SCI-CO+ Magazine 2023 October-December n°1

NEW FRONTIERS IN SCIENCE COMMUNICATION

INNOVATIVE MODELS, METHODOLOGIES, SKILLS FOR THE DIGITAL TRANSITION IN THE FIELD OF SCIENCE COMMUNICATION

n°1

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2023 October-December

The SCI-CO+ Magazine

This web platform is part of the Project "SCI-CO+ - High Professional Skills for Advanced Science Communication" (Agreement No. 2022-1-IT01-KA220-VET-000086033), funded under the European Erasmus+ Programme. The information and views set out reflect only the views and opinions of the authors (producers and the European Commission cannot be held responsible for any use that may be made of the information contained therein. This platform can be used for public use, subject to the acquisition of specific access credentials. No content may be used for commercial purposes. None of these materials may be used for commercial purposes.

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Digital edition is available on
www.SciCoPlus.org and www.SciCoPlus.eu

On cover:

Title: 3D rendering of a futuristic kaleidoscopic sci-fi tunnel illuminated with blue lights.
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Quarterly of the
Fondazione IDIS – Città della Scienza
Promoter and Coordinator
of the Erasmus+ Project
"SCI-CO+ - High Professional Skills
for Advance Science Communication"

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Fondazione IDIS Città della Scienza *(Italian version)*,
Trinity College Dublin, Sciencia Viva Lisbona e Navet Boras *(English version)*.

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Access to the web version
www.scicoplus.org
www.scicoplus.org/magazine

Program Erasmus+
Agreement No. 2022-1-IT01-KA220-VET-000086033

Erasmus+
https://erasmus-plus.ec.europa.eu

Sci·Co+ High Professional Skills for Advanced Scientific Communication

PARTNER

In this issue...

As we will read in the editorial (WELCOME!), the authors of the articles for this first issue of the magazine are all members of the organizations of the SCI-CO+ Consortium (or Partnership). Some of the articles represent experiences of innovation in science communication implemented during the Covid 19 pandemic, others summarize some of the results achieved by the SCI-CO+ Project in these initial months of work. In the first group there are two articles. The first (**Makers and Scientists**) describes one of the main areas of development of the Fondazione Mondo Digitale in Rome, the "Gym of Innovation", developing many activities from low-cost scientific experiments to the Earthquake Machine, experimenting with new "specializations" in this 'Gym'. The second (**Green in the Lab**) illustrates the project of teaching chemistry to preschool and primary school children conceived by the NAVET Science Centre in the province of Boras in Sweden. The initiative uses a green puppet (the Berta Dragon), conceived by Anna Gunnarsson, director of NAVET, together with IKEM, the commercial and entrepreneurial organization of Swedish chemical and innovation companies. The article also describes the innovations introduced as a result of the Pandemic.

The SPECIAL of this issue is dedicated to **Città della Scienza**, one of the largest Italian areas for the promotion and dissemination of science, born in 1996 after the success of the Festival "Futuro Remoto" ("Remote Future"), conceived by the scientist Vittorio Silvestrini in 1989, and the establishment of the IDIS Foundation. The article illustrates its development and the challenges it has faced up to the innovations introduced since 2020.

The two closing articles illustrate two important results achieved by the SCI-CO+ Project through two research initiatives. The first, **Professional profiles within scientific communication organizations**, is the synthesis of the results of the research carried out by Trinity College Dublin which aimed to analyze the most widespread professional profiles in organizations dedicated to science and technology communication, with particular attention to those with more innovative skills. In **The Communication of Science in the Digital Age**, the results of the research carried out by the Department of Social Sciences of the University of Naples Federico II are described, aimed at identifying and analyzing the innovative aspects of science communication based on the use of advanced digital technologies, with particular attention to experiences in this field carried out by the organizations of the SCI-CO+ partnership. Finally, with the article **An overview of the SCI-CO+ Project**, the NEWS FROM SCI-CO+ section starts. In this section, the most important results that the Consortium have achieved in SCI-CO+ will be presented in each issue.

SUMMARY

NEW FRONTIERS IN SCIENCE COMMUNICATION

WELCOME!
Our journey into advanced science communication begins

by Riccardo Villari

"NEW FRONTIERS IN SCIENCE COMMUNICATION" is the quarterly magazine of the Foundation IDIS-Città della Scienza, born within the Erasmus+ Project "SCI-CO+ - High Professional Skills for Advanced Science Communication", of which the Foundation is the promoter and coordinator, and which is carried out by a Consortium of eight organizations from five European countries. It is aimed not only at experts in the field – in particular managers and operators of science museums and science centres – but also: teachers of scientific subjects, university researchers, operators of public and private research centres, experts in scientific dissemination, in particular operators of publishing administration, experts in technological innovation, and young graduates who want to pursue a career in the sector. In addition, as SCI-CO+ is an advanced vocational training project, the magazine is also aimed at organisations in the VET sector.

With this editorial initiative we want to offer food for thought, updates and insights on all issues related to innovation in the field of science communication and to the training of the sector skills.

The magazine is organized with some fixed columns of a general character – Editorial, Special, News from SCI-CO+, Interviews, Events – to which are added, every quarter, articles about specialized topics.

The **Editorial** is a short introductory article developed by the Editorial Board to illustrate from a general point of view the criteria that guided the choice of the articles of that issue. The **Special** is the cover article; every quarter there will be an in-depth article on one of the general topics of interest in SciCo+, from the paradigms and methods of science communication to professional innovation in the sector, from innovative technologies for communication, to the teaching of scientific subjects in schools, from good practices in the field of scientific communication to European programs of interest for the sector. In this issue, the cover article is dedicated to the Fondazione IDIS - Città della Scienza and its experience gained during the pandemic.

In some issues we will have the Interviews section in which an expert will be invited to discuss with a representative of the partnership one or more topics of interest. To these periodic contents, further articles on specific technical-specialized topics will be added. In the **News from SCI-CO+** column, the progress achieved by the SCI-CO+ Consortium will be presented. In this first issue, the column has been dedicated to an in-depth analysis of the fundamentals on which the SCI-CO+ Project is based and its main general results. Finally, the **Events** column will advertise the main initiatives (conferences, exhibitions, reviews, seminars) planned "in Europe and in the world" in the reference quarter.

The authors will be both representatives of the organizations of the SCI-CO+ Partnership and experts and technicians in the sector external to SCI-CO+ Consortium. We have chosen to address this opening issue to the organisations that make up the rich SCI-CO+ partnership and to the experiences they have developed in the field of innovation in recent years, so the authors of this issue are all members of these organisations and these articles deal with both the results of the early research phases carried out by the Project, and experiences and good practices of sector Partners.

This magazine has a further important purpose: to grow around the SCI-CO+ Project a community of practice and knowledge that can support over the years, through comparison and dialogue, not only innovation in science and technology communication but also bring the younger generations and, in particular, women, closer to education and technical-scientific training and to the professions in the sector. We hope that our readers will help us achieve this challenging goal by providing their contribution by subscribing to the specialized areas of the "Services" section of the portal at www.scicoplus.org. In the portal a special section is dedicated to this Magazine in which readers can enjoy the digital version with the support of a series of full text services in all issues published and any additional digital content.

Happy reading!

Riccardo Villari is President of the Fondazione IDIS-Città della Scienza.

The innovation gym as a science factory

by Alfonso Molina and Mirta Michilli

Until a decade ago, associating the rigour of the scientific method with digital fabrication was almost unthinkable. Today, however, there are more and more popular events open to the public, as well as challenges and contests, involving researchers, scientists, innovators, creatives and makers in joint activities. The time when digital artisans were regarded as 'garage geeks', roboticists or just hobbyists seems long gone. The culture of makers and open innovation has now taken root and borne widespread fruit in different environments, contaminating even the 'ivory towers' of research. Several factors have played a role in this change of perspective, starting with the undoubted fascination that maker culture has for those with a democratic vision of knowledge as a common good to be shared with all. Another important contribution has been made by international events such as the Maker Faire, which have brought digital manufacturing and scientific laboratories together under the common denominator of creative innovation. But perhaps the most 'disruptive' and revolutionary aspect, as we say today for innovative technologies, is the one that has involved education thanks to the new digital environments created in schools or the fab labs open to the country. A transformation that we have experienced first-hand in the Innovation Gym in Rome and in the various digital environments on the Net, increasingly inhabited by researchers and scientists, who are experimenting with a new way of 'doing' dissemination with their hands in digital manufacturing. A now mature model, with applications from physics to genetics, which is progressively entering curricular teaching especially through the Pathways for Transversal Skills and Vocation Training.

THE INNOVATION GYM MODEL

The Phyrtual Innovation Gym is a phyrtual environment, physical and virtual, for innovation and education for life, experiential learning and the practice of innovation in all its expressions: technological, social and civic. It is an open space to practice 21st century skills, from entrepreneurship to professional growth. The first Innovation Gym, located at 102 Via del Quadraro, in the capital's Tuscolano district, was established in 2014 and is currently composed of several spaces (Game Lab, Immersive Lab, Video Lab, etc., including a fab lab built according to the MIT's Centre for Bits and Atoms). Configurable, evolutionary, inclusive and bottom-up: gyms, starting from the model created in Rome by the Fondazione Mondo Digitale, can be created in every school, open to country and citizens, to align education and training to the challenges of the 21st century. A bottom-up Gymnasia of Innovation movement thus enables schools to share their knowledge, experience and resources, involving different actors (universities, companies, associations, institutions, etc.), so that everyone has an active and proactive role in this process. Activities for schools (making, coding, robotics, etc.), afternoon workshops with tutoring for more autonomous teenagers (e.g. self-building of low-cost 3D printers), as well as training for teachers (FMD is a Ministry of Education accredited body) and original workshops for families are organised in the new spaces. Over time, the Innovation Gyms have also turned out to be extraordinary factories of science dissemination, where one learns to 'do' science, in the sense of makers, i.e. with their hands in digital manufacturing. Here are some experiences, very different from each other, realised over time in the digital fabrication laboratory of the Innovation Gym in Rome.

SCIENCE ILLUMINATES

Opened to the public on the occasion of the International Year of Light (2015) by the Physics Department of the Sapienza University of Rome, 'Science Illuminates' is "the first and only exhibition to have been conceived entirely by makers and non-professionals". The showcases of the 'works' on display and some interactive installations were made with numerically controlled machinery [https://www.phys.uniroma1.it/fisica/la-scienza-illumina].

THE EARTHQUAKE MACHINE

During Seismology Week (2016), the interactive labs in schools in Rome, L'Aquila and Amatrice (epicentre of the magnitude 6.0 quake in central Italy) experimented the 'Máquina de Terremotos', designed by Prof. Jaime Campos of the University of Chile and made by makers at the Innovation Gym Lab. The students simulated the telluric dynamics that occur in the event of an earthquake.

PHYSICS SCHOOL WITH ARDUINO AND SMARTPHONES

Various types of experiments can be performed: the motion of a heavy body on an inclined plane, measuring the charge and discharge of a capacitor, studying the propagation of heat along a rod, studying the attainment of thermal equilibrium as a function of time, experimentally verifying Ohm's second law, studying non-inertial reference systems, etc. In four editions of the School of Physics with Arduino and Smartphone (from 2016 to 2020), physics teachers learnt how to make incredibly precise and accurate measurements with an Arduino board, a few sensors and a smartphone, without the need for expensive and complex equipment. The various editions of the School are documented on the website of the Physics Department of the Sapienza University of Rome, thanks to the work of Professor Giovanni Organtini [https://www.phys.uniroma1.it/fisica/Arduino-Smartphone-Esperimenti].

A SELF-BUILT THERMAL CYCLER

With BioMaking Summer School (2018), in collaboration with the Golinelli Foundation, students were familiarised with laboratory techniques and notions of biology and genetics. It was a unique opportunity to experience innovative genetics techniques, used in the most advanced research laboratories internationally, and to build one of the tools that revolutionised genetics, the thermocycler.

A PONCHO GROWN IN THE FAB LAB

Argentinean designer and bio-materials researcher Lara Campos completed her Be-Grounded project, a kit for growing plants on textiles, in the very fab lab of the Innovation Gym. The result, presented at Fashion Digital Night 2020 in the Biomaterial category, is a poncho grown inside a greenhouse installed in the fab lab. The idea brought by the young designer is that of Nature as a material to wear, with specific beneficial and curative properties for common ailments, from anxiety to stress.

WAVES AND BLACK HOLES

What does a gravitational wave look like? Researchers from Sapienza University of Rome and the National Institute of Nuclear Physics (Infn) worked together with makers to create some artefacts on waves and black holes for the "Build your own gravitational wave" exhibition, within the Researchers' Night organised by the Science Together network at the Città dell'Altra Economia in Rome (2021).

Thanks to the Smart & Heart Rome programme, promoted with Roma Capitale, Innovation Gyms are also being set up in schools in Rome's suburbs. And in the Tor Bella Monaca neighbourhood of Rome, the first drone flying field in an Italian school dedicated to the challenge of environmental sustainability is active. Students from the Amaldi high school, with the help of researchers from the Tor Vergata University's Engineering Department, have learnt to programme and use swarms of drones for environmental detection. Their Aratrum Rover project participated in the RomeCup 2023 creative contests, winning second place in the Agrobot category.

We are convinced that the dissemination of science is much more effective if it is enriched by the experiential dimension, both for communicators and for the public who become participants.

Alfonso Molina is personal chair in Technology Strategy at the University of Edinburgh and scientific director of the Fondazione Mondo Digitale.

Mirta Michilli is the general director of Fondazione Mondo Digitale.

Chemistry goes digital

by Anna Gunnarsson

The concept cook-along has been used in many ways before, but not so often when it comes to chemistry. In Green in the Lab, two children, a green dragon, and a teacher join forces to spread fun chemistry to our youngest chemists, aged 4-8. It is all accessible on Youtube (https://www.youtube.com/@bertadrake7328) and can be used in any corner of the world. The activity is aimed at both children and teachers and will support all the fun that can happen in chemistry for a young audience. In this article we will share the structure of a lesson, how this project was born in NAVET, the Science Center of the Boras Region in Sweden, and how we have faced the limits created by the Pandemic beginning in 2020.

Before the experiment session can begin, the teacher of the children has access to online videos and other practical resources that contain all the information needed for preparations: for example what liquids, powders, containers and such will be needed for the experiment. The video also contains tips and tricks directed to the teacher, in order to prepare them well for the experiment session coming up. Teachers can also book an online preparation session with Navet if they want to make sure that everything is prepared properly in order to succeed.

For the youngest, it is crucial that the chemistry experiments are on the right level. The children must quickly be fascinated and invited so that they feel the urge to do it themselves. Strong colors that change, bubbling liquids, and clarity over all are success factors. For small children, it is not effectivefor an adult to say: «If you look really closely, you might see a small bubble»; everything must be visible to a young eye. With Berta the Dragon in Green in the lab, the children get to experience a varied exploration of the unexpected. The chemistry is challenging but not difficult - and doing chemistry with a green dragon includes laughter and engagement, even when it is done online. Many children remember the activities long after the experience itself and continue to use the language used; words such as fart-juice (red cabbage juice) and carbon dioxide have become understandable AND fun.

The experimental material is carefully selected so that it fits small and eager hands and is easy to find when the local teacher has to gather the equipment for the chemistry cook-along. The children appreciate using materials specifically associated with chemistry, such as pipettes and test tubes if they are at hand when preparing, but these are not a prerequisite for the activities. It is more important that everything fits a small hand that can, after only a few attempts, succeed in doing the experiments.

SUCCEEDING IN CHEMISTRY at a young age gives a sense of competence in natural sciences that can follow the children later in life.

This has to be made possible using digital resources too. If we do not succeed in this we will not give children equal opportunities to experience science, particularly if they have limited opportunities to visit a science center or similar facility for science activities. Studies conducted by researchers at King's College in London in the field of science capital show that if young people are given the opportunity to understand and experience science throughout their lives in many different ways, the likelihood that they will retain an interest after the age of 16 increases. This also makes it more likely that they will choose the area for their profession as well. And we need more people who know better chemistry (and Science) all over the world!

WHEN CHILDREN EXPERIMENT with others of the same age, they explore together.

«How did you do that?» is a common question for the friend who sits close by and has just succeeded in making it bubble or change color. When participating in Green in the lab activities, children are encouraged, in a cook-along manner, to take an active part in everything. Berta likes to remind children and teachers of chemistry expressions and concepts during the experiments, for example «how much gas have you got in your bag?» and «did you see how that air-filled soap bubble can float on carbon dioxide?». Talking out loud about the concepts of chemistry in Green in the Lab will eventually make children pick up the meaning of the words, while the pronunciation is rarely a problem. Four-year-olds who can easily pronounce the names of different dinosaurs and all the characters of Pokémon will have no problems with chemistry vocabulary!

ENTHUSIASTIC AND KNOWLEDGEABLE TEACHERS might be the most important factor when wanting to succeed in chemistry for the youngest.

Activities must take place in a safe way, with materials that are easy to find, are well-known and easy to use. This is even more important when teachers are encouraged to take part in a preparatory activity carried out online, as they might not have the experience of making changes to materials on their own. When we are aiming to create activities that show that it is possible to do fun and joyful chemistry in a simple way – this must also be true for the teachers. If it is not – then there is a huge risk that they will never take part again and might even influence the children negatively. Research shows that competence development in the field of chemistry is necessary for educators to feel confident in leading chemistry activities. This can either be carried out digitally or in person, but has to be done in a professional way - in a confident teacher to teacher manner.

Since chemistry made its way into both the Swedish curriculum for pre-school and the first years of primary school, many teachers have asked themselves how exactly chemistry curricula should be designed and carried out. Many of the pre-school teachers and primary school teachers never learned chemistry when studying, and they often find it complicated and difficult even to get started. Support is needed, and to use digital resources for that support does open up possibilities for many more than those able to come to a science center. Digital chemistry-support works from anywhere in the world!

CHILDREN TODAY should have the opportunity to do chemistry in both preschool and school. We should always start early and simply and then gradually increase the degree of difficulty and level of abstraction. When this is done in an equal way for all children, with or without using digital resources, we lay the foundation for the possibility that more people will choose chemistry as a profession and that more citizens have a basic understanding of the chemistry that exists around them. But how do we get there? Green in the lab for the youngest is a small piece of the puzzle in this big challenge. Hopefully the possibilities of using a mix of real world and online/digital learning will give more and more opportunities to our young and their teachers to explore science together in a playful way. Participating in Green in the lab activities may be a part of that journey.

Anna Gunnarsson, cocreatrice del Drago Berta, è insegnante, project manager e sviluppatrice presso il centro scientifico Navet di Borås, in Svezia.

To find out about the many initiatives implemented by Navet, we invite you to visit our portal at www.navet.com. To learn more about the Green in the lab project, we refer you to the Berta's YouTube channel. (https://www.youtube.com/@bertadrake7328).

SPECIAL

CITTÀ DELLA SCIENZA BETWEEN TRADITION AND INNOVATION

by Luigi Amodio and Alessandra Drioli

La The Idis-Città della Scienza Foundation is a nonprofit institution established in 1987 on the initiative of a number of scientists, personalities from the cultural and scientific world, and public and private institutions. Its mission is to enhance scientific culture and innovation for the economic and social development of the territory, in Italy and Europe. Central to its strategy is the theme of the "knowledge society" and the widespread use of innovation to improve people's quality of life and promote sustainable development for future generations and greater social cohesion. After launching its activities with the science festival Futuro Remoto, the Idis Foundation gave birth to Città della Scienza, a science hub located in Bagnoli, west of Naples. It integrates different functions in one place, with the aim of increasing scientific citizenship for people of all ages, to improve the social and cultural environment and promote innovation processes for the development of the territory.

With the support of new technologies, the closure of exhibition areas and related programs during Covid-19 led to the development of new forms of science communication and digital activities that can reach visitors at home.

Therefore, the aim of the SciCo+ project is to share these experiences with different European countries and to promote new paradigms in science communication, looking at online programs with the related need to increase the capacity of professionals and organizations.

FROM REMOTE FUTURE TO CITTÀ DELLA SCIENZA

The Idis Foundation was founded with the Futuro Remoto science festival in 1987. Among the first in Europe, the main purpose of the festival was to respond to the need to create a dialogue between science and society through the promotion and socialization of scientific knowledge and its technological applications. The title of the festival, Futuro Remoto, a journey between science and science fiction, is very significant and reflects the purpose of the event, which is to transport visitors into the future of science and technology and show them how research impacts many areas of our society. In its 37 years of existence, Futuro Remoto has contributed significantly to bringing generations of students, young professionals and ordinary people closer to science and technological innovation. In recent events, Futuro Remoto has expanded its practices and activities, thanks to the contribution of numerous scientific partners, universities and research centers. The impact of the pandemic in 2020 marked a further turning point by mandating the use of digital media. Thus, Futuro Remoto became a physical and virtual agora with exhibitions, workshops, demonstrations and events, a kind of large "knowledge exhibition."

With the premise of Futuro Remoto, the Città della Scienza project was born in the 1990s as part of a model of urban regeneration of the Bagnoli industrial area in western Naples. It is part of the regional strategy to create a new model of competitive and sustainable development based on research and innovation, capable of attracting talent, investment and innovative companies to Italy.

The heart of its activities is to facilitate access to knowledge for people of all ages, social and cultural backgrounds, to transform research results into business and innovation, and encourage open innovation processes among research centers, universities and industries.

Città della Scienza brings all activities together in one place. Spread over an area of about 70,000 square meters, it includes a Science Centre; a Business Innovation Centre; a FabLab and a Conference Center.

THE SCIENCE CENTER, TO STIMULATE CURIOSITY AND SUPPORT STEAM EDUCATION.

The Science Center at Città della Scienza, following the traditions of science centers around the world, is a place for experimentation, learning, meeting and building a constructive dialogue with science and technology,

The main programs currently consist of:

- *Corporea,* the Museum of the Human Body with interactive exhibits, immersive videos, virtual reality experiences and multimedia to explore the human machine in all its complexity.
- *Planetarium,* a 3D projection facility to present educational and entertaining shows on astronomy and the night sky.
- *Science laboratories* to support the teaching of STEAM disciplines, with inquiry-based learning approaches and making full use of digital technologies.

The goal of the Science Center is to inspire a passion for science and innovation among the younger generation and to engage the general public in scientific reasoning about current social issues and technological advances. Città della Scienza is one of three science museums in Italy funded by a national law for science communication and education from the Ministry of University and Research.

THE BUSINESS INNOVATION CENTER, TO FOSTER INNOVATION AND ENTREPRENEURSHIP.

The Business Innovation Center is designed as a hub to foster the acceleration of innovation and entrepreneurship in the knowledge economy, with the aim of contributing to the development of the metropolitan city of Naples and the region. The main activities offer innovators value-added services to support the growth of innovative ideas, business incubation and acceleration, internationalization solutions and their involvement in international projects. The incubator is managed by a specific company, Campania NewSteel, in which Fondazione Idis and University of Naples Federico II have a stake. Today it houses 40 startups, spin-offs and re-startups in promising sectors of the regional economy.

Today the Business Innovation Center is implementing a regional strategic project "Manifattur@ Campania Industria 4.0" with the aim of contributing to the 4.0 transition of the regional production system, particularly SMEs. The main objectives of the project are to qualify the supply with knowledge-intensive services, strengthen the capacity of SMEs with digital technologies and foster the connection between the research and business systems in order to create a virtuous dynamism of co-design and collaboration within the new paradigms of the 4.0 transition.

OPEN ACCESS TO DIGITAL MANUFACTURING

D.RE.A.M.-Design and REsearch in Advanced Manufacturing - is a large laboratory and testing center dedicated to new digital manufacturing technologies in production processes, open to young creatives, engineers, artisans, scientists, associations and the local community. It is an open-source collaborative platform with professional and technologically advanced machinery covering a broad spectrum of rapid prototype processing. The services and facilities cover five lines of activity: prototyping, reverse engineering, design, prototyping and communication.

The expected result is to push the laboratory to fit into the local business, craft and artistic environment, to connect with specific manufacturing sectors or innovative districts with strong research capabilities, such as aeronautics and shipbuilding or biomedical applications.

INTERNATIONAL COOPERATION

Idis Foundation is recognized as an "NGO in official relationship with UNESCO," and an active member of several international professional networks, such as ECSITE – the European network of Science Centers and Science Museums, EBN – European Business Innovation Network, and ICOM–International Council of Museums.

The international perspective looks at exchanging practices with other science centers around the world, the development of transnational cooperation projects with the aim of enhancing the field of science communication and strengthening and promoting the capacity building of the professional community locally and globally.

Among the most relevant cooperation projects, the Idis Foundation developed in collaboration with Al Quds University a science diplomacy project in the Middle East for the establishment of a science center in Palestine. Meetmath, a large traveling exhibition on mathematics, was created thanks to the contributions of Italian, Palestinian and Israeli mathematicians, curators and educators. Today, 15 years after its creation, the exhibition is still on display at the Al Quds Campus in East Jerusalem with tours for students, teachers and the general public.

Another case in point is the organization of a science festival in Nigeria in the city of Owerri with the collaboration of the Pontifical Council for Culture, university student associations and local universities in Imo State. A training program was first organized in Naples for twelve Nigerian graduate students. Subsequently, an interactive physics exhibit was produced and installed during the science festival in Owerri as the first nucleus of the Owerri Science Centre within the university.

The third case is the Euro-Mediterranean and Middle East Summer School, a training program for mid-professional staff aimed at strengthening and developing their operational capacities, especially in regions with less experienced organizations and few Science Centers. The program, held every two years, was promoted with the two networks, ECSITE and NAMES, and a group of Science Centers with experts in exhibition design, educational programs, and museum management. The 2017 edition was organized at Città della Scienza for a group of 20 people from Portugal, Italy, Kuwait, Egypt, Libya, Tunisia, Jordan, and Palestine.

Finally, the Idis Foundation led the design and production of traveling exhibitions to promote Italian research and innovation abroad. One of the most significant initiatives was the exhibition "Italy the Beauty of Knowledge," which recounts the Italian spirit in innovation processes and presents some results of recent research in different fields: Aerospace, Agribusiness, Cultural Heritage, Health, Environment. The exhibition was promoted by the Ministry of Foreign Affairs together with the National Research Council and other Italian museums. It touched several continents in a Tour organized in collaboration with the Italian embassies in Alexandria, New Delhi, Singapore, Jakarta, Hanoi, Canton, and Buenos Aires.

DEVELOPING ONLINE SCIENCE COMMUNICATION ACTIVITIES ON AN INTERNATIONAL SCALE

The 2020 edition of Futuro Remoto (Nov. 20-29) shifted totally from in-person format to online activities due to strong restrictions adopted by governments to prevent the spread of SARS-Cov-2 in public spaces. The idea was to keep the interactive formats of the festival alive as much as possible through connections with researchers in labs and new communication practices. It was also an opportunity for the festival to easily connect internationally with extraordinary and remote places and big-name scientists, as well as to raise awareness of the critical importance of international research cooperation in addressing global challenges.

Over the past 3 years, the festival has featured about 60 international events, ranging from connections to major research infrastructures (CERN, Concordia Antarctic Station, Italy's Arctic Dirigible Station, Cherenkov Telescope Array Observatory and Galileo National Telescope in the Canary Islands, SESAME-synchrotron light for experimental science and applications in the Middle East) to virtual tours of science museums (Universum in Mexico City, Musée des Confluences in Lyon, Deutsches Museum in Munich), science laboratories (Tinkering Studio at the Exploratorium, Astronaut lab at 'la Cité des l'Espace), and numerous conversations with Italian scientists abroad, as well as Talks with prominent speakers such as 2011 Nobel Laureate Saul Perlmutter and writer David Leawitt.

This set of activities has led to new science communication practices with interesting results for the entire field by testing the plurality of digital technologies in science public engagement and better integrating the international dimension in research dissemination. These results will be shared with SciCo+ project partner institutions to foster the exchange of practices, considerations, and guidelines for their dissemination within the community of Science Centers and science communication organizations at the European level.

Luigi Amodio is the Director of the Science Centre of the Città della Scienza

Alessandra Drioli is the head of the Science Centre of the Città della Scienza

Professional profiles within science communication organisations

Summary of the research results on Professional ProÞles Operating in the Field of Science and Technology Communication

by Aoife Taylor and Laura Bell

The way society engages with science is changing: physical interactions and spaces are shifting into the digital sphere[1]. Institutions such as science museums and science centres, which usually reach audiences with face-to-face engagement, must now question how they can continue to provide impactful experiences in light of this transition.

Transforming such experiences to a digital setting is a complex process, which involves a variety of methods, resources, and actors. The SCI-CO+ project hopes to assist science centres and museums in these endeavours by developing a set of methodologies and techniques that will allow for the seamless translation of activities from in person to the digital sphere. This is the e-SciCo model, which may be adapted by SciCo professionals to fit the diverse contexts of their own science museums and science centres. The SCI-CO+ project has idealised three new professional profiles that describe the skills, qualifications, and tasks required to implement different aspects of the model, which will also be used as the basis for designing specialised training modules for graduate students.

But to further develop these profiles and their associated trainings, it is vital to understand how they fit within the current landscape, the needs that they must fill within the frameworks of science centres and science museums, and the skills required to meet these needs. To build this understanding, the team at Trinity College Dublin investigated the state of the art through a mix of desk and field research. This resulted in a report titled: Analysis of the Professional Profiles Operating in the Field of Science and Technology Communication. In this article, we will provide a brief overview of the findings from this report, and its consequences for the next steps of the SCI-CO+ project.

INVESTIGATING THE CURRENT LANDSCAPE

In recent years, the European Commission has placed significant importance on understanding the current state of science communication and its role in mediating the relationship between science and society. Between 2018 and 2020, the funding call "SwafS-19: Taking Stock and Re-Examining the Role of Science Communication" distributed nearly €10 million in funding to eight research projects. This call specifically highlighted the need for a response to the changes brought about by digitalisation and identified science museums and centres as key territories for research and innovation[2].

Three relevant SwafS-19 projects were explored during this research on professional profiles: RETHINK, QUEST and ParCos. While each took stock of different aspects of the field, each identified the importance of reaching diverse audiences and stakeholders, as well as the effectiveness of employing digital activities – whether these are based in the virtual realm or the physical – using innovative and arts-based approaches involving technology, in reaching and engaging with target groups[3]. Looking towards current digital maturity in museums in general, the UK-US led One-by-One Initiative is an ongoing multi-partner international initiative dedicated to improving digital literacy at all levels in the museum sector. These mentioned projects and resources demonstrate the work already being done in this sector in understanding the effect of digitalisation on science communication as a field and provide a foundation for the creation of relevant and impactful professional profiles that will serve it.

To make use of the knowledge, practice, and institutional diversity of the SCI-CO+ con-

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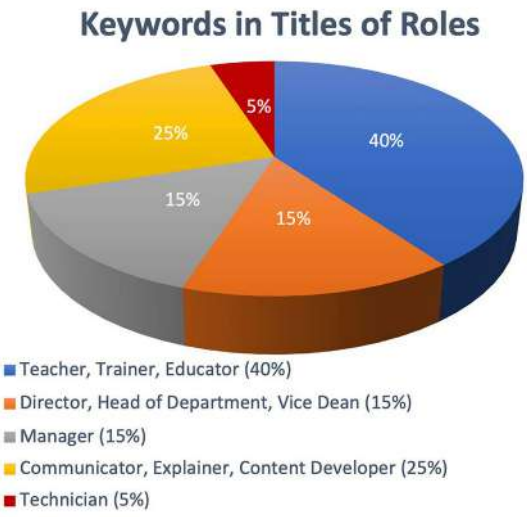
sortium, as well as the range of professionals therein, each project partner was asked to fill out questionnaires capturing the roles present in their own organisations that carry out science communication. The questionnaire asked a mix of open and closed questions, from quantitative information about the role to thoughts on how this role may change in the future. A full overview of the results can be found in the final report; however, several important insights were identified.

FINDINGS AND CONSEQUENCES

The results from the investigation into the current landscape of digital roles within science communication left lots to consider for the development of the professional profiles and their associated trainings.

One main question raised was whether these profiles should occupy full-time roles dedicated to the implementation of the e-SciCo model, or rather delegated as additional responsibilities to those already existing roles that overlap in tasks and skills. The One-by-One initiative reported that in general, larger museums have the resources to dedicate full time digital roles, but smaller museums do often not have the capacity for this and see work and training in the digital sphere as an additional task to already established roles[4]. From the questionnaire, it is evident that profiles with a focus on managerial tasks are very much present across many different institutions involved in science communication, with most actors carrying out this role in a full-time capacity. The results also indicated a demand for 'teachers' and 'educators' across organisations, and highlighted the importance of storytelling, content creation, and technical skills, though roles involving these latter skills tended to be part time or contractual. SciCo+ methodologies and techniques could be effective as a means of 'upskilling' existing professionals in an integrated way. This information will inform how the trainings of the professional profiles are structured and offered.

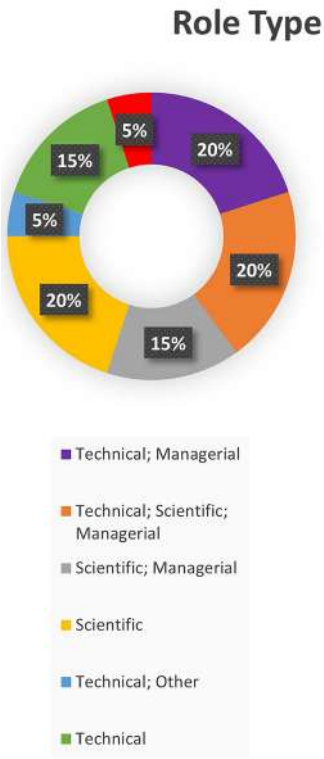


Another aspect highlighted was that engagement at museums is changing. It was reported in one questionnaire that since the Covid-19 pandemic, some audiences no longer wish to take part in face-to-face engagement with explainers at science centres and museums, and instead prefer to explore the institutions alone. Many activities were shifted online during the pandemic period, and this is expected by many to remain the norm, especially as it is much easier to reach more diverse audiences and stakeholders virtually. Yet the QUEST project raised the concern that the potential use of technology is causing exhibits to veer into 'entertainment' and away from 'education.'[5] Therefore, it is essential that science centres and museums have the means to successfully conduct activities online in the digital sphere, perhaps using virtual exhibition spaces, to account for the changing nature of engagement, but this transition must be handled with care to protect the integrity of the educational experience.

With the organisations surveyed echoing the belief that a digital transition is inevitable, increased digital literacy and opportunities for professional development at the individual and institutional levels are more crucial than ever. Training resources must be contextually adaptable as the professional profiles in the field continue to evolve[6].

WHAT'S NEXT?

Using the findings of this investigation, the SCI-CO+ project must now adapt initial ideas of the professional profiles and their associated trainings to ensure they accurately fit within the science communication landscape of science centres and science museums. With many organisations already beginning translation from real-life activities to digital, the definition of professional profiles will allow such institutions to assess their current capacity to successfully achieve these translations, and the areas where the e-SciCo model can assist.



SCIENCE COMMUNICATION IN THE DIGITAL AGE

EXPERIENCES OF THE SCI-CO+ CONSORTIUM

by Dario De Notaris and Rosanna Marino

As a result of the Sars-Cov-2 pandemic, the need for information and knowledge has exponentially increased at both the European and global levels, as well as the demand for easily and immediately accessible technological resources. The pandemic has highlighted the necessity of rethinking the relationship between science communication and digital transformation, starting from one of the major limitations in the field of Science Communication, which is the tendency to prioritize solutions that favor analog and "in-person" forms of engagement over those mediated by digital technologies that provide remote modes of access.

In the last two decades, during the progressive evolution of Web 2.0 and Web 3.0, technologies such as smartphones, social media, online platforms, virtual and immersive environments, artificial intelligence - just to name a few examples - have become the most widespread digital technologies through which millions of people, especially young individuals, access content, information, and culture in a broader sense. These technologies are also how they work, study, play, build relationships, and entertain themselves. They significantly influence the modes of production, distribution, and consumption of cultural content, including communication styles, formats, techniques, and models. Scientific communication is not exempt from these transformations, which have been accelerated by the pandemic. Instead, it faces challenges in adapting to a "new normal" increasingly mediated by the digital and online dimension.

Within the context of these dynamics, the Sci-Co+ High Professional Skills for Advanced Science Communication project aims to identify an innovative model of science communication based on the use of the most advanced solutions offered by information and communication technologies (ICT), especially those of Web 2.0 and Web 3.0. The goal is to conceive, design, develop, and implement "advanced" scientific communication experiences and related application methodologies.

To this end, as part of the project, an initial step was the exploration and description of the "state of the art" in scientific communication concerning the use of digital technologies. One of the first steps in this investigation was the identification and analysis of the real-world experiences of members of the SCI-CO+ Partnership. This partnership consists of universities, science centers, and organizations that, in various capacities, operate in the European field of science, technology, and digital transformation .

The exploratory research conducted by the team at the University of Naples Federico II, led by Prof. Raffaele Savonardo, was based on the analysis of 24 case studies. These case studies represented practices in science and technology communication by the partner organizations of SCI-CO+. The goal of this research was to provide an initial overview of the communication methods used in the field of science, particularly in terms of science dissemination and socialization. Specifically, the research aimed to highlight the following aspects: the content presented, the tools employed, the areas of intervention, the target audiences, challenges, and best practices.

This investigation allowed for an initial assessment of the activities within the partnership and will serve as the empirical and knowledge foundation for the development of project actions. These actions are particularly focused on creating an innovative model of science communication called e-SciCo, along with its application methodologies. Additionally, the research will help identify advanced professional profiles within the field of science communication, driven by the processes initiated by the digital transition in the post-COVID era. The research, based on a qualitative methodology, involved the selection, collection, and analysis of the 24 aforementioned case studies using a content analysis form. This form was designed to capture the following indicators:

a) Promoting entity (university, science center, organization);

b) Case study demographics (product title, web link, release date);

c) Description and objectives (product details);

d) Impact (potential social, economic, and commercial benefits);

e) SWOT analysis (Strengths, Weaknesses, Opportunities, Threats);

f) Type of technology used (website, video, document, audio, app, virtual reality experience, augmented reality, mixed reality);

g) Target audience and language (target groups);

h) Funding and costs.

The research unfolded in three phases: in the first phase, the data collection tool (template) was developed and validated based on the theoretical framework and a literature review of the study's topics; in the second phase, the template was administered to the partners of the SCI-CO+ project to gather the most significant digital science communication experiences of each partner; in the third phase, a qualitative analysis of the empirical material was conducted, and the results were elaborated descriptively based on the selected indicators.
To effectively and systematically present the main findings, here is a summary of the most relevant results, taking into account the differences among the three types of actors involved: Universities, Science Centers, and Science Museums, and other organizations.

In general, from the study of the investigated cases, it emerges that thanks to processes of cross-media and transmedia technological convergence, the partners of the SCI-CO+ Project employ a variety of tools and technologies to connect the public with science and vice versa. These include websites, videos, games, apps, online courses, interactive experiences both onsite and online, 2D and 3D virtual environments, virtual reality experiences (VR), augmented reality (AR), mixed reality (XR), and holograms. These digital tools complement the traditional educational and participatory pathways of in-person scientific communication, such as exhibitions, festivals, training events, dissemination, networking, workshops, as well as informative documentation. However, it is possible to identify further specificities depending on the promoting entities of the investigated initiatives.
In the case of universities, activities exclusively dedicated to science communication are primarily directed towards the scientific community and professionals, such as researchers, science communication experts, and scientific institutions. However, initiatives involving students and civil society are not lacking. The main areas of application for these initiatives are research, education, dissemination, and internationalization. The primary sources of funding for science communication activities in academia come from European programs and national and local public institutions. Among the main challenges are bureaucratic and administrative difficulties and the lack of specialized personnel for managing projects focused on science communication, as well as fundraising efforts.
In the case of Science Museums and Science Centers, on the other hand, science communication, dissemination, and socialization initiatives represent their core activities. Science museums target a very broad audience, encompassing civil society as a whole, but particularly focus on the world of education. They engage students of all levels, teachers, and families with the primary goal of spreading scientific and technological culture throughout society. In this case as well, the primary sources of funding mostly come from national public institutions, primarily the Ministries of Education and Public Instruction. According to operators of the investigated Science Centers, the main challenges for the success of science communication initiatives are multidimensional in nature and primarily stem from the complexity and constraints of technological systems, the limited interactivity of some technical solutions, and the involvement and active participation of interested target audiences.
Finally, among the other organizations within the partnership, which are involved in various ways in the field of science and technology, there is a greater openness to the world of businesses, innovative start-ups, stakeholders, and scientists. These organizations also target young audiences and groups characterized by educational poverty and social marginalization. In fact, the science communication initiatives proposed by these entities are geared towards promoting networking, education, social inclusion, and the dissemination of scientific and technological culture. These organizations receive funding from both private and public sources, primarily from European and national programs. However, they often struggle to secure sponsorships and partnerships in the corporate world.

This brief overview, certainly not exhaustive, ultimately highlights that in developing an advanced science communication model capable of addressing the challenges of digital transformation in the post-COVID era, several key elements must be taken into account. These include: integration and interoperability among existing technological systems; the use of interactive and participatory technologies to engage audiences interested in scientific topics; the design of new phygital (physical and digital) communication experiences, which integrate analog and digital, real and virtual, hardware and software, offline and online elements; the emergence of new professional profiles capable of managing the digital transition. This is the challenge that Sci-Co+ is taking on.

The Digital Mermaid", experience on the use of holography in museum communication (https://www.youtube.com/watch?v=TudGWpa9Hk0&t=86s)

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AN OVERVIEW

by Giuseppe D'Angelo

AIMS, OBJECTIVES AND RESULTS OF AN INNOVATIVE PROJECT IN SCIENCE COMMUNICATION

The foundations on which the development of the SCI-CO+ Project has been implanted are presented. Starting from the reference scenario and the needs identified, the priorities and themes addressed, and the expected results are described.

SCENARIO AND NEEDS

As a result of the Sars-Cov-2 pandemic, the need for easily and immediately accessible resources for production, information and knowledge has increased exponentially, worldwide and, above all, at European level. In addition to the general areas of work and education, the effects of the Pandemic have manifested themselves strongly in the area of communication of cultural heritage and knowledge, which includes the sector of Science Communication (SciCo).

Perhaps, the biggest limitation manifested by the SciCo sector was that of not being able to make available, even partially, in virtual and remote contexts its communication solutions. This limit has not been determined by a structural deficiency of the sector, because with the evolution of ICT also the Science Museums (MS) and the Science Centres (SC) have evolved in terms of quality and technological richness of their Installations, but for their prerogative to rely on "physical places" of relationship with their users, in particular: citizens and, above all, students. Obviously this prerogative is not a criticality in itself, on the contrary: it is quite clear that the sectors that are based on "representation" have their specificity precisely in being real places where the interaction between "installation" and "public" must be as active and direct as possible (the SC have evolved over time precisely to make the phenomena of science and technology increasingly alive matter, experienceable, "touchable"). The critical issue lies in the fact that the majority of SMs and SCs lacked the possibility to "transport" at distance their extraordinary ability to communicate in presence. This difficulty of adapting to the production and digital transmission of knowledge has been experienced, since the late 80s, also by the wide area of education and training; this was due to the structural limits of schools, universities and professional training institutions to make the transition to e-Learning technologies, which were certainly complex at the time but today, instead, absolutely mature and widely applied thanks to twenty years of ad hoc experiments and developments..

The SciCo sector needs to make the same cultural and technological leap.

The realization of MS and SC that are in whole or in part usable in a virtual context requires, first of all, a different way of "thinking" about SciCo and, immediately after, the identification of innovative methodologies and techniques and, therefore, skills to design and implement digital experiences of science communication. Instead, we had this transition process in Scientific Fiction (SciFi), which introduced methodological and technological innovations in "science fiction cinema and science documentaries", providing authors, screenwriters, directors of this type of movies, enormous possibilities to represent and tell the future and to tell science. Obviously in the case of SciFi the advantage was to start from a type of communication in which users are simply "spectators".

Even before posing problems of an economic nature, "thinking" in an advanced way about the process of scientific communication means substantially adapting the knowledge and skills of the sector. To transport into a virtual world experiences of material reality, a process that goes precisely by the name of Digital Transition, it is necessary to assume, within the organizations of the sector, a different approach to SciCo. New paradigms, models, methods, techniques and, with them, new professional skills for the "Advanced" Communication of Science (SciCo+) are necessary to become "accessible and consolidated practice" not only in the SciCo sector but also in adjacent sectors, such as Training and Education sector and in University sector, with their respective missions in the field of teaching-learning of science and scientific and technological dissemination.

THE ANSWER OF SCI-CO+

The SCI-CO+ project, funded by the Erasmus+ Programme to a partnership of eight organisations from five European countries (Ireland, Italy, Portugal, Romania and Sweden) was created to respond to these structural needs with a broad and integrated solution.
General information about the Project can be found in the portal at the address www.SciCoPlus.org from which a rich brochure can be downloaded. In this article, however, we will deepen the founding themes of the initiative.
The SCI-CO+ Project responds, in particular, to a specific horizontal priority of the Programme: *"addressing digital transformation with the development of digital readiness, resilience and capabilities".*
This priority was introduced in the critical period of the COVID-19 pandemic when it became clear that the definitive consolidation of the digital knowledge and skills for citizens, students, workers and organisations could no longer be postponed for European society. Implementing a broad process of Digital Transition has therefore become a "categorical imperative". Distance Learning and Smart-Working practices have assumed an absolute centrality, unimaginable until a few years ago.
SCI-CO+ fits into this context with an ambitious overall goal divided into three parts:

(1)) identify an innovative model of science communication (named "e-SciCo") based on the use of the most advanced solutions offered by ICT, in particular the Web 2.0 technologies, and introduce specific methodologies for the conception, design, development and implementation of "remote" scientific communication experiences based on this model;

(2) design new highly specialized professional profiles for the sector and sets of new skills for the updating of operators in the science communication sector, university scientific researchers and the teachers on STEM subjects;

(3) implement a technological-organizational system (called SCI-CO+ SYSTEM), to:
(a) disseminate the Sci-Co+ model;
(b) make accessible and usable all the products made by the Project;
(c) manage a large and active community of practice for training, cooperative work and professional sharing in the field of science communication.

MODELLO E METODI PER LA TRANSIZIONE

The Project is based on the most advanced paradigm that today characterizes the digital transition processes and that in the current language is identified by the "Smart" prefix (or, sometimes, by the suffix "+") which refers to the use of ICT applications of the so-called Web 2.0 – Augmented Reality, Virtual Reality, Holography, 3D Printing, Advanced Computer Graphics, Advanced Video Computing, Internet of Things.
Based on this paradigm, the Project will develop an Advanced Science Communication Model (e-SciCo), which will allow to classify all the knowledge, processes and strategies of a science communication based on the use of technologies of the Smart paradigm (+), as well as introduce a language contextual to facilitate its application. We want to emphasize that the e-SciCo Model will not exclude the "physical" dimension of scientific communication but will harmonize it within a general context in which the "virtual" and the "physical" dimensions can coexist within the same organization and the same communication processes. To make an analogy, let's think of the current SmartWorking practices in which the enabling technologies used by the workers allow an easy transferability of work practice from the "physical" dimension, face-to-face work in the office, to the "virtual" dimension, remote work.
To make the e-SciCo Model applicable, three specific **Operating Methodologies** will be developed. As is well known, starting from a given paradigm, each of its application models cannot be used unless suitable methodologies are identified that allow its use in the reference context. In our case these methodologies must allow the development of science communication initiatives, both in Museums of Science and in Science Centres.
In general, a science communication initiative includes a design phase, a storytelling phase, and an implementation phase of the installations necessary for that communication. In a "traditional" context, these three phases are well-defined and consolidated production processes, both for elementary installations and for complex and articulated initiatives. The SCI-CO+ Project will develop three similar Methodologies aimed at implementing SciCo+ initiatives. These three methodologies have been assigned the following names:

- eSciCo Design and Planning

- eSciCo Scripting

- eSciCo Development

They will be defined by identifying the set of knowledge, techniques, procedures, strategies, tools useful for the three phases of conception-design, storyboarding-narration and development-implementation.

SKILLS AND INNOVATIVE FIGURES

On the basis of these important theoretical and methodological foundations, the Project will face its second phase: the training phase. We must not forget that Erasmus+ is the European Union Programme in the fields of Education, Training, Youth and Sport.

Therefore, in the second phase the Project will work to transform the theoretical foundations and the methods and techniques developed on the basis of the Smart Paradigm in the first phase, into as many advanced professional skills. On the basis of an on-desk research process and an on-field operational survey involving representatives of stakeholders in the reference sectors, three **New Professional Figures** will be designed, named:

- Sci-Co Advanced System and Project Leader
- Expert in Authoring and Design of Advanced Sci-Co Materials
- Advanced Expert in Sci-Co Storytelling

These figures will be the "experts" in the application of the three methodologies of the e-SciCo Model. Each of them will cover the professional domain of one of the development phases of SciCo+ initiatives and will be developed on the basis of a specific set of indicators and a set of knowledge, competences and abilities, which will constitute its Skills. Of each of these figures we give a brief description below:

- *Sci-Co Advanced System and Project Leader,* medium-high level professional expert in the management of science communication Organizations, in particular Science Museums and Science Centres and in the conception, design and implementation of science communication initiative. They are competent in the development of an entire science and technology communication project, from the conception phase to the planning, development and implementation phases, based on the strategy of the e-SciCo Model and, in particular, of the eSciCo Design and Planning Methodology.

- *Expert in Authoring and Design of Advanced Sci-Co Materials*, tecnico medium-high technician expert in the design and development of environments and materials based on the application of the eSciCo Development Methodology.

- *Advanced Expert in Sci-Co Storytelling,* medium-high professional with a skill characterized by specific competences in the field of scripts and texts for scientific narration based on the innovations of the e-SciCo Model and, in particular, of the strategies and techniques made available by the eSciCo Scripting Methodology.

These profiles will be built through an action-research process with the involvement of the different categories of stakeholders in the Science Communication sector.

TRAINING AND UPDATING

For each of them, three *curricula of post-graduate master's* will be developed to train these professional figures:

- the curriculum of the Master for Sci-Co Advanced System and Project Leader will be aimed at graduates in Communication Disciplines,

- the curriculum of the Master for Expert in Authoring and Design of Advanced Sci-Co Materials will be aimed at graduates in Computer Science and Computer Engineering,

- the curriculum of the Master for Advanced Expert in Sci-Co Storytelling will be aimed at graduates in technical and scientific disciplines.

In addition, three professional upskilling courses will be developed for the people that already work in the field of science communication but also in the teaching of scientific and technological subjects in high school and in the scientific research. These courses will be aimed at:

- Operators of Science Museums and Science Centre;

- University researchers in science and technology;

- High school teachers of scientific and technical subjects, in particular STEM. including educational programs, materials and teaching aids.

THE SCI-CO+ SYSTEM

To make all this usable, the SCI-CO+ Project develops an articulated technological-organizational system called SCI-CO+ SYSTEM based on a set of enabling technologies for communication, connection, cooperative work, education and training (the Sci-Co+ Platform). The Sci-Co+ Platform will be accessible through a "Service Portal", which can be accessed from the Sci-Co+ Portal. Through this platform:

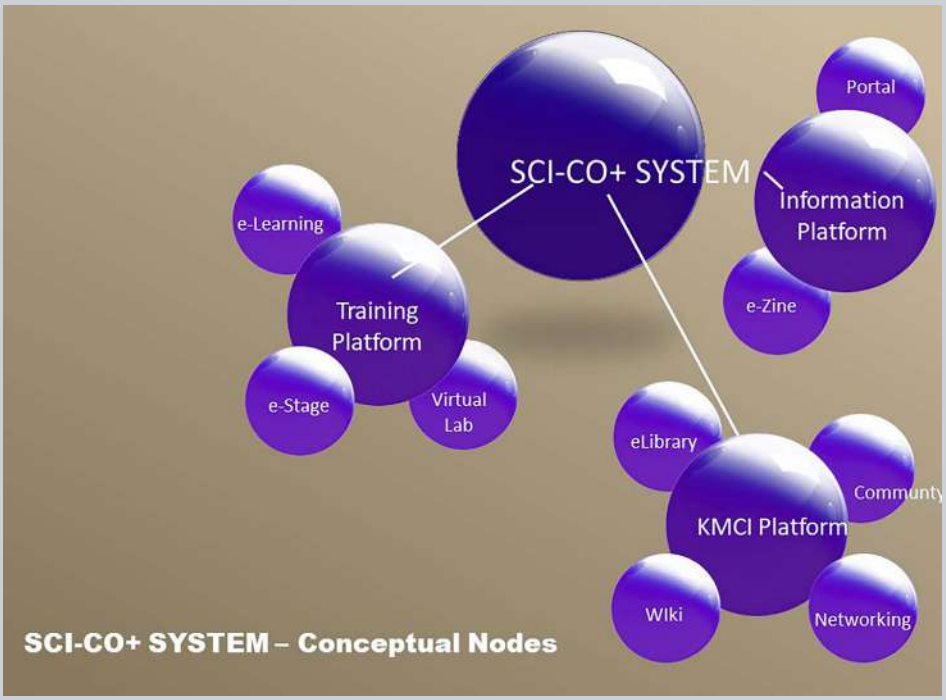
- the Specialization and upskilling courses developed by Sci-Co+ will be provided,

- the Advanced community and networking services will be made available to users.

From the point of view of the education and training processes applied, the Sci-Co+ System is inspired by cutting-edge scientific methods and will make it possible to make the most advanced paradigms for the realization of "intelligent" remote learning and work processes real and usable, which we can define, with a neologism, "Smart LearningWorking" processes. These processes are carried out through environments called KMCIS, Knowledge Management Systems and Collective Intelligence. One of the limitations of e-Learning is its difficulty in using non-formal and informal learning processes within training pathways, particularly in training and vocational education pathways. The KMCI Paradigm allows to build a new model of distance learning-training that introduces the "collective dimension" into the processes of distance learning. This dimension presupposes that the learners do not belong only to a "structured Class" but to an "organized Community" and are not only immersed in teaching-learning processes but also in training-on-the-job activities.

The need for such advanced solutions emerged in all its necessity when, at the outbreak of the pandemic, vocational education and training systems in Italy and Europe had to clash, on the one hand, with the lack of precisely this type of infrastructure and methodologies and, on the other, with the need to place millions of learners (pupils, students, learners) and operators (teachers, professors, trainers, tutors, technicians) in e-Learning and e-working. Just as companies and organizations have had to do to put millions of workers on telecommuting.

The Sci-Co+ Platform will be accessible through a Dashboard (Service Portal), will allow: the provision of the SCI-CO+ Training Offer as well as access to advanced community and networking services aimed not only to create highly innovative learning contexts but also to share experiences, discussing the results of the Project and building new shared knowledge on all the topics of interest.
They will compose the Sci-Co+ Platform: an e-Learning Management System, for distance learning; an e-Stage Management System, for the realization in Smart-Working of apprenticeship phases; a Virtual Didactic Laboratory, for the simulation of a virtual MS and SC, on which to practice the Sci-Co+ students; an e-library, for the management of editorial content; a Wiki Repository. for the collection of wiki pages on subjects of interest created by users and students; a Networking Infrastructure, for the development of the Community of Practice and Cooperative Work.
We will dedicate a specific NEWS FROM SCI-CO+ to the topic of KMCI Systems and the SCI-CO+ System in a future issue of the magazine



SCI-CO+ SYSTEM – Conceptual Nodes

Giuseppe D'Angelo is an expert in training and innovation. He holds the role of Advisor in the Sci-Co+ Project

SCI-CO+ SYSTEM AND SERVICES

The SCI-CO+ System is the technological platform that allows registered users to participate in a large community of practice in the field of Science Communication and to benefit from services dedicated to communication, sharing, comparison, and cooperative work, as well as participate in specialized training courses on the various advanced skills required to promote the digital transition of the sector. The System is divided into two areas.

Community & Networking Area

The Community and Networking Area of SCI-CO+ allows comparison, sharing and communication between users.

The main services offered are:

- participation in the SCI-CO+ Community of Practice and the use of communication and sharing tools,
- access to cooperative work and advanced communication,
- access to the eLibrary and the SCI-CO+ Wiki,
- fruition of the magazine "New Fronters in Science Communication" and other publications.

These services constitute the SCI-CO+ Knowledge Management and Collective Intelligence System (KMCIS) of SCI-CO+ through which it is possible to immerse oneself in an advanced Learning - Working environment.

Education and Training Area

The E&T Area carries out specific professional education and training activities in the field of science communication.

It offers:

- Specialization courses for graduates in: Communications, Information Sciences and Computer Engineering, and Technical and Scientific Disciplines
- Upskilling courses aimed at: Operators of Science Museums and Science Centers and other Public Engagement organizations, University researchers in science and technology, High school teachers of scientific and technical subjects, in particular STEM.

The Technological-Organizational Infrastructure of the E&T Area is divided into three distinct integrated platforms that form a Knowledge Management and Collective Intelligence System. This system makes applicable the Learning - Working methodology that is the basis of the SCI-SO+ training strategy.

E-LEARNING PLATFORM

The e-Learning Platform allows users to deliver distance learning modules (in a synchronous and asynchronous way)

E-STAGE PLATFORM

The e-Internship Platform allows users to manage Internship activities carried out as part of smart-working

LABORATORIO DIDATTICO VIRTUAL DIDACTIC LAB

Showcase of experiments, simulations, interactive and non-interactive descriptions of scientific phenomena

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ROMA - ITALY

MAKER FAIRE ROME

Maker Faire Rome is the European event that facilitates and talks about technological innovation in a simple and accessible way, connecting businesses, Academia, people and ideas. It is a trade fair where industry experts, makers and innovators meet to share their projects with the general public. The Faire of 2023 is an even bigger edition with new innovative contents, in a location suitable for hosting a constantly growing and evolving event. Maker Faire Rome 2023 – promoted and organized by the Rome Chamber of Commerce – is even richer in innovation: from digital manufacturing to the Internet of Things, from robotics to artificial intelligence, from the circular economy to agritech, from digital manufacturing to e-sports via big data and aerospace, up to the latest discoveries of the metaverse and augmented reality. At Maker Faire Rome 2023 will be an Ed Tech Area, an interactive space designed to stimulate creativity through workshops and educational activities. Furthermore, since Maker Faire Rome is a great opportunity to establish business relationships, this year exhibitors and visitors will be able to count on a dedicated matchmaking platform: a new tool for 'crossing' supply and demand for innovation, product and/or or service, to encourage and nurture the business opportunities that may arise. Main Topics are BUSINESS NETWORKING, FABRICATION & ELECTRONICS, ROBOTICS & AI, LIFE, HEALTHCARE & WELLBEING, CONFERENCES - WORKSHOPS - TALKS, EDUCATION & SCHOOLS

https://makerfairerome.eu/en

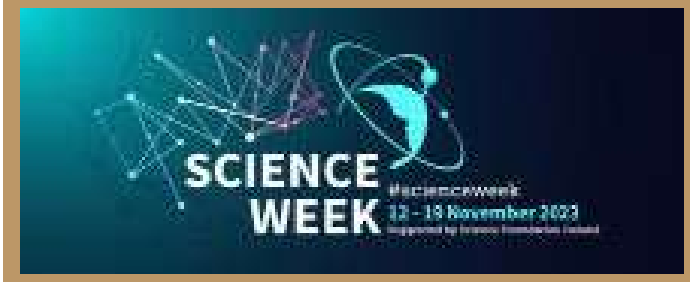
12th-19th NOVEMBER 2023

IRELAND

IRISH SCIENCE WEEK

Science Week is a yearly week-long event in Ireland celebrating science in our everyday lives. It includes 15 different festivals around the country, with activities for all ages. This year the theme is 'human', which asks people to consider what it means to be human in today's world.

Human creativity, curiosity and concepts have transformed how we live, how we interact with each other, and our relationship with our planet. Incredible developments have shaped our understanding of ourselves and our world. At times it can feel like changes are out of our control, from environmental emergency to being outpaced by technology. What lies ahead, and what role will science play in this? How will the actions we take now shape our collective human experience for the long term? In an uncertain world, one certainty is that from agriculture to AI, how we live today will not be how we live in the future.



https://www.sfi.ie/engagement/science-week/

26th OCTOBER 5th NOVEMBER 2023

GENOVA - ITALY

XXI EDITION OF THE GENOA SCIENCE FESTIVAL

FOOTPRINTS

The XXI edition of the Science Festival in Genova (Italy) has as its keyword "FOOTPRINTS". It will have a particularly large space dedicated to Sustainability. The Italian National Research Council, for own celebration of its centenary, will be present at the Festival at Palazzo Ducale with the exhibition Antropocene. The land with fire and sword. The events of Piazza delle Feste at the Porto Antico, the usual heart of workshops for children and teenagers, will be dedicated to the fundamental role of scientific research for environmental protection, always populated by classes visiting the festival. The focus on technologies will be dedicated to the future of artificial intelligence and robotics applications, increasingly pervasive in people's lives, with ethical implications that the festival will develop with the usual scientific rigor. On the occasion of the project "Genova Capital of the Book 2023", in the wide schedule of conferences and shows currently being finalized, there will be an ad hoc project dedicated to the value of reading as a tool for disseminating science: a series of close and informal meetings with the main science communicators in Italy. As usual, the festival will occupy the main cultural and recreational spaces of the city, in the usual spirit of mutual synergy. Every year there are about 50 city spaces touched by the event, including Palazzo Ducale, Palazzo della Borsa, Palazzo Reale, Galata Museo del Mare, Aquarium of Genoa and almost all the Genoese civic and national museums

https://www.festivalscienza.it/edizione-2023

14th-16th NOVEMBER 2023

NAPLES - CITTÀ DELLA SCIENZA

XXII EDITION OF THE **3 DAYS FOR THE SCHOOL**

"3 Days for Schools" is a national convention of the school world promoted and organized by Fondazione Idis- Città della Scienza and School Department - Social Policies – Youth Policies in collaboration with the Campania Regional School Office.

The event is aimed at school managers and teachers of all levels throughout Italy, companies that produce products and services for schools, teachers' associations and public institutions. The event is an opportunity for meeting and discussion about the needs and objectives of the school world. The 2023 edition includes the participation of authoritative speakers, events in plenary sessions on current themes, seminars to deepen studies and scientific research, workshops to present and exchange experiences and good practices.

The objectives of the 2023 edition are first of all contribute to the implementation of the Recovery and Resilience Plan in Italian schools by enhancing the work already carried out. Also, the event aims to contribute to the important reform on Orientation in schools, which has introduced substantial innovations for the choice of students' future study path, also from a European perspective and for greater coherence with an increasingly globalized and competitive society.

The event proposes a rich program of conferences, events, conventions, seminars and workshops will see the participation of authoritative speakers, representatives of institutions, associations and companies. But not only! The 3 Days for Schools is also an exhibition area where institutions, leading companies in the sector of technological innovation, publishing and sector printing, training, school tourism, furnishings, etc. propose their offer for the world of school.
Also, in the XXII edition there will be, within the event, the exhibition "The word to the schools", dedicated to the valorisation of experiences and good practices developed by schools throughout Italy in the context of educational and research projects.

http://www.cittadellascienza.it/3giorniperlascuola/

20th-26th NOVEMBER 2023

LISBON - PORTUGAL

PORTUGUESE SCIENCE AND TECHNOLOGY WEEK

During these days, several scientific institutes promote free science communication events ranging from visits to online seminars and a variety of outreach programs, all of which are highlighted on the Ciência Viva website. It also features the "National Scientific Culture Day" ceremony on November 24th.

CIÊNCIA VIVA
DIVULGAÇÃO CIENTÍFICA

https://www.cienciaviva.pt/

19th-22th DICEMBER 2023

LISBON - PORTUGAL

CONFERENZA DI NATALE DI CIÊNCIA VIVA

CIÊNCIA VIVA
CONFERÊNCIA DE NATAL
CHRISTMAS LECTURE

The Ciência Viva Christmas Conferences are co-organized by renowned national and international scientific institutions. They are inspired by the Christmas conferences established by Michael Faraday in 1825 at the Royal Institution in London and which are still carried out. The initiative is aimed at an audience of all ages, especially young people, to bring them closer to the world of science and technology. The 2023 Programme has not yet been published.

https://www.cienciaviva.pt/conferencia-de-natal/conferencia-de-natal-ciencia-viva.

21st-26th NOVEMBER 2023

NAPLES - CITTÀ DELLA SCIENZA

XXXVII EDITION OF **FUTURO REMOTO**

INTELLIGENCES

The XXXVII edition of Futuro Remoto which will be held from 21 to 26 November 2023 in Città della Scienza, Naples, with on site and online activities. This year, the theme of the event is "INTELLIGENCES".

The rich program includes different kind of activities with hundreds of free events. Among the many questions to which it is not easy to give a clear answer, there is certainly the question of what is intelligence? Sometimes, to answer this question, we talk about INTELLIGENCES.

This Science Festival, for almost half a century, promoted and fertilized the relationship between science, knowledge and society by working on sensitive topics that interact pervasively with everyday life and contribute strongly to the definition of the great processes of socio-cultural, economic and political transformation in progress. Thanks to the double formula, in presence and online, consolidated in recent years, the festival will talk about this current theme and its different declination, synergies and multidisciplinary approaches, through exhibitions, major events, scientific cafés and science shows, games and escape rooms. Many universities and research institutions will present captivating laboratory and demonstration and Science Shows with a "WOW!" effect!

All activities will be interactive and ensure the direct involvement of the public. The rich and varied program confirms the role of the festival as a meeting platform between all the players in science, culture and innovation and has the aim of spreading and growing the culture of scientific communication and educational innovation in all disciplinary fields within the research community, from universities to research centers to the business world.

https://www.futuroremoto.eu/

THE COVER OF THE NEXT ISSUE

> “The construction of the knowledge and economy society is a long process that began after the Second World War which, although divided into different phases, is constantly informed by scientific research. In this long process in which the traditional relations between the scientific community and the rest of society have been modified, the public communication of science has progressively taken on both a new role – almost a new ontological status – and new forms. We must take into account this new role and these new forms If we want to build a democratic society knowledge based”

Vittorio Silvestrini

Pubblicazione ISSN 3034-8285