Secondary education can become a significant period of time for young students, as they confront questions about their academic pathways and future careers. Students face various challenges during this chapter in their life, such as rapidly changing perspectives towards academic fields, in which the wide range of educational and professional options may seem overwhelming. For this reason, further and more constructive guidance in career planning has recently been put in place, particularly through the development of a number of European initiatives.

Education professionals need to inspire and commend students to help them overcome this juncture. In this respect, an advice or guidance can prove to be crucial – to show all the career possibilities that science, technology, engineering and maths (STEM) have to offer. It can provide young people with the essential support and skills needed in order to succeed in these academic disciplines – also increasing general public interest in science and awareness about related opportunities. This edition of the Scientix Newsletter is dedicated to such career guidance.
STEM skills at the workplace

Science teachers are, without a doubt, essential in guiding and motivating pupils at school to explore STEM related career options, especially since many of those students may have no access to a designated career counsellor, who can give them pivotal information and lead them towards all sorts of opportunities in the fields of science, technology, engineering and maths.

However, due to the rapid development observed in this area in the past years, many academic programmes and job responsibilities in STEM will unceasingly evolve, particularly as different disciplines merge and new ones emerge.

Under these circumstances, it is only logical that some educators may find it challenging to keep abreast of prospective career information to support students’ counselling on STEM careers. Hence, they would surely welcome additional information about the knowledge and skills necessary to follow certain career paths, which would better equip students for navigating through a consistently dynamic labour world.

A number of European and national initiatives help teachers to overcome these obstacles. They can, thus, prepare better students’ entry to the professional world. For instance, the eSkills for Jobs stakeholders’ initiative (eskills4jobs.ec.europa.eu) has designed a Teacher Toolkit that provides several resources meant to promote digital skills in the classroom. What’s more, the I-LINC project (http://www.i-linc.eu/) helps teachers and young people to develop specific digital citizenship skills and entrepreneurship. Among those actions is an inventory created by I-LINC to showcase best practices and policies devoted to innovation, digital skills and youth employment across Europe.

Why soft skills matter

Non-formal education and the development of so-called soft skills are becoming more prominent and recognised by society. They can help students deal with complex problems and situations that may come up in professional environment in real-life. For this reason, soft skills that can be transferred across disciplines, such as creative problem-solving, critical thinking, teamwork, flexibility, time management and other interpersonal skills, are all desirable and in fact in very high demand as qualities for certain types of employment, and as such, essential in order to succeed professionally.

Best practices and teaching strategies in the classroom

Career awareness and useful soft skills for the workplace can be easily addressed in STEM lessons, through the introduction of different pedagogic approaches, activities and projects, for example:

- Inquiry-Based Learning activities (like role playing games or simulations of real-life scenarios) can help students perceptualise actual work environments and distinguish among different professional tasks. This approach can be applied, for example, through the Go-Lab project, which fosters collaboration between universities and schools through an online platform where teachers and students can easily access laboratories remotely. http://www.scientix.eu/projects/project-detail?articleId=109877

- Encouraging students to create a portfolio of their interests or use match-making tools are strategies that can make pupils distinguish their strengths and weaknesses and link their skills with prospective STEM careers. For instance, the OPENSKIMR project is developing a match-making

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1 See the Teacher Toolkit of the eSkills for Jobs initiative here: http://eskills4jobs.ec.europa.eu/c/document_library/get_file?uuid=43ba3a81-2fbd-4dfb-916b-2e3f138197b4&groupId=2293353

Featured resources on STEM careers from scientix.eu:

- Tim Peake: Becoming an astronaut
  http://www.scientix.eu/resources/details?resourceId=7113

- Chreact: Working with a role model in a science classroom
  http://www.scientix.eu/resources/details?resourceId=5512

- The international panel on Climate Change – Role play
  http://www.scientix.eu/resources/details?resourceId=9340

- Ready or not. A role play on taking STEM cells into the clinic
  http://www.scientix.eu/resources/details?resourceId=3144

- Take part in a research on atherosclerosis and become a genetic engineer!
  http://www.scientix.eu/resources/details?resourceId=3378
Inviting guest speakers to STEM lessons is one initiative likely to bring about many benefits for students. Not only can such an invitation broaden their understanding of the life of scientists, but also help them to imagine their future as professionals in the field, discover new types of employment and overcome any prevailing preconceptions.

Additionally, by bringing STEM professionals to the classroom, educational institutions and organisations can surely make students recognise the societal value, the tangible outcomes and the excitement of STEM careers while breaking the monotony of regular lessons. Overall, it can demonstrate to pupils how they can apply what they have learned at school in real-life scenarios and how to turn their knowledge and skills into a future career.

**How to recruit STEM guest speakers?**

In order to find and invite appropriate STEM guest speakers, it is essential to stay alert for professionals who are willing to volunteer and to share their professional and personal input with students. It is most simple to start by making a connection with members of the local or regional STEM network: Employees or employers at local companies, members of professional associations, staff of science organisations and university alumni or researchers, can offer a unique standpoint on different STEM careers.

**Dalibor Todorović**, teacher of computer science and informatics and member of the "Team for Professional Orientation of Students" at different Serbian schools, says that: "Bringing experts into the classroom is a very good idea. In my opinion, it is better to bring a known professional: for example, a parent who is a professional on a specific STEM area, to explain what his job is really about, what are its challenges, responsibilities and benefits of the profession. Students feel more relaxed when they know the person with whom they are talking to."

A broad - even an international – perspective of a recognised professional can, furthermore, open students’ eyes to the world of possibilities, both in terms of education and careers. There are a number of initiatives already in place that can help teachers and students connect with those experts. An illustration of it is the Hungarian project Meet the Scientist (http://www.scientix.eu/projects/project-detail?articleId=357870), aimed at promoting STEM careers through volunteer presentations by former Hungarian Fulbright Scholars about their research field in different high schools across the country.

**What makes a good STEM guest speaker? Basic tips for the classroom!**

- **Connect with students**: Share your personal stories (not only your current job but also your trajectory and even your experiences outside of your work environment).
- **Make it relevant**: Describe the positive outcomes of your job and show students how these impact the present-day world and – particularly - their community.
- **Share your passion**: Explain what motivated you during your studies and in your career and what inspired you when you were at the same age as your audience.
- **Keep it interactive**: Engage students in hands-on experiences with the topics taught in the classroom, while presenting tangible goals for them to pursue.
# Job profiles of the 21st century

In an ever-changing world, some sectors perish while others continue to flourish. Check some of the most demanded and emerging occupations of the new century. eSkills for Jobs expects a total of 756,000 vacancies in the ICT sector by 2020!

<table>
<thead>
<tr>
<th>Job Profile</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td><strong>Web Developer</strong></td>
<td>For those interested in website creation and in possession of advanced computer programming skills, web developing is definitely a career path on the rise. The main task of a web developer is that of designing and maintaining websites, and specifically of creating the code that runs them.</td>
</tr>
<tr>
<td><strong>Epidemiologist</strong></td>
<td>Epidemiologists mainly investigate the origins of diseases with the aim to impede their transmission and recurrence. Epidemiology integrates different scientific methodologies, such as experimenting, assessing risks or using statistical analysis to study disease patterns and to advise authorities in the process of developing public health programs.</td>
</tr>
<tr>
<td><strong>Game programmer</strong></td>
<td>Game programmers are normally equipped with a software engineering or a computer science degree and are mostly engaged in the task of formulating the code that makes exciting video games run properly.</td>
</tr>
<tr>
<td><strong>Robotics engineer</strong></td>
<td>A robotics engineer is in charge of designing and creating robots and robotic systems that will operate tasks that humans are either unable or not prepared to accomplish. Robotics engineers are especially relevant in the manufacturing industry, where they will be in charge of fabricating robots that will make job conditions safer and work procedures more efficient.</td>
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<tr>
<td><strong>Environmental engineer</strong></td>
<td>The main role of environmental engineers is to safeguard and to improve current ecological conditions by regulating and reducing waste. Their main task is to implement measures and to design new technologies that prevent, device and remediate environmental hazards.</td>
</tr>
<tr>
<td><strong>Astrobiologist</strong></td>
<td>Does life exist beyond Earth? Astrobiologists might have the answer to this question, as they have recently become the key experts on the hunt for life among the stars. Specifically, as they study the origin and evolution of life in the universe and help recognise biospheres that might be different from planet Earth.</td>
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<tr>
<td><strong>Forensic scientist</strong></td>
<td>Forensic scientists are in charge of providing impartial scientific evidence that can be used to support legal cases at judicial courts, particularly in cases of criminal and civil judicial investigations. Their main tasks include finding and inspecting contact trace materials connected to crime scenes.</td>
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Career events: Make the most of them!

A careers event has the main goal of bringing together students, employers and representatives of higher education institutions, to exchange ideas and information about occupation routes and potential employment opportunities. Although sometimes, during these events, employers and academic representatives may try to recruit people, often they join the events with the main goal to stay connected with future generations.

A careers event can bring numerous benefits about for students. Not only are they introduced to potential careers related to their coursework at school, but they put in a better position to identify the skills they need to learn and the academic paths to follow in order to become successful in their field of choice. During these events, students can also network with professionals linked to STEM companies, organisations and institutions, and develop their communication and networking skills.

Careers events may include some people of the alumni of educational institutions hosting or attending the event. A dialogue with the alumni often offers students the chance to exchange similar experiences and direct knowledge about further academic and professional experiences, as well as about prospective paths to follow upon graduation.

Audrey Anne Vella Bondin, is the Head of the Science Department in a public secondary college, in Malta. She is responsible for the setting up of annual science fairs involving interactive experiments with the aim of promoting and popularising science in her home country.

When asked about the most important thing to keep in mind when organising career events, Audrey Anne replies: “It is to target your students’ inclinations, what their interests are. You have to make some background research on what your students really want to hear about. It is useless to bring experts in areas that students are not really interested in”.

And about the benefits of careers conventions, she adds: “The careers’ convention (in Malta) is at a national level. We take the schools’ children there. (...) They can mingle, and go to different stands. They can ask questions. The people at the stands give them information about their websites or their Facebook pages. The visitors can then follow-up at home”. In fact, it is particularly helpful when bridging the gaps between students and professionals to have the opportunity to meet different STEM professionals during career events and understand their daily routines. Moreover, it encourages students to reflect on potential career paths and teach them to make better informed choices about their professional future. As Audrey Anne explains: “In Malta, we send students to the Job Exposure Week. It is a whole week were they get to do a job of their choice. Many come back and say “I like it!”. Others come back and say “Listen, it was really different... I wouldn’t do that my entire life”. So that’s the most beneficial. Being in touch”. In relation to getting an insight into what the actual job is, she adds: “For example, we took them to a forensic lab. Many have these ideas of CSI. (...) They get a grasp of reality”.

Audrey Anne says that students are unaware about the plethora of career paths available, as well as is the usability of career fairs to dissipate any prejudices or stereotypes that students may have in relation to certain career paths: “When they think about biology, they just think about doctors and nurses. Unfortunately, some also have stereotypes, they think engineering is for boys. (...) At career conventions they see all those jobs, jobs some of them had never even heard about. And they see women as engineers or as pilots. That removes stereotypes and widens their horizons to the various careers that maybe wouldn’t have occurred to them”.

Finally, regarding the organisation of events of this kind herself, she addresses the amount of work that goes into it: “It does involve some work, obviously. Quite a lot of organisation. To get these professionals on the same day at the same time. They are very busy people. It is difficult. Sometimes you think: Why did I bother doing this? It is so much work! But in the end, when you see the benefits of it, it makes it all worthwhile”. And Audrey Anne concludes: “It is quite a lot of work, but you know, it can be done”.

Focus interview: Audrey Anne Vella Bondin
Projects in Focus

In this edition of the Scientix Newsletter, we highlight a selection of projects which promote awareness about STEM careers through research, promotion of skills for future employment and by bringing together professionals and students. Take a look and see how these can inspire you to increase STEM awareness at your school.

Employ: Digital skills for employability and social inclusion

EMPLOY aims at developing advanced digital literacy in line with industry’s needs for learners in primary and lower secondary education, with a focus on individuals at risk of exclusion, including migrants, or individuals facing socio-economic adversity. By building digital skills, forecast to be in demand in the coming years, the project promotes employability, fosters social equity and inclusion, and facilitates economic growth based on human capital, in other words, effectively trained future professionals.

JOBSTEM

The JOBSTEM project aims at creating a study about the development of students’ self-competence beliefs, their relation with school achievement, and the effect of self-competence beliefs on vocational interests and choices in the STEM area. The initiative addresses three main research goals:

- How are students’ general and specific STEM career aspirations formed, and how do they change over time?
- How are students’ academic achievement and self-competence beliefs related to their general and specific STEM career aspirations? How does this pattern of relations change during the course of primary schooling?
- How are students’ general and specific STEM career aspirations influenced by characteristics of their families and their gender?

Teen Science Cafe

An excellent opportunity to informally meet and interact with local scientists, the Teen Science Cafe is an initiative targeting “Year 8” Maltese students. The project offers young teenage students opportunities to encounter a number of professional experts in the field of STEM careers. The focus of these encounters is the creation of an interactive informal exchange between students and professionals, to engage students in conversation about STEM themes and career paths in an informal setting, thus impacting positively on students’ study and career choices. In this context, the Teen Science Cafe primarily serves as an outreach exercise in terms of promoting careers in science and technology.

Find out more about the EMPLOY project here: http://www.scientix.eu/projects/project-detail?articleId=545453
Find out more about the JOBSTEM project here: http://www.scientix.eu/projects/project-detail?articleId=486216
Find out more about the Teen Science Cafe project here: http://www.scientix.eu/projects/project-detail?articleId=491824