SCIENTIX
The community for science education in Europe

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FOREWORD

High-quality education systems that enable young people to develop key competences (e.g. linguistic, mathematical, scientific and technological skills, the ability to learn to learn, to be creative and an active citizen) are a major determinant of current and future economic and social wellbeing. Among these, competence in STEM is increasingly seen as a fundamental policy objective. Competence in STEM is a form of basic literacy that involves equipping young Europeans with the knowledge, skills and understanding to participate fully in society, influence and shape the future, and participate in economic activities that increasingly depend on STEM skills.

Yet STEM subjects are not popular subjects in schools. The declining interest in STEM among young people has been covered in many research and policy reports, conferences and events over the last decade. Some EU Member State governments, for example, have already put or are currently in the process of putting in place national strategies to increase interest in STEM. Nevertheless, the problem remains, despite this growing debate and activity.

European demographic trends are also worrying: we are becoming an aging population with many scientists, technicians and researchers drawing near to retirement. The teaching profession in Europe is also an aging profession, with one third of teachers aged over 50. Replacing these key workers in a knowledge society requires the development of a more scientific culture in which generally there is a much greater interest in STEM.

So, basically, Europe needs pupils, citizens and a workforce – inside and outside education – enthused by STEM, capable of making informed scientific and technological choices and interested in careers in science and ICT.

"Although setting curricula remains the prerogative of the relevant bodies and ministries within each Member State, much could be done at the European level that would have a substantive impact on the way that science is taught," stated the Rocard report in 2007, setting the course for the EU's science education actions in the years to come.

In 2009, European Schoolnet, together with the European Commission, started Scientix to take up this challenge. The objectives were all motivated by the Rocard report: promote new teaching techniques, help teachers present their subject in an exciting and relevant manner, stimulate Inquiry-Based Learning, and support networking among STEM professionals.

Since then, we have seen the "substantive impact" of Scientix in all the areas and at many levels: among teachers, schools, researchers and among our member organisations – national Ministries of Education. In this booklet, you will read about what Scientix offers, about its structure and history, and about its achievements. In the second part, you will "meet" five professionals; each of them is involved with and benefits from Scientix in multiple ways. These success stories give real-world experiences of why we think that Scientix can make a difference.

The ultimate goal is to inspire young people and attract them to STEM studies and careers. But first, it is important to inspire change in STEM education policy and practice. We believe that Scientix is part of that change and can largely contribute to promoting innovative practices from the STEM teaching community.

Marc Durando
Executive Director, European Schoolnet

INTRODUCTION

The European Commission funds a vast array of programmes aimed at encouraging school-age children to develop an interest in science, technology, engineering and mathematics (STEM) and, ultimately, to take up a career related to science, technology, engineering or mathematics.

The reason for so much funding for science education projects in the EU is clear. In a world where science and a scientifically literate working population underpin the economy, European children are showing less interest in the subject than many of their peers around the world. Add into the equation that many experienced scientists and technicians are now approaching retirement age, and the danger that Europe will fall behind in science, industry and commerce looms large.

Scientix is a key component of the European strategy to reverse this worrying trend and help put STEM subjects on the centre stage of school curricula across the continent and beyond. It has also been an important factor in encouraging educators to adopt Inquiry-Based Learning (IBL) and other innovative approaches to the daily teaching of science and mathematics in the classroom.

This short booklet provides an explanation of what Scientix is, does and offers – and most importantly, how you can benefit from it.

Who is it for?

If you teach STEM subjects – or even if you used to teach and you want to continue by contributing both in your country and internationally – this booklet will give you an overview of what Scientix is and does, and how you can get involved and benefit.

As a current teacher, you will also learn how Scientix can assist with your classes and daily teaching, your students and even your professional career.

For a STEM researcher or project manager, Scientix is a ready-made community of teachers and other education professionals. This booklet will give detailed information on the opportunities that exist to engage and collaborate with them.

Policymakers will learn about the available resources, and get an overall picture of the state of affairs in STEM education in Europe, as well as in individual countries. Our network of National Contact Points supports Scientix at the national level. You will also gain insights into the results and outcomes stemming from hundreds of science education projects from the past, present and future.

If you are a career counsellor and you would like to know more about how to promote STEM studies, Scientix can support you. Our specific training activities and tools can also help encourage the uptake of relevant jobs in your schools.

And finally, if you are a stakeholder in STEM education – as a parent, or a student or simply a contributing tax-payer – this booklet will give you a comprehensive insight into everything Scientix does and the reason why Scientix is important for science education.

PART ONE – A BRIEF GUIDE TO SCIENTIX

WHAT IS SCIENTIX?

Of the hundreds of EU science education projects funded by the European Commission, the vast majority have the express purpose of encouraging children to develop and expand interests in science and related careers. Given the huge range of projects and the funding they require, there is a need to ensure that the knowledge and results gained from these projects reach – and benefit – a larger audience.

There is also the need to facilitate dialogue between STEM stakeholders and multiple actors, such as policymakers, science project managers, education professionals, researchers – and, of course, teachers – enabling them to share best practices, policy guidelines and draw lessons and inspiration from research results.

Scientix promotes and supports a Europe-wide collaboration among STEM teachers, education researchers, policymakers and other education professionals. It is an initiative that helps to ensure that the many benefits of the EU's investments in science education are available to those who need them. Perhaps first and foremost, Scientix has contributed to the creation of a growing network that supports the exchange of the ideas, practices and experiences essential for the teaching of STEM to be fresh, relevant and engaging. It allows individuals and groups, from across Europe and beyond, to come together, in person, at training sessions, workshops, conferences and other events, as well as being able to communicate freely online.

As an initiative of the European Commission's Directorate-General for Research and Innovation, Scientix is run by European Schoolnet (EUN), also under the EU's 7th Framework Programme for

Research and Technological Development. EUN is a consortium of 30 Ministries of Education in Europe and, since it was founded in 1997, it has become one of the key organisations in driving innovation in teaching and learning, and fostering pan-European collaboration among schools and teachers. It is based in Brussels, Belgium.

SCIENTIX MILESTONES AND ACHIEVEMENTS

Since Scientix was launched by the EC in 2009, it has achieved a lot for STEM professionals in Europe. Here are some of its major achievements:

- Collecting and making available vital information on more than 200 publicly-funded science education projects
- Publishing more than 1,000 items of STEM teaching and learning materials
- Organising more than 30 events for teachers, project managers and researchers
- Successful first conference held in Brussels in May 2011 and attended by 400 STEM professionals. Subjects discussed included the role of science education in tackling current societal problems, the EU's Europe 2020 strategy, cross-border collaboration, school curricula, assessment models, learning resource repositories and teacher training.

SCIENTIX ONLINE

Scientix's online portal was created to let education professionals share know-how and best practices in science education across the EU.

It was launched in May 2010, and since then has been supporting teachers, schools, policymakers, researchers and other EU stakeholders by providing teaching materials and expertise in what is described as a "knowledge-building platform," totally free of charge and available in English, Dutch, French, German, Italian, Polish, Romanian and Spanish.

Many professionals involved in science education use the resources on offer at the Scientix portal, which allows them to:

- find information on European science education projects;
- discover high-quality resources in the field of science education;
- obtain translations of teaching materials on demand;
- stay informed about the latest news in science education in Europe, and important upcoming events;
- share information about best practices in science teaching;
- benefit from free online training.

See below for the portal's full features and benefits.

Resources

The portal has a huge bank of resources, coming from over 250 STEM education projects and comprising over 600 teaching materials and 500-plus research reports – all available online via the Scientix project library.

They are often available in a variety of languages, but if a resource you would like to use is not in your preferred language, you can request a translation via our *translation on demand service* – a unique feature of Scientix. It is free of charge for all end-users.

Search the comprehensive archive for your ideal teaching material, training course or other resource. First select the subject – you can choose one among over 30 educational areas; from astronomy to technology, environmental science to engineering.

What formats of material do you need – an application, case study, game, experiment or video? You may choose from over 20. You can also select your preferred age range and language.

Results are clearly displayed with a full description, so you can be sure that the resources you download – for free – will be the right ones based on your requirements.

Latest news

It is not just a place to browse the latest educational and STEM headlines. This section allows you to search for what is current by country and language. In addition, you can choose among over 40 subject areas – from aeronautics to zoology.

Regularly updated and very comprehensive, this is a highly effective repository that can save you hours of searching the Web, social media and RSS feeds.

Projects

Whether you are looking for a project to participate in or draw inspiration from – or if you are engaged in research or a review of a particular type of STEM project – this is the ideal place to start.

As with most information on the portal, you can apply a useful range of search filters to a long list of projects documented here. These include country, topic, funding details and time-frame.

The Scientix project library now contains over 250 publicly funded projects on STEM education and related fields, operating at both national and European level. If you are a project manager, feel free to submit your own project here.

Scientix Moodle

Moodle is a free, open-sourced and widely used learning platform. Scientix has taken advantage of this flexible technology to make a wide range of courses available to anyone who wants them.

Mostly aimed at teachers, the Scientix Moodle offers courses on various STEM subjects which are available as tools or straightforward worksheets, covering everything from nanotechnology to electrical circuits and evolution.

A large number of courses also allow teachers to become familiar with and competent in exploiting the rapidly expanding tools available as software applications, social media, blogs and online games. Here you can learn about the finer points of Excel, or how best to use a Wiki as a learning tool, or the pedagogical potential of Twitter.

Scientix observatory

The observatory is the place to download published papers dealing with one or several related themes in STEM education. Papers can also deal with what is currently happening in a particular field. Overall, the observatory aims to spread the news on science education and good practice.

Papers published here address a wide range of STEM issues, with recent submissions dealing with sharing open educational resources in multi-language repositories and improving online communication channels with teachers and students. If you have something of depth and importance to say in STEM, this is the place to say it.

Scientix enables face-to-face meetings with other individuals committed to STEM education; learning from experts and hearing all about the latest techniques and technology is a real boost to the opportunities and work life of any STEM professional.

Scientix's live events – such as workshops, project networking events and conferences – are also a great opportunity to make useful contacts and tell the educator community about your research project, conduct surveys and even help shape educational policy.

A good example was the 4th Science Projects Workshop in the Future Classroom Lab (also known by its acronym SPW@FCL). 35 teachers from 26 countries took part, including some Scientix Ambassadors, plus representatives from educational enterprises. They gathered in Brussels on 23-25 May 2014, to focus on using technology in science education and also to discuss how they could increase collaboration in STEM across Europe.

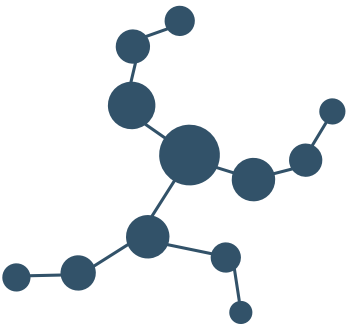
Second Scientix conference

Key to Scientix's ongoing evolution is its second conference, which takes place on 24-26 October 2014 in Brussels, Belgium. Over 600 teachers, policymakers, researchers, project managers and other science education professionals are expected to participate in this major networking event for STEM education in Europe. Entrance will be free of charge, accommodation will be provided by Scientix for all over 600 participants, and travel grants will be available for teachers. Using the Scientix portal, you can get the latest information on the conference calls, registration and programme, along with updates on post-conference developments.

Keep up to date and organised

The event calendar on the Scientix portal is a straightforward guide to upcoming happenings in the world of STEM. It displays events by month, including webinars, chats, debates, congresses and workshops, with links to a full description of each. As you would expect, it is fully searchable by keyword, country, type of event, language, and date range.

On the other hand, if you are organising an event and want to make it public to the Scientix community, you can do just that: simply upload the event via the easy-to-use interface and boost your profile and attendance figures entirely free of charge.



SCIENTIX AMBASSADORS

Central to the Scientix project have been the recruitment, organisation and activities of the Scientix Ambassadors and Deputy Ambassadors. Over 30 European countries have one, two or three of these dedicated individuals whose contact emails are listed on the Scientix portal.

Scientix Ambassadors and Deputy Ambassadors are members of our Teacher Panel. It is their role to promote Scientix to their peers – STEM teachers across Europe – and keep them informed about our activities.

Ambassadors and Deputies present our activities in schools and national teachers' associations, at conferences and workshops. They can advise teachers on how to get involved in European collaboration in STEM. In addition, they assist in developing and testing the various tools and services of Scientix and ensuring the pedagogical quality of the Scientix repository.

As well as fulfilment, networking and travel opportunities, both Ambassadors and Deputies are entitled to stipends, plus travel and subsistence allowances.

If you would like to organise a presentation of Scientix in your school, or as part of an event, you can contact the Scientix Ambassadors and Deputy Ambassadors in your country or region. The list of the Scientix Ambassadors and Deputy Ambassadors is available on the Scientix website.

SCIENTIX NATIONAL CONTACT POINTS

In 2013, Scientix introduced the network of National Contact Points (NCPs) in 26 European countries.

NCPs are existing national organisations that you can contact via the Scientix portal, where you'll be able to read about their activities in your country. They act as a link between national and European organisations, and their role is to reach out to national communities of STEM education professionals. From a practical point of view, it means keeping those communities informed about Scientix activities and organising national workshops, webinars and other relevant activities.

The main tasks of Scientix NCPs are to:

- present Scientix in their language at national conferences and online;
- organise online and face-to-face training and workshops;
- organise a Scientix National Conference;
- identify and monitor national strategies and initiatives to promote innovative STEM teaching and learning.

As NCPs, these organisations also have a vital part to play in monitoring and analysing national initiatives in science education policy and practice, which we will regularly publish, so that anyone interested in gaining a broad overview of what is happening in science education across different European countries will be able to do so.

HOW CAN YOU BENEFIT FROM SCIENTIX?

Scientix has been designed around the needs of teachers, researchers, project managers and policymakers in STEM education and other professionals in STEM. If you are a member of one of these stakeholder groups, you can benefit from Scientix activities and events in various ways, depending on your role.

Teachers

As a teaching professional, on the front-line of STEM education, the number one benefit of Scientix is the portal's huge range of teaching resources to inspire your students and add something new and different to your classes.

If you want to become more involved, check out national and international STEM education projects, using our matching tool, and engage with other STEM professionals by joining online communities.

To stay on top of a broad range of STEM subjects, as well as the latest online and IT tools that can add to your classes and lessen your workload, use the free training courses available on the portal's Moodle.

You can further develop your career by participating in national and pan-European workshops, online training and webinars. Finally, the Scientix conference, in October 2014, in Brussels, is an ideal opportunity for you to network, exchange ideas and hear the latest on STEM education from a wide range of experts.

Another plus for STEM teachers is the ability to find useful, practical and inspiring STEM resources on the Scientix repository to keep their classes fresh and challenging. On top of this, teachers have benefited from:

- obtaining free translations of learning resource materials in the Scientix repository through the *translation on demand service*;
- engaging with other STEM teachers and exchanging information on science and technology subjects by contributing to the Scientix Communities of Practice (CoP);
- receiving all the latest news from science education projects and from the Scientix community, by signing up for the Scientix newsletter and digest.

Researchers, project managers and other project representatives

Scientix is unique in offering organisations access to a pan-European network of STEM educators. It is an ideal place to disseminate information to the widest possible audience and create a "multiplier effect" for adoption.

If you need to engage with the STEM community, the first place to look is the Scientix portal. Here you will find teachers or schools to collaborate with in the Scientix public profiles directory.

Scientix project networking events give you a golden opportunity to reach out to the teaching community in person. Meet, greet and present to dozens or more dedicated, highly motivated teaching professionals, who can help spread the good news about your project to their colleagues and within their educational institution.

You can also browse our project reports library and submit your own projects (and their resources) to the Scientix portal, allowing you to disseminate them without the need to leave the office.

And, of course, the second Scientix conference in October 2014 will be an ideal event to network with fellow STEM professionals and communicate your ideas with some of the most motivated teachers in Europe.

Thanks to the Scientix portal, STEM managers have increased their ability to share and exchange experiences in managing STEM projects, present their work and create new collaborations and partnerships, by participating in and organising Scientix networking events. If you want to run an event, but need some assistance, why not co-organise an event with Scientix?

Other advantages include:

- showcasing your project on the Scientix project gallery;
- finding inspiration from the wide range of STEM projects from across Europe posted on the STEM projects gallery;
- scheduling an online meeting, webinar or online workshop for European STEM projects via the Scientix online meeting room.

Policymakers

If policy is your area of interest, the Scientix observatory has the very latest intelligence on STEM education research and practice, plus national strategies for STEM education.

For example, the Scientix observatory provides informative articles on the state of play of different topics related to science education.

Scientix also has the resources and extensive network of STEM professionals to help you define the changes that are needed for curricula in your territory, as well as assisting you in applying those changes.

If you are more interested in national perspectives, the Scientix National Contact Points can steer you in the right direction, and inform you about the latest development in STEM education in their country.

There's also the opportunity to engage with the STEM education community at the second Scientix conference.

PART TWO – WHAT DO PEOPLE SAY ABOUT SCIENTIX?

USING SCIENTIX TOOLS TO IMPROVE STEM CLASSES

Francesco Mazzucco is a senior secondary school teacher at the Liceo Classico Vitruvio Pollione in Formia, Italy, where he teaches maths and physics to students ranging in age from 14 to 19. He is a highly experienced educational professional, with 25 years in teaching, for 13 of which he has been Deputy Head. Here are his thoughts on Scientix, the tools it provides and STEM education in general.

The right resources for the right job

Francesco, a seasoned STEM teacher, faces an additional challenge in teaching maths and physics, since he teaches in a school that actually specialises in humanities – his classes have to compete for students' attention and enthusiasm with lessons on Latin, ancient Greek and philosophy. He started using Scientix tools in 2011, and found that his classes benefited immediately. So what does Francesco find useful, and why?

"Principally, I use the Resource Repository for my teaching. I look for new ideas and different methods to improve my teaching approach."

The teaching approach is key

One of the main reasons he uses Scientix resources is the way in which they help him approach STEM teaching – through IBL.

"When I was a student, science was almost exclusively taught according to my teacher's pace and interests. I was the 'vessel' he tried to fill with content, no matter what my attitudes or interests were," Francesco remarks.

From his point of view, nowadays such a teaching model makes no sense at all, and it is important that a teacher continuously explores new methods and ideas to stimulate and motivate students.

"Undoubtedly, Scientix is a very useful resource from this point of view," he adds, remarking that simplistic rote learning would be highly ineffective with his current students and that Scientix has been very beneficial in offering alternatives to old-fashioned methodologies.

"It has been a great place to find alternative ways to present challenging topics and reinforce understanding of difficult concepts," he emphasises.

Keeping the classes real

When asked what, in addition to outdated teaching techniques, Scientix can help remedy, Francesco cites the perception "probably from the media," that certain subjects, particularly physics, chemistry and maths, are "difficult" and even boring.

"Students also want to see where they can be applied in real life – they need to understand the usefulness of what they are learning," he remarks. And again, Scientix's tools have helped him, with a huge range of activities, and lesson worksheets that emphasise the real-world applications of STEM principles.

"Every time I face a new topic, I have one guiding principle: start by making it as simple as possible to give students the idea it is accessible to all. Scientix has given me a hand from this point of view. In addition, I use various apps available on the Internet," he adds.

Staying update, across Europe

Ensuring he remains up to date with the latest information and activities across the continent is also a priority for Francesco. "I often browse through sub-sections, such as News and Events, to see what's going on in Europe from an educational point of view," he explains.

Stepping back a little, Francesco explains why Scientix's support of STEM is so important: "A lot of the economic and cultural growth of a nation and the future of its people depends on how much is invested in scientific research – and, consequently, on the general interest in STEM."

HOW SCIENTIX IS HELPING STEM EDUCATION ENTERPRISES

Originally from Ireland, Sally Reynolds is the joint owner of an audio-visual and information technologies company in Belgium that specialises in the education and training field.

ATiT was set up in 1999 and, before that, Sally worked for 10 years in various European initiatives linked to the innovative use of technology in education, including working on European Commission-supported Research and Development.

Like many organisations, hers has benefited greatly from the relationship established with the Scientix initiative and community.

Two key advantages of working with Scientix

Sally and ATiT first became involved with Scientix when they kicked off their first science-related project in 2012. Scientix was to be a dissemination channel for the project.

"Having a single channel that brings together all the European projects, as well as all the people involved in science education, is a terrific idea. I fully support Scientix," enthuses Sally.

But there is another good commercial reason for her enthusiasm for the initiative, as she explains: "We're involved in Scientix not only because it is a centralised resource, but also because of its networking opportunities."

Her company took part in a networking event organised by Scientix in November 2013, which she found very beneficial. "We see a huge amount of value in these networking activities and are planning to be involved in many more," she adds.

Projects that are profiting from Scientix

An example of the value Scientix brings to her business can be found in their current projects being trialled in Flanders, where they have cultivated good relationships with the local Scientix Ambassadors, and also with the National Contact Point for the region, Technopolis, a respected technology education centre.

Sally plans to have a special event at the second Scientix conference in October 2014, especially for Flemish STEM teachers. "We wouldn't be able to do that type of activity without Scientix," she remarks.

She explains that the unique value of Scientix is its pan-European reach: "We're always looking for multiplier networks to get our message out. And unlike higher education and company training, there are very few of these for schools at a European level.

We would be really stuck without Scientix – there's nothing else like it. So it is absolutely vital that Scientix continues – and expands," she adds.

Scientix multiplies the uptake – and thus the effectiveness – of ATiT's projects. For example, a press release announcing

the features and benefits of a project reached a much wider audience through the Scientix portal than through other channels, according to Sally.

How STEM education gains

Access to the Scientix community has obviously great advantages for companies such as ATiT. But how do the parents and students involved in STEM gain? Sally cites one of her current projects as an example of how Scientix promotes mutual profit.

Inquiry-based learning (IBL) is becoming an increasingly important and effective approach to teaching a number of subjects, including STEM. As a move away from learning that simply forces children to absorb and regurgitate specific facts, it has been praised for providing students with a far more realistic introduction to the scientific method, problem solving and creative thinking. It is an approach that Scientix is championing across Europe as a more effective and engaging way to teach STEM.

One practical downside, however, is the difficulty in assessing student performance as compared with a traditional exam or testing regime. The European Commission-supported SAILS project, in which ATiT is a partner, provides teachers with strategies to make those assessments, helping with the adoption of this method of teaching STEM. By having the network to aid the dissemination of this project, Scientix is helping to reduce the barriers to adopting IBL.

A need for STEM and Scientix – from the business point of view

Sally and her colleagues clearly believe in the importance of STEM education – and Scientix's role in it. As a small business, as well as a provider of STEM-related tools, do they have any particular perspective on the subject?

When asked, she had the opinion that the way STEM was increasingly being taught in Europe was as important as the course content itself and commented:

"What's important at work is your ability to organise yourself, motivate yourself, be observant and able to work on your own, and not needing constant supervision. Those are the types of skills that STEM teaching is now trying to impart.

"Even if you never study these skills beyond secondary school, they can have a profound impact on your future success. As a small business, we would like to see all school subjects using Inquiry-Based Learning, not just STEM subjects, and it's this approach to teaching that Scientix supports so well."

WHAT SCIENTIX AMBASSADORS ARE DOING FOR STEM TEACHING

Tullia Urschitz is a maths, science and ICT teacher, working at the Istituto Statale Comprensivo B. Lorenzi di Fumane, a Lower Secondary School, 16 km from Verona, in Italy, where she principally teaches 11 to 13 year olds. She also teaches Educational Robotics at the University of Genoa.

A long-time advocate of progressive STEM education, she has been involved in several European STEM education projects, and she is currently a Pilot Teacher for the inGenious project, the European coordinating body in STEM education. But here she tells us about her activities as a Scientix Ambassador, and how they can benefit the STEM teaching community, as well as giving us some thoughts on STEM education in Europe.

Getting involved in Scientix

Tullia has been a Scientix Ambassador since 2013, but her involvement in education activism started about five years before that, when she became interested in helping girls become more involved in STEM.

"I was working at the School of Robotics in Genoa on the *Robots for Inclusion* project, when I met someone who encouraged me to get involved," Tullia explains.

Two weeks later, a Scientix representative spoke at the School of Robotics, and this finally persuaded her to apply to be a Scientix Ambassador.

Role and responsibilities of an Ambassador

She describes the role of an Ambassador as to help increase the spread of Scientix practices and support its nationally-based projects, often in collaboration with the National Contact Point (NCP).

In Italy, this means that she works closely with the Ministry of Education, which is the country's Scientix NCP. "Helping the NCP means assisting with large events," she remarks.

For example, at the time of writing, the NCP is organising an inGenious conference and they have asked Tullia and the other Italian Ambassadors to organise workshops on some Scientix practices and projects.

The NCP is also preparing a conference on digital textbooks this year, and again she will be providing support, such as organising workshops and presentations.

Training, mentoring and spreading the word

A large part of her time as an Ambassador is dedicated to introducing the Scientix initiative to other teachers in Italy, through face-to-face meetings, training course presentations and workshops.

"That means I travel a lot, although some of these activities can be done via webinars, and the Scientix online meeting room – anything that works!" she remarks. Another day-to-day activity is to help spread new ways of teaching STEM

amongst colleagues. In Tullia's experience, this is best achieved by encouraging fellow teachers to job-shadow her during classes.

As a Scientix Ambassador, Tullia is also involved with creating contacts between schools and companies that are happy to fund and be involved in Scientix activities – for example, a local organisation has asked her to look into the opportunities for them to collaborate with schools in robotics.

Advantages for the Ambassador benefit everyone

Ambassadors benefit from their role by increasing their professional visibility, learning the latest techniques in teaching STEM subjects, and meeting the top influencers in the field.

As an example, Tullia will be presenting the paper at an international conference, which will also be an opportunity to meet and learn from such luminaries as MIT's Mitchel Risnick, the originator of Scratch Programming.

This opportunity to travel and meet a wide range of educators can be highly beneficial for teachers back in the Ambassador's native country. Tullia explains:

"The world is a big place and if you simply stay in your school, and your country, you are never going to learn, or teach the important lessons of living in a globalised society to your students and colleagues." Tullia's argument is that if you travel, attend events and meet a wide range of people, you get a far better opportunity to learn and then, in return, share those lessons.

How STEM and Scientix helps create better citizens

"In Italy, we have a range of companies with a specific demand for STEM professionals. If they don't find them here, they look elsewhere. In addition, in my opinion children with STEM skills will be better citizens in the future," she comments.

Her reasoning is that while anyone can have an opinion about an issue – such as the Fukushima nuclear disaster in Japan – if you have a good basic understanding of the issues involved, you can participate in the debate more effectively. The same is true of controversies surrounding climate change, stem cell therapy and a whole range of STEM-related issues that are having an ever-increasing impact on our lives.

"With Scientix you can really reach each individual student, regardless of their needs and abilities." She believes this so whole-heartedly that she wrote a paper on the subject, based on her own extensive experience.

SCIENTIX NCPS: SUPPORTING TEACHERS AND RESEARCHERS NATIONALLY

Jacinta Burke is an Irish secondary school science teacher responsible for educating 12 to 18-year-olds. She also has an interest in primary school science and lectures at tertiary education level.

At the time of writing, she is on full-time secondment to the Professional Development Service for Teachers (PDST), the teacher education service in the Republic of Ireland. As Science Advisor at the PDST, she was asked to take on the role of Scientix National Contact Point (NCP).

She took some time to tell us about her activities as an NCP in Ireland, the local interest in Scientix, and how the PDST and Scientix are benefiting Irish teachers and their collaboration with STEM education researchers in Ireland.

Aiding STEM educators in Ireland

Jacinta has been acting as the NCP for Ireland since 2013. Her role is to fulfil the 13 tasks assigned to all National Contact Points. Much of this involves being in charge of organising big national STEM events, including conferences, workshops and exhibitions.

"We've recently been organising the National Conference for Scientix and promoting its various events," she explains. That promotion happens via a comprehensive network of teachers throughout Ireland.

Workshops that really work

"What the PDST and Scientix have in common is that we are both trying to support and encourage teachers to promote inquiry-based science – it's our main goal as teacher-educators – which is why there is such a good fit between the two organisations," she explains.

One of the first Scientix workshops Burke was responsible for was for chemistry teachers. The background to the project was that the Irish chemistry syllabus for mandatory experiments had just changed and teachers needed support to understand those changes. As there was no guidance at a national level, the PDST Scientix team stepped in to ensure the chemistry teachers were prepared to teach the three new experiments the syllabus required, with a Scientix-funded workshop in Galway.

In autumn 2014, another workshop is planned for junior-level physics. "The thing is," explains Burke, "when you're a junior school science teacher in Ireland, you have to teach chemistry, biology and physics – and not all teachers are that confident in all the subjects." The

scheduled workshop has been designed to guide teachers through inquiry-based physics teaching that they can apply to their own classes – again, with Scientix's financial backing.

Part of the wider Scientix community

The Republic of Ireland currently has one Scientix Ambassador and two Deputy Ambassadors. Asked about the NCP's relationship with them, Jacinta explained: "In fact, the Ambassador and one of the Deputies work for the PDST. They have been closely involved in helping us to organise workshops and other events and will continue to do so. Obviously, this means we have a close working relationship," she adds. One Deputy works for the Irish Science Teachers' Association (ISTA), which opens up a wider community of STEM professionals to Scientix.

Another duty of NCPs is to meet as a group several times a year. It offers additional pedagogical opportunities, as Jacinta says: "As a teacher and educator, being part of Scientix allows me to meet other NCPs across Europe, swap and compare ideas, and feed them back into our network of teachers here in Ireland. Various countries give presentations, during which I've learnt very many valuable things from my NCP colleagues," says Jacinta.

More assistance from Scientix

Looking more generally at the ways Scientix helps teachers in Ireland, Jacinta cites the tools and resources available on the Scientix portal as extremely useful. "Having one place for all the information from all over Europe is invaluable, according to many teachers I've spoken to," she confirms. "Several have found out about courses run by other organisations, and have been able to travel to different parts of Europe and participate in them."

Jacinta and her colleagues are happy to evangelise about the advantages the portal has to offer, not least because they use it themselves to discover more about what's going on in STEM across Europe.

As well as using the resources on the portal in order to improve their student's classes, teachers in Ireland are also participating in online classes themselves, thanks to the Scientix Moodle – a free, open-source learning platform that offers a wide range of courses available to anyone who wants them. "It's great because you can develop your own expertise, at your own pace and in your own time," Jacinta explains.

Helping researchers and their projects

Over the next year, Jacinta and her colleagues are planning to focus on bringing more STEM researchers and project managers into the Scientix community in Ireland. "Our role is to identify resources that their projects have developed and that can be used by primary or secondary science teachers. The researchers do not benefit financially from the Scientix project; however, we all have the common aim of working with teachers to promote STEM," she states.

The projects and organisations that Jacinta will be introducing to the Scientix community are many and varied. They include the Centre for the Advancement of Science and Mathematics Teaching and Learning at Dublin University, better known by its acronym, CASTeL.

Aimed at secondary school students, its remit is to analyse the underlying reasons for the current status of mathematics and science in schools as subjects that have been declining in popularity and the particular difficulties many children have with maths.

The PDST Scientix team hope to collaborate with other institutions in identifying STEM resources that can be used for science education, adding to an already packed schedule of activities that are already doing so much for STEM educators in Ireland.

WHY SCIENTIX NETWORKING MAKES ALL THE DIFFERENCE

Àgueda Gras-Velazquez is the Science Programme Manager at European Schoolnet, and has been managing Scientix for almost five years, basically from day one.

As an insider, she is in an ideal position to explain how the initiative is helping to bring STEM professionals together, all over Europe – and what the future holds for the Scientix community.

The value of face-to-face

"We're facilitators, we provide a forum," says Àgueda, explaining in the most basic terms what Scientix does for European teachers, researchers and other STEM professionals across Europe. According to Àgueda, in addition to the many resources on the Scientix portal, the most important aspect of the initiative is the range of Scientix networking events.

"This is what Scientix really brings to the party," she explains. Previous efforts made to encourage and support STEM teaching were done in isolation. Teachers were essentially working on their own, "but it's only when they get together that we see real progress. Like research, unless you have collaboration, progress takes a lot longer," she enthuses.

The content of networking events

Typically, a Scientix networking event will revolve around a particular topic or shared interest. STEM professionals bring, present and compare their own projects in a collegiate atmosphere. They might give advice on how to run teacher training courses better, or how to write policy recommendations, or how to disseminate courses more effectively.

One example of where this has been a particular success was the Scientix Project Networking Event, held in Brussels in late November 2013. The theme was communication and dissemination activities with over ten different projects present. And for the one held in September 2014, on teacher training in EU projects and policy recommendations, the number of participating projects doubled.

Increased enthusiasm for teaching

One of the most challenging parts of teaching is to maintain a level of enthusiasm for your subject, day in day out. It can be particularly difficult if you work within an inflexible curriculum, or an institution that is not open to new ideas. This has serious consequences for students, who are often deterred from following a subject simply because of dull, lacklustre teaching from an educator who is finding it difficult to pump energy into their classes.

This is an area where Scientix can be of help, as Àgueda explains: “After an event, we get hundreds of emails for months afterwards from teachers telling us about all the cool stuff they now do in class, which has been inspired by their weekend-long networking event.”

It’s not just teachers who benefit from the networking events. Scientix will even ensure that events involving teachers overlap with those of researchers, to help both groups communicate with each other and giving researchers access to dozens of highly motivated top teachers.

But is it working?

It’s clear that Scientix has plenty of supporters and that the activities the initiative promotes, and the resources it provides, are many and wide-ranging. But what difference is Scientix really making to STEM professionals? Àgueda has a number of answers to the question – and data to back up her arguments.

“We’ve been noticing an increase in teachers’ interest in these face-to-face activities. For an event called Science Projects in the Future Classroom Lab, we had 20 places and we received over 200 applications,” she states.

In addition: “When we launched grant applications for our upcoming conference, we had 1,000 applications for 200 places – within days of announcing the event!”

Àgueda points out that this is a real change from the earliest days of Scientix, when the organisation had to phone teachers directly to encourage them to come to an event and ensure it was fully subscribed.

Another positive development for Scientix is the number of new faces at these increasingly popular events. “These days, 90% of attendees are teachers I haven’t seen before,” she affirms.

The evolution of Scientix

Scientix is certainly growing. But is it evolving? Again, the answer is “yes”. As well as simply adding more and better activities to the roster, the initiative is branching out into exciting new areas.

“More and more initiatives at a national level are being supported, rather than purely pan-European activities,” says Àgueda. This is largely thanks to the new National Contact Points (NCPs) and Ambassadors, who replicate workshops in their own territories and organise their own activities, leaving other parts of the Scientix operation free to concentrate on European-level events.

Another important development is the Heads of Schools initiative. It has been designed to help educate principals in different countries about the importance of ongoing training – because, as Àgueda points out, “they are the major gate-keepers. If they buy into Scientix they will be far more likely to grant permission to their staff to take time off to go to workshops, conferences and other events. If they don’t understand the importance of teacher training, it’s game over!”

Hopes and plans for the future

Asked what else she would like to see, Àgueda enthuses about increased collaboration with industry – and even more networking events. “I firmly believe these face-to-face events are the best things we do for teachers in Europe,” she says, adding that another possible area for improvement would be more engagement with primary school education and events specifically geared towards primary school STEM teachers.

In conclusion, Àgueda believes it’s important to note that what started out as very much a European Union-centred project has already found popularity in non-EU and even non-European territories.

“We now involve teachers in Bosnia, Serbia, Iceland, Turkey and Israel, and Scientix is even getting noticed in North America and Australia,” she confirms.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AFTERWORD

We hope you will have found this booklet informative and useful. Its aim is to provide an insight into the wide range of resources Scientix has to offer, as well as illustrating real-world applications from people who are already taking full advantage of those resources.

If you have any connection with or interest in STEM education in Europe, Scientix offers a large and growing community to become part of. We hope that is exactly what you will do in the near future.
For anyone who is already part of our community, we urge you to continue to take full advantage of it – and wish you all the best of luck in helping to put STEM at the centre of European education.

For more information on the best way to get involved – or increase your involvement – with Scientix, please get in touch:

- www.scientix.eu
- newsletters: www.scientix.eu/web/guest/newsletter
- @scientix_eu
- groups/ScienceTeachersEurope

SCIENTIX
The community for science education in Europe

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