



EASE

EuropeAn network of
steam Educators

EASE 2024

STEAM Educators'

e-Yearbook



Prepared By:

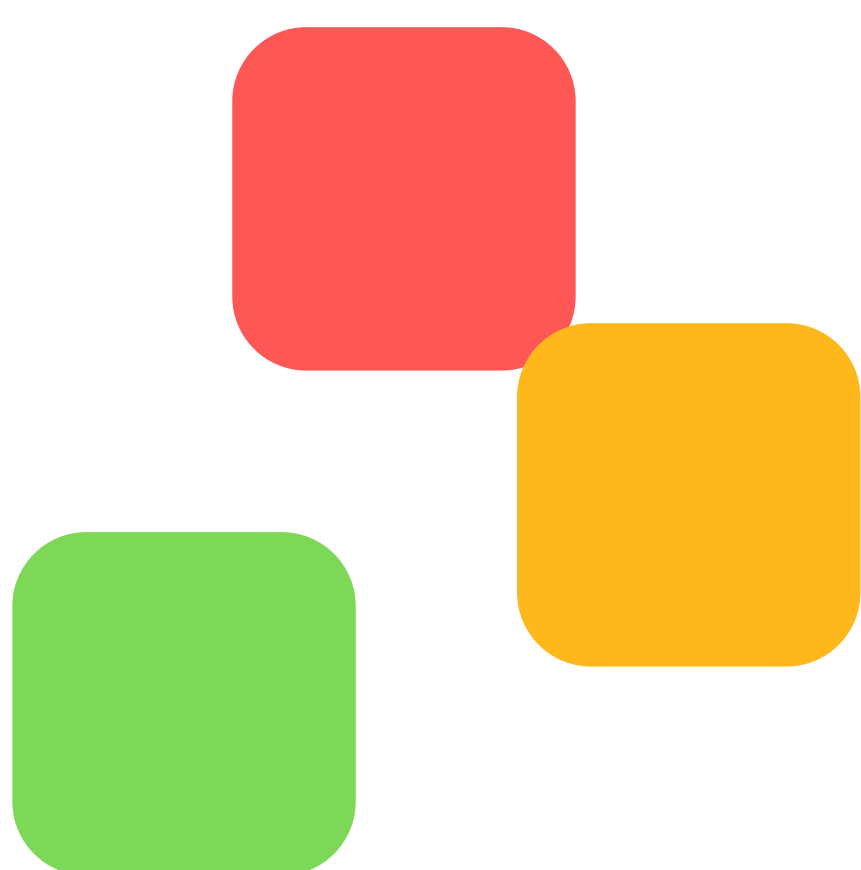
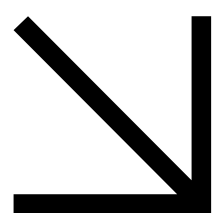
Daniela Brogna, Nelson Gomes

This electronic Yearbook is designed to showcase a group of European STEAM educators who made a significant impact in 2024 through their educational efforts and their influence in technical, pedagogical or educational STEAM areas.





European STEAM Educators 2024



- 1.** Adina Avacovici
- 2.** Afroditi Michailidi
- 3.** Ana Clara Grecu
- 4.** Camilo Parra
- 5.** Gjorgjina Dimova
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- 10.** Paulo Torcato
- 11.** Natalia Spyropoulou (STEAMComp Edu framework)



Introduction

Welcome to the EASE STEAM Educators' 2024 e-Yearbook! This e-Yearbook spotlights a select group of European STEAM educators whose dedication and influence have significantly advanced STEAM education throughout 2024. Within this e-Yearbook, each educator unveils a captivating project that exemplifies their innovative teaching methodologies, alongside their responses to seven insightful questions posed by EASE.

The featured educators represent a diverse range of backgrounds, expertise, and passions within STEAM education, highlighting the richness and potential of this field across Europe. Their collective contributions underscore the transformative power of STEAM education in nurturing essential 21st-century skills such as critical thinking, problem-solving, creativity, collaboration, and adaptability.

By sharing their insights and experiences, these educators provide a valuable resource for other educators seeking to enhance their own teaching practices and inspire their students. Their stories illustrate how STEAM education can be implemented across various educational levels, from early childhood to university, using diverse approaches such as project-based learning, game-based learning, robotics, coding, and interdisciplinary projects.

And we are getting to know a little more about these colleagues and the person behind the educator.

The impact of these educators extends beyond the classroom, reaching communities and inspiring educational policies. Their dedication to continuous professional development, evidenced by their participation in conferences, workshops, and online communities, demonstrates a commitment to staying at the forefront of educational innovation.

And in this edition, we will also find the exploration of a significant European reference necessary for STEAM Education, with the STEAM Educator Competence Framework and one of its authors, Dr. Natalia Spyropoulou.

This e-Yearbook serves as a testament to the exceptional talent and potential within the European STEAM education community. By investing in and supporting these educators, we not only elevate the quality of education but also cultivate a future workforce equipped with the skills and mindset needed to thrive in an increasingly complex and technologically driven world.

And EASE is fulfilling its role of promoting STEAM educators and STEAM Education.

Daniela Brogna
Nelson Gomes



1. Adina Avacovici

Adina is a science teacher with over 35 years of experience, specializing in teaching physics and chemistry. She holds a PhD in Chemistry and is creator of educational software and learning resources. Adina is also a trainer and consultant for STEAM and VET projects, both in Romania and internationally. She has been an ambassador for the Scientix community since 2016 and is a member of the Executive Board and an e-trainer for EASE (EuropeAn network of STEAM Educators). She is also part of collaborative networks that empower educators to deliver impactful STEAM learning experiences.

Adina worked as a deputy college principal in a vocational school for more than 20 years. She has been responsible for European projects at the county level for 4 years and has nearly 20 years of experience in project management, including EU-funded projects with partners across Europe. These projects cover topics such as STEAM, 21st-century skills, parent involvement in school management, multiliteracies and multimodalities, digital competences, and sustainability, among others.

She is involved in didactic and educational activities with a focus on STEAM, also integrating children with special educational needs. Adina is dedicated to inspiring young people to take a keener interest in their science, technology, engineering and math classes. She shares expertise, knowledge, resources, and best practice examples/projects among STEAM educators to help teachers maximize their STEAM classes and emphasize the importance of interdisciplinary and experiential learning.

Adina is seeking development and growth opportunities to utilize her existing skills and is always enthusiastic about learning and undertaking new challenges. Currently, she is looking for opportunities focused on AI integration in STEAM education.

My Blue Home (•◡•)

My science teacher expertise is valued in the last few years in Erasmus+ projects that include a strong international dimension ensuring people-to-people cooperation by promoting values, principles and interests around common priorities.

With an increasingly interconnected and environmentally conscious world, education systems globally are recognizing the importance of integrating experiences outside the traditional classroom environment that augment students' learning process.

The project "My Blue Home" aimed at raising awareness and interest in Ocean Literacy and Sustainability. Beside a digital game, an ocean museum was created in each partner school.

The museum's cross-disciplinary approach encourages all students from varying social and cultural backgrounds to understand and appreciate the oceans' relevance. They learn about the intricate role the ocean plays in their own lives and how their futures intertwine with the health of this incredible water body.



The Ocean Museum is thoughtfully designed to engage students across different ages, abilities, and skills. The aim is to make the process of learning not only inclusive but also appealing by offering a unique coupling of information and interactivity.

From a knowledge perspective, the museum seeks to familiarise learners with essential concepts about ocean functioning, marine habitats, biodiversity, and ecosystems, and to shed light on their critical role on global climate and life on Earth.

Simultaneously, the museum looks forward to nurturing the scientist within each learner, motivating them to question, hypothesise and validate, thereby fostering a robust understanding about our oceans. Alongside intellectual development, another key objective is to harness social and emotional learning. Skills such as empathy, cooperation, self-awareness, and responsible decision-making can be significantly enhanced by exploring the connections between human actions and their impacts on marine ecosystems. Moreover, the museum aspires to build learners' communication and advocacy skills. Through activities and initiatives that require students to express their ideas, findings and solutions, it strives to foster persuasive communicators who can effectively advocate for ocean conservation.

InterViewing Adina :)

1. What sparked your passion for STEAM education, and how has that passion evolved over your 35 years of experience?

The passion for STEAM education was sparked by a combination of factors that resonate deeply with both educators and students.

First of all I would mention curiosity linked with exploration to understand how the world works, new concepts, relevance of learning to make it meaningful and exciting.

Another aspects to mention are the possibility of cross-disciplinary learning that fosters creativity, encouraging to think outside the box and develop innovative approaches; working with peers stimulating a sense of community and collaboration, making learning a shared and enjoyable experience; gaining skills in critical thinking, problem-solving, and creativity opening up numerous opportunities for personal and professional growth.

Not al least, stories of scientists, engineers, artists, and innovators who have made significant contributions have been incredibly inspiring, and also having passionate and supportive teachers/mentors who provided guidance helped igniting a lifelong love for STEAM and personal growth. ...35 years is a life long learning journey!



2. You have extensive experience in both teaching and school administration. How do these two perspectives inform your approach to STEAM education?

My combined experience in teaching and school administration provides a comprehensive understanding of the multifaceted needs and dynamics involved in STEAM education.

From the teaching perspective the focus is on student engagement and learning; pedagogical strategies to make lessons interactive, engaging and relevant to students' lives with accent on diverse learning styles and needs. I am aware that using problem and project-based learning, flipped classrooms, and collaborative projects one can foster critical thinking and problem-solving skills. As a Scientix Ambassador, member of European networks of teachers and trainer, European projects coordinator I share expertise and distribute resources to help teachers make the most of their STEAM classes.

From the administrative perspective I do understand the logistical aspects of equipping classrooms with necessary technology and materials to facilitate STEAM activities; I identify resources for STEAM programs, including grants, partnerships, and community support fostering a collaborative and innovative school culture; I consider integrating cross-disciplinary approaches to improve and adapt the curriculum; I design and implement training programs for teachers to help them effectively integrate STEAM into their classrooms, based on practical classroom experience and administrative oversight.

InterViewing Adina :)

3. Your work involves supporting educators in delivering impactful STEAM learning experiences. What are some key strategies or approaches that you find most effective in this regard?

Referring to key strategies or approaches supporting educators in delivering impactful STEAM learning experiences I do recommend:

Ongoing Training programs, workshops and training sessions to keep educators updated on the latest STEAM teaching methods and technologies.

Peer Collaboration by encouraging collaborative learning communities where educators can share best practices, resources, and experiences.

Implementation of project-based learning where students work on real-world problems, encouraging critical thinking, creativity, and collaboration.

Use of AI tools, interactive simulations and multimedia resources to make complex STEAM concepts more accessible, inclusive and engaging for students.

Set up engaging learning environments that are dynamic and collaborative with flexible seating arrangements and interactive whiteboards.

Use formative assessments to monitor student progress and provide timely feedback that guides learning.

Implement portfolio-based assessments where students can showcase their work and reflect on their learning journey.

Ensure that STEAM activities and materials are culturally relevant and inclusive, reflecting the diverse backgrounds of students.

Recognition of innovative teaching approaches by promoting them through STEAM educators networks

Working at transnational level to reach an European dimension of teaching and learning.

4. You mention a current focus on integrating AI into STEAM education. What excites you about this integration, and what potential benefits do you see for students?

AI technologies hold immense potential to support teachers by handling time-consuming tasks, such as personalizing learning activities to align with each student's needs and interests, assisting with brainstorming, and managing administrative work. AI can bridge the gap between different educational systems and cultures, providing a more globalized learning experience and helping students understand diverse perspectives.

Potential benefits can be summarized as:

- personalized and interactive learning: educational games and simulations that can create immersive learning experiences. For instance, virtual labs and augmented reality (AR) can make complex STEAM concepts more accessible and engaging.
- AI can provide real-time translations, text-to-speech, and speech-to-text capabilities, making STEAM education more accessible to students with diverse needs and from different linguistic backgrounds.
- AI can facilitate collaboration through digital platforms encouraging creativity by providing tools for digital art, music, design, and engineering, enabling students to explore and innovate in various STEAM fields
- Integrating AI into the curriculum exposes students to the technologies they will encounter in their professional lives, bridging the gap between education and industry.
- equipping students with the skills and knowledge they need to excel in a rapidly evolving technological landscape.

InterViewing Adina :)

5. The "My Blue Home" project sounds like an innovative approach to teaching Ocean Literacy and Sustainability. Could you elaborate on the development process and the impact you've observed on students?

The main goal of this project (www.mybluehome.weebly.com) is to address the voids in Ocean Literacy education in primary school and to encourage the implementation of sustainability practices to children in the age group of 6-10 years old. The European team comprised partners from Greece, Italy, Portugal and Romania. With a playful learning approach, children assimilated knowledge in formal, non-formal and informal environments.

In addition to raising the students' awareness, this project helps them develop their critical and analytical thinking, as well as provide them with benefits on a social and communicative level, as learning was via interaction with others and playing.

On a cognitive level the students acquired knowledge regarding the current state of the oceans and sustainability issues, developed their ocean literacy, and studied the available options for preserving biodiversity and promoting sustainability on a regional and global level. The essence of Ocean Literacy is key to create solutions and produce changes in lifestyles and behaviors capable of addressing these challenges and contributing to the SDG14 - Life Below Water.

The two results of the projects were an Ocean Museum in school and a Digital Game. Each class of pupils, starting from the age of 6 till the age of 10, in part, carried out a series of didactic and learning activities that resulted in many final products. The creation of a new place in the form of an Ocean Museum, within a school, meant setting up an environment to facilitate particular experiences and then coaching the inquiry process. This is how the My Blue Home Museum was born.

The children were delighted with the idea of being involved in making a museum. The fact that they searched for information, that they worked in a team, that they were also helped by their parents, added value to the results of their work, both scientifically and emotionally. The strength of the Ocean Museum's pedagogical approach lies in its unique learning process, which fosters digital competencies, experiential learning, and collaborative problem-solving to enable an immersive, cross-disciplinary, and all-rounded learning journey.

At its core is a creative learning approach that promotes out-of-the-box thinking and moves away from memorization learning. It drives students to ask investigative questions, seek answers, and develop independent thought, making learning an intimate exploration of their curiosity. The museum adds an experiential dimension to this process, allowing students to touch, feel, explore, and experience oceanic concepts first-hand, making learning fascinating and unforgettable. The Digital Adventure Game is a game-based learning resource featuring an interactive adventure game and digital learning contents through the use of a computer, smart-phone or tablet. The ocean-related contents is delivered through different means: game mechanics, game storyline, digital image and video content, thus rewarding the children's gameplay, engaging them in a more inclusive, comprehensive and attractive experience.

The use of playful learning in education allows a collaborative and fun understanding of Ocean related issues, reinforcing in students and educators alike, the global concerns regarding the subject and the importance of acting socially and responsibly on these matters.

MBH project aims, as well, to help teachers, parents and children getting more familiar with the means of playful and online education, especially relevant due to the specific present era through a pleasant, user-friendly experience.

InterViewing Adina :)

6. The Ocean Museum created through "My Blue Home" aims to engage students with diverse backgrounds and abilities. How does the museum achieve this inclusivity, and what strategies ensure its appeal across different age groups?

The Ocean Museum consists of an exhibition of contents created by the children at the partner's schools, displaying their learnings and interests about Ocean Literacy and Sustainability.

The concept of the Museum is to apply the contents assimilated in the Game and propose a more hands-on, creative experience for educators and children, which reinforces their knowledge on the subject of Ocean Literacy and Sustainability.

Children produced the Museum's contents, exploring subjects such as natural habitat, endangered species, and other concepts, using crafts and creativity. Various experiments were conducted through which the children learned about the role of the oceans as a source of food, the impact of overfishing on fish populations, the effects of ocean pollution, and ways to combat it. Students explored Ocean and Sustainability subjects in their own creative way, thus assimilating matters in an effective manner, complementing and consolidating the Game's approach. The museum's cross-disciplinary approach encourages all students from varying social and cultural backgrounds to understand and appreciate the oceans' relevance.

The Ocean Museum is thoughtfully designed to engage students across different ages, abilities, and skills. The aim is to make the process of learning not only inclusive but also appealing by offering a unique coupling of information and interactivity.

With content tailored to captivate imagination and ignite curiosity, it ensures that students of varying age groups, abilities, and skills find the materials accessible, meaningful, and engaging.

7. Beyond knowledge acquisition, the Ocean Museum emphasises social and emotional learning, as well as communication and advocacy skills. How are these aspects integrated into the museum experience, and what impact have you seen on students' personal growth and engagement in ocean conservation?

Educational systems globally are recognizing the importance of integrating experiences outside the traditional classroom environment that augment students' learning process. One such integration is the concept of an "Ocean Museum" proposed herein that serves as a dynamic, multi-sensory, and accessible platform to impart and stimulate ocean literacy among students.

From a knowledge perspective, the museum seeks to familiarise learners with essential concepts about ocean functioning, marine habitats, biodiversity, and ecosystems, and to shed light on their critical role on global climate and life on Earth. It navigates through seemingly complex topics like thermohaline circulation, albedo effect, ocean acidification, and marine pollution, to break them down into understandable components.

Simultaneously, the museum looks forward to nurturing the scientist within each learner, motivating them to question, hypothesise and validate, thereby fostering a robust understanding about our oceans. This critical thinking objective is integral within the museum's pedagogical approach as it triggers an in-depth understanding and appreciation for marine life and the challenges it currently faces.

Social and emotional skills such as empathy, cooperation, self-awareness, and responsible decision-making can be significantly enhanced by exploring the connections between human actions and their impacts on marine ecosystems. By inciting feelings of stewardship towards the ocean, the museum aims to nurture a compassionate and empathetic outlook.

Moreover, the museum aspires to build learners' communication and advocacy skills. Through activities and initiatives that require students to express their ideas, findings, and solutions, it strives to foster persuasive communicators who can effectively advocate for ocean conservation.

The most important impact is that students are better prepared to engage in Ocean Education initiatives, more aware of the importance of the Ocean and Sustainability issues and relate different approaches and fields of interest such as Arts, Science, History.



2. Afrodit Michailidi

Afrodit Michailidi is a highly accomplished educator with extensive credentials in Computer Sciences and Adult Education. Her academic background includes a B.Sc. and M.Sc. in Computer Sciences, an M.Ed. in Adult Education, alongside a diploma in Career Orientation and Counseling. Currently, Michailidi serves as an ICT and Computer Science teacher at a public Vocational High School and holds the position of Headmaster at a large Vocational Laboratory Center, providing leadership for both morning and evening classes.

With nearly 25 years of teaching experience and over a decade in educational administration, she has become an influential figure in the field of STE(A)M education. Known for her commitment to teacher training, Michailidi creates innovative professional development programs focusing on digital, media, and AI literacy, delivered both on-site and online.

Her contributions extend to fostering Online Safety and Digital Media Literacy, participating in the nationwide School Network for Internet Safety, where she shares her expertise through effective educational techniques and best practices. She plays a pivotal role in the Computing at School Festival's organization committee, an event celebrated for its promotion of data privacy and digital wellbeing. Michailidi's involvement in the Scientix community underlines her commitment to advancing science education across Europe. As an EU Codeweek Leading Teacher and a member of the European Digital Education Hub, she organizes STEAM events and mentors fellow educators. Her volunteer efforts include supporting the Greek eTwinning Community.

Her engagement with ERASMUS+ and European projects highlights her dedication to innovative educational practices. In 2023, she participated in an EduHackathon to create educational scenarios for Computer Science aligned with the 17 Sustainable Development Goals, later incorporated into a well-received MOOC. Her participation in the Media Literacy for educators' workshop also contributed valuable materials for another MOOC.

Currently, Michailidi is involved with the Wellbeing in Digital Education Squad of the European Digital Education Hub, showcasing her commitment to enhancing digital education's impact on student welfare. A proponent of lifelong learning, she continuously engages in professional development opportunities, seeking new methods to inspire and educate learners.

Computing at School Festival



The Computing at School Festival is a grassroots initiative by Greek teachers, designed to showcase students' digital creations in a non-competitive, celebratory environment. The event encourages students to transition from being mere consumers to proactive creators of digital tools. This festival includes a variety of student presentations, workshops, demonstrations, and keynote speakers, offering a comprehensive experience free to the local community.

Throughout the academic year, teachers of ICT and Computer Science engage primary and secondary school students in diverse computing projects. These projects may encompass animation, digital artifacts, programming for mobile devices and computers, and robotics. Schools can submit multiple projects, supporting project-based learning and fostering creativity within STEAM education both in curricular and extracurricular contexts.

The Festival serves as a platform to unite students and teachers with universities, research institutes, and related NGOs, all sharing a common goal of celebrating digital creativity. The event aims to heighten students' awareness of both the real and digital worlds while empowering them to shape their digital futures.



Participants in the Festival benefit by enhancing their digital competencies and gaining a deeper understanding of the digital aspects of modern life. They also acquire vital knowledge, skills, and attitudes for the positive and sustainable development of technology, alongside cultivating responsible citizenship.

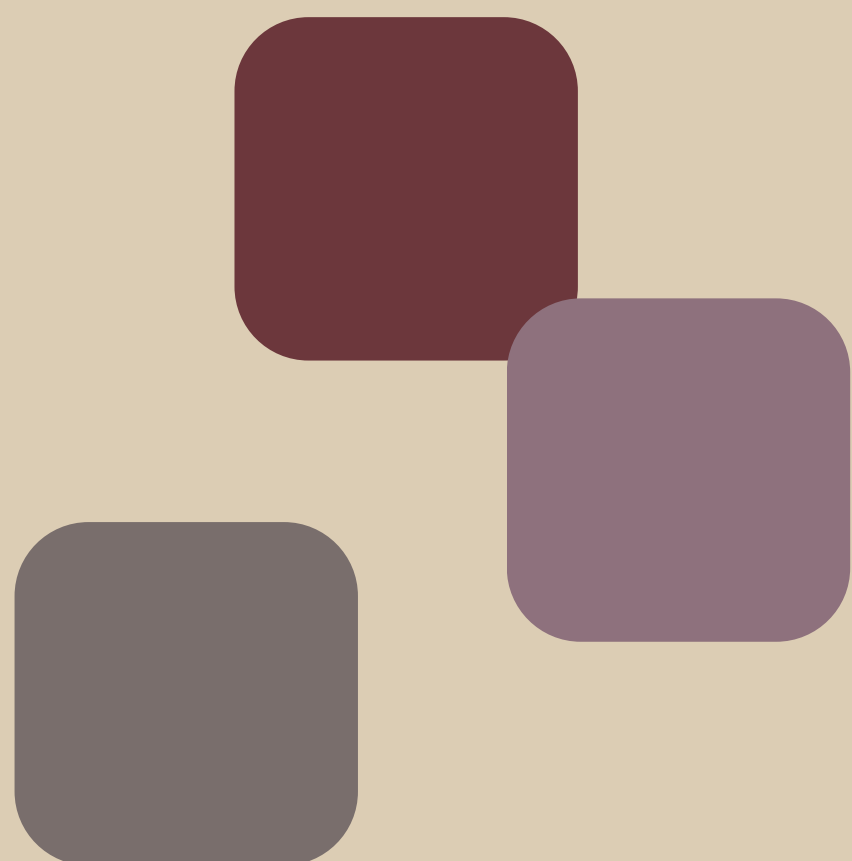
Held annually during the same designated week across Greece, the Festival attracts between five to seven thousand student participants and tens of thousands of visitors. Its enduring success is evident in its 14-year run and the many repeat entries it receives. In response to the COVID-19 pandemic, the Festival has adopted a hybrid format, providing both on-site and online participation options to accommodate a wider audience.

InterViewing Afroditi:)

1. What initially drew you to STEAM education, and how has your commitment to this field grown throughout your extensive 25-year teaching career and 10+ years in administrative positions?

I was fortunate enough to grow up with active parents, both scientists and both successful in their respective field. From an early age I was fascinated by how things work. My environment both encouraged and nurtured learning. I always wanted to be a teacher. Today I like to think of STEAM teaching as my calling but back then I did not answer it unquestionably, I explored my options first. For example, my first job was not in teaching but in IT. Even there I quickly gravitated to user support and employee training. After being appointed as a public high school teacher, the curiosity about how things work and my desire to better organize my work led me to become actively involved in the daily school process. I helped more and more in administrative tasks, voluntarily at first and then through more official roles. I started as a teacher of Computer Science, took on more interdisciplinary projects in Technology and European values, assisted students with career orientation, became an ERASMUS+ coordinator, mentor for other teachers, Assistant Headmaster and finally Headmaster. I was also fortunate enough to work in schools with a strong leadership and a collaborative culture with common goals between teachers. STEAM education facilitates 21st Century skills and helps bring different disciplines together combining their unique perspectives to form a more global approach.

STEAM education is also more engaging to the students. I remember I was teaching about hardware components (before the age of cell phones). I asked about the applications of a scanner, thinking about scanning documents and receipts. A girl student that had never before participated in class piped up “in hairdressing salons”. And she waxed delightfully about how they can scan your photo and change your hairstyle and hair color and show you if the look suits you before you tried it. I am so grateful for that unexpected comment. It was the first time I realized the benefits of combining students’ real life experiences, inclusive perspectives and STEAM. So my on-going commitment is really for the benefit of my students.



InterViewing Afroditi:)

2. Your background combines expertise in Computer Science, Adult Education, and Career Counselling. How do these diverse disciplines converge and influence your approach to STEAM education?

I am still curious about learning new things and I like passing on what I have learned to others. Fun fact, I still have an essay from when I was 10 years old, where I quote "I want to be a math teacher but maybe I will choose something more practical like computer science instead". So indeed I chose Computer Science as my University Major. When I completed my B.Sc. in Computer Science, I wanted to learn more so I followed up with an M.Sc. in Computer Science. To excel in my role as teacher trainer and teacher mentor, I enrolled and completed an M.Ed in Adult Education. I taught Career Guidance and Orientation at school and completed a one year program in Career Counseling and Orientation to feel more qualified for the job. The same drive pushed me to learn basic German before an ERASMUS course in Germany with my students, even though I was already proficient in English and Spanish. My last training course was on differentiated teaching for students with learning disabilities, since we have more and more in our schools.

All of the training, the knowledge and the skills I have gained have made me what I am today and they are but tools to use when needed. You never know when they come in handy.

For example, a lot of the methods in Adult Education also work for younger learners. Exposing the science behind everyday situations fascinates the young as well as the old. Team building methods can also be used for ice breaking activities. Exploring your work values and ethics in Counseling can also help in STEAM projects and problem solving. Programming in Computer Science depends a lot on the trial-and-error method which is also a great way to approach real life STEAM scenarios. And the list goes on.

3. As Headmaster of a large Vocational Laboratory Center and a Teacher Trainer for innovative teaching techniques, you hold influential positions within the educational landscape. How do you leverage these roles to promote and advance STEAM education in Greece?* This question focuses on Afroditi's leadership roles and how she utilises them to advocate for and implement STEAM education.

Imagine a doctor from 100 years ago going into a modern operating room. They would not be able to even recognize the equipment. Imagine an automobile mechanic from 100 years ago trying to fix a modern car full of electronics. They would probably give up. Now imagine a teacher from 100 years ago walking into a classroom today. Most probably they will just walk up to the blackboard, pick up the chalk and start lecturing. Until recently the only change would be the replacement of the chalk blackboard with a marker whiteboard. Fortunately things are changing. We are moving to more student-center pedagogical techniques, we are utilizing digital tools, we are using interdisciplinary teaching. STEAM education provides great examples of such techniques e.g. project based learning, problem solving, computational thinking, real world case studies.

Of course it is much easier if the policy makers are on board but I believe change can be done one step at a time. I also believe in the power of the community, and have always seeked out advice and mentoring. At some point I realized more and more teachers were coming to me for advice, so I emerged as a leadership figure through a very natural path.

In my role as Teacher Trainer I can share my expertise with my colleagues and trainees, provide concrete examples, test and share good practices. That is also a very good culture of collaboration in my school. We provide in service training and mentoring for educators and organize activities for learners from primary to secondary school. The training and activities are primarily directed at the school community but we make open calls to educators and to the general public as well. We also cooperate with industry leaders and take learners on on-site field trips.

InterViewing Afroditi:

4. The Computing at School Festival, which you are involved in, encourages students to transition from passive consumers of digital tools to active creators. Could you elaborate on how this festival cultivates digital creativity and empowers students to shape their own digital futures?

The computing at school festival started with a handful of teachers that wanted a way to reward students for their work and also encourage them to participate in STEAM related projects. It is not a competition, every entry is rewarded with the same prize: the chance to present and explain their work to an audience. Entries are free and open but they have to be registered by the school. Each school can have more than one entry if they have more than one team. Students decide on their subject and work all year long with the help of their Computer Science teacher. Every participating student team gets to give an 8-minute presentation of their work and also commit to showcase it and explain it in an exhibition. All the projects are also highlighted in the website. It is a successful and rewarding process and engages students. Each year they are excited to present their work and also see what their fellow students have been up to. Past projects include but are not limited to robotics, digital storytelling, videos, stop motion animations, 3D printing and automations.

Besides STEAM related skills, students also learn soft skills such as collaborating and presenting. Even the posters promoting the event are the work of students. It is also inclusive for students with disabilities and fewer opportunities.

The impact is such that we have repeat entries of schools with students that want to do more projects based on what they did last year.

The festival has grown from one room in 2000 to being a week-long event in over 15 cities in Greece, sponsored by the ministry of education and local educational authorities. To bring the cities together, there is always a common online event with one presentation from every city.

Part of its success for teachers is that it is decentralized. Every year the central organizing committee decides the dates of the festival, usually in April/May. Then there is a local organizing committee in each city for the implementation. The local committee decides the venue, the days of the week based on the number of participants and the related activities offered. This can include talks by invited experts and workshops for students, educators and parents. There is also collaboration with local universities and research centres that bring their innovative projects and explain it to the festival audience. All this is completely voluntary work on the part of the committees involved.

As such the computing at school festival is more of a celebration of student creativity and ingenuity and is open to the public. Since 2020 part of the workshops offered have been online allowing us to reach a greater audience. Still the joy of seeing so many young learners together in one place engaging in STEAM activities is something to behold.

5. You are actively engaged in various European initiatives, including Scientix, EU Code Week, and the European Digital Education Hub. How do these collaborations enrich your STEAM teaching practices and contribute to a broader European network of educators?

It is true, I identify as a lifelong learner and always seek to better myself. I initially got involved because I wanted to improve my teaching practices and learn new techniques. I believe in communities. I firmly believe in the bottoms-up approach and appreciate the good work of fellow educators. Good practices tested out in the classroom can be a lifesaver for the less experienced teacher and a starting point for the more experienced one. The years of collaborating with like-minded colleagues all over Europe have only strengthened this belief. Despite our different educational systems, we all have the same goal. We want to make education a more engaging and rewarding process for our students. We aim to empower our students to feel confident in themselves and their skills for their future careers. Sharing is caring. Learn from the best, is my advice. My involvement nowadays is more about transforming these good practices into educational policies, so as to reach and help an even broader audience of educators.

InterViewing Afroditi:)

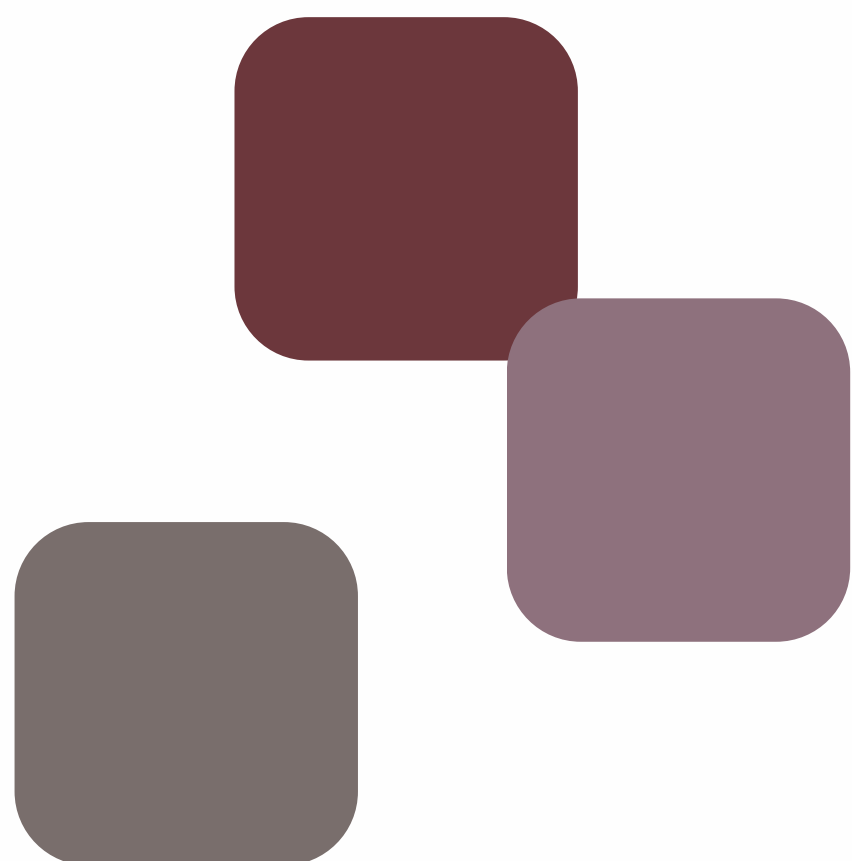
6. Your participation in the EduHackathon, where you developed educational scenarios for Computer Science incorporating the Sustainable Development Goals, highlights your commitment to integrating global issues into STEAM education. Can you discuss how you incorporate sustainability principles into your teaching and encourage students to become responsible global citizens through STEAM?

Again, I think STEAM education lends itself very well to a holistic approach. Examples are plentiful. You can have a course on air conditioning maintenance and discuss climate change. You can talk about the excessive tourism observed in some areas and factor in the allocation and depletion of resources. In cloud computing, the “cloud” is in fact somebody else’s computers and consumes electricity and space. AI is powered by large fields of supercomputers with an increased need in water for cooling, area for storing and power for working. The beauty of STEAM education is the integration of different subjects so that the whole is greater than the sum of its parts. The added bonus is that it enhances students' hard skills and knowledge and also allows them to express themselves creatively and discover their ingenuity.

7. Your dedication to lifelong learning, evidenced by your participation in various professional development programs and MOOCs, sets a strong example for your students. How do you inspire your students to embrace continuous learning and adapt to the ever-evolving technological landscape?

I think this dedication is self-evident. To paraphrase Alice in Wonderland, like the Queen of Hearts I like to learn six new things before breakfast. It is of course not easy to justify continuous learning to teenagers who are probably waiting to finish school so as not to study anymore. Fortunately or not, in quite a few STEAM disciplines, the speed of technology today is such that school books are outdated by the time they get to school. Engineering is such an example. Problem based learning and real world scenario case studies are the best way to bring this to students’ attention. It is of course not enough to make them realize the problem. We must also provide them with a solution. We can do so by taking them to real life work environments. We can use various digital tools and simulations. We can also bring invited industry speakers that update them on the knowledge and skills necessary. We must in fact teach students to learn how to learn. Our learners should not only acquire the necessary skills but be able to verify that they have them. So certification and accreditation is also of importance.

One final note. We are role models for our students. We may not think we are. We may forget we are. But we are. We have an impact. Let’s make it count!





3. Ana Clara Grecu

Ana Clara Grecu is a distinguished primary education teacher at Carol I Technological High School in Valea Doftanei, Romania, renowned for her innovative approach to integrating science and technology into the classroom. As an ambassador for eTwinning, Erasmus, ESERO, Techsoup, and Quiver, Grecu plays a pivotal role in broadening educational horizons within Romania.

Her career took a transformative turn in 2018 after participating in courses that expanded her teaching methods significantly. At the Romanian Space Agency, she discovered how to leverage space as an educational context, and through the TechSoup NGO, she learned to incorporate technology and robotics into her lessons. These experiences sparked her involvement in eTwinning projects, leading her students on explorations of coding, the Solar System, and diverse scientific experiments. Notably, projects like "My Planet: A Drop in the Universe," "Coding from Scratch to Scratch 3.0," and "European Menu: From Earth to the Moon" have garnered national and European Quality Certificates and even national awards.

Grecu's training at the European Space Agency in Belgium emboldened her to include more STEM-focused projects in her curriculum, particularly encouraging female student participation. Projects such as "Innovate Your Dreams" and "Cuéntame cómo dedicarme a la Ciencia," the latter initiated by the Natural Sciences Museum in Madrid, have been pivotal in promoting scientific vocations among girls. This project was notably presented at the International Conference on Science on the Internet, the International Conference on Online Education Without Borders, and recognized at Copa Tecnociencias Paraguay.

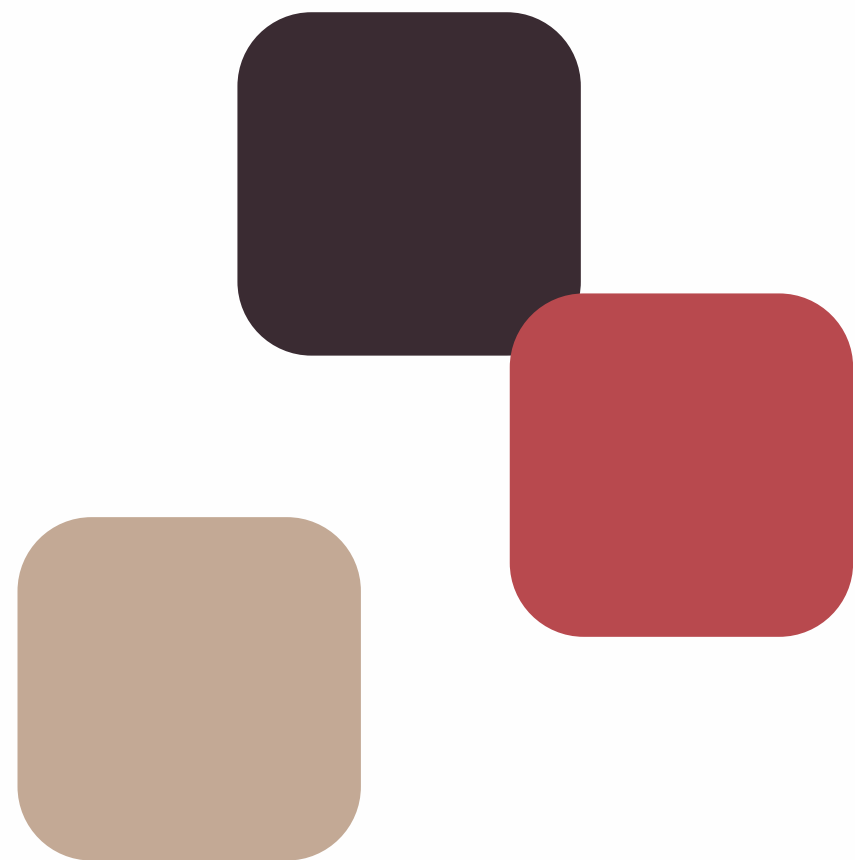
Annually, Grecu and her students engage in international events hosted by the International Astronomical Union, such as "Women and Girls in Astronomy," as well as Meet and Code events, World Space Week, and Code Week, demonstrating her commitment to active STEM engagement.

As a trainer, Ana Clara Grecu extends her dedication to STEAM education by training teachers and future educators. She remains a lifelong learner, frequently attending conferences, webinars, and workshops to further her knowledge and inspire those around her. Her dedication to education and her students continually fuels her passion for learning and discovery.

European Menu: From Earth to the Moon (◉◡◉)

The "European Menu: From Earth to the Moon" project was a collaborative effort that united students and teachers from Austria, Spain, Serbia, Turkey, and Romania. Throughout the school year, 200 students and 20 teachers embarked on a journey of learning revolving around plants, extraterrestrial environments, healthy eating, and programming. Through a series of online meetings, participants shared their achievements, posed questions, offered solutions, celebrated successes, and learned valuable lessons from their setbacks.

This project, targeted at students aged eight to twelve, used the intriguing context of extraterrestrial space to examine the complexities of life beyond Earth. Participants engaged in hands-on activities such as growing plants in hydroponic conditions, experimenting with flavors in space, learning robotics and programming, and exploring the contributions of twelve female astronauts to space exploration. Additionally, students delved into discussions about the social organization needed for future lunar colonies, debating and voting on potential rules to govern them.



The project's thematic exploration was grounded in the assumption that humanity will return to the moon and establish bases as a prelude to exploring Mars. Students were challenged with three pivotal questions: What types of plants could feasibly be cultivated on the moon, given the unsuitability of lunar soil? Who are the women who significantly contributed to space exploration, and what key information about them should be preserved in a lunar colony's library? What social rules should be adhered to in a lunar colony, and who would be responsible for establishing them?

The project's impact extended beyond immediate learning objectives. Participants—both teachers and students—gained a deeper understanding of conducting STEM activities, sharing support, celebrating achievements, and identifying areas for potential improvement. Positive feedback from students' parents highlighted noticeable behavioral changes in their children, underlining the transformative nature of this engaging educational experience.

InterViewing Ana:)

1. What initially sparked your interest in incorporating innovative teaching methods, such as technology and robotics, into your classroom?

I believe it was the novelty, the interactivity, and the break from tradition that drew me in. I discovered the internet quite late myself, but I understood why it fascinates children. I felt it was an opportunity to ignite in my students' eyes the same spark of curiosity that had ignited in me. I knew it was time to make a change in the way I teach.



2. Could you elaborate on the two courses in 2018 that you say "radically changed" your professional path? What specific knowledge or skills did you acquire that influenced your teaching approach?

The first training program I discovered by chance was the Digital Guide of the Techsoup Romania Association. The exercises they proposed were fascinating, but also methodologically explained, so that you could easily integrate them into the classroom. After taking this course and passing on the knowledge, I became a Techsoup Ambassador for Education and had the opportunity to learn more and participate in programs such as Meet and code, through which I received funding for my classroom robots. Also in 2018, I participated in an ESERO Romania course, where I learned how to teach my students using space as a context and how to collaborate with colleagues from Europe through eTwinning projects. An exceptional course, which fueled my hunger for something new, something different in the classroom. Thanks to this course, I learned about the opportunity to attend the European Space Agency courses, where I had my first contact with the Lego we do kits. And yes, they changed my life and professional path!

InterViewing Ana:)

3. You've led your students in numerous successful international projects, some even receiving national and European awards. Which project are you most proud of and why?

It's hard to choose the most beautiful project, because they are all close to my heart. I'm proud of each of them, but, probably, first love is never forgotten, right? My first eTwinning project moves me every time. I remember the joy of my children, the passion with which we did the activities together, the experiences we lived. Logistically, we didn't have all the modern facilities that we have now in school. We were all huddled in front of a laptop, but we were happy, because we saw other children, other cultures, greeted each other and sang together or learned new words. It was like a window opened for us to the whole world. And we took advantage of the opportunity. Everything followed from there: robotics and programming, STEM activities, learning a new language, national awards, lifelong friendships, Erasmus projects.

I am proud of the children, but also of myself. When I was a student, English was not one of the languages of study in rural areas of Romania. This was a barrier for me, but with the help of technology that has advanced, with the help of wonderful partners and the determination I had to do education differently, I managed to advance, learn something new and not let language barriers close that window for either my students or me.

4. The project "Cuéntame cómo dedicarme a la Ciencia" aimed to promote scientific vocations among girls. What specific strategies did you employ in this project to engage girls in STEM education, and what impact did you observe?

What a beautiful project it was! As it was built together with partners from Spain and the United States of America, we started from a series of stories of women scientists, in which they talked about that moment in their lives that marked their professional path. Because some of them were alive, we had online meetings with them, meetings in which my students were able to ask questions and discover what the life of a researcher at the South Pole is like, for example. We also had meetings with a female writer of children's books who was also a biology teacher or with Ana-Maria Stancu, founder of RoboHub Romania, a learning center in the field of robotics and programming, especially for children from vulnerable groups, but also for the rest of the children or interested adults and CEO of Bucharest Robots, the first start-up in Romania dedicated to humanoid robots and service robots. There were also interesting experiments, such as the cultivation of bacteria and fungus in a controlled environment and scientific experiments in the school biology laboratory. Some of the girls in the class made drawing exhibitions of the bacteria they observed, thus understanding that any skill can be used in STEM careers. Four years after this project, most of the girls involved are already making their choices about what they will study in high school and college: two want to become doctors, one in forensics, another in architecture, and, of course, someone always wants to go into space exploration.

5. Your work extends beyond the classroom, as you also train other teachers and future teachers in STEAM education. What are some key insights or practices you share with them to inspire and equip them in their own teaching journeys?

Every time I talk to my fellow teachers or future teachers, I give them my own example: I am a teacher born in the last century, who had the opportunity to enter the digital world late. A teacher who had no knowledge of English. And, despite this, had the courage to open the window to the world. And who did not stop learning. Before teaching anything, it's important to instill confidence in them, showing that they can achieve it too, as long as they truly want to. Then, of course, I give them examples of safe places where they can learn new practices in the classroom, of communities of practice, of opportunities for courses, events, workshops. And I always remain just a click away from them. I am always available to help them, to guide them.

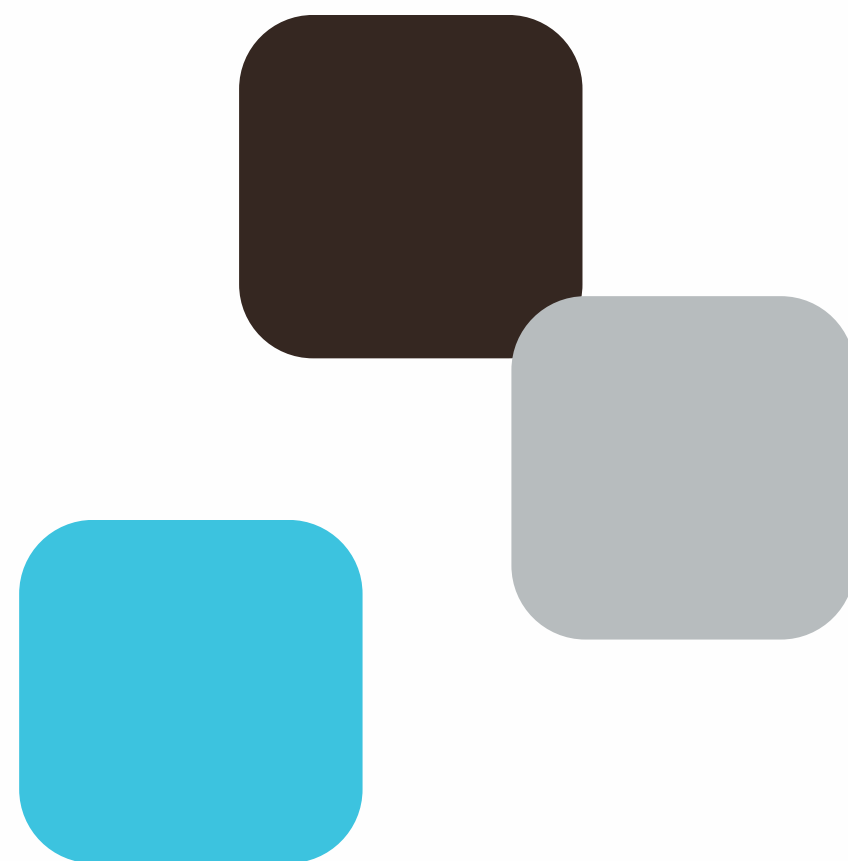
InterViewing Ana:)

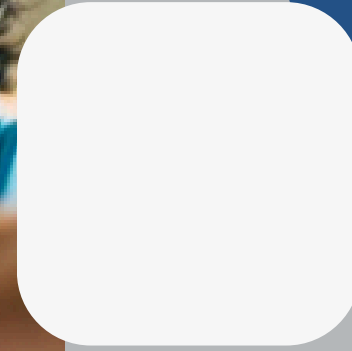
6. Your passion for STEAM education is evident in your continuous pursuit of professional development. What are some of the most impactful conferences, webinars, or workshops you've attended, and how have they shaped your understanding of STEAM education?

I have been following you with joy since I discovered you. This year's event was truly exceptional! I met fascinating people and saw their extraordinary work. I also participate every year in the international Teach with space conference of the European Space Agency. There I met fellow teachers who became my partners in eTwinning projects and with whom we now write successful projects. In Romania, there is an event that I never miss, the Predau viitor (I teach the future) Festival of the Techsoup Association. I follow the Scientix and Quiver pages and work on projects with their ambassadors. And, of course, I keep an eye on all the eTwinning project sharing events, because STEM activities are approached creatively.

7. The "European Menu: From Earth to the Moon" project encouraged students to think critically about life on another planet. What were some of the most creative or insightful solutions your students came up with in response to the challenges presented in the project?

This project is, for me, the highlight of the class. My students learned a lot about hydroponics, robotics, and democracy. I liked it and I can't forget the way they looked at themselves critically, recognizing their "weaknesses" when they debated card 4 of the Moon's citizenship. This card said that only people between the ages of 18 and 40 can go to the Moon. The debate in our class was interesting and their answers were even funny, at one point, because a little boy said: "We, children, are unpredictable and we could, while playing, accidentally touch a button that would throw us all into space. That's why we shouldn't be there before we're 18." They also discussed the need for children to move and have a play area, something they still considered difficult to achieve on the Moon's surface. Interestingly, they had the maturity to choose to stay home with their grandparents while their parents worked on the Moon. Of course, I see their choice as a result of the changes in our society in the last 30 years, in which many parents have gone to work abroad and left their children in the care of relatives. The solution chosen by the children seems to be an acceptance of their own condition but also an acceptance of the fact that progress involves sacrifices on everyone's part.





4. Camilo Palacio

Camilo Palacio, originally from Colombia, has made significant strides in the realm of educational robotics. From 2014 to early 2019, Palacio resided in China, where he worked as a toy designer and began creating his own line of whimsical robots, using these projects to delve into electronics and coding. This innovative drive led to the launch of plobot.com in 2015, the first tangible programmable robot designed for children aged four and up to learn programming through the use of cards.

In 2016, Palacio introduced the Otto DIY robot, which rapidly gained popularity as the most replicated open-source robot globally, earning multiple design awards. Recognizing the educational potential of Otto DIY beyond hobbyist circles, Palacio transitioned from his job in China to Europe in 2019 to focus on his startup under the "Otto DIY" brand. This venture specialized in producing robot kits through local 3D printing and distribution, widely adopted by educational institutions.

By 2022, the evolution of Otto DIY took a significant leap as Palacio partnered with Moravia Consulting and HP to develop a new generation of Otto robots. This collaboration is poised to revolutionize the teaching of robotics, integrating cutting-edge industrial design, educational content, and innovative hardware. Palacio continues to lead this venture, contributing to fields such as marketing, e-commerce, and branding, while strengthening partnerships with renowned entities like HP Inc. His work reflects a dedication to enhancing how technology is taught and experienced in educational environments.

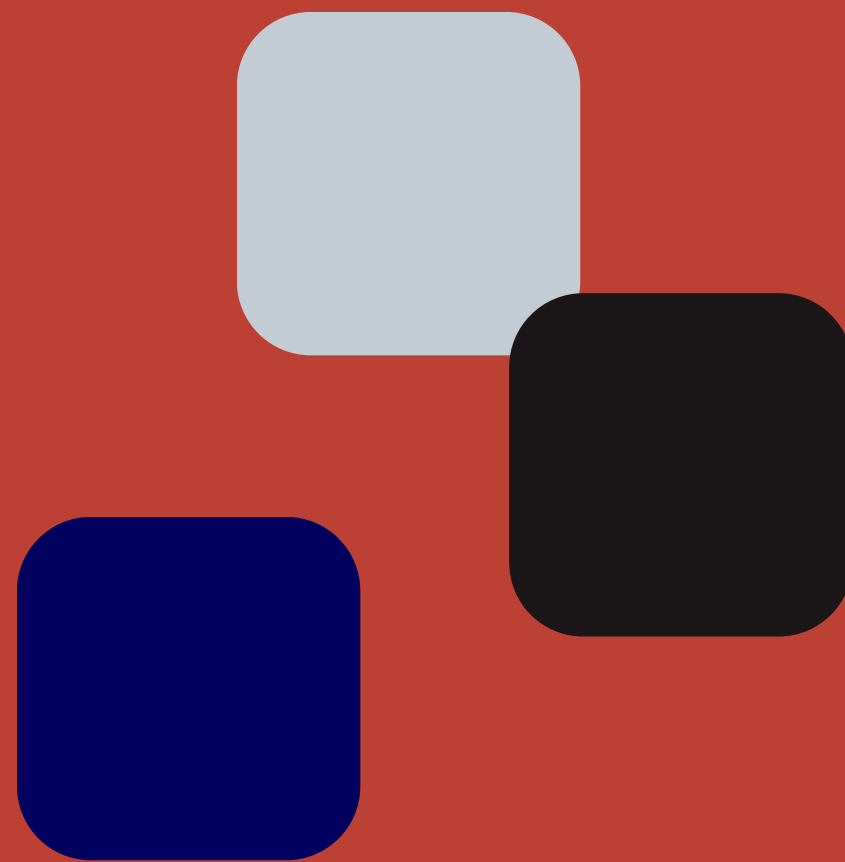
InterViewing Camilo:)

1. What inspired you to transition from toy design to creating educational robots?

The fact that toys are just momentary, education is meant to continue improving skills.

2. Can you elaborate on the design principles behind Otto DIY that made it so popular and award-winning?

Simple shapes that made it look cute, easy to understand, yet sophisticated and compact.



3. How did the partnership with Moravia Consulting and HP come about, and what new possibilities has it opened up for Otto in the EdTech industry?

Moravia Consulting, an EdTech manufacturing and distribution company located in Europe, Czech Republic, focused on education ranging from kindergartens to high schools since 1993. Moravia Consulting has been the official brand licensee of HP Inc. for HP-branded Calculators and Robots all over the world, their partnership is a long story. This year we launched the new HP Robots Otto kit, the second generation of Otto. Not anymore, a DIY cumbersome project but this time we made a product tailored to educators and for home use - new modularity, new coding ecosystem, more intuitive, more emotional and with the best technology, super easy to get right down into building and programming electronic projects. We are all about supporting creativity and innovation in the school and maker community by providing essential resources for education in electronics and robotics.

Otto: Build your own robot



The importance of STEAM education in empowering children through technology and coding is well recognized, with robots offering an engaging and inspiring medium for learning. Otto is a unique educational robot that was conceived eight years ago as a completely open-source project. The initiative was aimed at democratizing robotics education, allowing learners worldwide to embrace creativity and fun in their robotics journey. This project has cultivated a thriving international community of Otto builders, where its distinctive appeal lies in its character-like design, enabling children to bring Otto to life as a learning companion while navigating the challenges of robotics.

In partnership with HP, Otto has evolved beyond the traditional "Build your own robot" model to offer an integrated ecosystem of creation, connection, and coding. This approach encourages children to experiment and grasp fundamental robotics operations in a highly interactive manner. The emphasis is on how children learn to engage with machines in this rapidly advancing world, shifting the focus from obligatory tasks to creative exploration. This empowers students to take charge of their own learning experiences.



Beyond constructing a robot, students have the opportunity to assemble various gadgets and contraptions, facilitating the exploration of diverse topics. This fosters a consciousness change, guiding learners from passive consumption to active invention, and empowering individuals and communities for long-term, global impact. Otto's mission is to make robotics education accessible and equitable for all, nurturing a new generation of innovators.

InterViewing Camilo:)

4. You mention that Otto is "a real character that children build and pour soul into." Can you explain how Otto fosters this emotional connection and why it's important for STEAM education?

Unlike any other edtech robot Otto requires you to build, that itself not only is a very valuable learning engineering experience but it also creates an emotional connection with you, it is the same "IKEA effect" augmented to the fact that the robot comes to life and you can constantly add your own personality into it. We need more and more meaningful connections like this in a future surrounded by robots.

5. In what ways does Otto's "integrated ecosystem cycle of invention" empower children to go beyond simply building a robot?

Create. Connect. Code. It is our slogan that resumes the real robotics journey people should do; design thinking, then mechanics with electronics and finally programming, coming all the way back to the design. Is an iterative process that every inventor has to go through, if you only do 1 or 2 of those it is an incomplete process for making a product that people can actually use.

6. How does Otto address the challenge of making robotics education accessible and equitable for everyone, as stated in your motto?

We started as an open source project which we meant to keep alive as a parallel activity that enabled thousands of people around the world to make their very first robot. Is "Digital equity" - access to education for everyone and we boost that with the hardware an affordable robot, intuitive, plug and play, for all cultures and non-gender focused.

7. Looking ahead, what are your future aspirations for Otto and its role in shaping the future of STEAM education?

Growth and unification of the community. Right now the internet has helped to increase awareness but also to disperse and divide people into many subgroups that do not have a clear path. We want now to create a structure that helps people join forces with use to reach out their local communities into this cause now only using Otto but to keep showing the importance of STEAM and inspiring people outside this educational bubble into slow down our mindless consumerism and more into an active creativity mindset of constant improvement of the world around us.



5. Georgina Dimova

Georgina Dimova is a prominent figure in the field of computer science education in North Macedonia, recognized for her extensive contributions over a 25-year career. She graduated in 2000 from the Faculty of Natural Sciences in Skopje with a degree in Computer Science Engineering, later transitioning into teaching with a qualification from the Faculty of Pedagogy. Since then, she has been an integral part of the primary school "Strasho Pindjur" in Negotino, where she has served as an IT teacher, IT trainer, deputy principal, and Educational Team Leader.

Dimova's influence extends nationally and internationally through her workshops focused on integrating digital tools in education. As a national trainer, she has empowered over 300 primary school teachers to cultivate critical thinking and coding skills using microbits, addressing real-world problems. Her commitment to media literacy has led her to train more than 100 teachers and to contribute to a Macedonian-language MOOC focusing on media literacy and artificial intelligence.

Her approach to teaching emphasizes interdisciplinarity, effectively linking educational content with real-world applications. This philosophy has driven her involvement with professional networks such as Scientix, where she serves as an Ambassador, and as an Intel Skills for Innovation Certified Coach and National Geographic Certified Educator. Her innovative methodologies have been recognized with prestigious honors, including the 2024 Scientix Bioeconomy Award and the 2023 STEM Alliance Award in the Intel Educator Challenge. Furthermore, she has been acknowledged among the Best Teachers from Former Yugoslavia and has received a Municipal Award for her significant contributions to education and the IT sector.

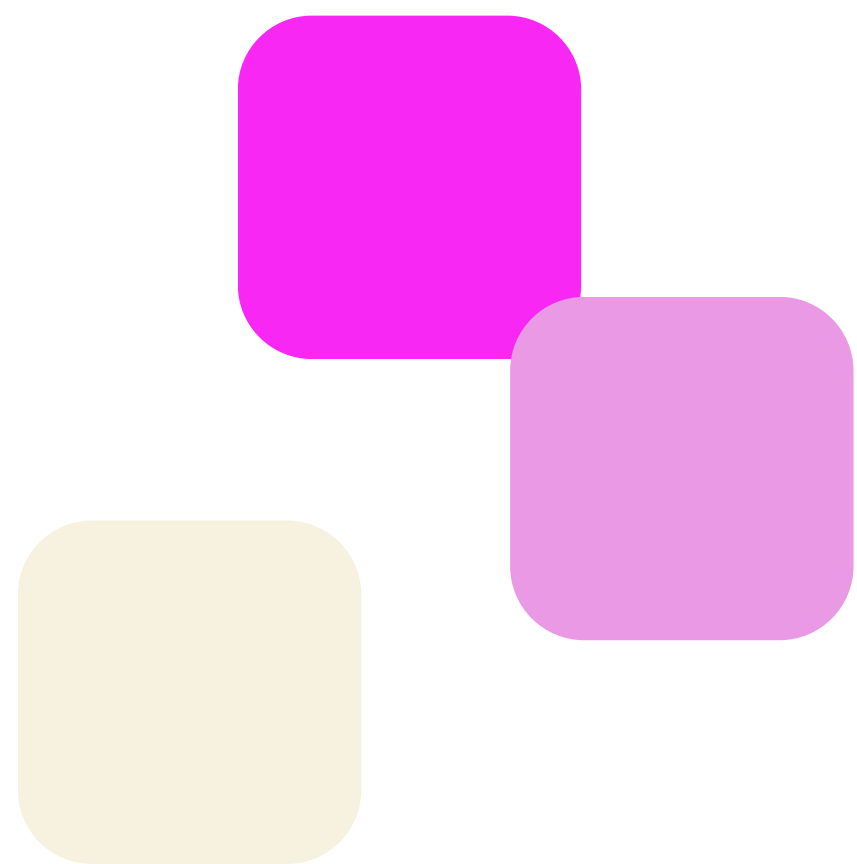
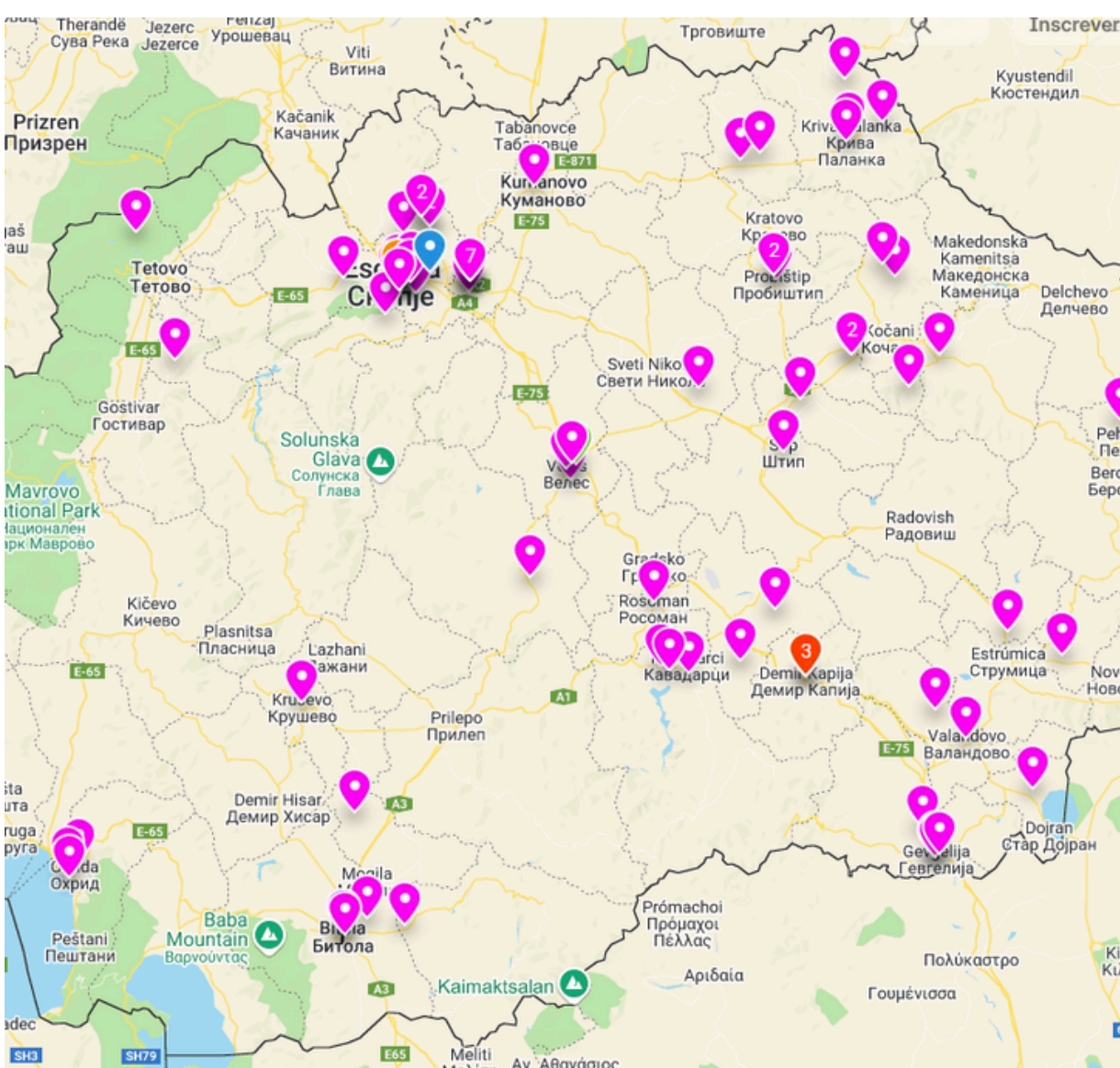
As the co-founder of the Center for Innovations and Digital Education (DIG-ED), Dimova works tirelessly to promote digital education and coding in schools, while fostering the growth of teachers' digital skills. In response to the scarcity of educational materials in the Macedonian language, she established a resource-rich website (www.informatikasp.wordpress.com) offering interactive lessons and textbooks freely accessible to students and teachers across Macedonia.

Outside her professional achievements, Dimova is a dedicated wife and mother of two, whose personal interests include playing the piano and amateur photography, showcasing her rich and multidimensional life.

Computer Science Week in Macedonia (•◡•)

Georgina Dimova is the co-founder of Computer Science Week in Macedonia, an esteemed annual event focused on advancing informatics, critical thinking, and coding among primary school students and educators. Celebrating its 11th year, the event has shown continual growth, with increasing numbers of schools participating annually. The initiative provides a carefully curated set of activities designed to enhance coding skills and digital literacy for both teachers and students.

Held each February, Computer Science Week invites teachers to register and organize a diverse array of activities with their students during the second week of the month. These activities include coding workshops, unplugged coding exercises, internet safety workshops, and more, offering a comprehensive approach to digital education.



The most recent iteration saw participation from 75 schools throughout Macedonia, engaging over 90 teachers and special educators, 3,427 students, and 30 parents. This widespread involvement underscores the event's impact on promoting digital literacy and preparing the next generation for the technological challenges of the future. More details can be found on their dedicated website.

(<https://nedelanainformatikata.wordpress.com>)

InterViewing Georgina:)

1. What inspired you to co-found Computer Science Week in Macedonia, and what were your initial goals for the event?

The Computer Science Week started as a joint initiative with my colleague Maja Videnovic also an informatics teacher in primary school. It was a time when informatics was struggling to find its place in primary education so we wanted to promote it among students, parents and other stakeholders.

2. Computer Science Week in Macedonia is now in its 11th year. How has the event evolved over time, and what have been some of the most significant changes or milestones?

The Computer Science Week started small, with only 13 schools taking part. For the first few years, participation stayed about the same. In 2017, the event won first place in the "Events" category at the All STEM - All Stars competition during the STEM Discovery Week, organized by Scientix and the STEM Alliance. As more teachers saw the value of these activities and students showed greater interest, participation quickly grew. By 2020, the event included 36 schools and 1,500 students and received recognition again as a winner in the STEM Discovery Campaign. Since then, the involvement of both teachers and students has continued to grow, confirming the high quality of the activities.



3. You have mentioned that over 3,400 students participated in Computer Science Week this year. What are some of the specific activities that students engage in during the event, and what impact have you observed on their interest and skills in computer science?

Each year, we strive to organize diverse activities that explore coding, both on computers and through unplugged methods. This year, we introduced two Scratch programming activities: "Catch the Star", where students created a simple game to catch a flying star, and "Animate Your Name", which allowed students to bring their names to life with creative animations. Additionally, we conducted a session on how computers represent images, helping students understand digital image processing. In previous years, as part of Computer Science Week, we designed and hosted a physical Escape Room experience. Our computer science classroom was transformed into a thrilling Escape Room, where students solved puzzles to uncover a device hidden by aliens and save the Earth. These activities make coding both fun and educational, inspiring students to engage with technology in creative ways.

InterViewing Georgina:)

4. You are recognised as a leader in digital education and have received numerous awards for your innovative teaching methods. Can you describe a particular project or initiative that you are most proud of and explain why it stands out to you?

I worked on a project with my colleague, Velika Markova, a chemistry teacher, called "Clean House = Good Health OR Not?". We explored how traditional cleaning products used at home can harm our health due to their toxicity, corrosiveness, and pH levels. Then, we looked for ways to use organic waste to create safer cleaning products.

5. You have also been actively involved in training teachers in areas such as coding, critical thinking, and media literacy. What do you see as the biggest challenges facing educators in integrating technology effectively into the classroom, and what advice would you give to teachers who are just starting to explore these areas?

I think that the biggest challenge in integrating technology effectively is the lack of good technology. But as you know we teachers make the best of what we have. What I would advice to teachers is start with something simple – some simple quiz app, that way you will feel confident. And always remember the technology is there to help the educational process and support students learning and should not be used without a purpose.

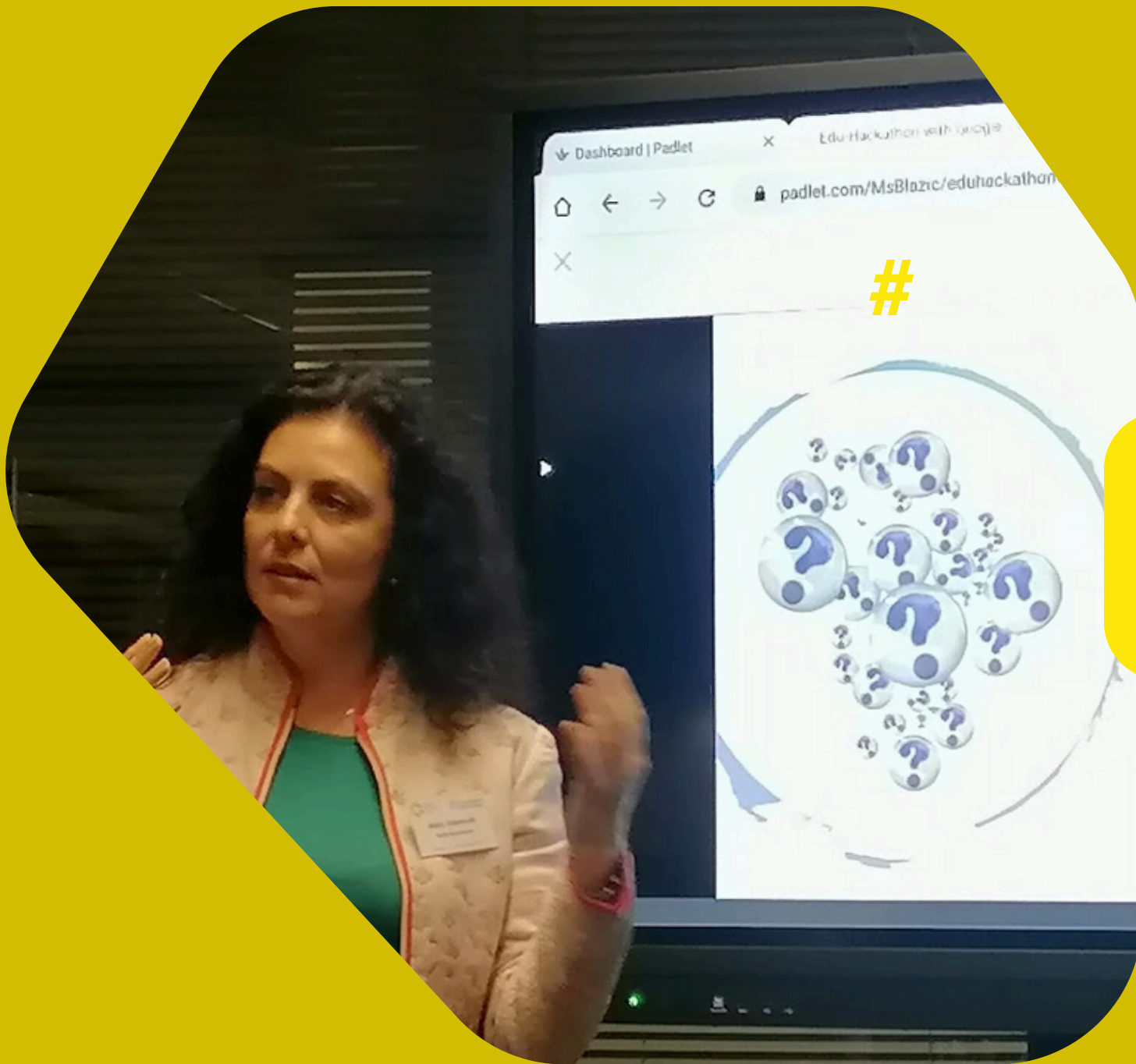
6. Recognising the lack of educational resources in the Macedonian language, you created a website to share interactive lessons and materials. What motivated you to take on this project, and what kind of feedback have you received from students and teachers who have used your resources?

My main motivation was to connect with my students and share learning materials with them. I use Genially to create interactive lessons because it lets me combine text and video in one lesson, catering to different learning styles. I also share interactive worksheets, games, and other resources.

Last year, I started making learning materials in Book Creator on topics like Coding in Scratch and Microsoft Word. In its first year, my book on Coding in Scratch was read by 654 people, many of them outside my school. The feedback from students and parents has been very positive—they feel these resources really help with learning.

7. Beyond your professional achievements, you are also a wife, mother, pianist, and amateur photographer. How do these different aspects of your life intersect and inform your work as an educator?

Balancing these aspects of my life allows me to approach education with empathy and creativity. As a wife and mother, I understand the importance of nurturing relationships and recognizing individual needs, which translates to a supportive environment for my students. My experience as a pianist teaches discipline and creative problem-solving, skills I integrate into my lessons. Photography, on the other hand, enhances my ability to notice details and present topics in visually engaging ways, inspiring students to think critically and creatively. These facets of my life not only enrich my teaching but also help me connect with my students on a deeper level.



6. Maja Videnovik

Maja Videnovik is an esteemed informatics educator at the primary school “Krstе Misirkov” in Skopje, North Macedonia, with a Bachelor's degree in informatics complemented by a Master of Science in educational management, focusing on ICT integration in education. Her commitment to lifelong learning is evident in her extensive participation in over 100 various conferences, workshops, seminars, training sessions, courses, and webinars. Currently, as a PhD student at the Faculty of Computer Science and Engineering, Videnovik's research centers on the use of games in education to foster interactive and engaging learning environments. She has authored more than 20 academic papers on technology integration in classrooms.

Videnovik is a pioneering force in advancing educational technology, serving as a teacher mentor and master trainer. Her focus areas include empowering teachers' digital competences, enhancing media literacy skills, and developing critical thinking, problem-solving, and coding abilities among both teachers and students. She has been a master trainer for the National platform for distance education and has contributed as a local expert in the development of standards and competencies for educators. Additionally, she collaborated with the Bureau for Development of Education in North Macedonia on curriculum development for Computing and basic programming.

Her involvement in Lifelong Learning and Erasmus+ projects has facilitated innovation and the exchange of best practices in education. Videnovik's contributions and expertise have earned her numerous accolades, including recognition as a Microsoft Innovative Educator Expert, New York Academy of Sciences STEM Certified Educator, Code Week Leading Teacher, Micro:bit Champion, eTwinning Ambassador, and Scientix Ambassador. She played a role in creating the Digital Skills Playbook for educators under the European Digital Education Hub and is a Fulbright TEA Media Literacy cohort alumna.

As a co-founder of the NGO Center for Innovations and Digital Education, Videnovik is deeply committed to the ongoing professional development of teachers. Her work emphasizes the use of technology to create dynamic, interactive learning environments and the integration of educational games into the learning process. Her efforts continue to shape the landscape of digital education both locally and internationally.

Methodological framework for developing students' computational skills (•◡•)

Computational thinking has emerged as a pivotal skill for 21st-century students, providing them with robust problem-solving capabilities that transcend traditional computer science boundaries. This cognitive approach enables students to deconstruct complex problems, identify patterns, and formulate algorithmic solutions applicable across various disciplines and real-world scenarios. Incorporating computational thinking into the curriculum is essential for enhancing problem-solving skills, fostering innovation and creativity, and preparing students for the digital age.

A recent project presents a methodological framework consisting of four cycles that alternate between cooperative and individual learning strategies, alongside game-based and project-based learning techniques. This framework includes three mandatory cycles and an optional cycle, each emphasizing principles of coding through diverse tools, enabling students to incrementally build their knowledge based on their interests.

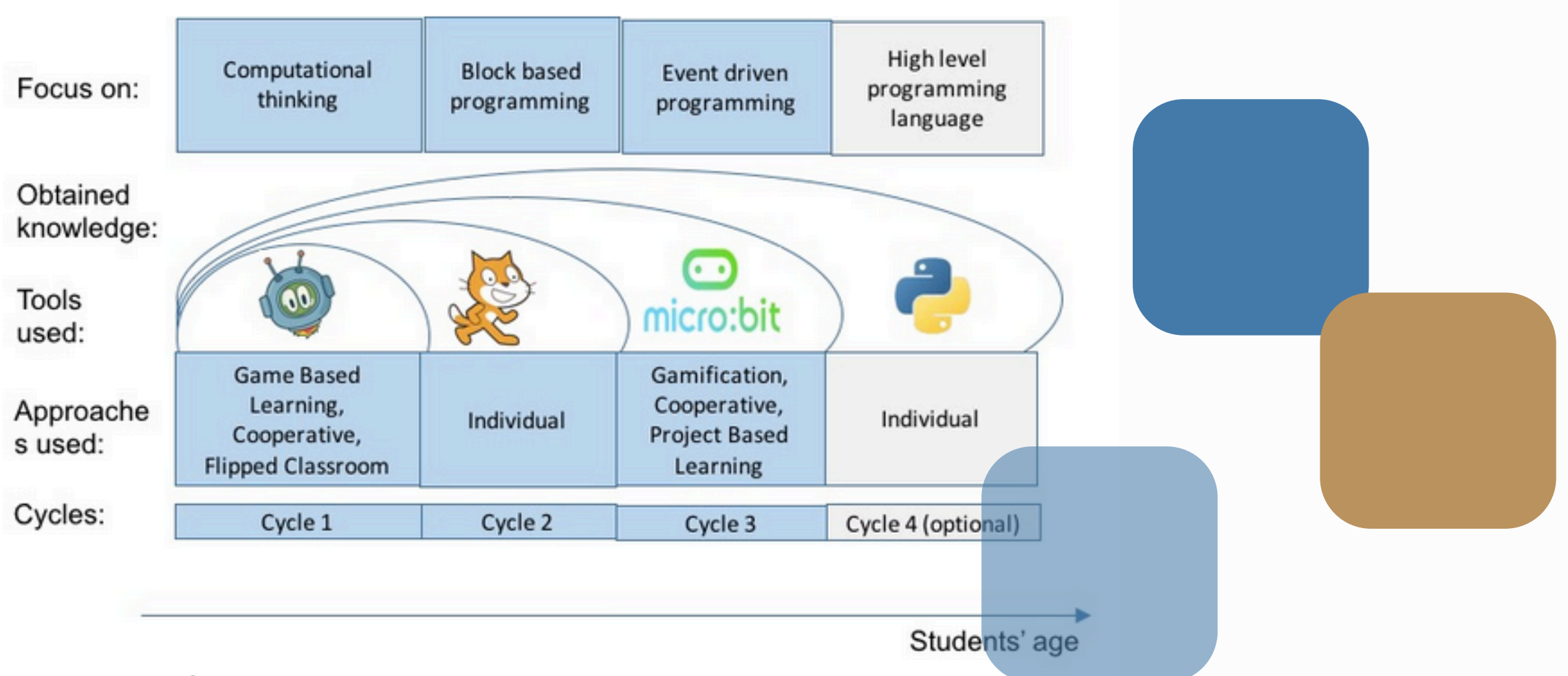


Fig. 1 Methodological framework—cycles

In practice, tools such as Scottie Go!, Scratch, Micro:Bit, and Python are utilized, although the framework primarily focuses on skills and educational approaches rather than specific tools, allowing for flexibility in implementation. Initially, students engage with block-based coding using conditions and loops through puzzles in "Scottie Go!". They then refine their understanding of block-based coding syntax with Scratch, followed by an enhancement phase using Micro:Bit. This stage introduces advanced features, such as sensor inputs and programmed smart objects, encouraging peer-to-peer communication and project competitions. Ultimately, students reprogram these features in a more advanced language, Python, further solidifying their computational skills.

The outcomes of this project are detailed in various academic publications, which can be accessed through the provided links:

- <https://onlinelibrary.wiley.com/doi/abs/10.1002/cae.22369>
- <https://ieeexplore.ieee.org/abstract/document/8615334/>

InterViewing Maja:)

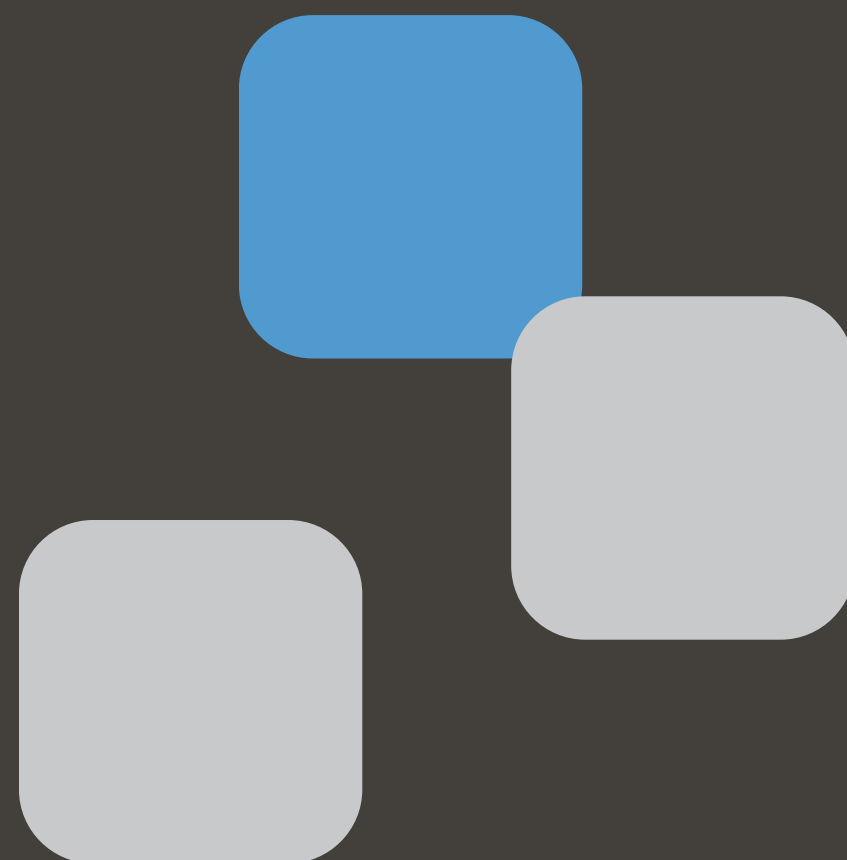
1. You have a BSc in Informatics and an MSc in Educational Management, and you are currently a PhD student focused on using games in education. What initially drew you to the field of education, and how have your studies shaped your approach to teaching?

I have always been passionate about sharing knowledge and skills with others, finding fulfillment in guiding others on their learning journeys. I see education as a powerful tool to transform lives, broaden perspectives, and unlock new opportunities, and I feel privileged to play a role in that process. Teaching excites me because it provides an opportunity to inspire and motivate students, spark their curiosity, and foster their creativity while promoting lifelong learning. Each lesson is an opportunity to build confidence in my students, helping them realize their potential and develop critical thinking skills that will serve them throughout their lives. I find joy in witnessing others grow, celebrating their achievements, and supporting them in overcoming challenges. Building connections with my students and creating a supportive environment that fosters discovery, collaboration and personal growth are central to my teaching approach. The most fulfilling reward is seeing the joy on my students' faces after class, shine in their eyes and hearing their insights, and knowing I've made a meaningful difference by empowering them to pursue their dreams.

My background in informatics has provided a strong foundation in problem-solving and innovation, essential skills for students in the digital age. I continually explore new ways to integrate technology into education, empowering students to become critical thinkers and active participants in our increasingly digital world.

My MSc in educational management strengthened my leadership and organizational skills, enabling me to design and implement innovative teaching strategies effectively and create structured yet flexible learning environments. I am continuously trying to emphasize the importance of creating student-centered learning environments and managing educational resources to maximize impact. Additionally, my understanding of educational management has equipped me with the skills to mentor peers, promote collaborative teaching strategies, and advocate for integrating technology into classrooms at an institutional level.

As a PhD student researching the use of digital games in education, I have refined my teaching approach to focus on experiential and playful learning. I align game-based learning with curriculum objectives, fostering a culture of both academic and creative excellence. By implementing various game-based methodologies, I make learning more engaging and interactive, emphasizing collaboration, problem-solving, and creativity. This approach not only enhances student motivation but also cultivates critical thinking and resilience, preparing students to navigate complex, real-world challenges.



InterViewing Maja:)

2. You have participated in over 100 conferences, workshops, and training events related to education. Can you share a particularly memorable or impactful experience from one of these events that has informed your work as a STEAM educator?

Each form of professional development is very important for me because at each training, workshop or conference I acquire new knowledge and insight that increase the quality of my teaching. So, it is very difficult to mention just one experience that is memorable and impactful.

For examples, I can mention various trainings and workshops about developing students' critical thinking and problem-solving skills, as well as coding skills. I was a participant at international trainings and after that I have been a teacher and principal trainer on national level. I have managed to implement various teaching approaches that have developed my students critical thinking and problem solving skills, collaboration, creativity, as well as coding skills using Micro:bit devices. On a national level, we have managed to create a network of STEAM educators, open for communication and collaboration, and sharing ideas, examples and good practices among each other.

As a truly life-changing experience I will mention the participation in the Fulbright Teaching Excellence and Achievement (Fulbright TEA) program with a specialized focus on media literacy, at University of Wisconsin – Madison, USA. This professional development significantly enhanced my knowledge and skills in the field of media literacy and AI, but also equipped me with the knowledge for creating an inclusive and supporting learning environment. When I speak about media literacy education, I must mention participation as a trainer at two TechCamps organized by the US State Department, in North Macedonia and Slovakia, concerning media literacy education. Although I was a teacher trainer, I got the opportunity to learn from the participants and to acquire some ideas that can be used afterwards. Additionally, I was involved in projects like "Media Literacy Case for Educators: Empowering Educators for the Next Digital Decade," which provided innovative teaching methods and resources for media literacy education.

Concerning the attended conferences international STEAM education summit is one of my favourites because it offers me the tools, knowledge, and connections to drive meaningful impact in their classrooms and beyond. It provides a platform for networking with like-minded educators and innovators across Europe, fostering collaboration and the exchange of ideas, gaining access to best practices and cutting-edge methodologies in STEAM education, alongside hands-on exposure to emerging technologies like AI, robotics, and AR/VR, enabling creation of engaging, interdisciplinary, future-focused learning experiences.

InterViewing Maja:)

3. Your work centers on innovative uses of technology in education, from empowering teachers' digital competencies to developing students' critical thinking and coding skills. What are some of the most exciting advancements in educational technology that you are currently incorporating into your teaching?

I am constantly striving to keep up with advancements in technology and find innovative ways to integrate them into education. Sharing experiences and good practices with other teachers is an essential part of this process, as it fosters collaboration and continuous improvement. Recently, I have been focusing on the transformative potential of Artificial Intelligence (AI) tools in education. I think that AI is a tool for creating more interactive and engaging learning environments, tailoring experiences to meet individual student needs and promoting personalized learning paths. These tools can be used not only to enhance student engagement but also to make the classroom a more dynamic, participatory space that fosters critical thinking, collaboration, and creativity among learners.

In my teaching practice, I constantly try utilizing new AI tools to generate educational content and automate routine administrative tasks, freeing up valuable time for meaningful instruction and interaction with students. This empowers both teachers and students, allowing for a more focused and impactful learning experience.

Building on my PhD research, I frequently integrate digital educational games into the classroom to make learning fun and interactive. These games significantly increase student engagement, motivation, and active participation by presenting challenges that encourage critical thinking, problem-solving, and creativity. They also promote collaboration and teamwork, fostering social skills and communication when used in group settings. Moreover, digital games allow personalized learning experiences, as students can progress at their own pace and receive immediate feedback to reinforce concepts and enhance understanding. By offering a risk-free environment for experimentation and learning, educational games not only help students grow but also provide me with valuable insights into their progress, enabling me to adapt my teaching strategies and create tailored learning pathways for each student. I have published more than 20 research papers emphasizing the benefits from integration of digital educational games in the learning process.

I would specifically mention here implementation of combined peer learning and game-based approach in the classroom during teaching cybersecurity and media literacy topics. This activity is a peer-learning initiative where upper-grade students teach lower-grade students about cybersecurity and countering misinformation through lectures and interactive games. Upper-grade students begin by researching these topics, evaluating information, and creating digital educational materials, enhancing both their understanding and digital skills. They then deliver lectures, engage younger students in discussions, and identify key challenges that need further explanation. Using this feedback, they develop interactive games in Scratch to reinforce the topics, offering fun, concrete examples for learning. The games are refined based on feedback and shared as open educational resources, creating a collaborative and impactful learning cycle. This approach was implemented within the project "Using Games to Learn Cyber Security and Misinformation: GaCySeMI" and is published as a good practice in the European Commission publication - Digital Skills Playbook for Educators.

InterViewing Maja:)

4. You have been involved in developing standards and professional competencies for teachers in North Macedonia. What are some key areas where you believe teacher training programs need to evolve to better prepare educators for the challenges and opportunities of 21st-century learning?

Teacher training programs must evolve to meet the demands of modern education, particularly with the rapid advancements in technology. Digital literacy and the integration of technology in the educational process are essential for equipping teachers with the skills to effectively use digital tools and adapt lessons to enhance learning and promote digital citizenship. Integrating AI into teacher training is especially valuable, as many educators may feel apprehensive about using AI tools. Teachers should be aware that AI-powered tools can offer real-time feedback, track student progress, and support personalized learning, enabling them to better address the diverse needs of their students. Additionally, incorporating AI into professional development can help teachers stay informed about the latest educational technologies, ensuring they are prepared to teach students the digital skills they need for the future.

Media literacy training is crucial for teachers to guide students in navigating the complex digital landscape and becoming discerning consumers of information. Educators who are trained in media literacy will be equipped to identify credible sources, recognize bias, and teach students how to critically evaluate information. By incorporating media literacy into the curriculum, teachers can encourage students to question, analyze, and understand the media they encounter, preparing them to make informed decisions and engage responsibly in a digital world. In an era where misinformation is prevalent, media literacy is an essential component of education that fosters informed citizenship and lifelong learning.

Professional development programs should also focus on different pedagogical approaches that will increase students' engagement, interest and motivation for learning. Training should include techniques for promoting critical thinking, creativity, and problem-solving—skills that are vital in a rapidly changing world. Collaborative and communication strategies should also be emphasized, helping teachers foster teamwork and peer interaction in diverse learning environments. Considering the challenges of modern teaching, programs should address teacher well-being and stress management, while promoting supportive classroom environments that prioritize students' mental health. Finally, teacher training programs should model the value of lifelong learning, encouraging educators to pursue continuous professional development and stay current with evolving trends in education.

InterViewing Maja:)

5. You have highlighted your methodological framework for developing students' computational skills, which uses a cyclical approach incorporating game-based and project-based learning. Can you elaborate on the benefits you have observed in students who have engaged with this framework?

The methodological framework for introducing coding in primary schools is based on four cycles that alternate between cooperative and individual learning approaches in addition to game-based and project-based learning. In every cycle, the students repeat practicing the principles of coding (as defined by the coding curriculum) but using different tools. In this way, students' knowledge increases in a graduated way, enabling students to progress according to their interests. At the beginning, students in groups develop their computational thinking skills using block-based game (Scottie Go!) and in the next cycle they individually learn the syntax of block-based coding (Scratch). In the third cycle they try to develop their programming skills through gamification and project-based learning, applying the same block-based coding interface enhanced with advanced features (Micro:bit). Finally, students can reprogram the same features using a more advanced programming language (Python).

Students who participated in the implemented methodological approach found learning to be more enjoyable and remained engaged throughout, resulting in sustained interest in computational concepts. The hands-on, experiential nature of the activities boosted their interest and participation in coding tasks.

By actively engaging in game challenges and tackling real-life problems, students were able to develop critical thinking and problem-solving skills, as well as strengthen collaboration and teamwork, particularly in group settings. The game-based learning and gamification approach provided immediate feedback, enabling students to learn from their mistakes in a risk-free environment, allowing them to build computational thinking skills at their own pace and in a stress-free space. Both game-based and project-based methods encouraged students to think creatively, design unique projects, and experiment with new ideas, all of which contributed to building their self-confidence and fostering a deeper sense of accomplishment.

6. Your methodological framework is designed to be adaptable and can be implemented with various tools beyond those specified. What advice would you give to educators who are interested in adapting this framework to their own classrooms and learning environments?

The educators who would like to adapt this methodological approach in their own classroom must understand the framework's core principles. The implemented methodological approach is focused on developing computational thinking and coding skills in primary school and there are many games, programming platforms, and tools that can be utilized in this approach. However, the focus should not be on the tools, but on the gradual introduction to programming skills starting by developing computational thinking skills, through block-based programming to object-oriented programming. Additionally, alternation between cooperative and individual learning approaches in addition to game-based and project-based learning is the focus on the implemented approach.

So, at the beginning students work in groups, play block-based games and develop computational thinking skills. In the second cycle they individually master learnt concepts by writing their codes in a block-based environment. After that they start writing more complex programs, working in groups, solving real life problems and progressing towards object-oriented programming, where mastering will be done again individually. This progressive approach to developing students' coding skills is the only thing that should be kept in mind. The tools used for achieving its goal can differ depending on teachers' competences and available resources. Also, you can always leave your students to guide you, just listen to their needs and interests.

InterViewing Maja:)

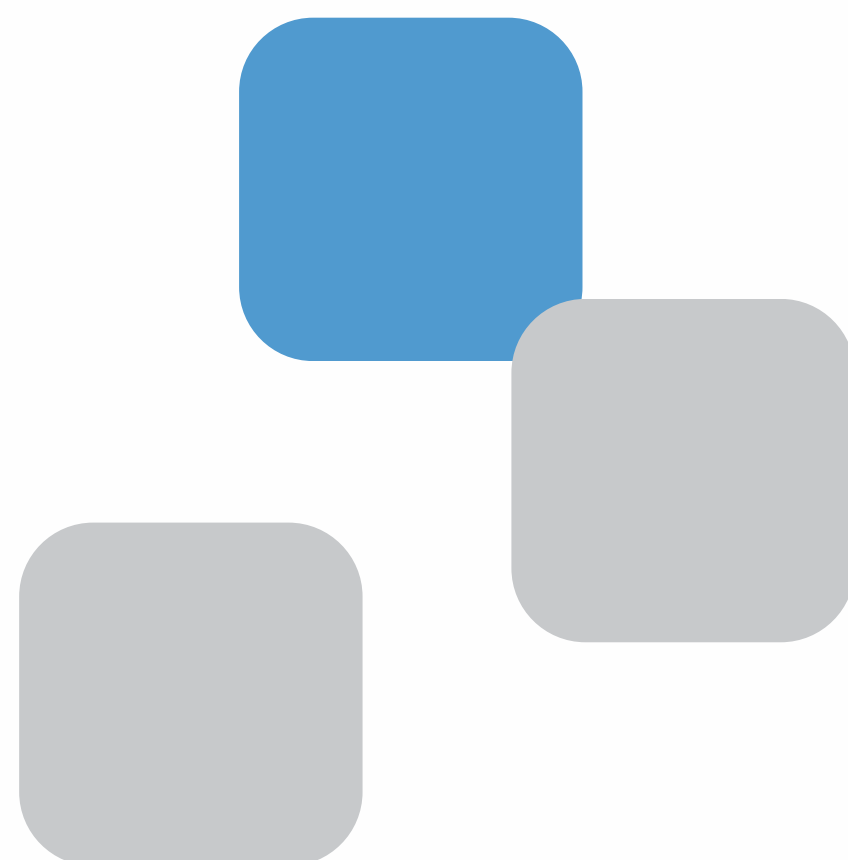
7. In addition to your work as a professor and your involvement with the NGO "Center for Innovations and Digital Education," you hold numerous prestigious recognitions, including Microsoft Innovative Educator Expert and Fulbright Alumni. How do these different roles and accolades contribute to your overall mission as a STEAM educator?

All my activities are focused on improving the quality of education by creating interactive and engaging learning environments that will inspire and motivate students for learning. As an educator I am always trying to engage my students, to implement various pedagogical approaches that will make learning fun and that will enable them to gather long lasting knowledge and skills through interactive experiences. As I already mentioned, my PhD research is focused on one of those pedagogical approaches - game-based learning, combining fun and educational elements at the same time.

I am convinced that the best way to improve is through learning from each other, sharing ideas, experiences and good practices. Communication and collaboration can lead to success in the educational field. As a teacher mentor I am trying to help and guide other teachers in their professional development, fostering a culture of collaboration and lifelong learning. As co-founder of NGO Center for Innovations and Digital Education (Dig-Ed), I am trying to scale this collaboration and networking beyond school, trying to offer various professional development opportunities for teachers that will develop their digital competences and will enable them to create engaging and innovative learning environments.

Through participating in various forms of professional development I have obtained numerous recognitions, validated my achievement, but also provided opportunities to share gathered knowledge and skills on national and international level. As New York Academy of Sciences STEM Certified Educator and Scientix Ambassador, I am promoting science education on a national and international level and sharing innovative scenarios and projects for raising students' interest and motivation. As Code Week Leading Teacher and Micro:bit Champion, I promote coding and try to involve as many teachers as possible in these activities. Microsoft Innovative Educator Expert is a recognition gathered for teaching skills and innovative teaching strategies concerning integration of technology in the classroom. My latest recognition is Fulbright Alumni, as the result of Fulbright Teaching Excellence and Achievement (TEA) Program: Media Literacy Cohort. Within this program I gathered knowledge and skills to promote critical thinking and media literacy among students, addressing the challenges posed by misinformation and digital communication in today's world. As a Fulbright Alumni, I am recognized as an educator with enhanced expertise in media literacy, global education strategies, and pedagogical innovations gained through immersive training, collaboration with international peers, and exposure to best practices in education. I have become a part of the community of teachers dedicated to making a meaningful impact in the community carrying forward the mission of improving education, fostering mutual understanding, and empowering others to navigate the complexities of the digital age with confidence and critical insight.

These interconnected roles give me the opportunity to inspire transformative learning experiences, influence educational policies, and empower the next generation with the skills and mindset needed to succeed in a rapidly evolving world.





7. Mari Nicolae

Mari Nicolae is a dedicated Project-Based Learning Specialist and Curriculum Designer, whose career in educational innovation spans two decades. Beginning as a PYP teacher and coordinator, Nicolae developed a deep expertise in inquiry-based learning and collaborative teaching methods. Her skills were further refined as a learning designer at a Common Ground Collaborative founding school, and she recently contributed to an OECD School Plus partnership focused on cognitive engagement strategies.

With a passion for sharing and testing innovative educational practices, Nicolae has contributed to publishing resources for both teachers and children. Her experience as a keynote speaker at a national conference led her to establish the "PBL Learning Stations" mentoring program, designed to support teachers in successfully implementing project-based learning frameworks. Marianne actively designs digital STEAM resources using platforms such as Canva, Book Creator, and Formative, to enhance student engagement and improve learning outcomes.

Additionally, Nicolae participates in public discussions regarding literacy and its integral role in STEAM education. She is in the process of developing the "Everybody Reads" literacy program, aimed at nurturing a lifelong passion for reading across all age groups. Through her diverse initiatives, Mari Nicolae continues to drive educational transformation and inspire educators worldwide.

PBL Learning Stations (•◡•)

The pandemics context prompted my professional engagement in various initiatives around Project-Based Learning (PBL). This eventually led to the development of my own mentoring program, "PBL Learning Stations," aimed at supporting teachers in addressing common pedagogical misconceptions and adapting their practices to the evolving educational landscape. My journey began with my role as a PBL Curriculum Leader, responsible for aligning the primary curriculum at my school with STEM principles.

The PBL Learning Stations are structured around several key milestones:

1. Collaborative Frameworks:

2. This program fosters a culture of collaborative learning, encouraging teachers to reorganise their curricula around real-world projects. Parents are integrated into the planning process, learning to engage with a shared language of learning, ensuring alignment between home and school environments.

3. Crafting Authentic Experiences:

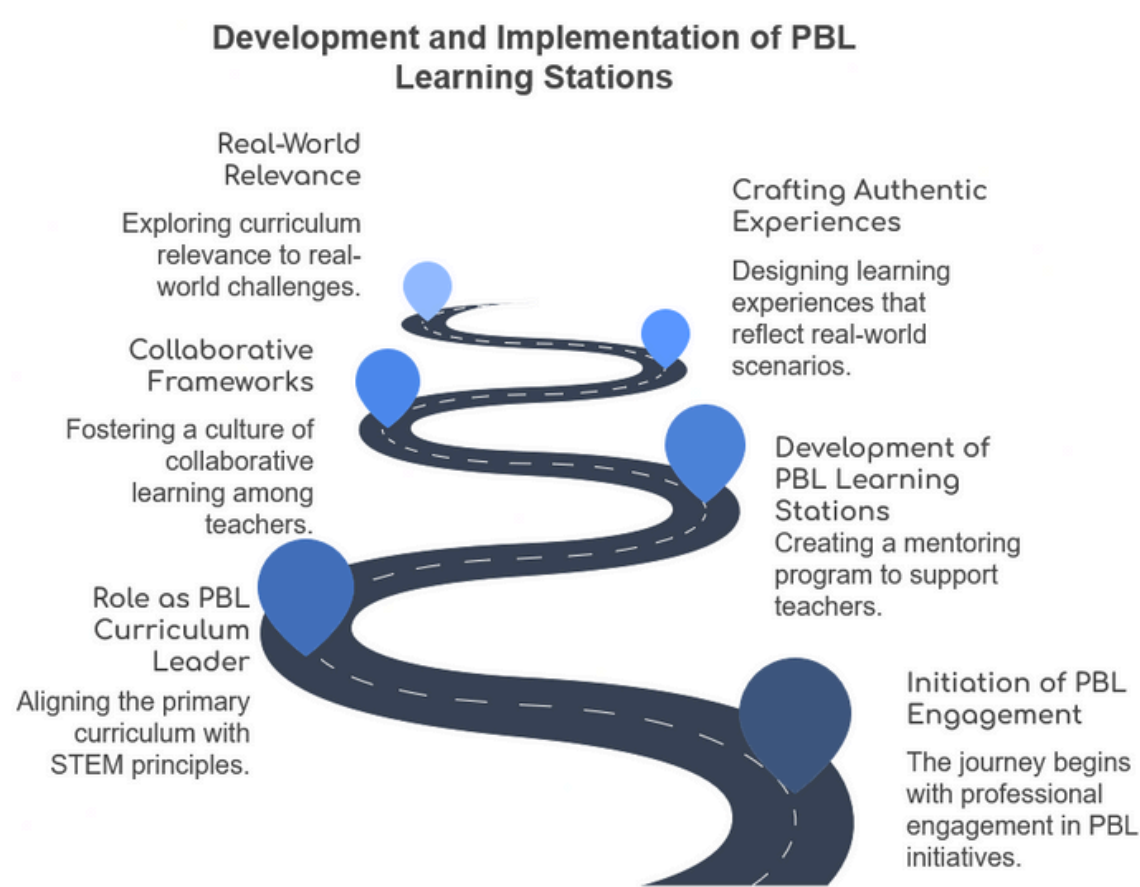
4. The program emphasises the importance of designing learning experiences that reflect the volatile, uncertain, complex, and ambiguous (VUCA) nature of real-world scenarios. A variety of mentoring activities, such as webinars, online lesson observations, and reconstruction meetings, support participants in applying the "Learning Triple Helix" model. This model integrates concepts, competencies, and character to promote deep cognitive engagement and socio-emotional growth.

5. Real-World Relevance:

6. Participants are encouraged to explore the curriculum's relevance to real-world challenges. Experts in STEAM fields are invited to share their insights on addressing contemporary issues, providing teachers with evidence-based strategies to create meaningful and impactful learning experiences that resonate with students.

Continuous Improvement through Reflection:

The program culminates in learning exhibitions, conducted either online or in person, where students showcase their learning journeys. These exhibitions serve as platforms for constructive feedback from diverse perspectives, promoting continuous improvement in teaching practices.



The PBL Learning Stations contribute to the advancement of STEAM education by grounding teaching practices in research, fostering collaboration, and promoting impactful learning experiences and future-ready mindset.

InterViewing Mari:)

1. Your career trajectory went from PYP teacher and coordinator to Project-Based Learning Specialist and Curriculum Designer. What key experiences or insights led you to specialise in project-based learning and STEAM education?

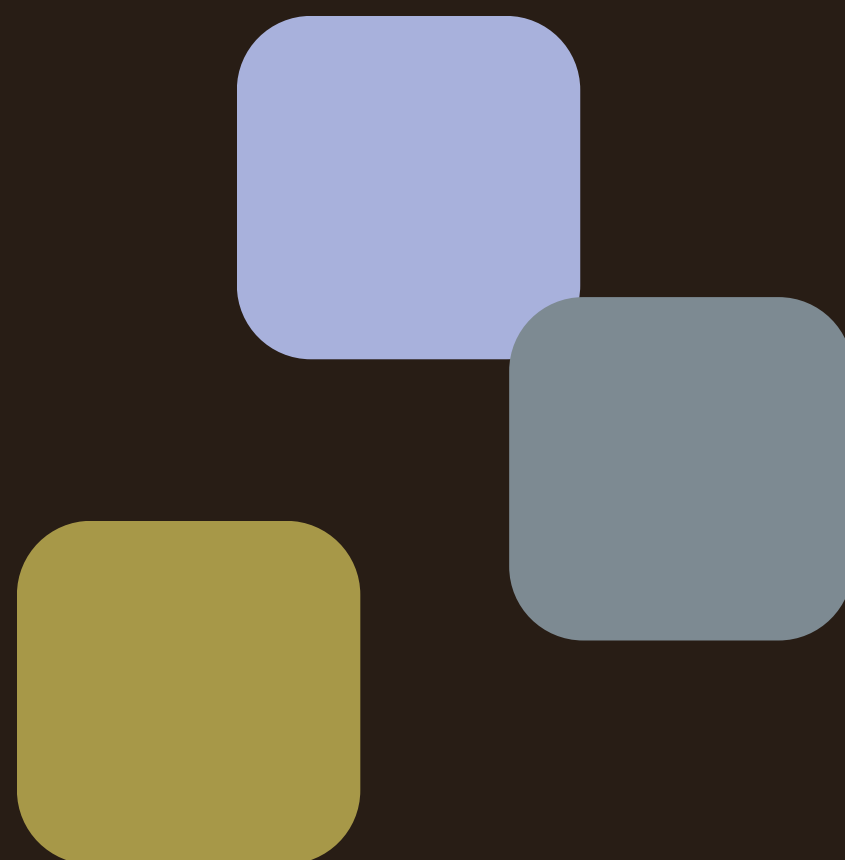
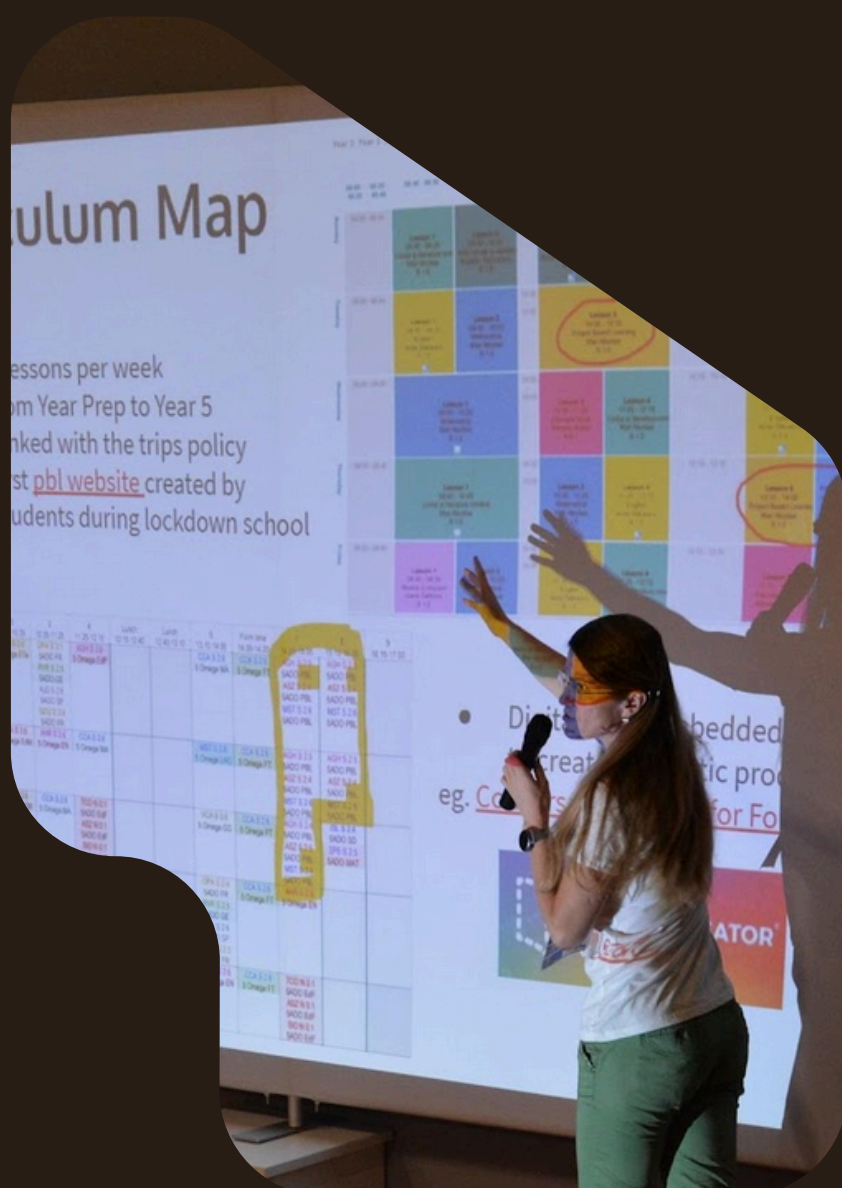
I've been fortunate to connect with incredible educators at key moments in my career. Learning alongside pioneers like Kathy Short, Kate Murdoch, Trevor McKenzie, and Kevin Bartlett has been a dream come true. I'm passionate about Guided Inquiry and concept-based education, and I believe these approaches perfectly capture the essence of STEAM learning. Working with teachers across the country on diverse projects has not only expanded my understanding of STEAM education, but also fueled the development of fresh perspectives and groundbreaking theories.

2. You note that you have contributed to publishing resources for teachers and children. Can you share an example of a resource you've created and explain how it supports STEAM education?

I believe that real-life experiences make learning meaningful and transferable. This belief influences everything I create, from teacher workshops to student workbooks.

For instance, I co-authored a book published by DPH in 2015 about using graphic organizers to help students visualize their thinking. This book was heavily influenced by my experience as a mind mapping practitioner under the mentorship of Tony Buzan himself.

Another project I'm particularly proud of is "The Little Explorer Notebook," an interactive notebook for first graders, published by ARTKLETT Publishing House in 2023 and designed to promote blended learning. It features real photos and non-fiction texts about animals, encouraging students to explore through activities in math, science, and art. The digital part of the notebook is done in collaboration with National Geographic.



InterViewing Mari:)

3. You are currently developing the "Everybody Reads" literacy programme. How do you see literacy as being integral to STEAM education, and what are the goals of this programme?

Reading isn't just about enjoying stories; it's a vital skill for navigating our VUCA world. Think about how we use reading every day: to follow instructions, understand signs, or distil information online. This is what "functional reading" is all about.

Some children learn to read before starting school by reading advertisements on the street. Living in a VUCA world makes reading (and by extension, all kinds of literacies) survival skill. Developing reading skills through various real-world scenarios and experiences beyond the literature or grammar bookshelf young learners understand written language, its context, and practical applications.

I've been exploring these ideas with my 2nd-4th grade students for a couple of years. We use the Book Creator App to uncover non-fiction short texts, using video and audio features, art techniques and digital design tools in order to better understand ecology concepts, for example. In this way reading turns into a dynamic and practical experience.

4. Something that calls us to attention is your "PBL Learning Stations" mentoring programme. What prompted you to create this programme, and what are some of the common pedagogical misconceptions that it addresses?

I was given the incredible opportunity to build a dedicated Project-Based Learning (PBL) program at my school, giving it the same level of importance as any core subject. Additionally, I have created a 8 week online course for teachers from public schools interested in implementing the PBL approach in their classroom.

Over the past seven years, my team and I have worked to weave PBL into our curriculum, integrating science, art, math, language, digital literacy, and engineering. We started by identifying subject matter that could be taught through projects rooted in real-world issues. Then, we designed inquiry-based learning experiences and opportunities for students to share their work with a real audience.

After a year of piloting this approach, I held workshops to address common misconceptions about PBL, tackling questions like:

- Does PBL always require a grand opening event?
- Do all students need to have identical learning experiences?
- Is PBL more free inquiry based or more guided inquiry based?
- Are students left alone working on their devices?
- Is a final product the only way to display evidence of learning?

I believe Project-Based Learning is the whole soup, not just the individual ingredients. It's about the messy, complex process of creation, not a polished final product or a single, shiny event.

InterViewing Mari:)

5. The "PBL Learning Stations" programme incorporates the "Learning Triple Helix" model. Can you explain this model and how it promotes cognitive engagement and socio-emotional growth?

I've been fortunate to learn from Kevin Bartlett, co-founder of Common Ground Collaborative (CGC). My school has the privilege of being a founding member of this organization. He introduced me to the "Triple Helix of Learning," a framework that emphasizes the connection between concepts, competencies, and character in order to define, design, deliver, diversify and demonstrate learning.

Each learning module I design follows the principle of connecting subject concepts to transferable competences driven by specific character descriptors of an universal learner profile. Students are given tools to develop their thinking skills and use a common language for learning.

An illustration of my focus on empowering students to learn is the "STAR Ladder of Feedback," a tool I meticulously crafted by weaving together three distinct threads: an assessment rubric emphasizing specific, timely, actionable, and respectful feedback; the insightful "Ladder of Feedback" by Ron Richhart; and my own creation, the 4C+ stamp (representing correct, complete, clear, and creative learning evidence), designed for versatile use across various subjects and experiences. This carefully constructed tool has blossomed into an integral part of my classroom and workshops. Students and participants alike now embrace the STAR Ladder, acknowledging its power to elevate their own growth and catalyze a collective shift in mindset within their teams.

6. The programme emphasises designing learning experiences that reflect real-world scenarios. How do you guide teachers in crafting these authentic experiences, and what role do experts in STEAM fields play in this process?

It's an undeniable truth, needing no research to confirm, that rich and relevant learning experiences arise from collaborative endeavors, from the tangible act of creation with our own hands, and ideally, from venturing beyond the confines of the traditional classroom into unconventional spaces. My work is fueled by a dual role: I am both a teacher and a learning leader, constantly seeking new knowledge and experiences. This allows me to guide others with authenticity, offering advice grounded in personal experimentation and genuine understanding.

Within a vibrant learning community, parents are not mere spectators, but active participants in the educational journey. Their contributions are invaluable. They possess a wealth of knowledge, connections, and real-world experiences that enrich the learning environment. A parent might suggest a field trip perfectly aligned with the study of light, or another, who runs a First Aid organization, might facilitate a visit to a fire station and orchestrate a fire drill risk assessment.

When educators embrace the notion that learning is a continuous process, and that wisdom can be gleaned from unexpected sources, they unlock the true potential of teaching and learning. This collaborative spirit, where expertise is shared and lifelong learning is championed, paves the way for a profound and transformative educational experience. Let's role model together future-readiness by embracing STEAM approach to learning!

InterViewing Mari:)

7. The "PBL Learning Stations" programme culminates in learning exhibitions. What are some examples of student projects showcased in these exhibitions, and how do they demonstrate the impact of the programme on student learning and development?

It comes to my mind two exemplary projects that showcase the transformative power of Project-Based Learning.

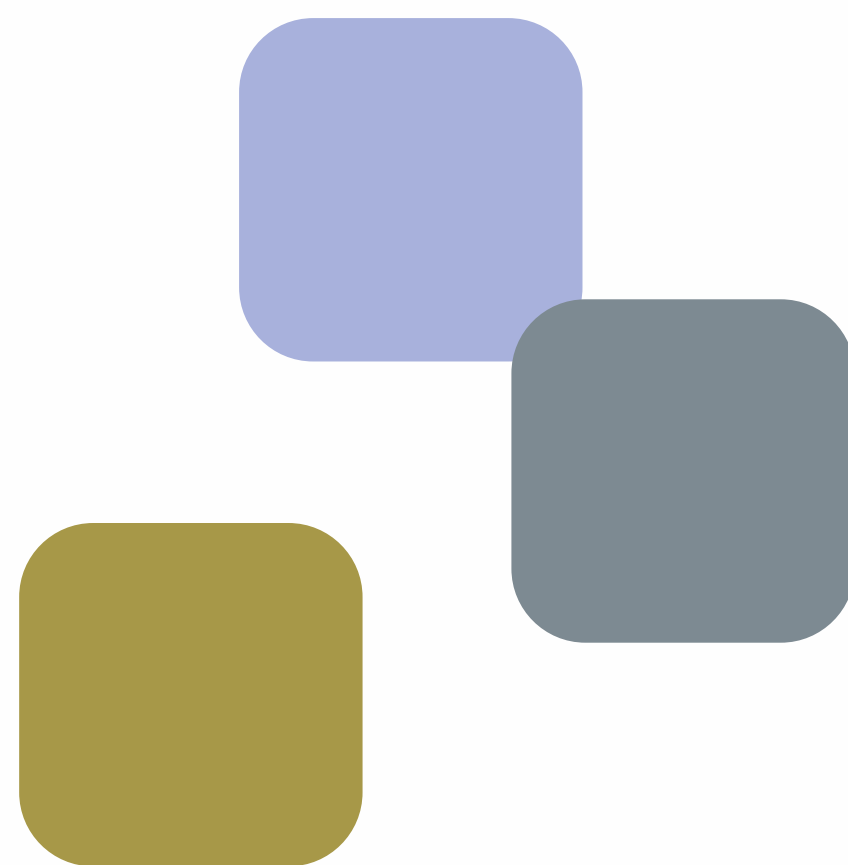
First, "Forest Week" saw our elementary students, led by the fourth grade, explore the fascinating "Codes and Senses" of nature. They investigated how nature captures carbon, creating interactive learning stations in a nearby forest. Through hands-on activities, they examined the impact of human development on plants and animals, culminating in an event where the parents and guests from the community joined them for soil testing, yoga, terrarium building, observing plants using PlantSnap App, and experiencing the benefits of reading outside. In this way students showcased their own answers to the driving question: How can a growing neighbourhood protect the forest?

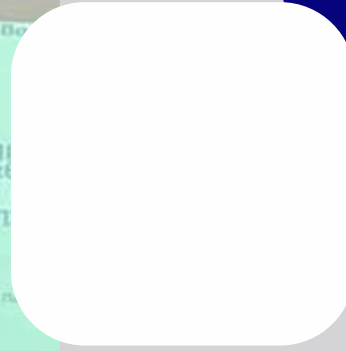
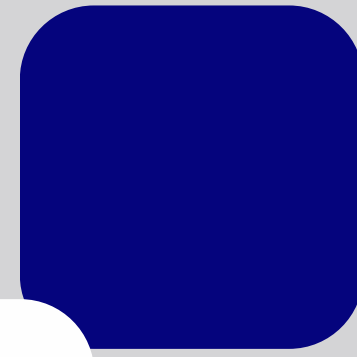
In my school the elementary students prepare a yearly Summer Show based on science storytelling! Yes, science gets dramatically beautiful when students are engaged in promoting national values. For 6 weeks students are guided to investigate the animal microhabitats, sources and forms of energy, environmental issues, endangered species and more science based topics. Students co-write the script, build props, sing remix songs changing lyrics, promote the event for emails, posters and invitations.

And as the curtain falls, the journey continues with "PBL Remake," a week-long expedition where students, transformed into teachers' critical friends, revisit and refine their PBL experiences over the year, offering insightful feedback and reimagining their creations and making new suggestions for new unexpected investigations.

Project-Based Learning, as I've come to embrace it, is a self written book of discovery. It's a journey filled with unexpected twists and turns, moments of confusion and clarity, and the occasional stumble. This journey, though often challenging, with planned or unplanned reflection stations, leads us to a profound sense of fulfillment and accomplishment.

This journey, though often challenging, is marked by moments of reflection, PBL Learning Stations- some planned, some spontaneous – that allow teachers and students (all learners) to pause, reconfigure our direction using our learning GPS and ultimately arrive at a deeper sense of fulfillment and accomplishment.





8. Maria Tsapara

Maria Tsapara is a childhood educator with a keen specialization in STE(A)M education, skillfully integrating science, technology, engineering, arts, and mathematics to cultivate an enriched learning environment for young children. As a PhD candidate at the University of Western Macedonia, her research focuses on utilizing board games as an effective medium for teaching STE(A)M concepts and raising sustainable development awareness among preschoolers.

Beyond her classroom endeavors, Tsapara serves as an ICT trainer, holding certifications in STEAM, Robotics, and Makey Makey. These credentials enable her to engage students with computational thinking, coding, and robotics, fostering an early interest in these critical areas. Her commitment to STE(A)M education is further evidenced through her role at the CrInTe Lab at the University of Western Macedonia, where she spearheads initiatives such as "Code it Local." This program aims to enhance coding and STE(A)M literacy within local communities, bridging educational research with practical applications to equip educators with the necessary skills and resources.

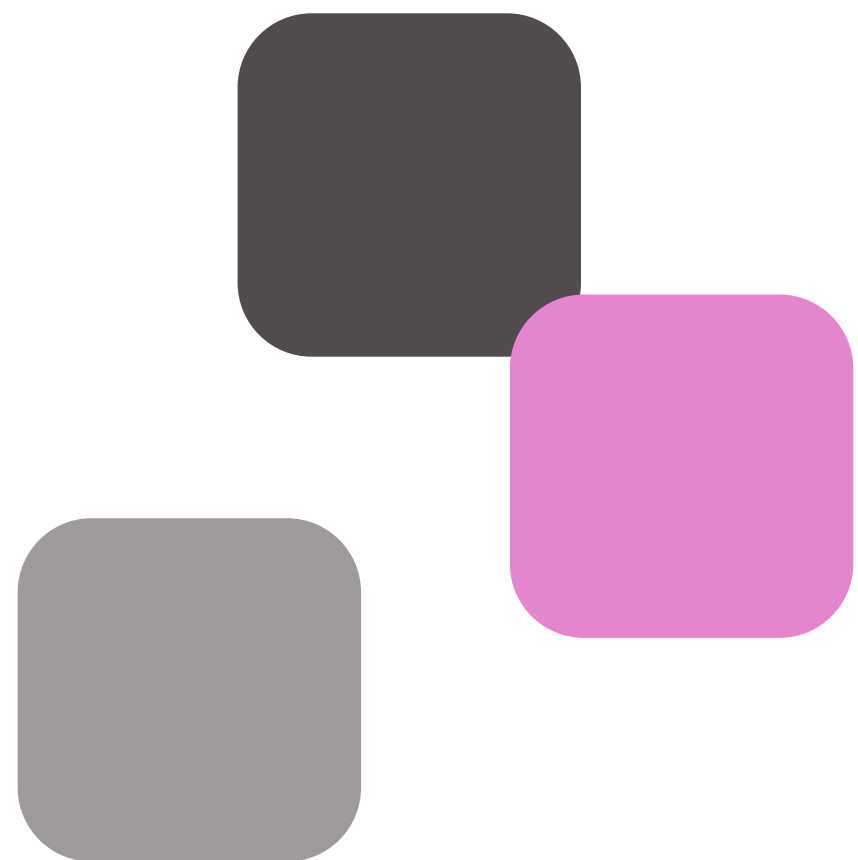
Additionally, Tsapara has actively contributed to various European projects and has published extensively on topics such as STE(A)M education, ICT integration, storytelling, and sustainable development in early childhood education. Her contributions underscore her dedication to advancing educational methodologies and engaging young learners with innovative approaches.

Code it Local (•◡•)

Maria Tsapara is a dedicated childhood educator who specializes in STE(A)M education, skillfully blending science, technology, engineering, arts, and mathematics to create a dynamic learning environment for young children. As a PhD candidate at the University of Western Macedonia, she is conducting research on the use of board games as a tool to teach STE(A)M concepts and instill sustainable development awareness in preschoolers.

In addition to her teaching responsibilities, Tsapara is an ICT trainer with certifications in STEAM, Robotics, and Makey Makey. These qualifications enable her to effectively engage students in computational thinking, coding, and robotics, sparking early interest in these essential fields. Her commitment to STE(A)M education is highlighted by her involvement at the CrInTe Lab at the University of Western Macedonia, where she leads programs like "Code it Local," designed to improve coding and STE(A)M literacy in local communities. This initiative aims to connect educational research with practical applications, providing educators with the tools and knowledge they need to teach computational thinking effectively.

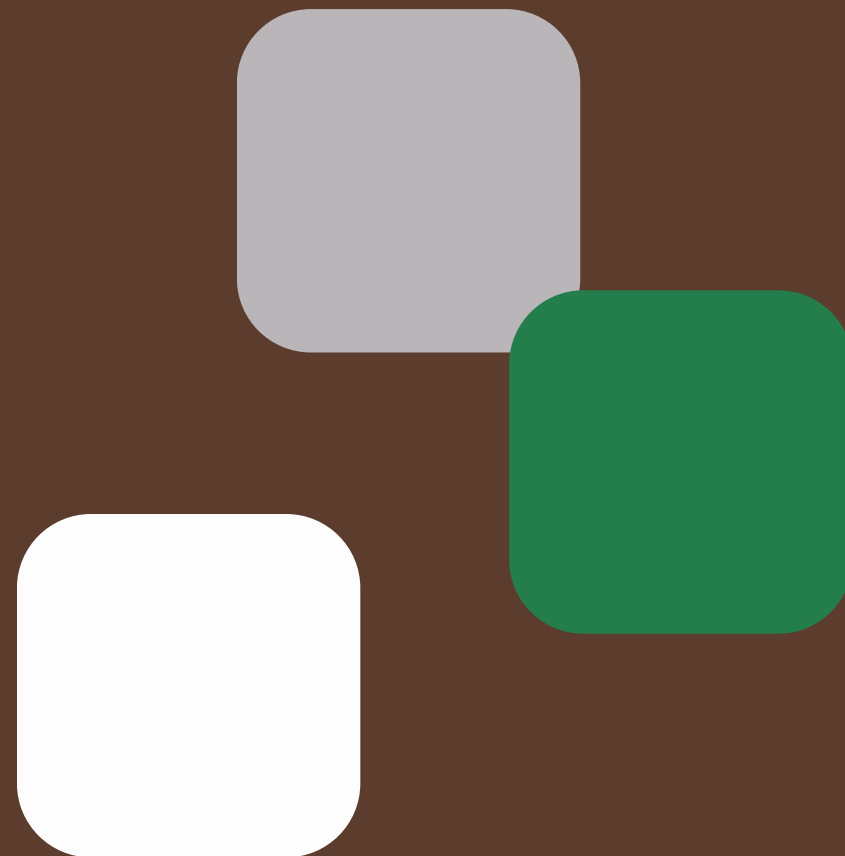
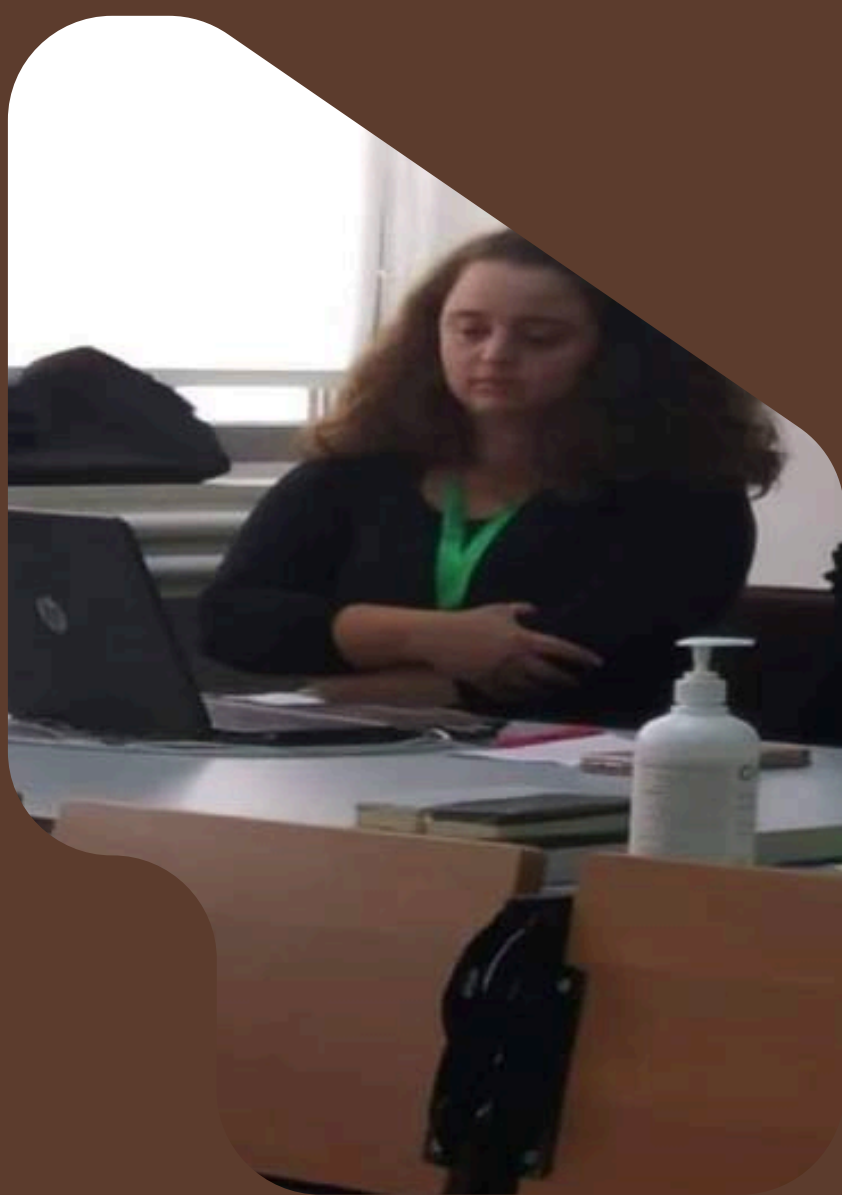
Tsapara is also an active contributor to numerous European projects and has an extensive publication record on topics including STE(A)M education, ICT integration, storytelling, and sustainable development in early childhood education. Her work reflects a deep commitment to advancing educational practices and engaging young learners through innovative and interactive methods.



InterViewing Maria:)

1. We notice that you are a childhood educator with a specialised focus on STEAM education and a PhD candidate researching the use of board games to teach STEAM concepts to preschoolers. What initially sparked your interest in STEAM education, and what led you to focus specifically on early childhood and the use of board games?

At this age, children are like little scientists. They constantly ask why and how the world works. They thrive on experiential learning, where they can touch, build, and experiment with real-world materials. STEAM education taps into this by encouraging exploration and problem-solving in playful and creative contexts. STEAM education not only aligns with their natural developmental stage but also nurtures skills like critical thinking, collaboration, and adaptability—skills that will serve them for a lifetime. It's an approach that embraces their innate curiosity and transforms it into a powerful tool for learning! The use of board games as a teaching tool became a focus during my PhD research when I observed how play naturally incorporates many STEAM principles. Board games can be effectively integrated into education, promoting the active participation of all students. Through games, children can also develop self-regulation skills and manage their behavior. Board games can be used to enhance concentration, as children need to plan, strategize, and follow through on actions. They also encourage persistence and the ability to handle both success and failure, promoting emotional intelligence and resilience. Incorporating board games into the classroom helps children not only in their cognitive development but also in their ability to communicate, work in teams, and adapt to different situations.



InterViewing Maria:)

2. How do you effectively integrate the 'A' for arts into STEAM education, particularly when working with young children and using board games as a tool?

Board games can be a useful tool and a great way to engage children's creativity. By integrating the arts into board games, children not only reinforce their learning in science, technology, engineering, and math, but they also gain a deeper appreciation for creative expression. One of the most creative ways to integrate the arts into board games is to involve children in the design process, while illustrating game cards or other elements, designing game rules. Moreover there are many board games that have elements that encourage children to create and act out stories based on the game's theme. In many board games, problem-solving is a key skill. Incorporating art allows children to express their solutions in more visual and imaginative ways.

3. You are also an ICT trainer with certifications in STEAM, Robotics, and Makey Makey. How do you incorporate these technologies into your teaching, and what are some specific examples of how you use them to engage preschoolers in computational thinking, coding, and robotics?

Incorporating these technologies into teaching involves creating hands-on, play-based learning experiences that resonate with my kindergarten students' natural curiosity and developmental stage.

- Guide children in creating step-by-step instructions for everyday tasks, like brushing their teeth, washing their hands, etc.
- In storytelling activities, children sequence the steps a character takes to solve a problem.
- Using simple robots like bee bot, bluebot, mouse robot, allow children to input directional commands to navigate maps or complete challenges.
- Connect everyday objects to the Makey Makey board to teach circuits and interactivity. Creating an interactive poster about environmental protection using Makey Makey is an engaging way to teach preschoolers about sustainability while introducing them to circuits and interactivity. Creating a piano out of paper and conductive materials, then code it to play sounds when children step on the keys.
- Storytelling combined with technologies like Makey Makey, Bee-Bots, or Blue-Bots, storytelling can be made even more engaging and interactive, allowing children to actively participate in the story.
- Combine arts and engineering by building structures like bridges or houses using blocks, then test their stability using weights experimentation, testing hypotheses, and developing engineering concepts in a fun and tactile way.
- Create enhanced board games. Incorporating technologies like Bee-Bot, Makey Makey, and STEAM tools into play-based learning creates an engaging way for kindergarten students to develop foundational skills in computational thinking, coding, and engineering. Integrating board games into this framework further enriches the experience, creating an interdisciplinary learning environment that captivates children's attention while fostering creativity, curiosity, and other essential 21st-century skills.

InterViewing Maria:)

4. You lead the "Code it Local" initiative at the CrInTe Lab at the University of Western Macedonia. Can you explain the inspiration behind this initiative and describe how it brings coding and STEAM literacy to local communities?

The EU Code Week – Code it Local initiative, led by Maria Tsapara, Anthi Arkouli and Angeliki Liapi in collaboration with the Creativity, Innovation, and Technology in Education (CrInTe) Lab at the University of Western Macedonia and under the supervision of Professor Tharrenos Bratitsis, exemplifies how grassroots efforts can make computational thinking and STEAM education accessible to the youngest learners. Supported by the EU Code Week team since 2021, this initiative is a pioneering step towards empowering kindergarten teachers across Greece to integrate programming, robotics, and STEAM into their classrooms. At its heart, "Code it Local" recognizes that building computational thinking skills at an early age is critical for fostering creativity, problem-solving, and digital literacy. By focusing on teacher education, the initiative addresses a fundamental challenge: equipping educators with the confidence and resources to introduce these concepts in developmentally appropriate and engaging ways.

5. "Code it Local" aims to make STEAM education accessible and relatable by aligning lessons with local and community-specific themes. Can you provide a concrete example of how a coding lesson is adapted to a local theme in the "Code it Local" program?

Code it local based also in a localized and child-centered approach focusing on familiar environments, on what "local" means to young children—their school, home, or neighborhood. This creates an engaging, personal connection to coding and helps children develop spatial awareness and computational thinking in a playful way. Furthermore encourages teachers to tailor lessons to their students' environments, making coding concepts approachable and meaningful. For example Exploring Our Local Neighborhood - This activity helps children understand the concept of coding while connecting it to their immediate surroundings—their school, homes, and nearby community - Through this activity teachers can introduce young learners to foundational coding concepts through play and exploration of what "local" means to them and empower teachers to design activities that are accessible and relatable, using the children's daily environment as inspiration.

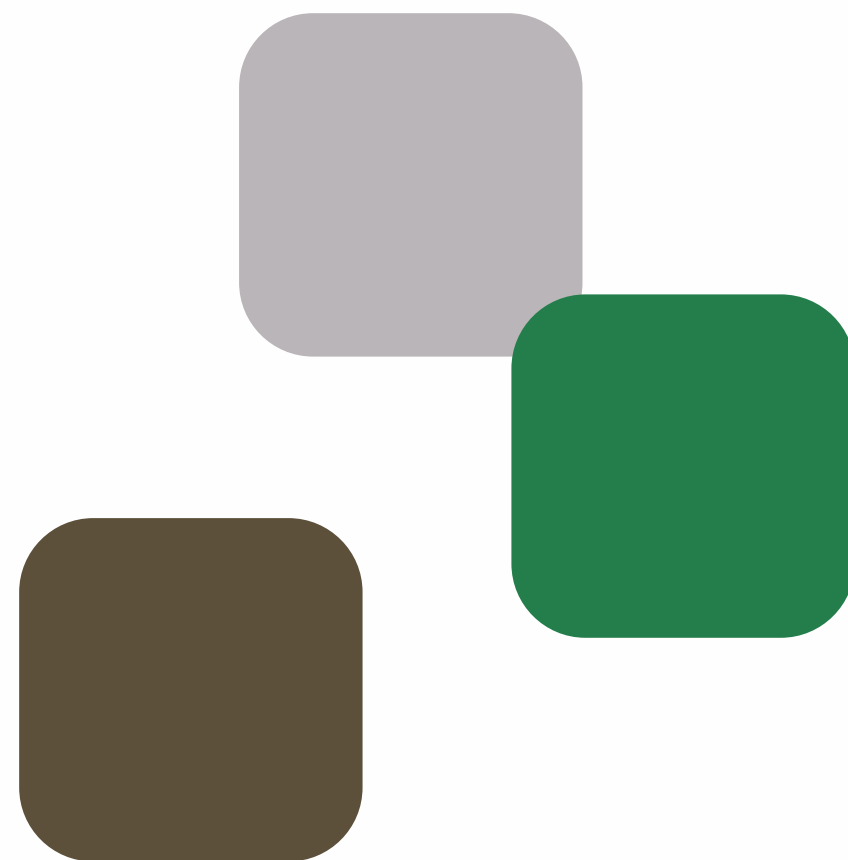
6. The sources highlight the importance of "Code it Local" in building a network among educators. How does this network facilitate the sharing of teaching strategies, experiences, and resources, and what impact has it had on the participating educators?

The "Code it Local" initiative fosters collaboration and resource sharing among educators. By creating an educational network with webinars, training sessions, and an online community, the initiative empowers educators to confidently incorporate coding and STEAM into early childhood education. The Facebook group, with over 7,000 educators, serves as an interactive hub where participants can exchange ideas, share, and discuss challenges and successes in implementing coding and STEAM activities. The network fosters a supportive atmosphere where educators can seek advice, troubleshoot issues, and celebrate successes together, making it easier for beginners to navigate new teaching methods.

InterViewing Maria:)

7. What advice would you give to other educators who are interested in implementing similar initiatives to promote STEAM education and computational thinking in their own communities?

- It is very important before launching any initiative, take the time to understand the specific needs of your community.
- Design your programs to be relevant to the specific needs and interests of your community members.
- The best way to engage learners—whether they're young children or adult educators—is by providing opportunities for hands-on, experiential learning. Encourage learners to explore, ask questions, and experiment. This process of discovery is vital for fostering creativity and critical thinking, key aspects of both STEAM education and computational thinking.
- Create opportunities for educators and students to learn from each other.
- Involve learners in group projects where they can work together and share their knowledge and their ideas.
- Technology should be used as a tool to enhance learning, not as the focus of the education itself. Incorporate digital tools that are easy to use and can facilitate creative expression, problem-solving, and programming.
- Encourage reflection and feedback, this reflective practice leads to continuous improvement in teaching methods.
- Make sure that all learners have access to the necessary resources, including technology, tools, and materials.
- Involve the Local Community, this increases awareness of the importance of STEAM education and can encourage wider participation in future initiatives.





9. Michael Scheuerl

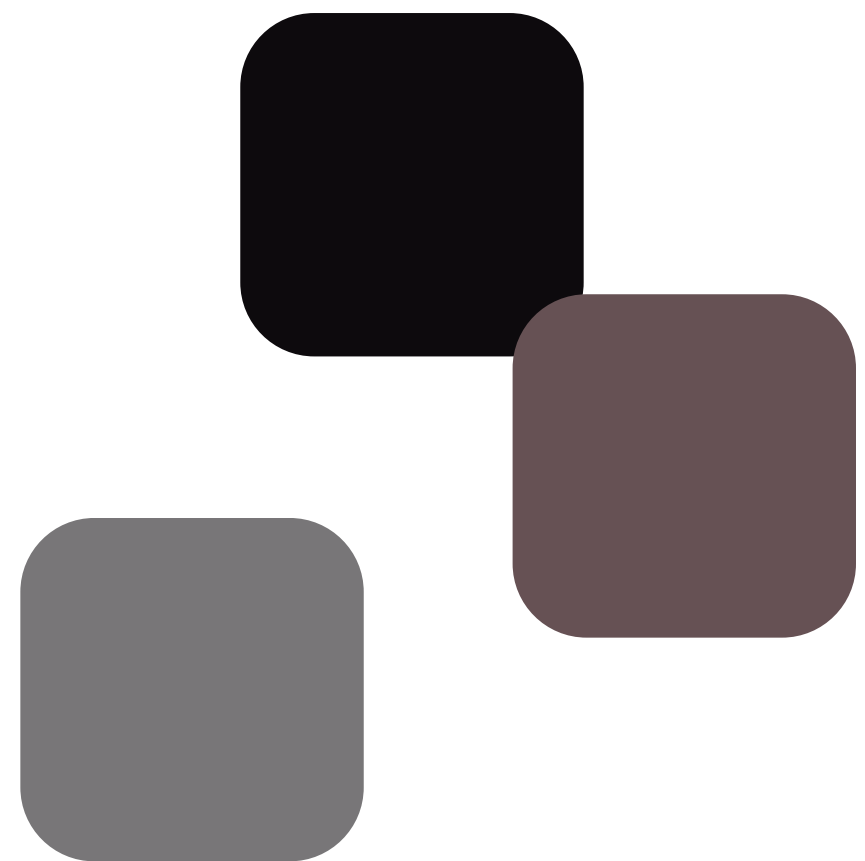
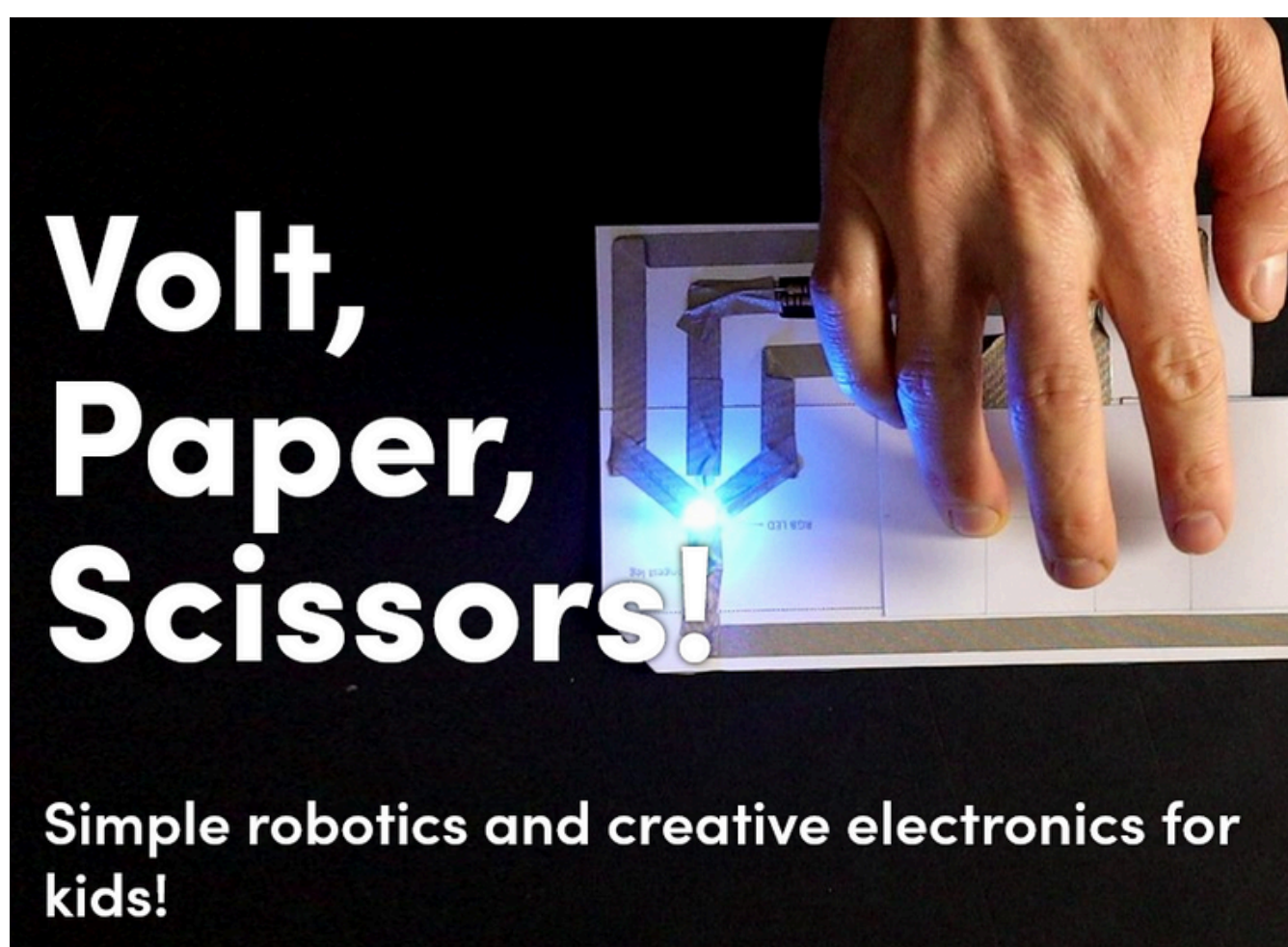
Michael Scheuerl began his career in the creative arts after studying design and interactive media, initially working as a game designer with a focus on developing engaging and educational games for children. His experience as a mentor at Maker Camps led to a realization of his deeper passion for creating educational content, prompting a shift in focus toward fun DIY projects that incorporate electronics and tangible materials.

Transitioning from game design to educational innovation, Scheuerl took on the role of a content creator for a children's DIY website. It was during this period that he discovered the potential of conductive tape, sparking the development of "Volt, Paper, Scissors!"—an online platform dedicated to creative tinkering with simple electronics. This platform embodies Scheuerl's commitment to fostering creativity and exploration in children through hands-on learning experiences.

Volt, Paper, Scissors! (•◡•)

Michael Scheuerl is inspired by individuals who dedicate themselves to their passions, a belief that fuels his own enthusiasm for tinkering with simple electronics, conductive tape, and paper. This enthusiasm led to the creation of "Volt, Paper, Scissors!"—an online platform that showcases his innovative DIY electronics projects. Scheuerl's work is distinguished by its focus on simplicity, accessible resources, and comprehensive video instructions paired with well-tested templates. His projects serve as an excellent introduction to electronics and engineering for both children and adults, presenting a variety of activities suitable for multiple ages and skill levels.

Scheuerl's project repertoire includes inventive creations such as light-up toys, book lamps, spin art machines, solar-powered robots, and programmable robots controlled via old smartphones. These activities come with detailed lists of required materials, templates, and video loops designed for educators to demonstrate each step clearly, making them ideal for workshops. His resources are continually refined through personal teaching experiences and feedback from other educators.



Importantly, Scheuerl's projects provide a welcoming entry point into technology for all participants, even proving particularly engaging for girls by emphasizing creativity. Designed for parent-child collaboration, these projects require no specialized tools, making them well-suited for libraries, schools, and under-resourced settings globally. The ease of assembly and disassembly, facilitated by conductive tape-based circuitry, ensures minimal waste, reinforcing the projects' accessibility and sustainability. More about his work can be found at voltpaperscissors.com.

InterViewing Michael:)

1. You describe your career journey from game designer to content creator for a kids' DIY website. What prompted this shift, and how did your experience in game design inform your approach to creating educational DIY projects?

A job as a game designer is often not creative since it is a very competitive, business-driven industry. Especially if you want to combine education and gamification to make small, creative experiences, your products are likely to drown in the marketing efforts of the big players.

I wanted to find something where I could focus on working creatively in a playful way on small and fun ideas. It is the shift to simple materials and hands-on tinkering that enabled me to do so while maintaining my goal of helping make education more fun.

My game design experience certainly contributes to my DIY projects, as they are all fun to play with when finished. Kids can use them as tools for creating art, exploring color mixing, or programming them in fun ways. Actually, I think of my projects as DIY toys.



2. How did you first discover conductive tape, and what sparked the idea for Volt, Paper, Scissors! as a platform for creative tinkering with simple electronics?

I was teaching kids about electronics and technology as a side quest during my work as a game designer and was already thinking about ways to turn this into an idea for an online project. I knew about copper tape, but I always had the problem that copper tape did not make good, reliable connections. It was in the comment section of a YouTube video that I read about conductive tape with conductive adhesive. This was a game changer and sparked a ton of ideas for simple DIY projects combining electronics and paper. Indeed, I think everything can be done using just these simple materials. That's when the idea for Volt, Paper, Scissors! was born.

InterViewing Michael:)

3. Your work has a strong focus on simplicity, easy-to-find resources, and detailed video instructions. What are some specific strategies you use to ensure that your DIY electronics projects are accessible to a wide range of ages and skill levels?

Besides the ones mentioned in the question, I do a lot of prototyping and testing to make my templates fail-proof and self-explanatory. It is the least visible work I do but the best way to avoid frustration. Furthermore, it is the beauty of paper circuits that you can integrate instructions and hints into the working material itself. And I keep adding little details and improvements to my templates whenever I use my work for my own teaching.

4. You state that your DIY projects are a great introduction to electronics and engineering, not only for children but also for adults. What are some examples of projects that have resonated particularly well with adult learners, and what makes these projects engaging for this demographic?

I often use my work to teach kids who are accompanied by their parents, for example, in libraries. Almost all adults choose not only to help their kids but also to make a project on their own. In my experience, those parents enjoy the process and the result just as much. They also seem to be learning almost as much. A great project for these kinds of parent-child workshops is the Spin Art Robot. But there is one project that I find especially interesting for adults, which is the Book Lamp, as it is a bit more sophisticated from a crafting point of view and you end up with a real product.

What's almost puzzling to me is the fact that learning about technology often alienates kids and adults who feel like they are not good at it. I have never experienced this with one of my projects. This is probably because my projects are disguised by the use of simple crafting materials.

5. Your work has also been especially successful in engaging girls and providing them with a more creative entry point into the world of technology. What design choices or pedagogical approaches do you attribute to this success, and what feedback have you received from girls who have participated in your projects?

There still are stereotypes among girls and their parents that tinkering with technology is for nerds and boys. Since my projects feel more like crafting, girls and their parents are much more likely to forget about this stereotype and give it a try. Furthermore, I often add an artistic element to my projects so that the process is not only about making something work but also about designing it. Another aspect is that I always try to find unique topics for my projects. This makes me think about light-up mushrooms or moving chameleons instead of more clichéd tech-themes like sci-fi robots, cars, spaceships, etc.

6. The sustainability aspect of your projects is something very relevant, noting that they are easy to disassemble and that the circuitry, made with conductive tape, is disposable. How important is the environmental consideration in your work, and does it influence your choice of materials or project designs?

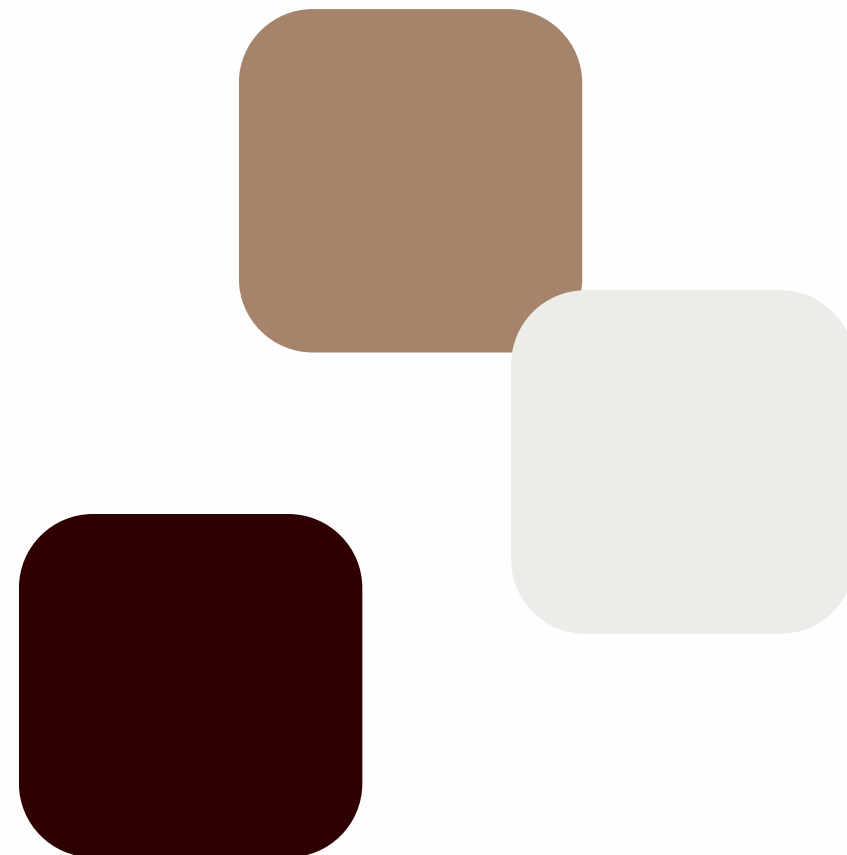
In the end, even the most creative DIY project is never about the result but the process. I know the stuff I show on my website will sooner or later end up being thrown away or catching dust on a shelf. The best thing we can do is inspire to reuse everything that is of value. That's why everything is easy to disassemble. Also, I constrain myself to only use the same set of electronics and only add conductive tape and paper as throwaway materials.

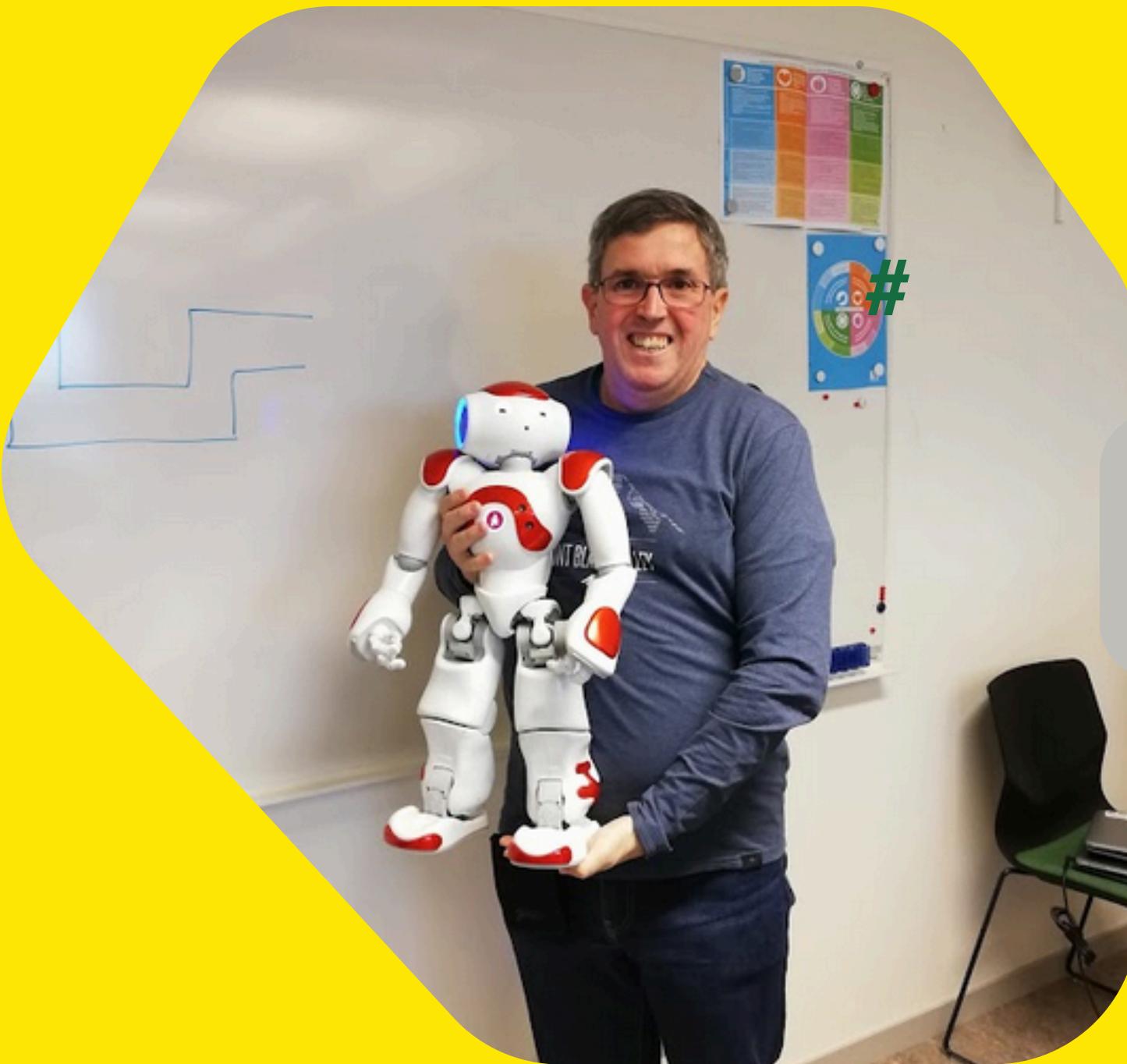
I am not there yet, but one day I would love to know that whatever project you decide to build from my website, there are two or three follow-up projects that you can do afterwards using the very same materials but different templates.

InterViewing Michael:)

7. You say that your project "shines more through pictures than words". What is it about the visual aspect of your work that you believe is particularly impactful, and how do you leverage this aspect in your teaching and online platform?

The visuals I make serve as an inspiration for everyone building my projects. I know that one downside of my work is that building the projects is a very straightforward process. That is the reason why I integrate art or some creative freedom into my projects wherever I can. The spin art robot helps kids make great art, the pixel art cube encourages kids to design their own pixel art, the smartphone robot can be programmed or animated in whatever way kids like, etc. The visuals are important because I do all this work to inspire others to use technology in creative ways. That's what I enjoy the most, and that is what I want to share with the world.





10. Paulo Torcato

Paulo Torcato is a prominent educator with a career spanning three decades, distinguished by his commitment to integrating technology and educational robotics into teaching. With an academic foundation in Electronic and Telecommunications Engineering, Applied Mathematics, and Computer Science, Torcato has adopted a comprehensive and interdisciplinary approach to STEAM education.

His notable contributions to STEAM education include founding and coordinating transformative projects such as "The Robot Helps!" ("O Robot Ajuda!") in 2009, which evolved into "aTTitude3D" (Educate, Teach, and Integrate) in 2018. These initiatives focus on developing interdisciplinary activities that utilize robot simulators, visual programming languages, and artificial intelligence.

Internationally recognized for his work, Torcato was a finalist in the Global Teacher Prize and was awarded the Global Teachers Awards 2023 by AKS Awards. His expertise has also been shared on platforms such as TEDx, where he discussed the integration of robotics in classroom settings.

In national project leadership, he has played a key role as a co-designer of the "Programming and Robotics at School" project, at the invitation of the Director General of Education. Additionally, he launched the "Programa o Futuro" project in collaboration with SIC Esperança, funded by Google, underscoring his influence in national educational initiatives.

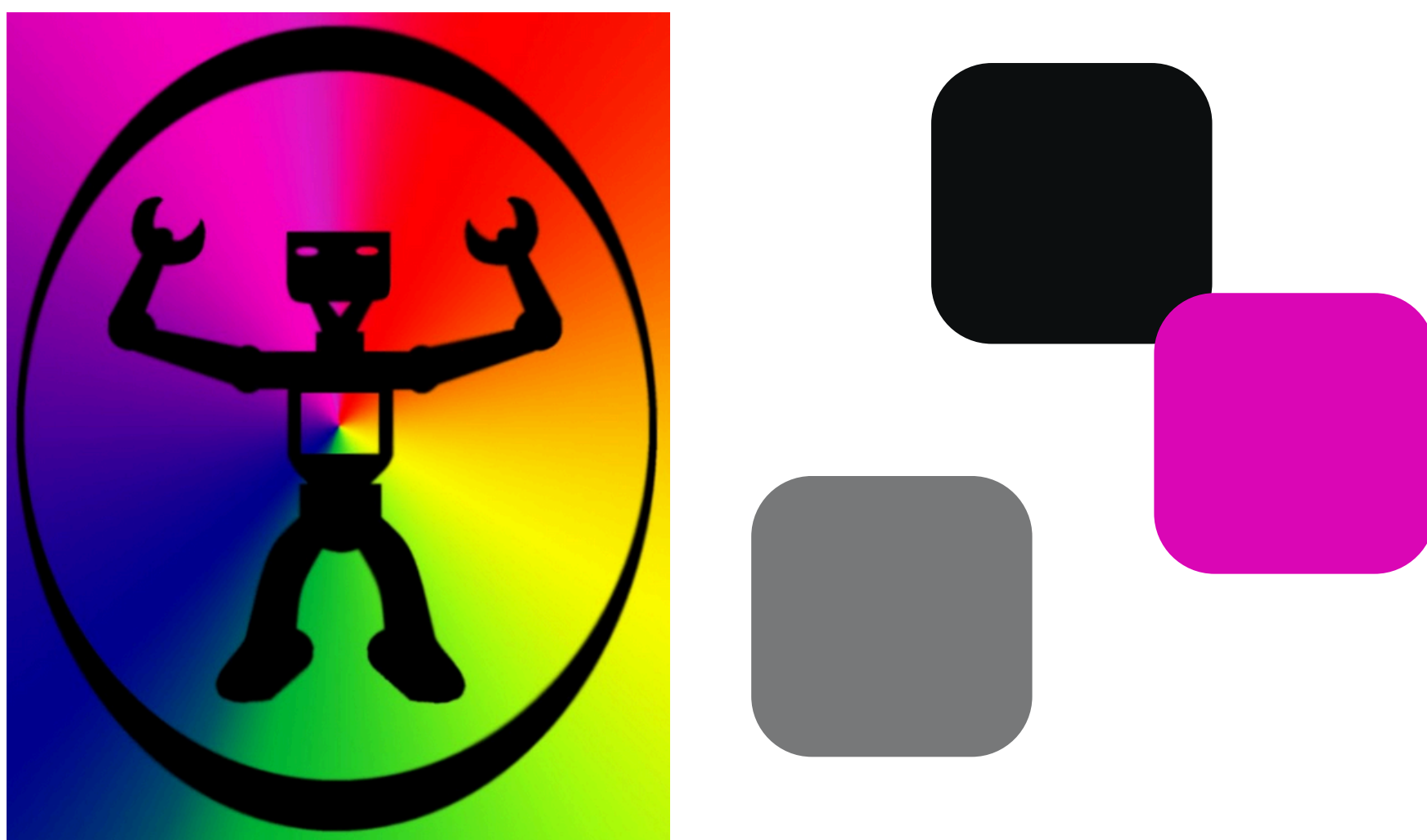
Torcato's extensive teaching experience spans elementary to university levels, including his role as a cooperating teacher in the Master's program for Teaching - Informatics at the Institute of Education, University of Lisbon. He is also a teacher trainer specializing in the Didactics of Informatics and Educational Technologies. From 2016 to 2024, Torcato was recognized as a Microsoft Innovative Educator Expert, and he serves as an Ambassador and Master Trainer in Educational Robotics at the Global Trainer Academy. Since 2019, he has been a Code Week Leading Teacher in Portugal.

Highlighting his dedication to pedagogical innovation, Torcato coordinated the first Makeblock Innovation Space in Portugal, established at his school by Makeblock and Areal Editores in October 2023. His career is characterized by a steadfast commitment to advancing educational robotics and digital technologies, making significant contributions to the field of STEAM education both within Portugal and internationally.

The Robot Helps! (•◡•)

"The Robot Helps!" is an innovative educational project founded and coordinated by Paulo Torcato in 2009, which evolved into "aTTitude3D" (Educate, Teach and Integrate) in 2018. This project showcases the transformative power of integrating robotics and technology within educational settings. Its core philosophy is centered on addressing the diverse learning needs of students through intersubjective, technology-driven methodologies, leveraging educational robotics to support the success of all students, from those facing challenges to those considered exceptional.

The project has gained international recognition, notably being named a champion in the E-Science category at the World Summit on the Information Society (WSIS) Prizes 2018. It exemplifies pedagogical innovation by demonstrating how the incorporation of robotics in the classroom can significantly boost student motivation and engagement. The inclusive approach caters to various learning styles and abilities, promoting educational equity and ensuring that all learners can benefit.



Teacher development is a key component of the initiative, as it organizes workshops and training sessions that empower educators across Portugal to incorporate robotics and programming into their teaching practices. By integrating robotics with a variety of subjects, the project fosters interdisciplinary learning and supports a holistic STEAM education approach. During the pandemic, it demonstrated adaptability by transitioning to the use of robot simulators and visual programming languages, maintaining continuity in robotics education.

Nationally, "The Robot Helps!" has had a significant impact, inspiring initiatives like the "Programming and Robotics at School" project, launched at the invitation of the Director General of Education. Additionally, the project's success paved the way for the establishment of the first Makeblock Innovation Space at Torcato's school, exemplifying collaboration between education and industry.

Overall, "The Robot Helps!" embodies the potential of technology-enhanced learning to revolutionize education, equipping students for the 21st century's challenges while ensuring that no learner is left behind.

Interviewing Paulo:)

1. You have an extensive career in education, spanning three decades and encompassing various levels from elementary to university. What initially drew you to the field of education, and how has your experience across different educational levels informed your approach to STEAM education?

My journey into the field of education was fuelled by a profound passion for learning and a desire to inspire others. From an early age, I was captivated by the transformative power of knowledge and the pivotal role educators play in shaping future generations. Over three decades, my experience across various educational levels—from elementary to university—has provided me with a comprehensive understanding of the diverse learning needs and developmental stages of students. This breadth of experience has been instrumental in informing my approach to STEAM (Science, Technology, Engineering, Arts, and Mathematics) education. By integrating these subjects, I strive to create a holistic learning environment that encourages creativity, critical thinking, and problem-solving skills, preparing students for the challenges of the modern world.



2. You have a diverse academic background in Electronic and Telecommunications Engineering, Applied Mathematics, and Computer Science. How has this interdisciplinary foundation shaped your perspective on the integration of technology and robotics into education?

My academic background in Electronic and Telecommunications Engineering, Applied Mathematics, and Computer Science has profoundly influenced my perspective on integrating technology and robotics into education. This interdisciplinary foundation allows me to view educational challenges through multiple lenses, fostering innovative solutions that bridge gaps between theory and practice. By leveraging my expertise in these fields, I have been able to design curricula that seamlessly incorporate cutting-edge technologies and computational thinking into classroom activities, making learning more engaging and relevant for students.

InterViewing Paulo:)

3. You founded "The Robot Helps!" project in 2009, which later evolved into "aTTitude3D". What were the motivations behind starting this project, and what were some of the key challenges and successes you encountered in its early stages?

The inception of "The Robot Helps!" project in 2009 was driven by a vision to harness technology as a tool for enhancing educational experiences and addressing diverse learning needs. The project later evolved into "aTTitude3D," reflecting a broader scope and ambition. One of the key motivations behind starting this initiative was to democratize access to technology-driven education, ensuring that all students, regardless of their background, could benefit from innovative learning methodologies. In the early stages, we faced challenges such as securing funding and resources, but these were overcome through community support and partnerships. The project's success is evidenced by its ability to engage students actively and foster a love for learning through hands-on experiences.

4. You mention that "The Robot Helps!" utilises intersubjective, technology-driven methodologies to cater to diverse learning needs. Can you elaborate on these methodologies and provide specific examples of how they are implemented in the project to ensure inclusivity and engagement for all students?

"The Robot Helps!" employs intersubjective, technology-driven methodologies designed to cater to diverse learning needs. These methodologies involve using interactive tools such as robotics kits and 3D printing to create immersive learning experiences that resonate with students' interests. For example, students might collaborate on building a robot that can navigate a maze, applying principles from physics, mathematics, and computer science in a real-world context. This approach not only ensures inclusivity by accommodating different learning styles but also promotes engagement by allowing students to take ownership of their learning process.

5. The project adapted during the pandemic to incorporate robot simulators and visual programming languages. What were some of the lessons learned from this transition, and how have these adaptations influenced the project's long-term approach to integrating technology?

During the pandemic, we adapted our project by incorporating robot simulators and visual programming languages into our curriculum. This transition taught us valuable lessons about flexibility and the importance of accessible online resources. These adaptations have had a lasting impact on our approach to integrating technology; we now place greater emphasis on digital literacy and remote collaboration skills. By continuing to refine these tools post-pandemic, we aim to provide students with versatile skills applicable in both physical and virtual environments.

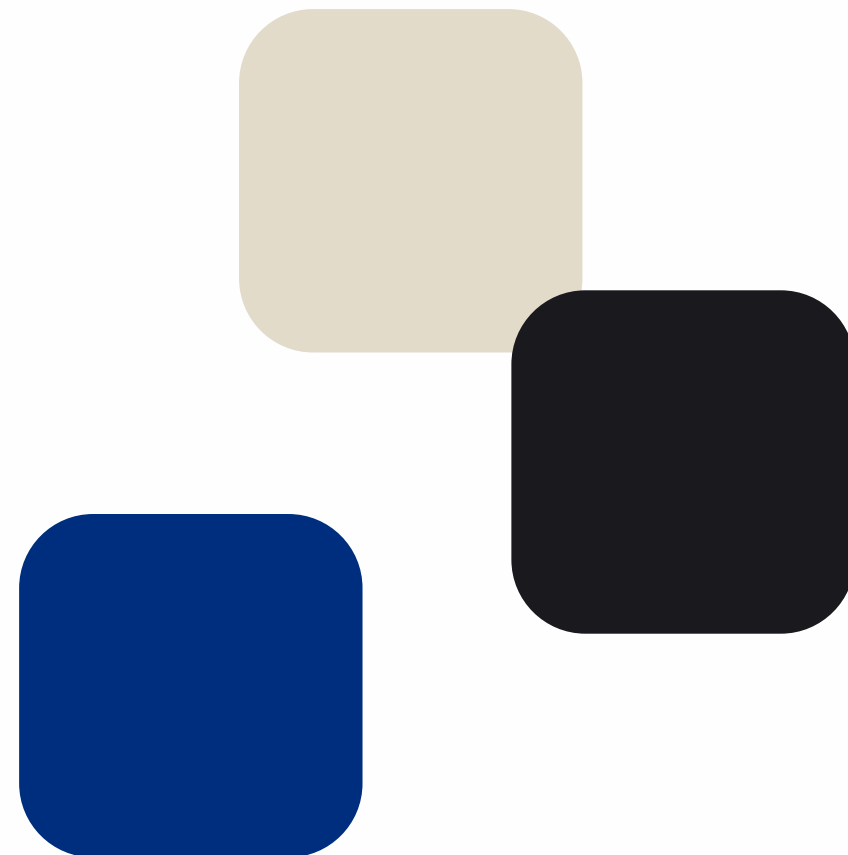
6. Your work has been recognised both nationally and internationally, including being a finalist for the Global Teacher Prize and winning the Global Teachers Awards 2023. What do these accolades mean to you, and how do they motivate you to continue pushing the boundaries of STEAM education?

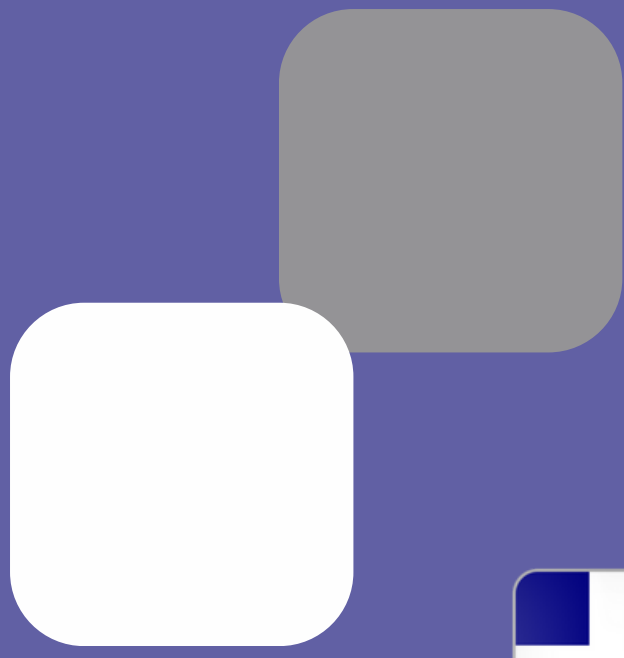
Being recognized nationally and internationally—such as being a finalist for the Global Teacher Prize and winning the Global Teachers Awards 2023—serves as both an honour and a motivation. These accolades affirm the impact of my work in STEAM education and inspire me to continue pushing boundaries. They remind me of the importance of innovation in education and reinforce my commitment to developing new strategies that empower students worldwide.

InterViewing Paulo:)

7. You are currently the coordinator of the first Makeblock Innovation Space in Portugal at your school. What are your aspirations for this space, and how do you envision it contributing to the future of STEAM education in Portugal and beyond?

As the coordinator of Portugal's first Makeblock Innovation Space at my school, I aspire to create an environment where creativity meets technology. This space is designed to be a hub for experimentation and exploration, where students can engage with robotics, coding, and engineering projects. My vision is for it to become a model for STEAM education in Portugal and beyond, fostering collaboration among educators, industry professionals, and students. By nurturing a culture of innovation, I hope to inspire future generations to pursue careers in STEAM fields and contribute meaningfully to society's technological advancement.





11. Natalia Spyropoulou

Dr. Natalia Spyropoulou is an esteemed Project Manager and Researcher noted for her extensive expertise in STEAM education, educational technology, and the advancement of teachers' professional development with a particular emphasis on integrating digital competencies into teaching and learning. She earned her PhD from the Hellenic Open University, where her research laid the groundwork for developing and assessing competencies for STEAM educators, resulting in the creation of the STEAMComp Edu framework. This framework serves as a significant tool for supporting professional development in the STEAM education field.

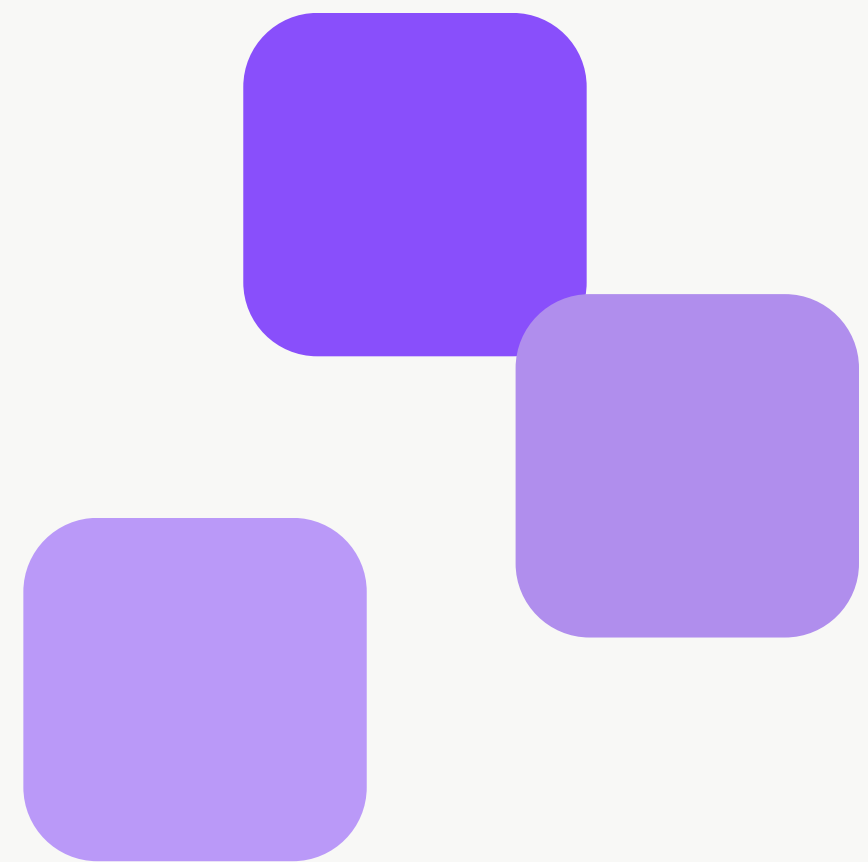
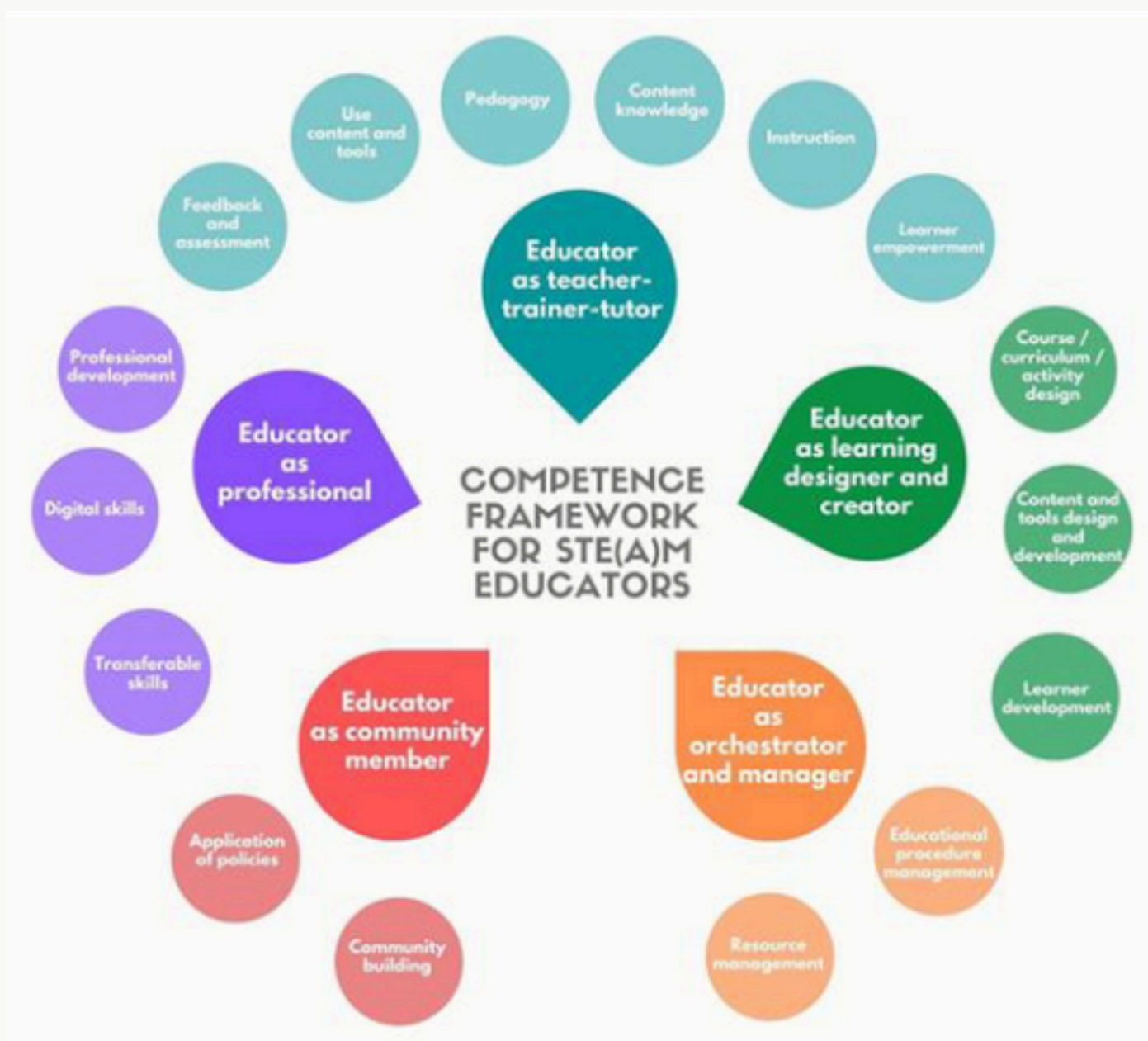
Dr. Spyropoulou has played a pivotal role in numerous European and national research and development initiatives throughout her career. Currently, as a Senior Project Manager and member of the DAISSy research team at Hellenic Open University, she spearheads influential projects focused on teacher professional development, STEAM Education, online and blended learning, distance education, and technology-enhanced learning.

With more than a decade's experience in higher education, Dr. Spyropoulou has a proven track record in the design and implementation of educational innovations. Her scholarly contributions include over 50 publications in international journals and conferences, underpinning her commitment to advancing interdisciplinary approaches in STEAM education. Her efforts are directed towards empowering educators and fostering innovation in teaching and learning methodologies.

STEAM Educator Competence Framework (•◡•)

The STEAMComp Edu framework, conceived as the centerpiece of Dr. Natalia Spyropoulou's doctoral research, addresses the urgent requirement for a specialized competence framework catered to STEAM educators. Distinguished as the first of its kind specifically crafted for STEAM education, it integrates essential interdisciplinary teaching competences, digital skills, management, and community-building capabilities alongside the unique pedagogical demands intrinsic to STEAM disciplines. This pioneering work stems from a meticulous methodology that included comprehensive needs analysis, stakeholder collaboration, and mapping of STEAM education policies and initiatives across Europe and internationally.

The framework functions as a structured tool tailored to bolster the professional development of educators. Its application spans diverse contexts, such as designing MOOCs, blended learning courses, and teacher professional development programs. These applications are supplemented by the creation of a self-assessment tool and detailed role descriptions aligned with the European Skills, Competences, Qualifications, and Occupations (ESCO) guidelines, evidencing its tangible utility across a multitude of stakeholders.



For policymakers, the framework provides a structured methodology for developing educational strategies and policies in STEAM education. Training providers benefit from a comprehensive tool designed to enhance professional development offerings. Educators, in turn, are empowered to incorporate innovative pedagogical techniques and effectively integrate STEAM principles into their teaching methodologies.

The evolution of the STEAMComp Edu framework, incorporating recent insights and enhancements, is documented in the journal article "Augmenting the Impact of STEAM Education by Developing a Competence Framework for STEAM Educators for Effective Teaching and Learning." This research-driven, evidence-based initiative aims to bridge the divide between policy and practice, advancing STE(A)M education and globally aiding educators in delivering effective, inclusive, and innovative instruction.

InterViewing Natalia:)

1. Dr. Spyropoulou, you are a renowned expert in STEAM education. Can you tell us a little about your background and what led you to this field?

My academic background includes a BSc in Digital Systems and an MSc in e-Learning, which provided me with a strong foundation in ICT, instructional design, and technology-enhanced learning. I also hold an MEd in Adult Education, where I explored the importance of lifelong learning, particularly for educators, to continuously adapt their skills and stay effective in evolving educational landscapes. Over the past decade, I have been involved in European and national research and development projects, focusing on STEAM education, digital competences, and technology-enhanced learning. My transition to STEAM education was driven by its interdisciplinary nature, which connects science, technology, engineering, arts, and mathematics to solve real-world problems. This approach fosters holistic learning, engages students meaningfully, and ensures inclusivity by attracting both girls and boys to diverse subjects and careers. STEAM education equips students with essential 21st-century skills—adaptability, resilience, and creativity—preparing them to thrive in evolving job markets and dynamic environments. This drives my commitment to empowering educators with innovative tools to inspire and prepare students for future challenges.



InterViewing Natalia:)

2. Your PhD research focused on developing the STEAMComp Edu framework, a tool for supporting professional development in STEAM education. What are the key components of this framework, and how does it address the specific needs of STEAM educators?

The STEAMComp Edu framework is a competence framework designed to support the professional development of STEAM educators by recognizing their multifaceted roles both inside and outside the classroom. It considers five distinct educator roles, reflecting their diverse interactions with students, educational materials, institutions, and the broader community. The framework emphasizes the need for preparation, collaboration, and management before, during, and after educational activities. These roles are:

- **Teacher-Trainer-Tutor:** This role highlights the educator's ability to facilitate effective learning through pedagogical expertise, content mastery, and skillful instruction. It includes competences in utilizing educational tools, providing feedback and assessments, empowering learners, fostering their autonomy, and guiding them toward academic and personal success.
- **Learning Designer and Creator:** Focused on the preparation and development phase, this role includes competences in planning, preparing, and designing educational activities tailored to diverse STEAM environments. It also involves creating supportive, inclusive learning settings that enhance student growth in STEAM disciplines while fostering creativity, problem-solving, and critical thinking.
- **Orchestrator and Manager:** This role involves competences related to managing and coordinating educational processes, including handling content, digital technologies, lab equipment, and group dynamics. It also includes organizing collaborative learning activities among students and educators to ensure the effective implementation of STEAM projects.
- **Community Member:** This role emphasizes the educator's interaction with the institution, school, and broader community. It includes competences in networking, collaboration, and participating in STEAM-related initiatives. It also involves applying policies that promote STEAM education and sharing best practices to strengthen community engagement and advocacy.
- **Professional:** This role focuses on the educator's continuous professional growth, including staying updated on the latest developments in STEAM education and refining transferable and digital skills. It also includes engaging in lifelong learning and reflective practices to adapt to evolving educational challenges.

3. The STEAMComp Edu framework was developed through a comprehensive methodology. Can you explain the process of its creation and the research that went into it?

The STEAMComp Edu framework was created through a pragmatic and community-driven approach, with educators playing a central role throughout the process. Recognizing the critical importance of addressing real-world challenges in STEAM education, the framework was designed to be practical, adaptable, and grounded in the experiences of those directly involved in teaching and learning.

The development process combined extensive research with iterative input from various stakeholders, including educators, policymakers, and institutions. By focusing on a "from community to community" approach, the framework emphasized the collaborative nature of its creation, ensuring that it reflected the needs, insights, and challenges of STEAM educators across diverse contexts.

A key focus was on capturing the multifaceted roles educators play, not just in the classroom but also as learning designers, managers, community members, and professionals. This broad perspective ensured that the framework supports educators in all phases of the teaching process—preparation, delivery, collaboration, and reflection—while also addressing their interactions with students, peers, institutions, and the wider community.

InterViewing Natalia:)

4. You mention that STEAMComp Edu has been applied in various contexts, such as MOOCs and blended learning courses. Can you share some specific examples of how the framework has been implemented and its impact on educators and learners?

The STEAMComp Edu framework can guide the design of training programs, evaluate their effectiveness, or identify competences required by specific target groups through needs analysis. In the Erasmus+ project STEAMonEdu, the framework was pivotal in enhancing professional development for STEAM educators through a MOOC and a blended learning course. Initially, it was used to conduct a needs analysis, identifying the competences most relevant to the target group. This informed the design of both the MOOC and the blended course, ensuring that the training programs were tailored to address educators' real gaps and challenges. The framework also helped define clear learning objectives and outcomes, aligning them with its competences for practical, measurable results.

Additionally, the framework supported the creation of a certification system and online badges, recognizing educators' achievements in a standardized and transferable way.

By structuring the MOOC and blended course around the STEAMComp Edu framework, the programs ensured relevance, focus, and measurable impact. Its adaptability makes it a scalable and practical solution for professional development in STEAM education across diverse contexts.

5. The framework also has implications for policymakers and teacher training providers. How does STEAMComp Edu guide the development of educational strategies, policies, and professional development programs in STEAM education?

For policymakers, the framework can be used as a foundation for designing evidence-based strategies that promote STEAM education. By defining clear roles and competences for educators, it helps policymakers identify priority areas for investment, curriculum development, and teacher support. This ensures that policies are grounded in practical needs and aligned with broader educational objectives, such as fostering 21st-century skills like creativity, critical thinking, and adaptability.

For teacher training providers, STEAMComp Edu acts as a guide for creating targeted professional development programs. It enables providers to perform needs analyses that identify specific competences educators require, ensuring training programs are relevant and focused. The framework can also be utilized in the development of learning objectives and outcomes, certification systems, and the evaluation of the programs, increasing the credibility and transferability of the training.

InterViewing Natalia:)

6. In your abstract, you highlight the importance of bridging the gap between policy and practice in STEAM education. How does the STEAMComp Edu framework contribute to this goal, and what are its long-term implications for the field?

The STEAMComp Edu framework provides a pathway to bridge the gap between policy and practice by aligning educators' needs with transformative educational strategies. By focusing on a consistent, competence-based approach, the framework enables policies to go beyond addressing immediate teaching needs to providing holistic support for educators. This includes empowering them in their multifaceted roles—inside and outside the classroom—and fostering innovation across the entire educational system.

The long-term implications of the framework can be many. By equipping educators with the skills to deliver interdisciplinary, inclusive, and dynamic learning experiences, it not only prepares students to meet the demands of 21st-century education but also supports the development of adaptable, skilled citizens ready to thrive in a rapidly changing world. The framework's flexibility ensures it evolves alongside emerging educational challenges, remaining relevant and impactful in diverse contexts.

Moreover, STEAMComp Edu encourages the transformation of education systems by integrating the perspectives of educators, policymakers, and institutions. Policies guided by the framework can holistically address educators' professional growth, supporting them as community members, collaborators, and innovators. This systemic approach recognizes that education extends beyond the classroom, fostering environments where learning, teaching, and collaboration intersect to drive societal progress.

7. An updated version of STEAMComp Edu is available through your journal paper, "Augmenting the Impact of STEAM Education by Developing a Competence Framework for STEAM Educators for Effective Teaching and Learning." What are some of the key updates and improvements in this newer version, and how do they enhance the framework's effectiveness?

The updated version of the STEAMComp Edu framework incorporates valuable feedback from educators and stakeholders, resulting in refinements that enhance its relevance, adaptability, and usability across different educational contexts. One significant update is the revision of the language used in the framework. The terminology was simplified and generalized to make it applicable to all levels and types of education, including formal, non-formal, and informal settings. This change ensures that the framework can be widely adopted and understood, regardless of the specific context in which it is applied.

Another key improvement involves the merging of certain competences based on educator feedback. This adjustment was made to streamline the framework, reducing complexity and overlap while ensuring it remains comprehensive. By consolidating competences, the framework avoids presenting overly complicated areas, making it more practical and easier to implement.

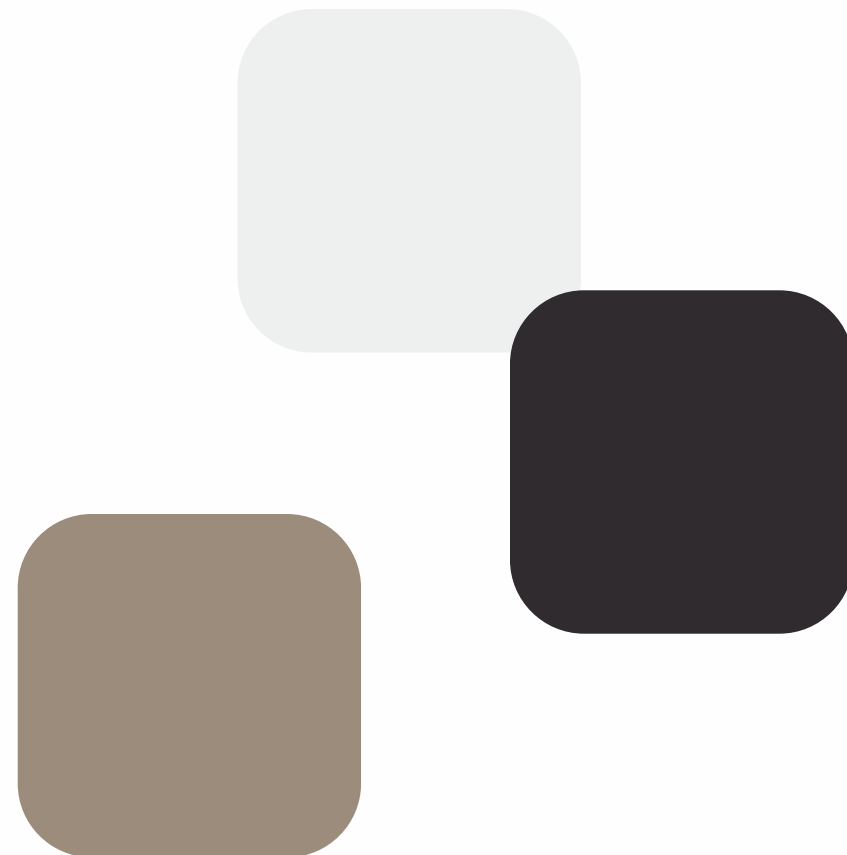
The updated version also includes a new focus on collaboration with parents and guardians, acknowledging the critical role of family engagement in students' STEAM education. This addition broadens the framework's perspective, emphasizing the importance of building bridges between the classroom and the home to create a more supportive and holistic educational environment.

InterViewing Natalia:)

8. What do you think about EASE, as an international network of STEAM educators, look at your work as a reference for their MOOCS and their training academy?

It is truly an honor to see the STEAMComp Edu framework recognized by EASE, a leading international network of STEAM educators that plays a pivotal role in shaping global educational practices. This recognition underscores the framework's relevance and applicability in supporting STEAM educators worldwide. By aligning with EASE's mission, the framework provides a solid foundation for designing training programs that are interdisciplinary, inclusive, and aligned with international standards.

This collaboration highlights the potential of working together as a global community to address the challenges and opportunities of STEAM education. It bridges the gap between policy and practice, transforming theoretical frameworks into real-world applications that directly benefit educators and learners. EASE's recognition amplifies the framework's impact, fostering a network of educators who are ready to innovate, inspire, and lead in classrooms, institutions, and communities around the world.



EASE 2024 STEAM Educators



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EASE- EuropeAn network of STEAM Educators is a non-profit organization whose activity has the ultimate objective of helping and enhancing the work of all educators and teachers in terms of promoting STEAM skills with children, young people and adults in formal and non-formal education.

