape rooms to classrooms, science festivals and science museums. The presentation will focus on three examples of educational escape rooms, their design principles and findings from evaluation of the activities.

8. School projects

Moderator: Alvaro Molina Ayuso

8.1 STIMEY – A Generic Multichannel Hybrid e-Learning Platform for STEM Education (T30)

Presenter: Juho Mäkiö

The international competitiveness of Europe strongly depends on the availability of good educated engineers. To get good educated engineers, STEM education must be more relatable to European youths to raise their interests and involvement in STEM careers. This interest needs to be awoken already at the school. This is the aim of the STIMEY

(Science, Technology, Innovation, Mathematics, Education for the Young) project. To reach this overall goal, the STIMEY project proposes a multichannel hybrid e-learning platform for STEM-Education, which provides e-learning components that are designed and developed on the base of a well-researched pedagogical framework that is to be developed in the project.

8.2 Walking through the nature (T03)

Presenter: Andonoska Aleksandra

This educational media was created as a result of a project between four countries (four teachers and their students). Our goals were: learning through cooperation, improving the ICT skills, learning more about endangered animals and finding different ways to help them, overcoming the language barrier when communicating with other schools, working together as an international team, improving innovative learning methods, developing self-confidence. We started with the project on TwinSpace, after which we made our own web page where everyone can see and benefit from our work (http://walkingthroughthenature.weebly.com).

8.3 "Happy Channel presents Space News by Space Scoop" (T33)

Presenter: Marina Molla

The aim of this presentation is to share the experience of implementing a space related topic in Primary Education in an interdisciplinary approach that combined Astronomy, Journalism, Storytelling, Literacy, Language classes and Inquiry Based Learning. "Happy Channel presents Space News by Space Scoop" was a project that I implemented with my students last school year in the 5th grade of the 2nd Minority Primary School of Komotini which is located in the Northeastern part of Greece.

8.4 Taking science classes across borders (T37)

Presenter: Benedict O'Donnell

Given the universal nature of science, teaching the subject at school remains to date strikingly local. Our session looks at how the Prometeruse project has brought together schools in five European countries to share the experience of cross-border research with teenagers – inspiring them with an often understated perk of working in research before they choose their path at university. We will showcase approaches that have simplified collaboration between classes in different countries, identify ideas that worked well on paper but not in the classroom, and outline opportunities for taking part in future international STEM projects.

WORKSHOPS C

Moderator: Panagiota Varouta

C.I Drones at School (WS04)

Fernandes Liliana and Jorge Reis

With this workshop we intend to share ways in which drones can be used in the classroom. Drones can be a powerful resource, in helping teachers to lead students to discover and acquire complex concepts through simple programming activities. Teachers will get familiar and learn how to use drones in the classroom, programming them with language blocks. Mathematics concepts will be explored, such as angles, distances and speed. The use of these methodologies develop students' interest in research, testing and proposing solutions to everyday problems in the surrounding community, increasing their civic participation and environmental responsibility in the community. In this workshop, teachers will get familiar with the drone, use both the Tynker APP and Free Flight Mini APP to program and control the drone. After presentations and flight security advice, teachers will learn how to use Tynker in programming drones, whether ground or flying drones. Some examples of unit plans for primary and middle school levels will be presented. Teachers will be challenged to test some programming sequences, find their strong and weak points and present suggestions. Afterwards, teachers will be challenged to fly a drone, using FPV and Free Flight Mini programming APP, and plan a lesson to use it. In the end, teachers will share their ideas with colleagues.

To participate actively in this workshop, a tablet or smartphone with Tynker and/or Free Flight Mini apps installed is needed.

C.II First Steps in Scratch (WS01)

Mihai Agape

This hands-on workshop will aim at exploring Moodle courses on the Scientix portal and initiating participants in coding with Scratch 2.0 programming language. After an introduction, participants of this workshop will explore the courses on Scientix portal and identify courses that are useful in their professional development that they can follow later at their own pace. Participants will also create animations, simulations and games in Scratch on topics proposed by participants. The experience gained could be the first step in introducing Scratch programming into teachers' current teaching activities.

WORKSHOPS D

Moderator: Vesela Todorova

D.I Learning Science Though Theater: hands on! (WS08)

Alexandros Koukovinis and Menelaos Sotiriou

The workshop explores the framework of the initiative Learning Science Through Theater which has been effectively implemented in Greece for 4 years (more than 2500 students and 250 teachers have already participated) and recently spread across the EU, managing to engage the school community in Science & Art dialogic cases. Using theatre as a means of engagement places students in a rich context of stimuli and, with the support of the educators and specialists on art and science, leads to a dramatization of the scientific knowledge approached (performance) and a deeper understanding of the related meanings. Following the imperatives of a culture that strives towards the spread of scientific literature, Learning Science through Theater approaches STEM subjects in an innovative way that embraces the A element - whether it stands for "Arts" or "All disciplines" – in the process. The action places the students in the centre and, following the Inquiry based Science Education model, they are becoming able to develop an understanding of the world and scientific knowledge and an engagement with both scientific and artistic lines of thinking through hands-on experimentation with real scientific data. In the workshop, participants will get a brief overview of the initiative and a quick and digestible presentation on its framework and its milestones. Then, they will have the chance to experience the process from the point of view of the students, going through a fast simulation of the inquiry process implemented. In the end, they will play their unique short performances.

D.II Society / Board games in learning STEM subjects (WS11)

Cristina Nicolaita and Cornelia Melcu

This hands-on workshop will aim at introducing participants to society and board games learning. After a short introduction, two projects will be presented to participants "Active Minds moving hands" and another game focusing on STEM and inclusion entitled "The odd one...IN!"

Some examples of society/board games will also be explored and participants will be given the opportunity to work in teams, and to reflect on a society game to adapt to their STEM context.

PARALLEL SESSIONS III

9. Earth and the environment

Moderator: Kavita Sanghvi

9.1 Marine Litter Solutions Through Learning by Doing (T26)

Presenter: Teresita Gravina

Authors: Teresita Gravina , Juan Diego Lopez Giraldo, Daniel Rolleri, Enrique Sánchez, José Alberto Pereira, Costantina Cossu, Christos Maratheftis, Markella Papanicolaou, C. Marisa R. Almeida

Some industries, such as fisheries, shipping, large-scale greenhouses agriculture, marinas and tourism, are beginning to quantify the costs of marine litter as considerable risk issue, while for other types of activities more research is needed to determine its real impact on living systems. Marine litter awareness hands on actions through learning by doing is a Erasmus+ funded project designed to introduce this global challenge to school students in a constructive way, with the aim of including marine conservation practices and marine litter educational guidelines in the national school curricula of four EU countries.

9.2 Preparing the World for Tomorrow (T55)

Presenter: Timur Yavas

The project aims to contribute to the development of individuals who have an international consciousness, respect all the assets in the world, take initiative to leave a better world for future generations, try to produce solutions for all kinds of problems, make mistakes, try again and finally innovate. The project is a study that brings together different disciplines, making it valuable for students to see how different disciplines work together in different life situations.

9.3 Extending NetLogo "climate change" model (T25)

Presenter: Georgios Gkaras

In the frame of an experimental school project, a class of students studied "Climate Change as a Complex System" with the help of NetLogo programming environment and Netlogo library models. Students worked mostly with "Climate Change" Netlogo model. They studied the model code and familiarized themselves with the NetLogo programming language, and then they extended the model introducing new functions. In particular, they introduced positive and negative feedback associated with Climate Change using simple control commands and taking advantage of the existing routines of the model.

9.4 SOS Pollinators (T52)

Presenter: Clara Vignolo

In recent years, numerous threats have been described that affect pollination, such as: habitat fragmentation, intensive agriculture, diseases (e.g. of the Varroa mite), the abuse of phytosanitaries, the introduction of exotic species and climate change. SOS Pollinators is an educational project that seeks to encourage teachers and students to gain knowledge on pollinators in the green areas of the city: parks, gardens, urban gardens, etc. In addition, it seeks to encourage the use of these spaces for teaching science, promoting the observation of urban biodiversity and natural processes.

10. IBSE

Moderator: Irina Vasilescu

10.1 Examining the added value of computer-supported inquiry learning with embedded virtual experimentation on students' attitudes and motivation on STEM education (T27)

Presenter: Achillefs Kapartzianis

The purpose of this study was to examine the effect of a computer-supported inquiry-learning environment, which incorporates virtual experimentation, on students' attitudes and motivation towards STEM education. The participants of the study were 14 eleventh graders (16-17 years old) from a public secondary technical school in Limassol, Cyprus. Students completed the activities of three online learning environments during their physics course and the duration of the implementation was 135 minutes. The online learning environments, which are called Inquiry Learning Spaces (ILSs), were selected from the Go-Lab learning platform (www.golabz.eu) and were adapted for the needs of this study.

10.2 Novel ways to promote Math, Science and Technology education through international StarT (T31)

Presenter: Anette Markula

Novel hands-on science education solutions are needed in order to encourage young people to take up an interest in STEM subjects and to strengthen their science skills. In the International StarT operating model, students from early childhood education to upper secondary school learn together and from each other through collaborative working by carrying out interdisciplinary projects in groups. The International StarT is a part of the activities of LUMA Centre Finland, which is a network of Finnish universities working to ensure the high quality of teaching STEM subjects in Finland.

10.3 ICSE International Centre for STEM Education (T45)

Presenter: Günter Törner

The ICSE is a European Institution in Germany. STEM subjects are vital prerequisites for employability and active participation in society. ICSE's ultimate aim is to raise students' interest in STEM, their achievement levels as well as their related process-oriented competences for example in inquiry, reasoning and problem solving. To reach this aim, ICSE focuses on practice-relevant research and its transfer into practice, and sustainably links stakeholders from research, practice, policy and industry, both nationally as well as internationally through the ICSE consortium.

10.4 The "Science, Technology, Society" course for high school students in Estonia (T44)

Presenter: Katrin Timakova

The presentation will highlight the "Science, Technology, Society" optional course, that has been designed to solve problems that are essential for students and have a wide impact on the society. During the course, reasoned decisions will be made taking into consideration scientific, technological, social, ethical and economical aspects. Whereas, the application of previously acquired knowledge in new contexts demanding higher order thinking skills and the acquisition of new interdisciplinary knowledge and skills through the scientific content of socio-scientific problems is kept in balance.

11. Strengthening teacher & school competences

Moderator: Ariana-Stanca Vacaretu

11.1 Data-driven STEM teaching: The presentation of the JOBSTEM research project experiences (T12)

Presenter: Josip Burusic

The JOBSTEM project ("STEM career aspirations during primary schooling: A cohort-sequential longitudinal study of relations between achievement, self-competence beliefs, and career interests – JOBSTEM") is a comprehensive Croatian project that started in 2015, designed to explore three general issues: how students' general and specific STEM career aspirations form during primary schooling, how they are related to students' school achievement and self-competence beliefs, and how students' general and specific STEM career aspirations are shaped by their families and gender. During the project period, we produced various research findings significant for STEM school teachers, as they are important sources of inspiration to students.

11.2 The STEM School Label - how to apply for my school (T09)

Presenter: Noëlle Billon

With the STEM School Label, school representatives will be able to evaluate their school via an online self-assessment tool according to the criteria defining a STEM School. This self-assessment tool will identify required areas of development and provide training and resources for applicant schools to improve their STEM activities at the school level.

11.3 Changing Places and Changing Teaching in STEM Education (T35)

Presenter: Richard Walden

Preparing students for leaving school is a challenge. Schools may provide academic and vocational training but how effective is this in equipping students for entering the world of work? EUROFUTURE: Changing Places is a unique European funded project aimed at providing students with insight into entering employment, or further education.

11.4 Make Tomorrow – Turkey Programme (T14)

Presenter: Fatma Caner

Today, individuals need to be producers, thinkers, tinkerers and creators. In order to train these individuals, it is suggested that two or more disciplines should be taught together with an interdisciplinary understanding with no regard to the disciplines of STEM (science, technology, engineering and mathematics). Make Tomorrow – Turkey Programme is a digital conversion training programme based on the development of STEM skills for 9, 10 and 11th grade students in Turkey. Make Tomorrow – Turkey induces the spirit of entrepreneurship to the students, encourages them to be productive individuals by recognizing problems in their environment and finding solutions to these problems.

12. Science and inclusion

Moderator: Biruta Pjalkovska

12.1 Effects of problem-solving and epistemology beliefs on academic performance. Differences according to academic level and gender (T01)

Presenter: Javier Alabau-Gonzalvo

One of the main objectives in science and mathematics education is that students achieve a good competence in problem solving. Among the variables that influence the results one finds the personal belief system. Beliefs are cognitive-affective configurations, usually encoded in the form of affirmations, to which a truth-value is attributed.

According to the literature, students' belief system can influence their learning strategies, thus having an impact on their academic performance and results. This work uses well-established conceptualizations and attempts to find the relationship between epistemological and problem-solving beliefs, and the results in a problem-solving test.

12.2 Science for ALL children: giving new opportunities to the less privileged (T05)

Presenter: Enrico Maria Balli

In the last two years the SISSA Children University (Trieste, Italy) has run a special programme with a small group of teenagers who have interrupted the school before the terms of the obligation. The aim of the project was exploring the potential of science to mitigate school dropout and facilitate social inclusion. The outcomes are very encouraging: through the active engagement, the young participants have succeeded in completing a complex project, taking responsibility, dealing with other people external to their usual circle (both children and adults), in a context in which they have been valued and respected.

12.3 Supporting and Teaching Visually Impaired Pupils (VIPs) (T34)

Presenter: Nikolaos Nerantzis

Authors: Nikolaos Nerantzis, Varvara Toura

The last few years, a shift has been made advancing special education in the direction of inclusive education. We will present (a) the latest research findings on brain function, (b) the VIPs' educational needs and the general teaching guidelines for teaching visual impaired students, (c) the educational methods and activities we used (e.g. tactile and auditory material & tasks, science theatre, etc.) in order to support our pupils, (d) our distinguished participations at in-school projects (e) how our educational practice provides us the means necessary to plan and implement 'wider' projects.

12.4 The TEC model for Teacher Training and Social Inclusion (T22)

Presenter: Asmaa Ganayem

TEC (Technology, Education and Cultural Diversity) is an innovative pedagogical model in leading social inclusion through multicultural online collaborative learning and teaching. This educational model was developed at the TEC Center (in Mofet Institute, Tel Aviv, Israel) by three visionary women leading change through ICT, and representing three different sectors – Arab, Jewish secular and Jewish religious: Dr. Asmaa Ganayem, Dr. Miri Sheinfeld, and Dr. Elaine Hoter. The TEC centre initiated and developed a social and educational programme designed to create a multi-sectorial discourse for studying various educational topics: science, English literature, online pedagogy, etc.

WORKSHOPS E

Moderator: Mihai Agape

E.I ORT Makers: Doping STEM with the Makers' spirit and practice (WS12)

David Rossenberg

The Makers culture had spread worldwide in relatively short time. Makers combine the ever-growing availability of traditional and new means of production and the availability (and open-code) of information via the Internet, with a critic on consumerism and the joy of creation and invention, either alone or with friends, i.e. Do It Yourself (DIY) or Do It Together (DIT). In recent years the makers message had resonated among educators who seek to leverage both social and mental skills of the makers culture in pursuing educational goals such as creation, iteration, sharing, and autonomy. Some educators integrate the Makers' skills into Project Based Learning (PBL) schemes, while others focus on technologies such as 3D-Printing. Two years ago, the R&D centre at ORT Israel, a secondary school network, took upon itself to articulate its pedagogical approach to this new concept, to be integrated at its 100+ educational campuses. Chafing off buzz words and focusing on skills, we also had to find a sustainable approach towards implementing the makers workshops and curriculum among our diversified school population. We will practice the 5th class of the introduction to ORT Makers course called "from sketch to a model".

In this workshop we will measure and complete a sketch of a chair, copy and make a 3D 1:10 scale model from cardboard and wire. The skills developed in this workshop are measuring, reading and writing a scale sketch, using hot glue, bending wire and cutting cardboard with box cutter and ruler.

E.II Light-interacting materials: Science meets Beauty (WS09)

Annamaria Lissotti and Rui Baptista

Materials Revolution is here! Engage and experiment with light interacting materials. An inspiring workshop mixing Physics, Art &Technology to boost students' scientific knowledge and experimental skills while spurring their creative thinking and innovator's potential. Light may be considered as a "material" in itself. "Building with light" is now possible thanks to aesthetic and functional properties of new materials such as dichroic sheets, plastic micro-optics, fibre optic textiles, and many more! In this hands-on workshop, participants will also get a taste of Arduino use as data logger with low cost sensors. From MoM-Matters of Matter: Future Materials in Science Education project, a joint Erasmus + KA2 schools partnership (IT, PT, DE, IR). MoM offers a set of resources to teachers willing to involve their pupils (14-19) in inquiry based science in current issues while bringing in a touch of creativity and design. The protocols are low cost, easily reproducible in school labs but also offering the possibility of real research, design and prototyping to individuals or small groups of highly motivated students.

WORKSHOPS F

Moderator: Daniel Aguirre Molina

F.I Aura-virtual reality (WS05)

Marija Gaurina and Ivana Marić Zerdun

Aurasma changes the way we interact with the world. In this hands-on workshop, participants will turn everyday objects, pictures and places into new opportunities thanks to the striking experiences of reality. Participants will be presented with examples of aura made for the teaching of chemistry and physics (distillation of the gall bladder distillation, sulphuric acid activity, calculation of the molecular formula compound, nuclear fission, carbon dioxide poisoning measures), which are viewed through their own android device. Participants will be trained to connect digital content such as video to pictures in books, notebooks, and classrooms. Methodology: On the presented wooden 3D model of the hydrological cycle, the participants will organize and set up the aura (digital material: video, pictures, text). Aura refers to the processes of rotation, regeneration and apparent water loss on the ground. The aura made in the Aurasma studio will overlap with the texts on the labels / papers on which each of the water circulating processes is written. Using this technology, students can create and format their own teaching materials and teaching in general. During the research of digital materials, students critically reflect on its relevance and relevance to a given theme, learning more than content. The trainee is engaged in interacting with his environment by challenging interactive educational content that is viewed on his own device (android device) on demand. Aurasma offers a unique, inventive, fun and holistic way of engaging students of all ages.

F.II Secret of the mobile phone (WS07)

Sladana Jovic and Bojana Mitriceski Andelkovic

In this hands-on workshop for teachers, mobile phones will be used as an example for elements resources in our daily lives. The interdisciplinary teaching material could be used for students ages 13 and up to raise awareness for our resource-rich lifestyle. More than 90% of students own a mobile phone. This workshop will demonstrate how to engage students in this up-to-date topic. The topics covered in this workshop include: the contents of mobile devices and short discussions about the ecological and social impacts of mining elements used to make the phones. The teaching box contains flash cards of the elements- materials, which are being used as basic materials for the mobile phone production. The workshop participants will be divided into groups.

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PARALLEL SESSIONS IV

13. Supporting gifted students

Moderator: Tiina Kähärä

13.1 Be STEMpatic! (Budi STEMpatičan!): the project of identification, guidance and teaching of STEM gifted students (T13)

Presenter: Josip Burusic

The „Be STEMpatic!" project is financed by the European Social Fund, and it is focused on the identification, guidance and teaching of STEM gifted students. The project is conducted in the northern part of Croatia, in Virovitica-Podravina county, in 14 elementary schools and 7 high schools. The presentation will address the main project idea and activities, including a model for the identification of STEM gifted students. The model and later activities of choosing the identification criteria were based on a review of current theoretical models of giftedness and talent and empirical findings about the specific area of STEM giftedness.

13.2 Launching a gifted children programme (T43)

Presenter: Luise Tiks

I am a science teacher from Estonia. Nationally, we have a lot of projects and methods to help students who are struggling, but there is much less done to help gifted students reach their full potential. Thanks to our school psychologist who has worked for years on lobbying and raising awareness, there is a pilot project going on in our school to support gifted students. I have been running this pilot programme for almost two years now. The aim of the programme is to help class teachers to identify gifted students to offer them additional challenges for supporting their development.

14. Out of school learning

Moderator: Irina Vasilescu

14.1 The Formula 1 competition in Junior High School (T04)

Presenter: Panagiotis Angelopoulos

Authors: Panagiotis Angelopouos, Angelos Giouvrekas

F1 in Schools is a global multi-disciplinary challenge in which teams of students aged 9 to 19 deploy CAD/CAM software to collaborate, design, analyse, manufacture, test, and then race miniature compressed air powered balsa wood F1 cars. Is one of the most comprehensive educational programmes to enhance students' interest in STEM (Science, New Technologies, Engineering and Mathematics). The challenge inspires students to use IT to learn about physics, aerodynamics, design, manufacture, branding, graphics, sponsorship, marketing, leadership/teamwork, media skills and financial strategy, and apply them in a practical, imaginative, competitive and exciting way.

14.2 The Open Science Internships (T41)

Presenter: Katerina Svobodova

The Otevřená věda (Open Science) projects have sought for the past ten years to address issues related to the lack of interest in scientific careers of young people in the Czech Republic by taking a combined approach to supporting scientific interest among secondary school students, providing opportunities for growth and development among students, teachers, researchers and science communicators. The projects have enabled Czech students to gain experience of science first hand, working with researchers on a one-to-one, scientist-led basis, and have shown that this experience is invaluable in enabling young people to appreciate the potential of a career in STEM.

15. STEM + A

Moderator: Daniel Aguirre Molina

15.1 Particle Physics and Creativity in Primary Education (T28)

Presenter: Ourania Lampou

This presentation will introduce teaching practices of the "Playing with Protons" programme, an innovative training programme which promotes STEAM literacy and vision in primary teachers and students by empowering them to become "out-of-the-box" thinkers and creators. "Playing with protons" is a science education programme that encourages the implementation of STEAM projects and is organized by the CMS experiment, one of CERN's Large Hadron Collider (LHC) experiments. It is a pioneering CERN project that teaches basic concepts of physics and particle physics to primary school students.

15.2 Learning Science Through Theatre (T39)

Presenter: Menelaos Sotiriou

How can we leverage student understanding on STEM concepts and at the same time guarantee their cheerful engagement? How can we transform school to a hub of connecting with both the scientific world and the local community? The 'Learning Science Through Theatre is an initiative that strongly promotes the above principles by creatively merging STEM with Art in a dialogic – Inquiry process. To do so, theatre is used as a means of deliberation, a vehicle around which the whole team of stakeholders builds relationships that favour the transfer of scientific knowledge.

16. Remote and digital

Moderator: Biruta Pjalkovska

16.1 The use of immersive Virtual reality in the Mathematics classroom (T32)

Presenter: Álvaro Molina Ayuso

The aim of this presentation is to explain how to introduce the immersive virtual reality in the learning process of Mathematics with CoSpaces. This tool provides a programming environment for both teachers and students to create their own virtual reality as a means of content expression. CoSpaces unites the visual power of its graphic enviroment with the utility of visual programming by blocks since it uses the Blockly add-on that allows coding different actions in the elements of the scene in an easy and engaged way.

16.2 Simplifying the use of IoT for STEM primary education (T50)

Presenter: Alex Vakaloudis

The application of Internet of things in education is being studied and results up to now demonstrate that it can lead among others to increased student engagement, easier learning processes, personalised and improved measurement of student assessments. Apart from the obvious link to Technology, IoT deployments can be utilised in Science experiments, real data generation for Maths problems and Engineering. The aim of our work is to open IoT for STEM to this median teacher and as such the objective is to break-down the complexity around IoT and demystify its cost and the novelties it brings forward.

WORKSHOPS G

Moderator: Mehmet Basaran

G.I Mobile phone for lessons (WS14)

Rigonda Skoruskiene

Mobile phones, tablets and other technologies are attractive to students. Many teachers and school officials try to limit or ban phone usage during the lessons, however, portable devices can be used for learning purposes. In the workshop, examples of how phones and tablets can be used in the lessons will be introduced. The workshop will analyse 3 types of apps, firstly apps usable for everyday lessons, then pool/survey apps, and finally, augmented reality apps. Firstly, participants will analyse LiveBoard, Science Journal by Google, Ruler and Smart Distance apps. Finally, augmented reality apps help to develop an interest for students to learn more. Two will be presented: "Animal 4D", where animals 'become alive' and the app user is able to feed them appropriate food.; and a similar app, "Space 4D", which can be used to analyse different planets, natural satellites and other Sun System objects.

WORKSHOPS H

Moderator: Alexia Micallef Gatt

H.I Astro party (WS06)

Ivo Jokin

Astro Party has been traditionally held since 2005 on the beautiful bank of the river of Danube at the village of Baykal, Dolna Mitropolia Municipality, Bulgaria, under the patronage of the Minister of Education and Science and the Mayor of Dolna Mitropolia Municipality. The programme includes activities with students and teachers, which inspire a love of both sciences – physics and astronomy. When taking part in the party, students gain more skills both in theory itself and in making observation experiments of space. They learn how to analyse and describe such experiments. These activities are not held in school competitions in astronomy. The party itself gives a lot of opportunities to carrying out a variety of methodical activities with physics and astronomy teachers. It makes extra-curricular activities more attractive to students. The event is included in the National Calendar for extracurricular activities of the Ministry of Education and Science for the academic year 2017/2018. Another important idea of Astro Party is the integration of astronomy with biology, in particular ecology: use of the telescopes for observation of water-floating and water-loving birds. This workshop will include hands on activities related to Astronomy. A variety of practical activities related to Ecology will also be presented and tested by participants.

ROUND TABLES

Round Table (RT1): Initial Teacher Training

Moderator: Dorothy Cassells (European Schoolnet, Belgium)

Teacher Training Institutes are at the forefront of education since they have the possibility to train future educators into innovations and methodologies that they can put in use in the classroom. Next-Lab, for example, understands the importance of Teacher Training Institutes so it aims to facilitate their work by providing them support and custom-made materials.

To increase the quality of teaching, it is essential to make all science education stakeholders aware of the importance of training pre-service teachers in Inquiry Based Learning (IBL) methods and to tackle key issues related to the attractiveness of the teaching profession.

In this round table, the participants will discuss the following:

- What can be done to increase the attractiveness of the teaching profession and to address the professional development of STEM teachers?

- How can Teacher Training Institutes prepare teachers in matching inquiry learning pedagogies, and the science content to be taught?

- How to foster the exchange of best practices between Initial Training Education organizations both at the national and European level?

Speakers:

- Teijo Koljonen, Finnish National Agency for Education, Finland

- Aleksandra Mudrinic Ribic, CARNET, Croatia

- Jan Van der Meij, University of Twente, the Netherlands

- Shane Bergin, University College Dublin, Ireland

Round Table (RT2): The limited information on STEM careers

Moderator: Maïté Debry (European Schoolnet, Belgium)

High quality and multi-disciplinary education in science, technology, engineering and mathematics is needed in order to drive the current innovative economy forward and to sustain a knowledge-driven society, supported by skilled, responsible and inspired young people.

While the number of graduates with science and technology qualifications keeps falling, recent reports estimate the need for a high number of scientists and researchers within Europe. While often priority is placed on increasing students' academic achievement, higher performance does not necessarily entail higher interest in STEM as many "good-achievers" are still not pursuing STEM degrees or STEM careers. Providing students with the tools to know which careers and possibilities are ahead of them can be crucial to ensure future professionals are being shaped. Thus, it is essential for policy makers to provide students with more and better information on possible STEM careers.

In this round table, participants will discuss the following questions:

- Squaring a particular issue of STEM Education - the lack of student motivation in STEM studies and STEM careers, what groups would you consider most vulnerable to this issue?

- What steps can be made to increase the attractiveness of STEM studies and STEM jobs?

- How to attract students in STEM studies and careers from an early age?

Speakers:

- Desiree Scicluna Bugeja, MEDE, Malta

- Imbi Henno, Ministry of Education and Research of Estonia, Estonia

- Nada Stojicevic, Elektrotehnička škola "Nikola Tesla", Serbia

- Griebel Stephan, Texas Instruments, Germany

Round Table (RT3): How to make research results more accessible to teachers

Moderator: Yves Beernaert (EDUCONSULT, Belgium)

Europe's shortage of STEM skilled labour force is well documented, and the lack of STEM-skilled labour is predicted to be "one of the main obstacles to economic growth in the coming years". There is a strong need for innovative approaches to increasing the motivation of pupils towards STEM subjects and for offering teacher training into innovative ways of introducing science into the classroom. Additionally, there is still much work to be done in improving the image of scientists at the societal level. Initiatives that help demystify science and the scientific paradigms, and which connect pupils with real scientists can create a long lasting positive impact with regards to the poor image of scientists. Moreover, connecting schools with the world of research is an essential step in ensuring that the research sector will benefit of much needed new talent in its various fields, and that students are thought to think like scientists, weighing evidence to draw conclusions, and learning how to navigate the claims and counterclaims bombarding us in our everyday lives (a crucial need identified through OECD's PISA 2015).

In this round table, participants will address the following questions:

- How to support the exchange between research institutions and schools?

- What are existing initiatives that aim to introduce Citizen Science initiatives in schools?

- What are the steps in order to engage schools and researchers into joint initiatives?

Speakers:

- Bertrand Pajot, MEN, France

- Piotr Stankiewicz, Institute of Geophysics Polish Academy of Sciences, Poland

- Franca Sormani, Liceo Statale scientifico e classico E. Majorana, Italy

- Dragos Tataru, National Institute for Earth Physics, Romania

Round Table (RT4): The importance of supporting primary schools with the teaching of STEM

Moderator: Anca Popovici (University of Bucharest, Romania)

Research shows that interests influence future career choices and attitudes to science acquired in school impact a person's relationship to science and technology in adult life. Therefore, it is crucial to ignite that interest in pupils at an early age. According to the European Commission (EC), science teaching at the level of primary schools has a strong long-term impact, which corresponds to the time of construction of intrinsic motivation, associated with long-lasting effects. The 2015 TIMSS showed poor results in pupils' performance in science disciplines in most countries within the European Union (EU). According to the PISA results, at secondary level, EU has slipped behind in both science and mathematics and has taken a step backwards, compared to the PISA2012 results. While most students in PISA2015 expressed interest in science topics and recognised the important role that science plays, only a minority of students reported participating in science activities.

In this round table, participants will discuss in particular the following questions:

- How do we train primary generalist teachers and provide them with innovative ways of teaching STEM, enabling them to teach in a relevant, contextualized manner to increase student's proficiency in STEM key competences?

- How do we develop sustainable models of training at primary levels via innovative interactive tools and the development of a community of practice?

- How do we involve national public authorities, such as policy-makers as well as teachers from disadvantaged areas where pupils' underachievement is higher?

Speakers:

- Panagiotis Angelopoulos, 1st Junion High School of Vrilissia / Ministry of Education representative, Greece
- Cornelia Melcu, Scoala Gimnaziala Nr. 9 Nicolae Orghidan Brasov, Romania
- Jordi Diaz, University of Barcelona (CCiTUB), Spain

Round Table (RT5): Getting leading schools from different countries to work together and share expertise

Moderator: Vladimíra Pavlicová (Centre for International Cooperation in Education, Czech Republic)

School leadership has been high on the reform agenda for decades and even more since the radical and accelerated changes in the 21st century societies, pleading for fundamental reform in education. School leadership is indeed a key lever to implement transformation at institutional level, especially in the context of increasing autonomy given to schools in the 90s. The school leadership is more about preparing the future, analysing the changes in the environment and proposing a way and a strategy for the school to evolve and ensure all students get prepared to the society they will be living into. According to research findings, school leadership is related to student achievements in the sense that it indeed affects student's motivation, the quality of the school organization, and acts as a catalyst of the potential of the school staff, all factors in turn directly affecting student learning.

In this round table, participants will discuss the following:

- Are there any existing initiatives which strengthen the professional profile of the teaching profession by integrating STEM skills in the area of shared leadership?
- How to give recognition at the national and European level to the existing schools engaged in promoting STEM activities?
- How to support other schools in engaging in a similar process?

Speakers:

- Giedrius Vaidelis, Education Development Centre, Lithuania
- Christel Op de Beeck, Department of Education Flanders, Belgium
- Teresita Gravina, MIUR – AIRIcerca, Italy

Round Table (RT6): STEM education practices: transferring between National and European level

Moderator: Natalija Aceska (Bureau for development of education, Former Yugoslav Republic of Macedonia)

According to the OECD's PISA 2015 which tested around 540,000 15-year-old students in 72 countries and economies on science, reading, maths and collaborative problem-solving, only 12 of the 72 countries and economies assessed in PISA have seen their science performance improve over this period. Nonetheless spending per student in primary and secondary education increased by almost 20% since 2006 in OECD countries alone. STEM education is looking at teaching students computational thinking and focuses on the real world applications of problem solving. Besides, there is a growing demand for professionals in STEM which is met with a significant labour shortage in these fields.

Some teachers are engaged in innovative teaching processes (Inquiry science based learning, computational thinking…) which contribute to increase students' interest in pursuing STEM studies and careers. There are also numerous initiatives led at both national and European level regarding STEM education.

In this context, participants will discuss the following:

- What are the possible strategies capitalizing on various existing isolated initiatives at the European Level?

- What more should be done at the European level to support and help everything that already exists at the national level?

- How can international STEM initiatives have a stronger impact at the national level?

Speakers:

- Tunç ErdalAkdur, Ministry of National Education, Directorate General For Innovation and Educational Technologies, Turkey

- Rosa Doran, NUCLIO / GTTP, Portugal

- Günter Törner, University of Duisburg-Essen, Germany

POSTERS

P01. STEM in my school backyard

Presenter: Elisa Saraiva

Ms Saraiva presents how students at her school built a garden in the school's backyard that they call the "Bio Conscience Garden", which contains only autochthonous species. This project increases the students' awareness about the subjects of biodiversity and natural preservation, including various hands-on activities, questionnaires and blogs, where they describe their experiences. Students learn more about specific subjects in natural sciences, such as how bees contribute to biodiversity, how to take care of flowers and plants and how honey is produced. Now the students and teachers at the school are organising a conference about the impact of climate change on biodiversity in Portugal, including activities that are based on their school's garden. The project is developed in collaboration with her colleagues Andrea Ferreira and Maria Manuel Azevedo, with sponsorship from the Portuguese Ministry of Education and the Ilídio Pinho Foundation.

P02. Coding in my school

Presenter: Maria Eugenia Melniciuc

Ms Melniciuc has taught computer science at a secondary school in Romania for 15 years. As part of her poster demonstration, Ms Melniciuc explains how her school is preparing students, by strengthening their competences in relation to the use of technology. Students who graduate with a specialisation in mathematics and computer science create and present their own websites. They learn how to code and compete with other students from other countries as part of various international activities, such as the Hour of code, the European Code Week, the Get Online Week, the CoderDojo Siret, the Adfaber-Kids in tech project and the BEBRAS challenge. All those activities increase also general awareness about coding and other subjects in science, technology, engineering and mathematics at the school.

P03. CSI - Popular themes for education

Presenter: Özgür Özdemir

Mr Özdemir is a teacher of mathematics who uses popular culture to increase students' curiosity about subjects in the fields of science and mathematics. The Crime Scene Investigation (CSI) is a well-known series, in which investigators collect evidence, analyse those items and come up with a hypothesis about the situation they are facing. This process demands critical thinking, as well as problem solving and team working skills. During his poster demonstration, Mr Özdemir explains how he uses CSI to make school subjects more exciting and fun. Students must solve cases by applying their knowledge and problem-solving skills and connect pieces of evidence together. As a result, the students' motivation about the school subjects has increased.

P04. Collaborative learning of an academic MOOC by middle school students in the Educational team model

Presenter: Limor Ben Shitrit Haimi

As part of her work at the Israeli Ministry of Education, Ms Ben Shitrit Haimi will explain her first experience of an international learning model, which makes use of an academic Massive Open Online Course (MOOC). This learning model includes three groups from different local schools, in addition to three international groups, who all participate in an academic course on science citizenship and outdoor learning called "From sky to soil" by Future Learn. The groups' work follows the Eduteam model, which is developed by Education Cities, but has never before been used in international learning and outdoor learning among international groups. All participants in this activity, including teachers, become learners themselves, in which the teacher's role is to coach and to divide roles among the groups' members. Thus, the teacher's role is to help the groups reach their goals and to balance the "actors".

P05. Make an easy drone

Presenter: Mustafa Erken

It is fun to develop an application for drones, but it is a complicated process. All the materials you need, though, are 8 wooden ice cream sticks, plastic body arms, silicone gun, scissors, tape, styrofoam body, servo motor, fiberglass plate, control card, gyroscope sensor, brushless DC motor, propeller, remote control and receiver. The aim of this project is to support the students to improve their technological skills through coding in science, technology, engineering and mathematics education. During the activity, students develop effective software programmes that make use of technological innovations, thus encouraging those students to think in detail and become more creative and innovative. Prototypes are designed by tracing and generating more than one idea for proper operation, which can be redesigned, tested and further developed.

P06. Municipalities and business by sciences through MUDIC-VBS-CV.

Presenter: Jesús Carnicer

MUDIC-VBS-CV has operated a project since October 2017 together with businesses and municipalities in the Vega Baja region in Valencia, Spain. MUDIC-VBS-CV is a didactic and interactive science museum, which presents more than 50 modules of experiments and 25 workshops along with a planetarium and a science garden. As part of the project, various science activities are organised at schools, cultural centres, enterprises and even in the streets. The municipalities and businesses that participate in the project must offer an annual programme in science and technology into place, which includes activities meant to popularise and teach science and technology. The companies together with the university and the museum management design activities. The project primarily aims at making citizens consider science as an integral part of today's culture, to make people aware of the relationship between science and society, people acquire scientific skills and bring closer the STEM careers to students.

P07. Work-based science learning: connecting schools with industry

Presenter: Panagiota Argyri

Authors: Panagiota Argyri, Zacharoula Smyrnaiou

This poster demonstration emphasises how important it is to connect schools with workplaces. The industry has an important role to play in the development of students' skills. In this respect, a literary review of learning process theories for apprenticeships identify different aspects in students' development of expertise, students' learning styles, students' integration of knowledge acquired at schools and workplaces, knowledge development, motivation for learning and professional identity. In the case of the European Union, various forms of work-based learning, such as apprenticeships, that combine learning at companies with learning at schools, are a proven springboard for the transition to successful career and the development of related skills at the labour market. Early acquisition of these skills is the foundation for the development of higher, more complex, skills needed in order to promote creativity and innovation.

P08. STEMigrants.eu - A repository of STEM activities for education and integration of refugees and migrants

Presenter: Ioannis Lefkos

An inclusive education of foreign students, including migrants and refugees, is a huge challenge for teachers and the students themselves. In the fields of science, technology, engineering and mathematics, they do not only have to deal with scientific concepts, but also with the language. But recent research results support the argument that in STEM-oriented education, the learning environment is fertile, also for new language learners. STEMigrants.eu website is a private initiative created by educators. The team argues that by using STEM education as a creative and practical solution, teachers can bypass existing language barriers, helping the integration and education of migrants and refugees. STEMigrants' first objective is to become a multimedia web repository of STEM-related activities open to the educational community. STEMigrants' second objective is to create a teachers' network, where teachers can exchange good practices and ideas by submitting their own activities. STEMigrants considers STEM a language for everyone.

P09. Measuring primary children's confidence in science

Presenter: Sarah Carroll

Science self-efficacy, (SSE) is the confidence an individual has in their ability to do science. SSE is positively linked with performance, motivation and engagement with science. Current research on primary children's SSE is limited, and non-existent in Ireland. Additionally, the influence of scientists on SSE has not yet been explored. Due to the prevalence of scientist-led informal education activities aiming to increase children's engagement with science, this research aims to investigate the effect of scientists on primary children's SSE strengths and sources.

First, an effective tool to measure children's SSE is needed. This questionnaire is currently being developed and tested. Once validated, this will be used to compare children's SSE beliefs before and after participation in a scientist-led classroom intervention delivered by a university outreach initiative. This questionnaire will also prove to be an invaluable tool for any formal or informal practitioner wishing to measure the SSE of their students.

P10. Earth and space in classroom activities

Presenter: Cristina Iulia Anghel

The poster demonstration presents two examples of interdisciplinary activities that Ms Anghel has carried out with her students during physics classes, which make use of research methods and scientific data acquired from the European Space Agency and European Schoolnet. Those inquiry-based activities make use of ICT tools in sequences of the lessons and stimulate students' collaboration. The first activity describes the design and construction of a paper rocket and its launching for the study of motion equations. The second activity describes a model for an earthquake simulation making use of the Arduino online platform and how its magnitude can be measured. Using real-world data, the students are able to understand scientific concepts and the proposed activities, giving them the chance to broaden their knowledge horizons and to develop their scientific competences.

P11. Life in a bottle

Presenter: Angela Ruotolo

This poster demonstration describes a hands-on science lesson for primary schools, in which a terrarium life is created within a bottle. The aim of the activity is first and foremost to put school pupils at the centre of the learning process, to engage children in subjects related to ecology and environmental protection and to reflect on various related topics in natural sciences and how every element in nature is connected. The miniature ecosystem, in spite of isolation from the outside world, succeeds in absorbing light to carry out photosynthesis, the process by which plants produce the energy they need to grow. The integrated science subjects promote an investigative approach to the environment and prepare the children for more in-depth studies in the following years.

P12. From windmills to wind turbines

Presenter: Ralia Thoma

This poster demonstration describes an interdisciplinary educational practice that is carried out with elementary school pupils and makes use of educational robotics and Web 2.0 tools in the classroom. Web 2.0 tools and educational robotics can help students to make the connection between physics and other school subjects. Furthermore, fun and creative activities help the students to develop a sense for viable solutions to problems that they may encounter in their daily lives. This practice uses Lego WeDo robotic training packages, including a distance sensor, a dial sensor, a motor and Lego building blocks. The active components can be programmed with the Scratch 1.4 or 2.0 programming language. This educational practice follows five stages for learning, namely: activation, exploration, investigation, creation and presentation.

P13. World Population Global Project

Presenter: Argentina-Monica Pomohaci

One of the most important matters of our days refers to the population of our planet, its recent growth and the consequences on the quality of people's lives, the distribution of the resources on Earth and its surveillance. It is necessary to inform our students about these matters and to involve them in knowing and anticipating the problems of the future.

In this context, a team of students from 10th and 11th grade from our high school, in collaboration with their peers from 'Ithaca High School' from Ithaca, New York State and 'La Arboleda School' from El Puerto de Santa Maria, Spain started a project referring to the population of the world, based on the need to attract students to Mathematics by demonstrating the impact of using Algebra, Statistics and Calculus on practical problems such as population growth.

P14. Education and industry to improve STEM - Two weeks as pharmacist

Presenter: Maria Zambrotta

"Two weeks as a chemist" is a project developed for 80 students of 16 years old from the Secondary School Santorre di Santarosa (Turin). It has seen the collaboration of the University of Turin (degree course in Pharmacy), Municipal Pharmacies of the City of Turin, and private companies: Procemsa, Candioli Pharmaceuticals, Abc Farmaceutici, Reynaldi Pharmaceuticals. The project aims to increase student motivation and interest in science, to promote collaboration between schools and local stakeholders and to encourage the sharing of experience in teaching science, including the use of new methodologies in the classroom and the contextualization of STEM teaching.

P15. Teaching chemistry using online labs

Presenter: Aleksandra Blazhevska

The new era of digitalization imposed the need for teachers to change their pedagogical approach in teaching students. Go-Lab is a great example that follows the trends of new pedagogical approaches of Inquiry Based Learning by using digital technologies. This poster is a representation of the ILS (Inquiry Learning Space) and it will help share the possibilities offered by Go-Lab.

The Go-Lab federation of online labs opens up virtual laboratories (simulation), remote laboratories (real equipment accessible at distance) and data sets from physical laboratory experiments (together called "online labs") for large-scale use in education. In this way, Go-Lab enables inquiry-based learning that promotes acquisition of deep conceptual domain knowledge and inquiry skills, with the intent to engage students in pursuing a career in science.

P16. botSTEM: Robotics and STEM education for 4-8 years old children

Presenter: Ileana M. Greca

Recent research have demonstrated that early techno-scientific literacy in children as young as 4 years old could improve their long-term achievement in STEM fields and raise the scientific and technological vocations, especially for girls. botSTEM is an ERASMUS+ KA201 project with partners in Spain (coordinators), Sweden, Italy and Cyprus, that aims to address this point, through the development of a new methodology for including gender inclusive STEM integrated programmes into the formal education curricula for childhood and primary schools (4-8 years old), using inquiry teaching and educative robotics and code-learning. The project outputs are specifically aimed to provide in- and pre-service teachers with research-based materials and best practices.

P17. Professionals Go Back to Petro Kuzmjak School

Presenter: Natalija Budinski

In this poster, we present our activities related to the scheme Professionals Go Back to School (PGB2S). Since last school year, we have been organizing different types of STEM activities using PGB2S scheme in our school "Petro Kuzmjak" in Ruski Krstur in Serbia. We have applied PGB2S in primary and secondary school, collaborating with different STEM professionals. Besides our examples, the poster will present organizational and classroom stages necessary for successful implement PGB2S scheme, such as: contacting professionals and discussing the details of the visit, using PGB2S tool, performing a lesson in school and connecting it to the curriculum, arranging possible field trips to the professionals' working place, and analysing outcomes and promotion of activities.

P18. Inspire students to study STEM by using of COMPASS project

Presenter: Tsetsa Hristova

COMPASS (Creating Online Materials & Products At STEM Subjects) is an ERASMUS KA2 School Education project running from September 2016 to August 2018. In this poster provides a brief review of the Compass project, the software used and evaluation results of the students and teachers who tested the project's resources. The COMPASS project has a dual task: to develop materials on STEM subjects (science, technology, engineering and mathematics) on the Moodle platform, and to educate interested classroom teachers on the creation and use of such materials. The main objective of the project is to help improve students' achievements and interest in STEM subjects.

P19. Why Collaborative Learning for Teachers is important?

Presenter: Bertalan Péter Farkas

Teachers in the 21st century need to be able to respond to a rapidly changing environment characterised by fast technological progress, changing labour market needs, demographic changes, etc. In order to have up-to-date knowledge and skills to be able to live up to this expectation, lifelong learning needs to be a reality for teachers as professional educators. Fostering working relationships among teachers was one of the elements of teachers' professional development identified as critical in terms of effectiveness, and collaborative processes enhance students' outcomes as well. In line with these findings, the main focus of the EFFeCT project (European Methodological Framework for Facilitating Teachers' Collaborative Learning) is improving teacher competencies through enhanced opportunities for teacher learning at all stages of their career and developing a Methodological Framework to support the teachers' collaborative learning. EFFeCT is coordinated by Tempus Public Foundation, Hungary and supported by the European Commission. Web: effect.tka.hu

P20. STEM for daylighting rivers: understanding the dynamic of rivers and the impact of urban sprawl for increasing civic ecology

Presenter: Francesca Ugolini

Authors: Francesca Ugolini, Fabrizio Ungaro, Serena di Grazia, Vincenzo Striano, Fouli Papageorgiou, David Pearlmutter

The project DAYLIGHTING RIVERS, funded under the Erasmus+ Programme, engages students of secondary schools in scientific and interdisciplinary investigations – not only STEM, but also history, agriculture, and economy – about land cover and river studies, with an emphasis on the effects of urban growth on soil degradation and on river management.

Due to accelerated urban development, many rivers have been diverted or culverted, in favour of urban infrastructures and new neighbourhoods. This has increased the risks of flood, led to the loss of biodiversity along the streams, increased water pollution and impaired other for the community services connected to the flowing water. The process by which the culverted rivers are uncovered and re-exposed to the environment is known as 'daylighting'. Daylighting rivers also refers to 'daylighting' in terms of youth consciousness – raising awareness and inspiring global action for sustainability in water use.

P21. Teen Science Café

Presenter: Desiree Scicluna Bugeja

The Teen Science Café (TSC) is an initiative targeting students in middle schools. The aim of the TSC is to offer young teenage students opportunities to encounter a number of professionals/experts from different STEM related careers. The professionals/experts from different fields of science, visit a number of schools throughout the first two terms of each scholastic year to share their career paths, insights, experiences and aspirations related to STEM. The focus of the encounters is the development of an interactive, informal exchange between students and the professional/s to engage young students in conversation about relevant STEM themes and career paths in an informal setting, thus influencing positively on student's study and career choices. In this context, the Teen Science Cafe' primarily serves as an outreach exercise in terms of promoting careers in science, technology, engineering and mathematics by involving STEM professionals/researchers/academics from the industry.

P22. An example of teacher training: Astronomy education with STEM

Presenter: Ayşe Arslan

Authors: Ayşe Arslan, Ezgi Taylan Koparan

The aim of this study is to determine the awareness of teachers working away from the city centre on STEM education and to provide them with a STEM study and an example STEM practice to understand STEM education. Astronomy education, one of the indispensable subjects of basic science education, is at the centre of human's efforts to understand nature (Koçer, 2002). Therefore, it was chosen as an example topic to explain STEM education. The results of the study show that, when teachers understand STEM education and as they have practical examples, they are eager to transfer to their knowledge and experience with their peers and students.

P23. Analysis of the pedagogical use of programming in a virtual reality environment for the development of STEAM competences in primary education

Presenter: Ascensión Robles

The incorporation of ICT in the education has allowed the inclusion of ubiquitous, flexible and collaborative teaching and learning that seeks to prepare students from kindergarten for the acquisition of STEAM competences (science,

technology, engineering, arts and mathematics) that allow them to thrive in the 21st century. The use of virtual reality and programming in the classroom promotes the development of meaningful learning in participants, through experimentation, discovery, collaboration, teamwork, and it can stimulate student interest in STEAM subjects. In this context, the research question arises: is it possible to promote the development of the STEAM skills through programming in a virtual reality environment in primary education? What are the opportunities? What are the limits? This research aims to design and implement educational activities in a virtual reality-based programming environment and analyse the impact on the acquisition of STEAM skills for students in the third cycle of primary education.

P24. Pre-service physics teachers' STEM perspectives and STEM integrations

Presenter: Fatma Caner

In order to integrate STEM to the class effectively, teachers need to have certain skills and knowledge. If teachers' thinking about STEM is understood, more collective and instructional representation related to science teachers' learning about STEM education can be obtained. For this purpose, it is beneficial to understand how pre-service physics teachers conceptualize STEM education. The purposes of this research were to investigate pre service-physics teachers' STEM perspectives and to examine the role of their perspectives in their STEM integration. If we realize what teachers are actually thinking and their perspectives about STEM education, then we can start conceptualizing what STEM education is.

P25. Cell EXPLORERS - a growing network of Higher Education Institution teams delivering STEM outreach and engagement in schools

Presenter: Muriel Grenon

Cell EXPLORERS (www.cellexplorers.com) is an outreach and public engagement initiative that promotes modern biology nationally in Ireland. It aims to "Inform, Inspire and Involve" people in the excitement of science, increases the general public's engagement with "Science Technology Engineering and Maths" and its importance in society. The initiative uses various interactive outreach approaches and activities, designed to give an insight into how scientists work on a daily basis and are linked to current scientific research. Cell EXPLORERS uses a unique model for sustainable science public engagement in 10 Irish Higher Education Institutions. It engages students in educational outreach activities as part of their curriculum and also works with a growing volunteering base made of students and researchers. This organisation has the dual benefits of engaging children, young people and the public in STEM whilst developing key graduate student attributes and researchers' public engagement skills.
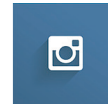
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