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# DEVELOPING A SUCCESSFUL TEACHER PLACEMENT SCHEME

## A guide for companies

*October 2018*

European Schoolnet

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**Authors:** Maïté Debry, Marina Jiménez Iglesias, Adrienn Pap, Yves Beernaert, Evita Tasiopoulou and Àgueda Gras-Velázquez (European Schoolnet)

**Collaborators:** Francesco Debono, Desiree Bugeja (Directorate for Quality & Standards in Education, Malta), Fernando Franco, Teresa Godinho (Directorate General of Education, Portugal), Tommi Raivio (CSR Europe), Ana Sofia Godinho, Rodrigues Valdemiro (Obitec).

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# EXECUTIVE SUMMARY

This guide offers an insight into developing successful collaborations between industry and education through the Teacher Placement framework of the STEM Alliance. It is aimed at company and other science, technology, engineering, and mathematics (STEM) industry-related organisation representatives, who are interested in sharing their everyday working experience with educators.

Teacher placements can take shape in various forms, depending on the length, the focus and the tasks and responsibilities of the placement. It can be organised by companies, as well as by civil society organisations, research laboratories, or start-ups. The goal of these placements is to familiarise teachers with the knowledge and skills used in the 21st century workplace, specifically STEM workplaces, in industries such as biotechnology, life sciences, chemical or electrical engineering industries.

Teacher placement activities are long-term investments. One of the benefits is the pedagogical experience of teachers, which can be made use of for in-house education and training of company personnel. Teacher placements also allow a close view on the social impact of company activities, build connections with local communities, while igniting the interest of the future work force in STEM by bringing the reality of a 21st century workplace closer to STEM studies. This activity can also function in a variety of ways to support the education sector. It helps align the skills and knowledge of the future work force with the requirements of the modern workplace, enables teachers to contextualise their teaching, and facilitates exchange between practitioners and teachers. An active connection between industry and education can play a role in

improving the STEM strategies of schools on the individual school, local or regional levels.

The first step in setting up a teacher placement is to get in touch with relevant educational authorities, such as ministries of education, or initiatives specialised in STEM education. This partnership can ensure that the programme is used in the most relevant and equitable way to benefit all stakeholders. Following, it is crucial to take time to reflect upon the needs and limitations of your organisation and set concrete steps to reach measurable goals through the teacher placement activity. The guide provides a list of example organisations that could be useful to get in touch with.

Depending on the needs of the company and on the function that the teacher will take on, the time and length of the programme can vary. The schedule of the school year must be taken into account. First-time teacher placement organisers might opt for a short-term placement of 1 to 10 days and after evaluation decide on the length of subsequent programs. Ministries of education or local educational networks offer a suitable platform to recruit teachers for this activity. Alternatively, own networks and social media channels or education events are also suitable to promote teacher placements. The purpose and objective of the placement should already be clarified and disseminated at this stage, so that teachers are fully aware whether their interests align with joining the programme. Other tips to enhance the quality of the placement include engaging teachers already before the placement, designing innovative daily tasks for them, strengthening their ability to promote STEM careers, involving them in the Continuous Professional Training activities for employees, connecting teachers from different schools, and building long-term relationships that last beyond the placement.

Once the placement starts, a general introduction to the company, the environment and the daily activities is useful for teachers to transition from education to industry. Assigning a mentor to maintain contact with teachers will ensure that both parties are following the appropriate steps to achieve their goals, making adjustments when necessary along the way. Mentors are not only in charge of communicating about the long-term goals of the placement, but also of supporting teachers in their transition and their daily tasks at the workplace. Employees mandated with mentorship might need a training beforehand. Other success factors for teacher placement programmes include: aligning placement activities with the national or regional curriculum; recognising the placement as a formally acknowledged way of Continuous Professional Development (CPD); allowing teachers to include their students in industry activities; disseminating the placement towards other schools, the company and ministries of education; furthering the collaboration with other forms of activities; offering teachers the opportunity to be placed in a function that is interesting for them; integrating the placement strategy into human resources and outreach strategy of the company; evaluation by all stakeholders; and sharing experiences, case studies and testimonials with other interested stakeholders.

For the purpose of sustaining the programme, it is recommended to secure the long-term support of relevant educational administration as well as to set up effective procedural guidelines at the company to run, administer and evaluate teacher placements. Maintaining collaboration with partaking teachers, their schools and students plays a key part in the sustainability of the outcomes of the programme. This expanded collaboration can transpire as debriefing sessions for schools and teachers, teachers recounting their experience to Heads of Schools, a report written by the teacher about their placement, data collection by teachers about the perceived changes in their teaching, or a fair to showcase the results of the placement.

To evaluate these outcomes, and the impact of the company's collaboration with the education sector, four evaluation tools are available, which can be used for in-house or external evaluation in a summative, formative or impact evaluation manner. Surveys and questionnaires are a cost-effective way to gather large amounts of measurable and anonymous information. Interviews are suitable to learn about perceptions and attitudes in a detailed manner. Logs and diaries help to understand behavioural information and potential relationships between different items of the placement. Finally, focus groups are used to gather an insight into behaviours and perceptions of a larger sample size.

To conclude, the most useful tips for developing a successful teacher placement programme are: integrate placements into the STEM strategy of the school and CPD activities as well as company strategies; sign a common agreements with all partners, ensuring quality for everyone involved; be aware of your needs and constraints; seek support from STEM education organisations, especially educational authorities and administration; organise related activities during the placement to promote STEM education and support your daily work together; provide support and mentorship to participating teachers; document and evaluate the programme appropriately for future reference.

## Abbreviations

**List of abbreviations**

| | |
|---|---|
| STEM | Science, Technology, Engineering and Mathematics |
| CPD | Continuous Professional Development |
| CSR | Corporate Social Responsibility |
| MoE | Ministry of Education |
| TP | Teacher Placement |
| SME | Small and Medium-sized Enterprise |
| VET | Vocational Education and Training |

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## Foreword

With teachers being one of the most important influencers in a student's subject and career choice, they are role models who can help to transform young people's attitudes towards STEM. To harness this, teacher placements in industry have been shown to positively impact the quality of students' learning outcomes and their motivation for STEM subjects.

In 2018, CA Technologies launched its STEM Ambassador Academy designed to help teachers gain insight into the skills needed for jobs of the future and enrich their continuous professional development – while helping to address the chronic talent shortfall in Europe.

The academy includes a set of interactive workshops, which include an introduction to unconscious bias and gender stereotyping, where teachers learn how to recognise and manage these behaviours in the classroom. In an Agile Fundamentals Lego workshop, teachers get a hands-on experience in learning the concept of agile working, which encourages team collaboration to stimulate creative thinking and problem-solving skills. To further enrich the STEM Ambassador Academy experience, CA Technologies nurtures relationships with teachers after their placement through its STEM Buddies initiative, where employee volunteers, CA STEM Ambassadors, work with schools to show them the value of technology skills and careers in building a better future for everyone.

This guide provides a thorough starting point and checklist to help you plan and deliver a successful teacher placement programme. However, long-lasting outcomes rely on multistakeholder partnerships between industry, government and education to make teacher placements recognised, accessible and commonplace. It's only when we collaborate and work together that we can truly make a difference.

Sarah Atkinson,
Vice President Communications for EMEA at CA Technologies
& Board Member at techUK

# INTRODUCTION

*Developing a Successful Teacher Placement Scheme – A Guide for Companies* has been created by a team of education and corporate experts for businesses that are committed to championing and promoting education and employability in science, technology, engineering and maths (STEM).

The guide is addressed to those in charge of different types of departments, including Human Resources, Communication, Corporate Social Responsibility (CSR), Outreach or Community Activities, and Education or Training.

Here's the value you will get from this publication:

- Understanding of **teacher placement programmes**;
- How to **define your objectives** when initiating a teacher placement programme, in line with your goals in STEM education – and the local country's STEM policy;
- **Step-by-step guidelines** on how to design and implement a teacher placement programme in your own organisation – and how to expand its value by working in collaboration with key stakeholders in STEM Education;
- Discover top **success factors** in teacher placement programmes resulting from consultations with Ministry of Education (MoE) STEM representatives, partners of the SYSTEMIC[1] project and company partners of the STEM Alliance;
- Useful **evaluation guidelines and tools** that align with your teacher placement programme and enable you to assess and develop your efforts in

1 SYSTEMIC is a strategic partnership project funded under KA2 of the Erasmus+ programme aiming to increase young Europeans' interest in maths, science, engineering and technology education. See more here: systemic.eun.org

providing professional development opportunities to teachers;

- **Measure the impacts of your investment** in your teacher placement programmes and learn how to disseminate the benefits of these programmes.

Following the *Teacher Placement Initiatives – Collection of Best Practices*, this guide complements the STEM Alliance's[2] efforts to promote STEM teacher placements in industry through the **Teacher Discovery Placement** Scheme. The STEM Alliance works to fill the need for more STEM-skilled workforce in Europe and to support the central role STEM teachers are playing to motivate young people to pursue STEM studies and careers.

This publication constitutes the second part of the Intellectual Output 4 'Guide on contextualisation of STEM teaching' of the SYSTEMIC project. SYSTEMIC is funded by the Erasmus+ Programme of the European Union. In this publication we include guidelines and conditions of success for this type of school/industry collaboration and some analysis on how teacher placements contribute to improve teachers' STEM skills and their capacity to influence students' studies and career choices. The first part of the SYSTEMIC Intellectual Output provided comprehensive information in the form of use cases describing programmes linking STEM teaching with real-life industry situations. The description of the teacher placements (TP) programme presented in this publication aims to inspire the industry world and public authorities to establish more cooperation of this type between schools and companies.

2 The STEM Alliance – www.stemalliance.eu – is an industry-education cooperation initiative coordinated by European Schoolnet and CSR Europe which aims to promote Science, Technology, Engineering and Maths education and careers to young Europeans and address anticipated future skills gaps within the European Union.

# 1. WHY OFFER A TEACHER PLACEMENT IN INDUSTRY?

Main points to remember from the chapter:

- Placements vary across length, focus, tasks and responsibilities and type of organisations.
- Benefits for companies include the use of pedagogical experience of teachers for in-house training; a close view on the implication of social corporate activities; attracting the future workforce to STEM careers; and creating bonds with local communities.
- Benefits for teachers consist of the contextualisation of their STEM teaching; the familiarity with industry dynamics and activities; connections with like-minded teachers; and the improvement of 21st century skills and competences.
- Benefits for students are recognition of career opportunities; and a better, more attractive learning experience.
- Schools can also benefit by improving their STEM strategy based on their teachers expanding knowledge and experience and collaboration with industry.

## 1.1. STEM teacher placements in industry

**STEM teacher placements in industry provide an opportunity for teachers to upgrade their knowledge, skills and competences in STEM and improve the teaching and learning of these subjects. They also help teachers integrate 21st century skills and competences into their teaching – giving students insights into skills needed in the workplace.**

During these work placements, STEM teachers spend time in a company and

experience what it's like to be part of the organisation's workforce. However, they can take place in many different forms, varying in length (from one day or one week to trimestral placements – taking place in one shot or spread over time), in focus (depending on the company's area of work) or even in tasks and responsibility levels (from assisting company staff to helping in a specific work programme as part of a team, to learning how teams within the company operate and the key skills needed).

Furthermore, while this guide will refer to placements in various private industry sectors where STEM skills are required, teacher placement initiatives do not all take place in private companies but may also take place in public companies or in civil society organisations (NGOs). Next to companies (both in production and in maintenance jobs), civil society and the social profit (or even non-profit) sector such as hospitals need STEM technicians, graduates, etc.). For example, some teacher externship initiatives in the US or UK combine the teacher placement with limited or intensive Professional Development, the latter provided by a university. In fact, research laboratories, start-ups or incubators linked to universities can also be open to teacher placements for STEM teachers as they are unique opportunities to create a link between research and school education

Despite differences, all teacher placements are a means to familiarise educators with scientific, academic and technologicalcutting-edge research, knowledge, skills and competences and dispositions for vocational success. In addition, these placements will provide major structured learning opportunities, as a full-fledged part of teachers' Continuous Professional Development activities (CPD). It is also hoped that such teacher placements are part of an innovative school strategy to promote quality STEM education based on problem-based learning (PBL) and inquiry-based science education (IBSE). Teacher placements are a unique opportunity to contribute to the school as a learning organisation.

## 1.2. Know your industry. Are you in STEM?

In today's digital economy, every company relies on technology to operate. Generally, any sector of industry, the economy, commerce and trade, social/non-profit activity or cultural activity that have a direct or indirect link with Science, Technology, Engineering or Mathematics activities can be considered STEM. Industries can range from international or European to national companies and micro, small and medium-sized enterprises (SMEs). In addition, craftsmen/women or artists who may operate as sole traders might need STEM to develop some of their work, too. Therefore, a teacher placement can take place in a production company, a hospital, a science museum or science and technology centre, or in small and medium enterprises.

Below you will find some of the STEM-related sectors[3] the European Union is committed

3 Full list of industry sectors is available here: http://ec.europa.eu/growth/sectors/

to support, in order to create more opportunities for people and for business.

- The **aeronautics sector** manufactures a wide range of artefacts, from aircrafts, helicopters and drones to aero-engines and other systems and equipment. Likewise, the **automotive autom industry** is indispensable for the steel, chemicals and textiles sectors.
- The **biotechnology and life sciences** branch not only supports sustainable development, public health and environmental protection but also many industries related to healthcare and pharmaceuticals or animal health.
- The **fashion and textile industries,** such as clothing and footwear, link creativity to innovation (by connecting the arts with technology) at a time when originality is indispensable in business innovation and development.
- The **chemicals industry** (producing petrochemicals, polymers, basic inorganics, specialties, and consumer chemicals) plays a huge role in producing new and advanced materials and technological solutions.
- **Pressure equipment and gas appliances.** The pressure equipment field concerns a wide range of products, addressed to both consumers and industries (from pressure cookers to installations in power plants). Related to this, the gas appliances sector produces appliances that burn gaseous fuels and that can be used for refrigeration, heating, lighting or washing.
- The **Electrical and electronic engineering industries** manufacture electrical devices, radio equipment and products related to the telecommunications industries, such as mobile phones, the mobile network infrastructure or power supply units.
- Within the **healthcare industries**, the **pharmaceutical sector** is necessary to improving public health protection. In addition, the **medical devices area** provides health care solutions in the form of diagnosis, prevention, monitoring, treatment and alleviation of disease.

## 1.3. Benefits of a teacher placement programme

Introducing a teacher placement programme is a long-term commitment. Building awareness and opening teachers' minds to incorporate a STEM careers aspect – especially the skills needed - into their teaching is a long-lasting process and the impacts are generally mid- to long-term.

A well-designed and managed teacher placement programme will be mutually enriching for companies, teachers, schools and students. Look at some of the most substantial benefits in the list below:

## FOR COMPANIES

- **Increase in-house training and education**

  Companies can also make use of teachers' knowledge and competences to increase and improve the in-house education and training of their own personnel. Through teacher placement schemes, you will have the opportunity to co-organise workshops, job shadowing schemes and other activities that might be helpful not only for the placement teachers but for your staff or your organisation, overall. Your staff will definitely improve some of their soft skills or 21st century skills and competences.

  In particular, the presence of teachers can also provide an opportunity for company staff to learn how to manage, train and mentor teachers – responsibilities that may be useful and stimulating to be used to the benefit of fellow employees.

- **Focus your objectives and help improve the STEM workforce**

  Teacher placements should be win-win partnerships for the educational community and companies alike. By fostering connections with STEM organisations and schools, you will be able to focus your social implication efforts and contribute to transforming STEM education. Your teacher placement can be a major contribution to community-building at local or regional level.

  However, it is good to tailor the objectives if, for instance, you want to contribute in aligning classroom instruction with the skills and competences needed in your industry sector, inform teachers and their school about the activities and processes developed in your company and the kind of competences and skills needed.

- **Addressing the leak in the STEM skills pipeline**

  Taking the decision to have teachers placed in your company will be a way to address the drop of interest for STEM subjects in schools and beyond, promoting STEM careers.

  One of the main objectives of teacher placements in companies is to connect STEM education to real-life experiences and provide STEM teaching with a context. Teachers and guidance counsellors involved in this collaboration with industries and SMEs will acquire updated information about the STEM jobs of today and tomorrow.

  Exchanging information, challenges and experiences with educators will allow you to gain new insights on how to connect practices from the world of work to the classroom. Become an innovative thinker by introducing teachers' fresh ideas, new perspectives and even more energy to your company. In addition, and on the other hand, by making available to schools

and teachers entrepreneurial skills and competences and giving them a unique opportunity to be in touch with cutting-edge research and link teaching and learning to the real concrete world.

- **Develop your social implication in a sustainable manner. Start small; think big!**
  Impact in society and public service works best when it is an integral part of your company's strategy, culture and values. Are you committed to improving STEM education? Do you want to support the teaching profession and to enhance kids' motivation and interest in STEM jobs or careers? Developing a teacher placement scheme is the way to go.
  However, consider the assets and opportunities your company can offer, and find something that you can uniquely provide. Develop your relationships with schools gradually so that when your company grows, you can also maximise your capacity to generate social and community impact.
  If you are an SME, you can best start by engaging with schools in your local community. Get to know what are the immediate needs of schools surrounding you and find out through dialogue where you can contribute. Creating a bond between social and community impact and business success will be particularly relevant for the sustainability of the teacher placement.

## FOR TEACHERS

- **Improve teachers' contextualisation of STEM teaching**
  By joining placements in industry, teachers get to experience first-hand examples of how STEM disciplines are useful and essential in the world of work. Through their direct involvement in industry, they learn how the content taught in science, technology, engineering and mathematics subjects is applied in a company's everyday work, and how companies have to face the challenges in today's vibrant and quickly changing society.
  This experience will facilitate the contextualisation of their teaching and can enhance the quality of overall instruction. For instance, think about how a mathematics teacher placed within in a company can improve his or her knowledge on how to use geometry to solve real problems faced in architecture or construction companies. Be the one providing that knowledge and you will contribute to give real-life and concrete meaning to classroom practices.

- **Demonstrate how a company works**

Through teacher placements, educators will discover specificities of the life and activities of STEM companies and will develop a better understanding of workplace practices.

Specifically, they will witness how the workplace is structured and organised and about its culture and codes of conduct; they will learn about the conceptualisation and implementation of strategic plans, the usage of certain types of technology as well as any workplace training procedures. They will clearly see how central teamwork is within a company and what it means to be active at local, national, European or international level. Teachers will see how important it is to master different languages in such a context.

These experiences will enable them to give students better and more concrete career advice that will position them with better knowledge and skills when entering the workforce.

- **Enable teachers to network with like-minded peers**

  Many companies organise teacher placements involving educators from different schools, giving STEM teachers the opportunity to network with like-minded peers from other schools and/or other disciplines. In this way, learning communities of teachers are created. Within such groups, they are able to exchange information, talk about their professional challenges and discuss new ideas about how they integrate STEM career activities and mentoring in their everyday teaching. They will also reflect the implementation of the knowledge and skills gained during the teacher placement in their future work.

- **Build up teachers' skills and confidence in the classroom**

  Teacher placements in industry can support Continuous Professional Development by providing STEM educators with an array of new skills and competences that can imbue them with renewed confidence and increased motivation. Teacher placement programmes may also have a positive impact on the retention of teachers, providing them with motivation to remain in the profession, as (too) many young teachers leave it within 5 years.

  Being exposed to innovative science, technology, and engineering, teachers will develop many STEM-related skills and will deepen many 21st-century soft skills. These include communication and advocacy skills, creativity, critical thinking and problem-solving abilities, project and time management, teamwork, budget planning and leadership.

  In addition, teachers will gain expertise related to the sector of the company of their placement (e.g. data literacy, digital learning, and many more). They will also have the opportunity to learn how to link the content and activities

that are developed within a classroom to business essentials. The aim is to make their teaching more embedded in the real, world.

## FOR STUDENTS

- **Keep students abreast of career opportunities in STEM**
  There is growing concern among industry and educators that career counselling in schools is inadequate. To solve this, teacher placements can help to keep not only teachers – but also students – in touch with current and future career opportunities and with less known professions.
  Engaging the company, teachers and their school in a long-term and broad collaboration will provide the ground for a deep-rooted impact on youngsters. Combining the teacher placement and activities involving students will have a deeper impact than focusing on only one of the target audiences. There are many ways to ensure interactions between students and STEM professionals: career talks, company visits, placements of students in industry, company representatives acting as ambassadors, employees involved in school STEM projects, etc. Embedding culture change and having a long-term impact on teachers' mind-set is more likely to have a sustainable impact than focusing exclusively on events targeting students and vice versa.

- **Help improve students' STEM learning experience**
  Increasing the quality of learning by strengthening the scientific, technological, engineering and mathematical literacy of all students is one of the primary objectives of STEM teacher placements in industry.
  Indeed, teacher placements are likely to produce or collect better teaching materials and resources that will be directly beneficial to students. For instance, material gathered during placements can help to link what sometimes appear to be only abstract subjects to the real world. This will contribute to the development of a better school curriculum or improved school resource development.

## FOR SCHOOLS

Engaging teachers in a placement in industry will be easier to organise and will have a long-lasting impact if the school has a clear STEM strategy. In their broader collaboration with the school, STEM professionals and their enterprise/industry more generally are encouraged to support the school in their effort to develop a STEM school strategy. The teacher placement will be part of this shift of strategy and mind-set in the entire school.

Cooperation with industry will strengthen the development of STEM school strategies and school leadership. For some schools it may be the start of developing a STEM strategy possibly in cooperation with industry.

As defined by the **STEM school label project**,[4] there are seven criteria that schools can follow to have an integrated STEM strategy as a learning organisation. Below we show how the teacher placement programme and these criteria can be interlinked:

- **STEM instruction**
  STEM instruction must be based on certain types of pedagogical methods that have proven to trigger motivation for STEM topics among students: the personalisation of learning; Project and Problem-Based learning (PBL); and Inquiry-Based Science Education (IBSE). The knowledge and resources gained by the teacher through the teacher placement will help bring innovation into STEM instruction.

- **Professionalisation of staff**
  The educational system and schools should allow and invest in the professionalisation of staff, providing extensive and regular professional development opportunities to teachers, ensuring STEM education is delivered by highly qualified professionals and a supportive (pedagogical) staff. The teacher placement can clearly be a contribution to the professionalisation of the teaching staff.

- **Connections**
  A STEM school strategy should also consider the development of connections with various stakeholders: industry professionals, parents/guardians, other schools and/or educational platforms, universities and/or research centres and local communities. Sustaining an ongoing connection with the companies involved in the TP will not only benefit teachers but also schools and possibly also the education system at local, regional or national level. Indeed, strong and stable partnerships with STEM industries can entail a wide array of benefits for schools – from facilitating work experience placements for students once they leave school, to the development of Continuous Professional Development opportunities for teachers. It can also consist of periodical organisation of STEM-related activities for students such as reciprocal visits from businesses to schools, STEM ambassadors from companies supporting schools, STEM professionals going back to school, and PBL approaches to STEM which might involve some industry professionals.

- **Curriculum implementation**
  To build a strong STEM strategy, the school should make sure that,

4 The STEM School label project has published the European STEM Schools report, an analysis of the key elements and criteria to establish and validate the definition of a STEM school. Connections with industries has been included as one of the key elements in this definition, after a consultation process with schools, STEM teachers, representatives of Ministries of Education and of STEM industries and STEM education academics. The full report is available here: http://stemschoollabel.eun.org

in curriculum implementation, emphasis is given to STEM topics and competences, interdisciplinary instruction and the contextualisation of STEM teaching. This contextualisation will be done through the connection of the lessons in the classroom to real-world experiences. With the knowledge and experience gained during the placement in an industry, teachers will be able to integrate into the curriculum the new resources they have acquired or developed. This process will be even more valuable if done after discussions with their fellow teachers and their head or management team.

- **Assessment**
  Assessment is key to the development of a STEM school strategy and the TP should follow the same principle. The strategy will involve a strong emphasis on the assessment of STEM courses, STEM teaching and learning with assessment put in place that is both *continuous* (students are examined continuously) and *personalised* (pupils have met specific educational goals according to their personal development).

- **School leadership and culture**
  The school leadership and culture should be developed with the implementation of governing boards and management teams but also a high *level of cooperation among staff* and an *inclusive culture* (sharing of success, respect for colleagues' ideas, etc.). The TP programme will strengthen the school as a learning organisation. To ensure best impact, the programme will be discussed with the head teacher and the team of teachers to create a basis for support for such placements. The teachers joining a TP will be able to disseminate to their colleagues all of the new knowledge, skills and competences learned in the placement, through staff meetings, presentations and sharing schemes of work. Moreover, management support will facilitate putting in place and implementing pre- and post-placement action plans integrated into the STEM strategy of the school and linked its action plan as a learning organisation.

- **School infrastructure**
  The school infrastructure should provide access to technology, equipment and high-quality classroom materials. In some cases, the TP can be an opportunity to be aware of STEM devices and equipment available for learning and teaching purposes.

# 2. DESIGNING YOUR STEM TEACHER PLACEMENT SCHEME

Main points to remember from the chapter:

- To achieve a relevant and beneficial teacher placement programme for all stakeholders, it is essential to collaborate with support organisations, such as ministries of education or others initiatives specialised in STEM education.
- The time and length of the programme depends on the companies needs, capacity, the schedule of the school year, and the time of leave of teachers.
- Promoting the call for teachers can transpire through educational organisations, the companies' own parents' networks, online and printed dissemination channels.
- It is important to clarify what the placement offers for teachers when disseminating the call.
- To enhance the quality of the placement engage teachers already before the placement, design innovative daily tasks for them, strengthen their ability to promote STEM careers, involve them in Continuous Professional Training activities, connect teachers from different schools, and build long-term relationships that last beyond the placement.

## 2.1. Getting in touch with all key stakeholders

To ensure a deep impact and relevance of the programme, companies should develop preliminary contacts with schools or educational authorities that may benefit from it. Thorough preparation is the guarantee for the sustainability of a TP. To make sure the

collaboration between the company and the industry is organised smoothly, you can refer to the ***inGenious code of conduct***,[5] the first European guide for schools and businesses to setting up such collaboration. Thanks to the input of both schools and industry, the inGenious code addresses key issues and offers clear checklists for all parties.

Experience shows that developing a teacher placement in close cooperation among companies, schools and educational authorities and other stakeholders may take six to nine months.

## INVOLVING THE EDUCATIONAL AUTHORITIES UPFRONT

As soon as a company or a sector organisation decides to offer a TP programme for STEM schoolteachers with a general idea of the objectives and opportunities offered, the first step will be to make contact with the relevant educational authorities.

Organisations like European Schoolnet, through initiatives like the STEM Alliance running the Teacher Placement Scheme, can advise on the educational authority to be contacted and later on support for outreach to schools.

Here are the **key reasons why the MoE should be involved from the very beginning** in the development of teacher placements:

- The country may have a STEM strategy and (in rare cases) funds to support it (e.g., in the United Kingdom, Insight UK). Companies have a great interest in setting their programmes in these existing frames.
- This collaboration will ensure the programme responds to concrete and clear needs of the education system in general and of the schools, teachers and pupils more particularly.
- Industry/MoE collaboration will enable the schools to focus on the link with the curriculum and on the practical aspects (administrative and financial) of such placement, linked to e.g. replacing a teacher during his or her periods of placement.
- It will not only help reaching out to all schools equitably but will also contribute to enhancing the impact at regional and national systemic level.
- It will be much easier for companies to develop and implement their teacher placement proposal if they know what the schools and teachers want and need.

5 Guide available here: http://www.eun.org/resources/detail?publicationID=301

### INVOLVING OTHER STAKEHOLDERS

According to the kind of placement envisaged it might be useful to involve other stakeholders such as a university or pre-service teacher education institution, parents, the municipality or other local community organisations.

## 2.2. Understanding your organisation and its needs

**Once the first contacts have taken place, your first and main priority is to reflect and define your teacher placement programme, focusing on objectives and concrete activities**. You may be serious in your wish to improve STEM education but you should still pick a specific strand to focus on.

Having explicit objectives can prove very useful to evaluate the outcomes of the placement scheme and to improve your performance as a host.

- For instance, a company in the pharmaceutical area might want to promote the use of chemistry and pharmacology examples to illustrate the curriculum across all STEM subjects, so students can understand the value and the need of this content in the field;
- Another example is that of a company operating in the transportation field, which will support the promotion of interdisciplinary education, focusing on how to link STEM with non-STEM subjects, to make students aware of how different abilities (numeracy, commercial awareness, etc.) are needed in the industry;
- A company with a focus on robotics might be interested in supporting coding workshops for teachers, providing them with the necessary skills to teach students while informing them about career paths in the sector;
- Last, a corporation in IT will want to give information to students about the many different careers offered by the industry – software engineer? systems analyst? – showing students what these jobs entail and encouraging them to enter this field.

> *The STEM Alliance has built up a body of knowledge from academia, STEM education experts and businesses, which show the importance of investing in STEM education to reduce the expected skills gap in the European labour market.*

Scroll through this publications catalogue to find a curated selection of books, research papers, articles and other publications that will provide you with a range of background

information to define your objectives in the promotion of STEM education and STEM careers.

Overall, being aware of your organisation and its needs will help you to develop the type of knowledge you want to transmit to the teachers, the kind of tasks and activities you want them to perform during the placement, and the strategy of your company in supporting STEM education and STEM careers

Other elements to consider that will help to design and create the framework of your teacher placement are the following:

- **Setting clear, specific and measurable goals for your company's teacher placement programme.** Consider whether you need support completing a specific project or programme, are supplementing staffing needs, or are supporting talent among teachers.
- **Reflecting on whether and how your company will benefit from hosting a number of teachers.** If so, what type of work would you benefit from (writing and research tasks, provision of overall organisation or programme support, etc.)?

Last, you should also be aware of your **logistics and overall capabilities** to develop and implement a teacher placement scheme. Consider whether your company has the resources to support it or whether you can offer relevant industry experiences, such as attendance at workshops or other types of training, during the placement. Only when you can guarantee the issues will you be prepared to bring teachers on board.

## 2.3. Connecting with support organisations

### SUPPORT OF SPECIALISED STEM EDUCATION ORGANISATIONS

A successful teacher placement will greatly depend on a successful partnership. Working with experienced organisations specialised in STEM education can provide support for the set-up of the teacher placement programme, especially for first-timers.

Many organisations with experience in the field can act as intermediaries and provide businesses willing to set up a TP scheme with support. These range from national institutions to platforms operating internationally and can focus on different areas and levels of STEM education. Examples of such organisations are the National STEM Learning Centre of the United Kingdom, the foundation *La main à la pâte* in France, the LUMA Finland Centre in Finland or the IMST centre in Austria.

Companies can join an already existing teacher placement programme that groups several companies. A list of these programmes is available in the *Teacher Placement Initiatives – Collection of Best Practices*, available here: http://www.stemalliance.eu/teacher_placement.

Various organisations provide opportunities for teachers to collaborate with the industry. The following section focuses specifically on these.

Below are examples of established organisations, institutions and initiatives already involved in collaboration between teachers and industries. The list does not aim to be an exhaustive catalogue of organisations working with teacher placement, but to highlight a variety of existing good practices of collaboration between teachers and industry (e.g. organisations involved in different teacher-industry activities, a representation of different countries). Make sure to check their websites to familiarise yourself with their work.

## AT NATIONAL LEVEL

In most European countries, we can find many STEM education organisations that operate at national and/or regional level and carry out STEM education projects that involve both schools and industry. Liaising with them can be a fruitful way to understand in what ways it is better to involve educators in teacher placements.

Universities and other higher education institutions are key organisations to approach as research bodies and responsible for pre-service and / or professional development / in-service teacher education. Connecting with universities will help you understand the needs of teachers and the kinds of opportunities you can offer them through schools/ business collaboration. These institutions can also provide support if you want to set up an evaluation framework for your TP programme, as they are used to developing research evaluation and quality assurance procedures based on up-to-date knowledge and research. *(For more information about evaluation procedures, please check Section 4. Evaluation of Teacher Placement schemes.)*

Here is a non-exhaustive list of national STEM and/or educational organisations, initiatives and projects to consider for the development and implementation of teacher placements:

- **Smart Futures**
  **http://www.smartfutures.ie/ - Ireland**

A collaborative government-industry-education programme that provides second-level school students in Ireland with information about careers in STEM. With partner organisations working together under the Smart Futures umbrella, the framework proposes a series of strategic steps for better coordination of the delivery of STEM careers resources, to achieve a more effective means of evaluation and greater impact

- **The Freie Universität Berlin and the Berlin-Brandenburg Science Academy – TuWas! project**
  **www.tuwas-deutschland.de - Germany**

The aim of this project is to promote IBSE in primary schools. The regional project

"TuWaS!-Köln/Bonn" is run by the Chambers of Industry and Commerce of Cologne and Bonn/Rhine-Sieg. Ideally, a company is twinned with a primary school (grade 1-4) or a lower secondary school (grade 5-6), financing the participation of that school in the TuWaS! programme.

- **Professeurs en Entreprise – Fondation CGénial**
  **https://www.cgenial.org/82-nos-actions/84-professeurs-en-entreprise - France**

Every year in November this action offers:

- Quality visits to research and development, innovation and production sites throughout France, in the presence of scientific managers and engineers for in-depth exchanges.
- These visits are free, open to secondary school teachers, school heads, other school staff and other executives of the national education system, only on registration and within the limits of available places.

In 2018, almost 240 sites will welcome teachers, in mainland France and overseas, in November. Among them: Arkema, Colas, Eurotunnel, IBM, Safran, Saint-Gobain, Schlumberger, Solvay, TechnipFMC... and many others.

- **Eerst de Klas**
  **http://www.eerstdeklas.nl/ - the Netherlands**

Eerst de Klas is a two-year programme targeting excellent young academics who are interested in education and business. In a form of a traineeship, university graduates get a chance to spend several days a week teaching after graduation, before launching their career in business. By the end of the two-year programme, they earn a teaching certificate as well as the experience that comes with taking part in an intensive business leadership programme.

- **ENTR'APPRENDRE**
  **http://www.entrapprendre.be – Belgium**

Entr'apprendre, launched in 2015, is an initiative by the Foundation for Education *(Fondation pour l'Enseignement*) set up by the French community of Belgium. The aim is to upgrade Vocational Education and Training (VET), to support positive orientation by developing entrepreneurship skills and information on work opportunities and jobs of the future, and to stimulate CSR by encouraging skills transfer between businesses and schools. In this context, the Foundation actively promotes placements in industry for teachers. More information:

- Professional development opportunities through Entr'apprendre:
  http://www.ifc.cfwb.be/documents/multi/JDFentrapprendre.pdf
- Fondation pour l'Enseignement:

http://www.fondation-enseignement.be/

- **Lehrer in der Wirtschaft (Teachers in Business) https://www.vbw-bayern.de/vbw/ServiceCenter/Wirtschaft-und-Gesellschaft/ - Germany**

Lehrer in der Wirtschaft (Teachers in Business) offers secondary school (*Gymnasium*) teachers the opportunity to get a real sense of the diverse work carried out within a company. More information in the brochure:

http://www.bildunginbayern.de/download/LidW-Schulleitung_2011_Flyer.pdf

- **STEM Insight https://www.stem.org.uk/stem-insight - United Kingdom**

STEM Insight has been developed to give staff in schools and colleges a unique chance to experience work in modern industrial or academic settings and use this insight to enrich the teaching and learning of STEM subjects. The programme provides participants with a wealth of knowledge and allows them to contribute to the careers strategy of secondary and post-16 students. Participants have the chance to attend a leading UK industrial or university setting over a five- or ten-day placement.

- **STEM Teacher Internship Programme, Dublin City University & Accenture https://www.dcu.ie/physics/news/2016/jun/stem-teacher-internship programme-launched-dcu-accenture-and-30-club.shtml - Ireland**

A first-of-its-kind internship programme, specially designed to give pre-service teachers hands-on industry experience of working in a STEM role in industry, so that they are better positioned to provide guidance and encouragement and bring their experience to life in the classroom.

- **VETtLIS supported by the MoE in Montenegro, the Centre for Vocational Education and the Chamber of Economy https://connections.etf.europa.eu/communities/community/cpd - Montenegro**

The VETtLIS project (VET teachers as learners in the industry sector) aims to build a partnership between national educational and business organisations through the establishment, design and delivery of 20 teacher placements in industry for vocational teachers, in Montenegro.

The VETtLIS project is led by the **MoE in Montenegro**,[6] which has defined as a main objective of its education system to develop Montenegro as a knowledge-based society using education as a crucial pillar for social and economic growth. The project partners are:

6 http://www.mps.gov.me/ministarstvo

- The **Centre for Vocational Education**,[7] a developmental, advisory and research institution, established to advance vocational and adult education systems and aimed at producing professionals; and
- The **Chamber of Economy of Montenegro**,[8] a business association for the economic and overall development of Montenegro. The Chamber has conducted various successful projects with international partners. It plays a significant role in the reform of the national education system.

## EUROPEAN ORGANISATIONS OR ASSOCIATIONS, PLATFORMS

There are also organisations operating at an international (mostly European) level. The STEM Alliance, through its portal, has set up a list of initiatives at national and EU level handling collaboration between industry and STEM education. Make sure you check the whole list of initiatives through the following link: http://www.stemalliance.eu/stem-initiatives.

Here is a non-exhaustive list of European and global STEM and/or educational organisations to consider as key stakeholders for the development and implementation of teacher placement:

### *AMGEN FOUNDATION - AMGEN SCHOLARS*

(http://www.amgenscholars.com/ - International)

The Amgen Scholars programme engages undergraduate participants to carry out a research project under the supervision of recognised researchers and institutions. The programme offers an outstanding learning experience in the field of biotechnology in the form of seminars, networking events and a symposium. Amgen Scholar offers a summer programme to undergraduate students to participate in cutting-edge research opportunities at notable institutions in three regions of the world (US, Europe and Japan).

### *T³ EUROPE – TEACHER TEACHING WITH TECHNOLOGY*

(https://www.t3europe.eu/home/ - International)

This programme shares ideas and visions on the implementation of Texas Instruments technology in Maths and Science. It also offers teachers the opportunity to use various activity plans and resources as projects in the classroom, inspired by the latest technology of different companies, research institutes and organisations. Using these resources brings real-life innovation and technology into the classroom.

7 http://www.cso.gov.me/centar

8 http://www.privrednakomora.me/

In addition, there are a variety of great teacher placement initiatives in place in the United States and Australia. Please make sure to see some of them listed in the Teacher Placement Initiatives publication of the STEM Alliance and SYSTEMIC.

## EUROPEAN, NATIONAL OR REGIONAL ADMINISTRATIONS AND MINISTRIES

The administration, with its institutions at local, regional and national level, and as responsible for policy measures that directly affect schools, teachers and students, will be of great relevance when trying to set up teacher placement schemes.

### *MINISTRIES OF EDUCATION*

Many administrations have launched initiatives to address the problem of insufficient STEM career information among secondary students:

- For instance, the Department of Education and Training of the Flemish Community of Belgium has developed the STEM Framework for Flemish Schools: Principles and Objectives. This framework is addressed to schools but it can also *"serve as a source of inspiration for all bodies investing in STEM, like for instance STEM Academies, companies, sectors and scientific institutions. Ideally, they can use this framework to examine their own approach and to be in dialogue with the education sector, in a formal and informal context."*[9]
- ***Eerst the Klas initiative*** is part of the overall strategy Teacher 2020 of the Dutch MoE, to improve teacher education and STEM education.[10]
- In Germany, since 2001, more than 120 high-school teachers have engaged in the ***Lehrer in der Wirtschaft*** (Teachers in Business) initiative, through the Bavarian Industry Association (vbw) and the Bavarian State Ministry of Education, Science and the Arts.[11]
- In France, the ***Professeurs en entreprise initiative*** organises half- to one-day visits in R&D (Research and Innovation) companies or research centres. They are intended for teachers and other key professionals in school education such as inspectors (IEN and IA-IPR), heads of schools, STEM counsellors (CAST) or innovation counsellors (CARDIE), pedagogical

9 https://onderwijs.vlaanderen.be/sites/default/files/atoms/files/STEM-kader%20%28Engels%29.pdf

10 European Schoolnet (2017) Teacher placement initiatives - Collection of best practices, Brussels, Belgium, p7. See here: http://www.stemalliance.eu/teacher_placement

11 European Schoolnet (2017) Teacher placement initiatives - Collection of best practices, Brussels, Belgium, p21.

advisers and representatives of the MoE.[12]

- The ***VETtLIS*** project, which includes a teacher placement, in industry programme is led by the MoE in Montenegro, which has defined as a main objective of its education system to develop Montenegro as a knowledge-based society using education as a crucial pillar for social and economic growth.[13]

> *We recommend devising the programme, the recruitment and identification of teachers in line with the needs of the national education system, in collaboration with the Ministries of Education or other educational authorities of the country.*

A list of Ministries of Education in Europe members of European Schoolnet with the reference to their portals is available here: http://www.eun.org/about/members

European Schoolnet, as a network of 34 European Ministries of Education, based in Brussels, aiming to bring innovation in teaching and learning to key stakeholders (Ministries of Education, schools, teachers, researchers, industry partners), can support collaboration to set up the placement programme. European Schoolnet is driven by its mission to support education stakeholders in Europe in the transformation of education processes for 21st century digitalised societies.

### *UNIVERSITIES*

Finally, collaboration with universities at regional or national level can also be considered, to enrich the teacher placements in different ways:

- Having university graduates working several days a week as secondary school teachers for a certain period. In addition to earning a teaching qualification, they take part in an intensive business leadership programme. This was for example implemented in the ***Eerst de Klas*** programme in the Netherlands. It was built on the active involvement of all key stakeholders: business and other organisations, schools, university, teacher training institutes and educational authorities, and the VO-Raad or Secondary Education Council. When a candidate is accepted, he or she is linked to one of the following ULOs: Centre for Teaching and Learning (Utrecht University), ICLON (Leiden University), ILO (University of Amsterdam), Radboud Teachers' College (Radboud University Nijmegen), ESoE (Eindhoven University of Technology), ELAN (technical University of Twente), VU University

12 op. cit p25.

13 op. cit p62.

Amsterdam, Delft University of Technology or the University of Groningen.[14]

- Universities can also be involved as sites of teacher placement, e.g. in the UK, with the ***STEM Insight programme***, participants have the chance to attend a leading UK industrial or university setting. The insights they gain in universities are to learn about the rapidly evolving and developing STEM disciplines and commercial opportunities that arise from university research.[15]
- In Germany, Ireland and the United States, a number of teacher placement programmes are run by or in collaboration with universities, for example:
    - Accenture runs the ***STEM teacher internship programme*** in Ireland in collaboration with Dublin City University. They came together with the 30% Club Ireland to take this action. This first-of-its-kind internship programme is specially designed to give pre-service teachers hands-on experience of working in a STEM role in industry. [16]
    - ***TuWaS!*** (Technik und Naturwissenschaften an Schulen) is an initiative by the Freie Universität Berlin and the Berlin-Brandenburg Science Academy.[17]
    - The ***Kenan Fellows Program for Teacher Leadership***[18] taps the wealth of professional expertise in North Carolina's private sector, universities and community colleges to enrich learning opportunities for teachers and students. Teachers, researchers and businesses collaborate to make science and maths education relevant, engaging and, above all, effective.[19]
    - The ***STAR Program*** is run by CESAME of the California State University[20] (CSU). It aims to produce excellent K-12 STEM (pre-service) teacher-students and teachers by providing aspiring teachers with opportunities to do authentic research while helping

14 European Schoolnet (2017) Teacher placement initiatives - Collection of best practices, Brussels, Belgium, p7.

15 op. cit, p31.

16 op. cit, p35.

17 op. cit, p57-60.

18 https://kenanfellows.org/about-us/

19 European Schoolnet (2017) Teacher placement initiatives - Collection of best practices, Brussels, Belgium, p17-20

20 http://cesame.calpoly.edu/

them translate this research experience into classroom practices. STAR also supports the continued development of STAR Teacher-Researcher Fellows with ongoing professional development and networking opportunities.[21]

## *AN EXAMPLE OF TEACHER PLACEMENT PROGRAMME: STEM AMBASSADOR ACADEMY*

In 2018, CA Technologies launched its STEM Ambassador Academy to help teachers gain insight into the skills needed for jobs of the future. Through industry placements, the Academy aims to enrich teachers' Continuous Professional Development and help address the chronic talent shortfall in Europe.

"There is a chronic skills gap in science, technology, engineering and maths (STEM) in Europe – too few young people, especially girls, are studying these subjects and then going into related careers. From the classroom to boardroom, many factors impact young people's perceptions of STEM. The STEM Ambassador Academy is part of Create Tomorrow, designed to inspire the next generation of innovators, by connecting with school teachers who have a significant influence on their students' career choices," said Sarah Atkinson, Vice President Communications for EMEA at CA Technologies & Board Member at techUK, on the launch of the Academy.

The first group of teachers, from more than ten secondary schools, attended the Academy's series of interactive workshops at the company's UK headquarters. The next placement is planned for the end of 2018 at the company's Prague office, and CA STEM Ambassadors are working with the Czech Ministry of Education to align the placement with the Ministry's STEM agenda.

The Academy includes a set of interactive workshops, which include an introduction to unconscious bias and gender stereotyping, where teachers learn how to recognise and manage these behaviours in the classroom. In an Agile Fundamentals Lego workshop, teachers get hands-on experience in learning the concept of agile working, which encourages team collaboration to stimulate creative thinking and problem-solving skills. In the Prague placement, teachers are assigned CA mentors whom they will shadow for the day. During this time, they will learn how the STEM subjects they teach relate to technology jobs and the value these skills bring to the digital market.

To further enrich the STEM Ambassador Academy experience, CA Technologies nurtures relationships with teachers after their placement through its STEM Buddies initiative. Employee volunteers, CA STEM Ambassadors, work with schools to show them the value of technology skills and careers in building a better future for everyone. As part of the continued collaboration, teachers attended a People Like Me workshop

21 European Schoolnet (2017) Teacher placement initiatives - Collection of best practices, Brussels, Belgium, p27-30.

– a programme created by the WISE campaign to help change schoolgirls' perceptions about STEM careers.

## 2.4. Choosing the right time and length of the Teacher Placement

Ideally, a TP should enable educators to get into the rhythm of the position and to complete activities or projects that are valuable to both the teacher and the industry host. **For this reason, choosing its right time and length might determine the scope of activities that teachers will be able to undertake and the range of opportunities for the development of knowledge and talents during the placement. The length will also be determined by the possibilities there are to replace the teachers involved in the placement.**

While TP schemes can vary greatly, we can outline a few main types:

- Short teacher placements: Short teacher placements usually take from 1 to 10 days, in a block period or spread over the school year and can be with either limited or extensive professional development. They can involve one teacher but sometimes teams of teachers can be involved for a very short period. In certain cases, company representatives or others carry out work with the pupils while the teacher is involved in his/her placement. Although companies usually offer these types of placements, they can also take place in spin-offs or research labs of universities.
- Long teacher placements: These are TPs that last several weeks and can be offered with limited or extensive professional development. Not only teachers or other school staff can be involved but also future teachers. In the latter case, the students can receive credits for their placement.

- **How long should the teacher placement last?**
  The length of the teacher placement should depend on the objective of the scheme. Specifically, it will depend on which tasks you want teachers to perform: Are they going to be linked to a specific project? Or are they just supporting the overall functioning of the organisation?
  For a company setting up a very first TP scheme, a smart option would be to start piloting a short-term placement, evaluate the experience and its outcomes and assess the logistics you have made use of. You will be able to learn from this first experience and plan your next actions. It may also be useful for a company new to placements to start by having a contact with a company that has already implemented a teacher placement. Tapping into their practical experience may prove very useful.

- **What time of the year can you host a teacher/intern?**
  Determining the ideal start and end dates for a teacher's placement is quite a complex matter:

  - If you are interested in developing a long TP programme, it will be best to plan it during teachers' vacation time. Many teacher placements are planned as "summer professional development programmes" which can last up to 3 months, depending on the length of the school summer vacations.
  - You should also bear in mind whether teachers have the opportunity to be "on leave" while they become temporary employees in your company and whether they will receive any compensation (and from whom) during that time.
  - In some cases, the administration (MoE or similar) will support teacher placement schemes by ensuring a replacement while the teacher is away or by providing them with some kind of compensation or related benefits.

## 2.5. Recruiting and planning the teacher placement programme

### RECRUITING TEACHERS AND PROMOTING YOUR TEACHER PLACEMENT PROGRAMME

Educators at all levels are usually the main target of STEM teacher placements in industry, particularly those in primary, general secondary schooling and VET. However, involvement in teacher placements can also be very beneficial for other school staff. This is the case of heads of science departments, science coordinators at primary or secondary schools, career counsellors and STEM lecturers in pre-service teacher education or in institutions organising STEM Continuous Professional Development. Short placements (1/2 day) a week for several weeks may also prove to be very useful to heads of schools as they are the cornerstone of STEM strategies within their school.

- **Where to promote your teacher placement programme?**

Promoting your teacher placement programme will be essential to get teachers interested in it and to maximise the number of applications, especially if you are launching a new programme that is still relatively unknown. You can do so by taking full advantage of your company's resources but also by leveraging your network of contacts, especially those involved in the programme. Below you can find a few actions you can take in order to sponsor your programme:

### *THROUGH DIRECT CONTACTS WITH SCHOOLS (IN COOPERATION WITH THE MINISTRIES OF EDUCATION)*

- The first method to reach out to schools is to collaborate with the MoE or related educational authority as recommended earlier in the guide in the section dedicated to the design of your teacher placement programme.

### *THROUGH YOUR OWN CHANNELS*

- Parents who are employees of companies and are involved in parents' organisations can disseminate information at school level. If a school already has a STEM ambassador from a company, he or she may be the right person to inform teachers and the headmaster about the possibilities and potential of a teacher placement.
- The broadest way to promote your placement scheme is to disseminate it online. Make all the information available through your corporate websites and use your social media accounts. Post it on Facebook, Twitter and in professional online networks such as LinkedIn. In addition, using other social media profiles connected to your company will also help spread the word.
- Printed advertisements might prove useful, too. Design attractive flyers and handouts, print them and distribute them at events your staff might attend too.

### *THROUGH NETWORKING*

- Whenever company employees are acting as speakers or company representatives at events, encourage them to share the advantages and opportunities of the placement scheme to the audience and show them where they can find all the necessary information to apply.
- Liaise with education institutions and authorities to make sure the placement is advertised in national dissemination channels targeted at teachers and other school staff (portals, newsletters, face-to-face events, etc.).
- Make use of news outlets (such as newsletters, digests, newspapers, etc.) whose audience is relevant for your programme.

The STEM Alliance offers numerous channels of communication through which you can highlight your programme. Twitter: @stemalliance_eu - Facebook: @StemAllianceEU. If you want more information, contact us through the following email address stemalliance@eun.org.

In addition, make sure you publish content related to your programme regularly and, in general, always make sure you target your dissemination efforts to the main audience you want to reach, whether teachers, schools or STEM education organisations and authorities.

- **How to promote your teacher placement programme**

When advertising TP positions, it will be essential to make available as much and as specific information as possible. It is very important to make clear the duties of the teacher and also the responsibilities of the host company and the school. The duties, responsibilities and opportunities of the teacher should be agreed upon in the preliminary discussions involving the school, the teachers and the companies. In this way it will becomes a win-win operation for the company, the sector organisation and the school with its teachers.

When drafting a teacher placement description, make sure the following information is made available:

- The purpose of the TP and its contribution to the company's mission;
- The objective of the TP for the school and the teacher and its contribution to the school's STEM strategy;
- The department where the placement will be performed and the main activities and tasks that will be required of the teacher; the department should be involved in the design of the placement in cooperation with the school and the teacher;
- Information about the Continuous Professional Development activities that will be offered and the concrete outcomes that are expected from the placement for the company or the school: e.g. description of STEM careers in the companies useful for students; the development of pedagogical resources useful to teachers and/or students;
- The application and selection process specificities and other administrative aspects.

## HOW TO DEVELOP A QUALITY TEACHER PLACEMENT

- **Improve teachers' engagement before the placement.**
  Involving teachers actively in preparing the placement programme and providing them with background materials prior to starting the placement can be a great way to excite and inspire them for what is to come. In addition, they will start the training with a better understanding of the organisation and the tasks they are expected to perform. Informing clearly the head and fellow teachers may also prove to be stimulating at school level.

- **Design innovative activities as daily tasks.**
  From workshops to company presentations or specific hands-on activities, a wide array of tasks and activities can boost teachers' capabilities. Enable them to participate in company tasks that teach them something that can be used in the classroom while actively contributing to the company's purposes.

In that manner, you will be able to design a teacher placement that enables educators to improve their abilities in STEM and to actively participate in the sector. It is important always to ensure that the activities will be beneficial to the company, to the teacher, his/her fellow teachers, the pupils and the school.

- **Strengthen teachers' ability to promote STEM careers**
  Organise activities that will provide teachers with a better idea of the different employee profiles existing in your company. In addition, enable them to understand which are the most important and most needed skills not only within your company, but also within the sector you operate in, and any current and future career opportunities for future young professionals. The teacher could before the placement have analysed the needs of his or her students in terms of career counselling so that he/she can address their questions and concerns during the placement.

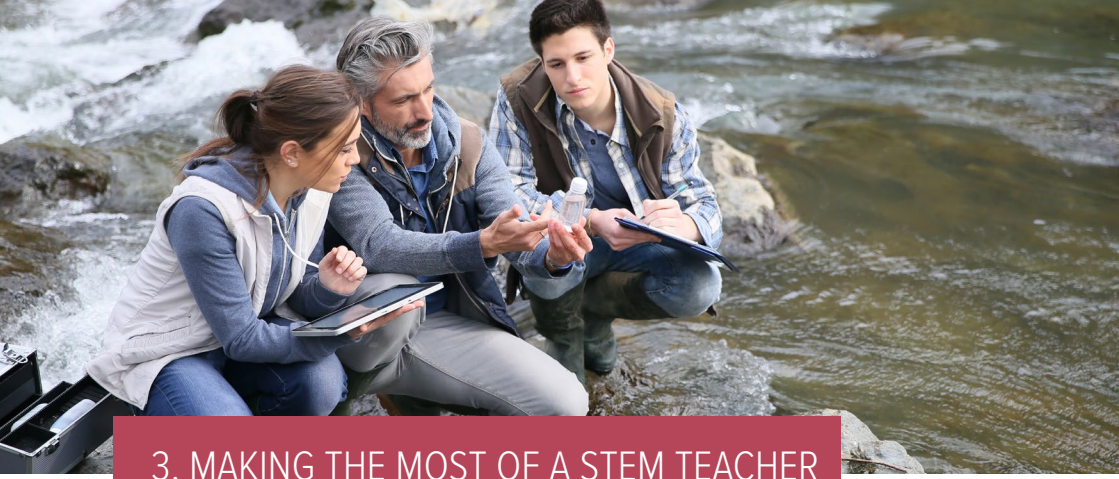
- **Provide teachers with Continuous Professional Training**
  Aside from the day-to-day tasks the teachers will be assigned to, your company can support additional on-the-job training. Many companies have training materials, courses and company workshops the teachers can join or have access to, while in the placement.
  Teachers involved in the placement may be involved in the Continuous Professional Development (CPS) organised by the company for its employees. Teachers may also organise a CPD session on STEM education at their school for the employees and reflect with them on how to improve it. This may result in new company activities at school level such as STEM ambassadors or employees supporting STEM projects in the school.

- **Connect teachers / educators from different schools**
  Consider taking more than one teacher at a time, from different schools. This has the potential to provide teachers with a richer environment and help them build links with like-minded peers and across schools. Networking and the creation of learning communities among teachers and possibly employees are another key to the success of the placement programme.

- **Build up long-term relationships**
  Following up with the teachers will be essential to ensure the sustainability of the placement and its outcomes. By maintaining the contact, you will be able to follow up and evaluate whether educators have learned from the experience and how they are transmitting it into their schools. Follow-up activities could be a students' STEM fair showing the project that have been developed in cooperation with industry or companies. Such fairs may be open to other schools and other companies to promote teacher placements.

## Best practice #1!

*Teachers will have worked hard at completing their tasks, during the teacher placement. Why not highlight their work during company presentations? This will be a great way to thank them for their work and to show their accomplishments. Moreover, it will allow you to display the teacher placement programme and its outcomes.*



# 3. MAKING THE MOST OF A STEM TEACHER PLACEMENT SCHEME

Main points to remember from the chapter:

- Teachers can benefit from an initial induction session, explaining the context and activities of the company.
- Assigning a mentor to monitor and maintain a connection with the teacher throughout the placement will help teachers transition to the workplace, answer their questions on daily activities, and support them achieve their long-term goals.
- Success factors are many, among which for companies it is crucial to remember the integration of the programme into company strategies; making the placement ideal for all stakeholders involved; and offering a relevant function that is interesting for the teacher.
- Securing long-term support from educational authorities contributes to the sustainability of the project.
- Setting up effective procedural guidelines at the company level facilitated the organisation of further teacher placement programmes.

## 3.1. Induction and mentorship

### INDUCTION

When entering the teacher placement, teachers will be unacquainted with the activities, environment and purposes of your organisation. However, while placed in the company, they will need to follow certain aspects related to your company policies.

Make sure you provide teachers with this and other background company information through a general induction session, at the beginning of the placement. Teachers will be able to take responsibilities and contribute to your mission if they understand your organisation and its operation. They should have an induction before they join your company or organisation.

On the other side, the mentors who will follow the teachers will be informed of the needs and expectations of the school and the teachers. A placement should respond to the needs and expectations of the school (teachers and students) and of the company.

During the induction sessions, you can inform teachers about the following:

- The company's background and an overview of the services or products manufactured;
- The company's mission and who benefits from it;
- Why the company is engaged in promoting STEM education and what is the purpose of creating a TP scheme;
- Any specific work standards and administrative procedures that teachers should follow during the placement;

## MENTORSHIP THROUGHOUT PLACEMENT

Assigning mentors to participating teachers will ensure they make the most of their time in the company, since they will be assigned the role of facilitating teachers' personal and professional development. A mentor should be assigned as early as possible in the development of the teacher placement and before it actually takes place.

Ideally, mentors will work in the same department as the teachers and will be assigned taking in consideration the STEM specialisation(s) of the teacher. In addition, it is advisable to allocate specific time that mentors will use to train the teachers. During this time, they will give them information about the organisation and explain the projects and the processes. It will be an opportunity to discuss the progress of the placement and any adaptation needed.

Mentors will also be in charge of supporting teachers during the whole teacher placement. This means helping to make the transition to the workplace as easy as possible as well as answering any questions or concerns they might have. Additionally, it is advisable they give teachers regular feedback, that they monitor teachers' adaptation to the company, and that they discuss how they can maximise the growth of their skills during the placement. In addition, making sure teachers are aware of how their work is contributing to the organisation's objectives on the one hand and the school's objectives at the other hand will encourage their confidence and participation

in the programme.

The mentor has a key role in a teacher placement and may require a minimum training as a mentor for the employee concerned before he/she takes on this role. In some cases, companies may already be working with mentors such as experienced employees who support novice employees and, in that case, their experience may be very valuable in helping teachers during placements.

## SCENARIO FOR SHORT-TERM PLACEMENT

### I. BEFORE THE PLACEMENT:

- The teachers discuss the possibility of a placement with their head and with colleagues
- The teachers prepare the visit:
  a. Developing a pedagogical plan with: the objectives, learning outcomes, competences and skills that teachers and students will gain. This pedagogical plan can be discussed with the mentor in the company and finalised by focusing on the concrete outcomes agreed upon.
  b. Choosing a topic they want to work on in advance of the placement, starting working on a lesson or other type of activity (e.g. discussion with the pupils or communication with the municipality, parents, etc.).
  c. Preliminary contact(s) are organised with the mentor.
  d. The team within which the teacher will work during his placement is informed about the placement and the plan agreed upon.
  e. Teachers fill in a survey about their needs and expectations and a pre-questionnaire for evaluation purposes.
- The company:
  a. The company makes contact with the educational authority and key educational stakeholders as described above.
  b. The company selects mentors to follow the teachers during their placements. Ideally, the topics the teacher is teaching should be matched with the speciality of the mentor.
  c. The mentors are informed about what is expected from them in the process:
    - Following the placement with the teachers on a regular basis
    - Staying in contact with the teacher to co-build the activity in schools
    - Possibly going to the school to talk to students
    - Filling in the questionnaire for the mentor after the activity.

### II. THE PLACEMENT:

Placement in the company offices with a part of the programme dedicated to job shadowing and the opportunity to discuss their activity plan with the mentor.

**III. AFTER THE PLACEMENT:**

- Putting in place a follow-up with teachers and analysing how they applied the knowledge gained in the placement in their teaching practices
    a. Teachers finalise their lesson/activity plans, pedagogical resources etc. Possibly going back to the mentor and integrate the knowledge, they gained during the placement. A recommendation is for teachers to prepare the activity plan with the mentors that shadowed them during their placement.
    b. Share activity plans and reports with the STEM Alliance to make sure it becomes a best practice and inspire fellow teachers around Europe.
    c. STEM professionals from the company going to the schools of these teachers to engage in collaborative activity with the pupils.
- Evaluation of the impact with the teacher and the mentor.
- Debriefing session with the STEM teachers and the STEM mentors from the company and possible representatives from the Ministry and other STEM stakeholders some months after the placement to share views on the impact in the class and on students and keep the network active.

## 3.2. Success factors of STEM teacher placements

A number of success factors of STEM teacher placements have been defined based on the work done by the STEM Alliance[22] (within the Teacher Discovery Placement Scheme) and in conjunction with a number of stakeholders (companies, NGOs, universities, teachers) concerned with encouraging innovation in STEM education and supporting initiatives to attract young people into STEM careers.

In particular, the success factors published in this section are the results of an extended consultation process initiated in 2017 with the European Schoolnet MoE STEM Working Group representatives,[23] with partners of the SYSTEMIC project[24] and with company partners of the STEM Alliance.[25]

While these success factors address all stakeholders involved in the design and implementation of a Teacher Placement Scheme, those under the section “Companies” are the most relevant ones for industry representatives trying to set up a teacher placement.

22 http://www.stemalliance.eu/teacher_placement

23 Find more information about the STEM Working Group of European Schoolnet in the European Schoolnet’s Annual Report 2016, on page 6: http://www.eun.org/documents/411753/817341/EUN+Annual+Report+2016_public_November2017_v3.pdf/a25dc-1cc-2328-4416-a987-3138201abcf5

24 Find more information about SYSTEMIC here: http://www.stemalliance.eu/stem-initiatives/detail?articleId=736815

25 Full list of STEM Alliance partners available here: http://www.stemalliance.eu/partners

## ADMINISTRATION

- To make sure the teacher placement programme answers a real need of the educational sphere, try, as much as possible, to involve the public authorities in charge of the school curriculum. The placement will be more successful if it relies on the following factors:
- The integration of the teacher placement into the STEM strategy of the country or region as a means to enhance the quality of STEM education. Make sure you are informed about the national STEM strategy and the possible budget and administrative support available for it in the area, e.g. the Insight programme in England.
- The support given by the national or regional MoE to the organisation, implementation and evaluation of teacher placements.
- The recognition of teacher placements as a fully-fledged form of Continuous Professional Development for which credits can be awarded leading to a new qualification or degree.
- The impact the teacher placement has on the curriculum in general and in particular on the STEM subjects and on interdisciplinary activities between STEM subjects and other disciplines.

## SCHOOLS

- Another key body to engage in the design and implementation of the placement programme are the schools. Teacher placements will be more successful if the management of the school is informed and engaged in the programme and aware of the following success factors:
- The integration of the teacher placement into the STEM strategy and overall pedagogical plan of the school.
- The support the school (its management and stakeholders) give to the involvement of teachers in teacher placement.
- The contribution the teacher placement makes to career counselling of students.
- The contribution the outcomes of the Teacher placement has on CPD for fellow teachers within the schools.
- The dissemination and valorisation of the outcomes of the teacher placement towards all teachers, the school, and the staff of the company.
- The teacher placement resulting in various forms of cooperation between school and industry: better study visits to companies, better internships for students in the company, etc.

- The opportunity for teachers to involve their students in the placement.
- Dissemination and valorisation towards other schools and possibly towards the MoE.

## COMPANIES

- The placement programme will have more impact and success if you keep the following elements in mind:
- The integration of the teacher placement into the outreach strategy of the company towards the local community and into its human resources strategy.
- The support given to the teacher involved in the teacher placement by the host company in general and the mentor put at the disposal of the teacher.
- The fact that involvement in a teacher placement is a win-win situation for the school and for the industry as outlined in the agreement between the company and the school.
- The support the company should give to the placement offer to give teachers the opportunity to select the company and the department where they want to be placed. The company should be well aware of the work and the allocation of resources involved in the process of implementing a teacher placement.

## ALL STAKEHOLDERS

To make the placement programme a success, all entities and actors involved should take measures to implement the action below:

- The evaluation of the teacher placement by all the stakeholders concerned to measure its impact on all teachers and staff of a school, students and the company.

The STEM Alliance, through the Teacher Discovery Placement Scheme, provides support to all stakeholders involved. For more information, see: http://www.stemalliance.eu/teacher_placement

- Sharing case studies and testimonials to present and attract companies, public authorities and teachers to engage in placements in industry programmes, especially in countries where such a scheme has not been implemented before.

*The STEM Alliance is already contributing to the sharing of case studies, through its Teacher Placement Initiatives – Collection of Best Practices booklet, containing a selection of 15 initiatives collected from 10 countries around the world, providing inspiring examples of STEM teacher placements in industry.*

## 3.3. Placement sustainability

The ability to maintain not only the Teacher Placement Scheme itself – and its activities – but also to monitor its impact and potential benefits over time will be essential for the sustainability of the programme and its objectives.

### MAINTAINING THE TEACHER PLACEMENT

A number of essential sustainability measures for a Teacher Placement Scheme are proposed below:

- The overall support of the national and/or regional administration (in general, a network of stakeholder connections that can be relied on) and financial stability to carry on the programme and its activities smoothly;
- Executive and administrative capacity to effectively manage the programme and its activities as well as ability to create strategic planning procedures to run it;
- An evaluation framework, including procedures and resources to adapt the programme according to evaluation outcomes and in order to ensure it effectiveness.

In addition, if your teacher placement programme has been running for a while, you might be interested in enlarging the beneficiaries, sharing best practices with other programmes and, overall, promoting broader policy initiatives.

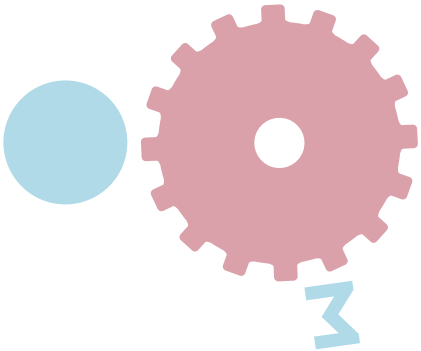
### MAINTAINING THE OUTCOMES OF THE PROGRAMME

Making the Teacher Placement Scheme sustainable will also be essential to maintaining its outcomes. Check the following elements that will help keep track of the outcomes of the placement once participants go back to their educational centres:

- Extend the partnership/activities with the school, and do not limit them to the time the teacher is placed in your company. As an example, in the Lehrer in der Wirtschaft programme, in order to promote the transfer of experiences from the business world to schools, teachers continue to work on project

assignments for a year (for example, developing a concept for professional orientation in high schools).

- Organise debriefing sessions with the teachers and STEM mentors and, ideally, administration representatives. The session should aim at sharing of best practices on how teachers used the knowledge gained during the placement and the impact it has had on their students.
- Encourage teachers to have meetings with their Heads of School or administrative boards upon their return to the school. This meeting should be oriented to discussing the next steps to be taken to continue with the partnership and how the school can better benefit from the experience.
- Invite teachers to write a report about their placement. This report should be very concrete, focusing on the activities the teacher will set up subsequent to the placement. The report should detail how the teacher will change the contents and pedagogical approach of the courses, how he or she will make his/her teaching more linked to real-life situations, how students' career counselling will benefit from the placement, how students' placements in industry are affected by the teacher placement, etc.
- Invite teachers involved in placements to collect data about the changes they bring about with their students, with their colleagues and within their school because of a placement. Make those data and the report about the placement available to policy-makers within your MoE.
- Organise a fair to highlight the positive outcomes of school-industry cooperation in general and teacher placements in particular; projects run jointly by students, teachers and companies may be very persuasive in encouraging other schools to develop stronger school-industry cooperation and teacher placements.



# 4. EVALUATION OF STEM TEACHER PLACEMENTS

Main points to remember from the chapter:

- Evaluation can be done in-house or externally.
- Summative evaluation can be conducted at the end of the programme; formative evaluation during or after the placement; impact evaluation measures the impact of the programme on teachers and/or students.
- Surveys and questionnaires are a cost-effective way to gather large amounts of measurable and anonymous information.
- Interviews are suitable to learn about perceptions and attitudes in a detailed manner.
- Logs and diaries help to understand behavioural information and potential relationships between different items of the placement.
- Focus groups are used to gather an insight into behaviours and perceptions of a larger sample size.

## 4.1. Types of evaluation

Creating evaluating procedures for your Teacher Placement Scheme will help you connect more effectively with teachers and help your company achieve its goals by creating opportunities for improvement. You can carry out your evaluation scheme in two main ways:

- **External evaluation:** Working with a specialised organisation that carries out the full evaluation (as referred to in Section 2.3 Connecting with support organisations of this publication). An external organisation can also provide consultative support through the process. This can be developed in different ways, such as discussions on the structure of the evaluations or on different

methodological options or by giving feedback on draft answers to specific evaluation techniques.

- **In-house evaluation:** the company designs and implements the evaluation. If this is the preferred option, you can refer to the guidelines below (for more information, see Section 4.2).

In addition, in methodological terms, the three main types of evaluation procedures will be the following:

- **Summative evaluation** (evaluation only at the end of the project);
- **Formative evaluation** (evaluation during and at the end of the project);
- **Impact – quantitative/qualitative evaluation** (data is collected on the impact on teachers and possibly on their pupils through different methodologies).

## 4.2. Evaluation tools

Various tools can support the evaluation procedures mentioned in the previous section. Below we enumerate some of them, including their usage purposes and the way they need to be implemented. Follow this guide to understand and identify the type of tool that best suits your organisation, programme and purposes.

### SURVEY OR QUESTIONNAIRE

#### *WHAT IS IT?*

A survey usually consists of a set of questions that provide an overview of the opinions, attitudes, behaviours, and other background information of a group of individuals, through self-reporting.

#### *WHY USE IT?*

- To reduce the costs of implementing an evaluation. Online surveys, in particular, have a very small cost per respondent.
- To provide a large amount of information that can be gathered and analysed quickly. This will ensure a bigger and more accurate sample to target results and to draw conclusions.
- To measure simple, quantifiable variables and pre- and post-knowledge of content taught, attitudes, preferences and/or achievements.
- The anonymity of surveys allows respondents to answer more candidly, which will help you gather accurate and unambiguous data.

## *HOW TO IMPLEMENT IT?*

- When developing a survey, you should first write general questions to develop more specific survey items later. To help you, below you can find a number of survey types, organised from more simple to more complex, focusing on Continuous Professional Development evaluation.[26] You can take this as a reference to develop your own surveys.

  Level 1: Assessing participants' satisfaction. This is the most common form of evaluation. *Did they feel their time was well spent? Did the materials and activities they were involved in meaningful to them? Was the mentor knowledgeable and helpful? Do they believe that what they learned will be useful to them and their fellow teachers?*

  Level 2: Measuring the knowledge, competences or skills and attitudes that the teachers have gained. It is difficult to get this information immediately after a CPD activity. To get a good idea of the impact of the CPD, this evaluation is done a few months after.

  Level 3: Evaluation of the organisation and, specifically, any information on organisational support and change. Organisational support elements (or their absence) can be the success or failure of any CPD effort.

  Level 4: Assessment of whether the teachers involved in the teacher placement are using in the classroom the new knowledge, skills and competences and attitudes acquired during the teacher placement. This information can only be gathered after the teacher has been back in the school for a sufficient time.

  Level 5: Finding out whether and how students have benefited from the professional development the teacher has been involved in. *Has their interest and motivation for STEM subjects increased? Is there more interest in scientific careers or professions?*

- Integrate in your questionnaire various types of questions such as closed questions with multiple-choice answers and open questions. Open questions enable you to gather general information but such questions will take more time to be treated. An example of an open question in relation to teacher placements could be: what did you like MOST about the placement? Or what did you like the LEAST about the placements?
  Open question will give you very useful quotes that you can integrate into the final report you will draft about a teacher placement.

- You should also decide whether to collect data from just a sample of your survey participants (that is, just a few of teachers taking part in the

26 The five-level CPD evaluation model proposed by Thomas R. Guskey in his book Evaluating Professional Development.

teacher placement) and generalise the responses or to collect data from all participants. In the case of a teacher placement, as it will most likely be a small group of teachers, it is recommended to send the survey to everyone.

- To analyse the survey responses, you will have to gather descriptive data as well as the most representative scores. Once you have run the evaluation several times, comparing your outcomes with those of previous evaluation surveys will be very useful.
- It may also prove useful to complement the information collected from a survey by organising a focus group. The objective of a focus group is to bring together beneficiaries of the teacher placement (in the school end in the company) to reflect on which objectives of the placement have been achieved or not; what have been the obstacles or facilitators and how a placement can be improved. One can start the focus group by presenting the results of the analyses of the survey.
- Last, and in order to make sure your findings are valid and accurate, you should see whether the survey collected the information it was designed to collect. Did teachers respond to all the questions? How relevant were their responses? If the number and quality of the answers is not high, there might be something to improve in its formulation.

**Best Practice #2:**

Writing surveys can be tricky. Even if you think your wording is easy to understand already, it may be confusing to others. Using questions from other projects that have been tested will always be a good idea. Otherwise, it is recommended to pilot-test your questionnaire before you send it to the target audience. This will reveal any items that might need clarification.

*EXAMPLES*

The STEM Alliance has developed some questionnaires for which we provide the templates in Annex 1 of this guide. These mainly focus on levels 2 and 4 of the evaluation model of Thomas R. Guskey. They have to be filled in not only by the teacher involved in the placement but also by the company or the mentor supporting the teacher, as it is important to have feedback from the two partners of the teacher placement: the teacher and the company.

## INTERVIEW

### *WHAT IS IT?*

Interviews are conversations between an interviewer and a respondent (interviewee), where questions are asked in order to acquire information. There are different interview formats – structured, semi-structured or unstructured.

### *WHY USE IT?*

- In general, interviews will be used to learn about certain attitudes, perceptions of a person and their overall thinking. They will be especially useful when in need of a detailed exploration of someone's views that cannot be gathered through other evaluation tools, such as questionnaires.
- To follow up on unexpected results or to confirm interpretations acquired through other evaluation tools or techniques.

### *HOW TO IMPLEMENT IT?*

As with surveys, it will be better to interview all the teachers who have participated in a teacher placement. However, if that is not possible, below are a few different options to select a specific group of interviewees:

- Choosing those who have made the most of the programme, as a way to show the potential of your company's placement scheme.
- Choosing those who did not seem to get as much from the placement scheme, as a way to explore what aspects of the placement are not working properly.
- Setting specific criteria to select the interviewees, which match the specificities of your Teacher Placement Scheme (for instance, teachers who completed a specific number of training sessions or who worked in a specific project or department of your company).

## LOG OR DIARY

### *WHAT IS IT?*

A diary can take different shapes. If it is going to be used as a form of quantitative evaluation, it can be developed as a structured record of observations or events, arranged chronologically. If the diary is intended to be used in a qualitative approach, it need not be structured chronologically, and it should mostly consist of text entries, notes about experiences or feelings from the person who is writing it. A log or diary (which is filled in on a regular basis) is an excellent way to collect material to be integrated into the report of a teacher placement. Logs or diaries are key elements to organise documenting a teacher placement in a structured way. Pictures, diagrams, videos. etc. can be added to it.

### *WHY USE IT?*

- To gather behavioural information that is not observed easily or to understand and develop knowledge about participants' interpretations that is not attainable through interaction with them.
- To collect data about participants' thoughts, interpretations and activities with the objective of discovering potential relationships (between different items) and their evolution over time.

### *HOW TO IMPLEMENT IT?*

To implement this evaluation method, you can use different approaches, depending on the type of data you want to collect. It can be either a paper or a Web diary (sometimes even a voice-recording or video diary) to be completed on a daily basis and used to collect teachers' specific observation, feedback on certain tasks, and particular events.

The design of the diary can be left to participants' choice (ensuring the data collected is both relevant for the evaluation and meaningful for participants). However, the evaluator can also decide on it, for methodological purposes.

If you are interested in collecting more data, you can discuss with participants about their impressions and receive their feedback from their experience writing the diary.

## FOCUS GROUPS

### *WHAT IS IT?*

A focus group is a gathering of selected people who participate in a planned discussion intended to generate and display opinions and attitudes about a topic of interest. Focus groups allow those participating to interact and influence each other during the discussion.

### *WHY USE IT?*

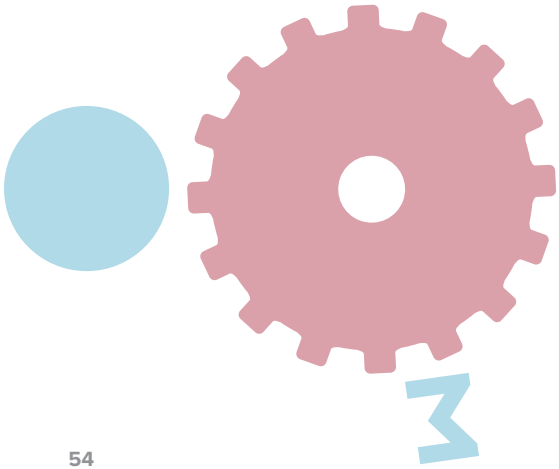
- To learn about a particular group of people and its patterns of interaction.
- Because it enables you to get results relatively quickly and to increase the sample size (the number of evaluation participants) by talking with several people at once.
- Because participants will be able to learn from one another as they exchange and build each other's views, experiencing the focus group as an enriching encounter.

### *HOW TO IMPLEMENT IT?*

Focus group participants should be selected based on different criteria, depending on what you want to assess. In general, it is advisable to create three or four different groups to ensure different perspectives and ideas. It is not easy to plan a great focus

group on your own. Follow these useful tips to get the most out of it:

- Limit the number of questions to allow participants to engage in all of them, and formulate them in order that they enable you to gather the information you are searching. Take into account that each participant has an important contribution to make and try to obtain a balanced representation of opinions across the group.
- Place your most important questions in the middle of the session (never at the beginning or at the end). In this way, you will have time to warm up participants and you will still ensure they have time to develop on the most relevant topics.
- Last, run a test and pay attention to several items, such as appropriate language, non-verbal communication, timing and conversational flow.



# 5. CONCLUSIONS AND RECOMMENDATIONS

STEM teacher placements in Industry are work placements that provide an opportunity for teachers to upgrade their knowledge, skills and competences in STEM and to improve the teaching and learning of these subjects.

This guide has been designed to address companies engaged in CSR programmes that want to set up a STEM teacher placement scheme while supporting STEM education and the promotion of employability in the sector.

As means of concluding, we have selected a number of items that should be kept in mind when setting up and carrying out a STEM teacher placement scheme, from the design and development of the placement to its sustainability and evaluation.

## SETTING UP AND RUNNING THE STEM TEACHERS' PLACEMENT

- Teacher placements have to be integrated in the STEM strategy of the school and in the school's overall strategy to become a learning organisation. This also means that teacher placements have to be discussed with the Head and fellow teachers within the school to contribute to the CPD plan of the whole school. Companies should also be aware of the strategies mentioned above, as they will directly or indirectly contribute to implementing them.
- The need for a strategy to turn the school into a learning organisation is clearly outlined in the 2017 EU report: "Teachers and school leaders in schools as learning organisations: guiding principles for policy development in school education."[27]
- Similarly, the company or sector organisation should integrate the

27 European Commission (2017a). Teachers and school leaders in schools as learning organisations: guiding principles for policy development in school education, Brussels, Directorate-General for Education and Culture: https://ec.europa.eu/education/sites/education/files/teachers-school-leaders-wg-0917_en.pdf

organisation of teacher placements in its CSR strategy or outreach STEM strategy that is closely linked to the company mission statement.

- The fact that both the company and the school have integrated the organisation of teacher placements in their STEM strategy is best reflected in a common agreement signed by both partners as a basis to their cooperation and showing their commitment to implementing such quality teacher placements. The agreement or contract should include evaluation of the cooperation at regular intervals.
- Understanding your own objectives and needs will help you to develop the type of programme you want to set up based on the knowledge you want to transmit. Being aware of your logistic and overall capabilities for developing and implementing a teacher placement scheme will be fundamental to starting.
- Ensuring a successful partnership can be crucial for the running of the programme. Working with existing organisations specialised in STEM education will provide you with support for the set-up of the programme.
- Moreover, having the backing of your national or regional administration (MoE) will facilitate many aspects of its implementation. To have their support it will be important to inform them of every step in the development of the teacher placements and of the outcomes and effects of the placements on the schools, the students and fellow teachers.
- Taking in consideration different logistical and managerial aspects of your company and of the placement you want to set up (such as its length and scope) will be necessary in order to ensure its sustainability.
- During the placement, try to organise activities that match your objectives in promoting STEM education and that accompany and support your company's daily work but that also provide participants with useful knowledge and skills, in the form of CPD.
- Likewise, provide teachers with support and mentorship whenever needed, in order to enable them to be acquainted with your company and its organisational policies and to facilitate teachers' personal and professional development.
- Document and evaluate thoroughly what is happening in relation to the teacher placements by using logbooks, diaries and questionnaires for teachers, students, mentors, etc. A thorough evaluation is the best guarantee of maintaining or improving the quality of what you are doing, to prove its relevance, efficiency and effectiveness. A strong evaluation is also the basis for sustainability.

## SUSTAINABILITY AND IMPACT OF THE STEM TEACHER'S PLACEMENT

The ability to maintain not only the Teacher Placement Scheme and its activities, but also to monitor its impact and potential benefits over time will be indispensable for the sustainability of the programme and its objectives. For this, you should extend the partnership and activities with the school, and not only limit them to the time the teacher is placed in your company.

In addition, set up a thorough evaluation framework, including procedures and resources to adapt the programme according to evaluation outcomes and to ensure its effectiveness. Several types of evaluation tools can be used to assess your programme, from surveys to interviews, diaries or focus groups. Use the outcomes of the evaluation to improve what you are doing and to prove to key stakeholders (such as MoE and other companies or sector organisations) that teacher placements are a worthwhile investment in teachers to the benefit of the schools and the companies and above all to the benefit of the students.

*Overall, enjoy the process of creating and managing a successful teacher placement programme and contributing to the support of STEM education and STEM careers.*

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# ANNEX 1: TEMPLATE – SURVEY TO ASSESS THE IMPACT OF A TEACHER PLACEMENT PROGRAMME

In this Annex, you can find some template questionnaires developed in the framework of the Teacher Placement Initiative of the STEM Alliance. These mainly focus on levels 2 and 4 of the evaluation model of Thomas R. Guskey, presented in Section 4.2 *Evaluation tools. They have to be filled in not only by the teacher involved in the placement but also by the company or the mentor supporting the teacher as it is important to have feedback from the two partners of the placement: the teacher and the company.*

**Characteristics of the STEM teacher**

- Age:
- Gender:
  - male
  - female
- STEM subjects currently teaching:
- Number of years teaching STEM subjects:

**Characteristics of the school**

- school name
- school address
- school type: primary school / general secondary school / VET school

**Characteristics of the company**

- company name
- company address
- field of activities of the company

**What were the characteristics of the STEM TP?**

- The TP was an individual placement. Yes No
- The TP is part of a tertiary education programme. Yes No
- The TP is part of a CPD formal programme. Yes No
- The TP is integrated in the school STEM strategy. Yes No

The placement lasted

- less than 5 days
- 5 to 10 days
- 11 to 20 days
- longer

If longer, how many days?

The TP is taken:

- in a block period
- spread over several weeks: one or two days a week
- spread over several months

Do you want to provide more information about the duration and organisation?

| **Objectives of the teacher placement**<br>Have the objectives of the TP been achieved?<br>X = this was an objective<br>Y = objective was achieved<br>N = objective NOT achieved | Yes | No | This was not an objective of the teacher placement |
|---|---|---|---|
| • Update STEM skills and expertise of the teacher<br>• Integrating company practice examples in everyday teaching (to contextualise STEM in the world of work)<br>• Enhance the attractiveness of STEM jobs and careers for students<br>• Prepare long-term cooperation strategy between the company and the school (preparing TPs for other teachers, preparing visit of teachers and/or students ...)<br>• Enhance a school STEM education strategy | | | |

***IMPACT of the TP on knowledge, skills and confidence***

How knowledgeable, confident or able were you before you started (PRE) and how knowledgeable, confident or able are you after (POST) the TP as a STEM teacher concerning the following elements. Indicate how far you agree with the statements below:

| 1 = don't agree at all<br>2 = don't agree<br>3 = agree more or less<br>4 = agree<br>5 = totally agree | Before the TP (PRE) | | | | | After the TP (POST) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **1** | **2** | **3** | **4** | **5** |
| I knew/know how to update my knowledge on recent developments in science and technology and where to find the appropriate information | | | | | | | | | | |
| I knew/know how and why cooperation between teachers and companies can improve quality of teaching | | | | | | | | | | |
| I felt/feel confident to cooperate with colleagues from companies, scientists, researchers, engineers, university students, etc. to plan and implement activities that improve STEM education | | | | | | | | | | |
| I felt/feel confident to cooperate with teachers of various disciplines within my school to promote STEM education | | | | | | | | | | |
| I was/am able to teach in an interdisciplinary way together with other teachers | | | | | | | | | | |
| I felt/feel confident to share results and outcomes of various forms of CPD (such as TP) with colleagues in my and other schools | | | | | | | | | | |
| I feel/felt confident to use visits to industry, labs, museums, science centres, etc. to support STEM learning & teaching | | | | | | | | | | |
| I was/am able to use field trips (nature trips, zoo, sea or mountain classes, etc. to support STEM learning & teaching) | | | | | | | | | | |
| I was/am able to transfer soft skills such as critical thinking, collaboration, communication, etc. to students in the classroom | | | | | | | | | | |

***IMPACT of the TP on knowledge, skills and confidence***

How knowledgeable, confident or able were you before you started (PRE) and how knowledgeable, confident or able are you after (POST) the TP as a STEM teacher concerning the following elements. Indicate how far you agree with the statements below:

| 1 = don't agree at all<br>2 = don't agree<br>3 = agree more or less<br>4 = agree<br>5 = totally agree | Before the TP (PRE) | | | | | After the TP (POST) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **1** | **2** | **3** | **4** | **5** |
| I was/am able to contextualise STEM teaching by providing concrete company examples in teaching practices | | | | | | | | | | |
| I was/am able to kindle the attractiveness of STEM jobs to students while making them aware of what they involve | | | | | | | | | | |
| I was/am able to give good STEM career counselling and guidance to students | | | | | | | | | | |
| I was/am able to reflect on my STEM teaching with colleagues and professionals (in companies) | | | | | | | | | | |
| I was/am able to support STEM placements of students in industry | | | | | | | | | | |
| I was/am able to support a school culture promoting STEM education | | | | | | | | | | |
| I was/am able to inform and convince the Head of School, colleagues, parents and other stakeholders about the advantages of better cooperation between school and industry | | | | | | | | | | |

## OPEN QUESTIONS

What did you like MOST about the placement?

What did you like LEAST about the placement?

| |
|---|
| |

What are the concrete outputs of the placement?

- A report
- Pedagogical STEM materials
- Proposals for further cooperation between the school and the company involved
- etc.

Would you recommend such a TP to other STEM teachers?

| YES | NO |
|---|---|

And WHY?

| |
|---|
| |

## QUESTIONNAIRE: APPRECIATION OF THE MENTOR BY THE TEACHER INVOLVED IN THE TP

Questionnaire to be filled in by the teacher and to be made available to the mentor and the school

| ***To what extent do you agree with the following statements?*** | | | | | | |
|---|---|---|---|---|---|---|
| 1 = don't agree at all<br>2 = don't agree<br>3 = agree more or less<br>4 = agree<br>5 = totally agree<br>6 = I don't know | **1** | **2** | **3** | **4** | **5** | **6** |
| The mentor supported me up at every moment of the TP. | | | | | | |
| The mentor helped me implement my plan of activities for the TP throughout the duration of the project. | | | | | | |
| The mentor helped me to see how the company deals with scientific and technological innovation and the results of research. | | | | | | |

| *To what extent do you agree with the following statements?* | | | | | | |
|---|---|---|---|---|---|---|
| 1 = don't agree at all<br>2 = don't agree<br>3 = agree more or less<br>4 = agree<br>5 = totally agree<br>6 = I don't know | **1** | **2** | **3** | **4** | **5** | **6** |
| The mentor helped me to see how the company makes use of key skills in its activities. | | | | | | |
| The mentor helped me to finalise and make a concrete contribution to the company team I was assigned to. | | | | | | |
| The mentor had a formative approach to evaluating my work and learning progress during the TP in the company. | | | | | | |
| The mentor helped me to present at the end of my TP the contribution I had made to the team I was working with. | | | | | | |
| The mentor made a full formative and summative evaluation report at the end of the TP, which was a very useful learning tool for me. | | | | | | |

What did you appreciate MOST about the mentor and the company?

What suggestions do you have to improve the mentorship of a TP?

## QUESTIONNAIRE: APPRECIATION OF THE TP BY THE COMPANY OR THE MENTOR

| ***To what extent do you agree with the following statements?*** | | | | | | |
|---|---|---|---|---|---|---|
| 1 = don't agree at all<br>2 = don't agree<br>3 = agree more or less<br>4 = agree<br>5 = totally agree<br>6 = I don't know | **1** | **2** | **3** | **4** | **5** | **6** |
| The TP has been useful for the professional development of the employees of the company. | | | | | | |
| The relation between the school and the company has been enhanced through the TP. | | | | | | |
| The company will be involved on a regular basis in STEM activities in the school. | | | | | | |
| The company is considering taking in more teachers on TP. | | | | | | |
| The TP will have an impact on students to take up STEM jobs and careers. | | | | | | |
| The TP will have an impact on the way the teacher who was involved in the TP teaches STEM subjects. | | | | | | |
| The TP will have an impact on the STEM curriculum. | | | | | | |
| The company learned a lot about what is currently taught in STEM subjects at school. | | | | | | |

Would like to make any additional comments?

What did the company or the MENTOR appreciate MOST about the teacher and the school?

What suggestions does the company or the MENTOR have to improve the mentoring of a TP?

SYSTEMIC

SAY YES TO STEM IN THE CLASSROOM

## ABOUT SYSTEMIC

The overall objective of the SYSTEMIC project ("Say Yes to STEM In the Classroom") is to increase young Europeans' interest in maths, science, engineering and technology education and careers and to provide teachers with the appropriate pedagogical tools to teach STEM topics differently and in a more attractive way.

More information: systemic.eun.org

STEM Alliance

inGenious education & industry

## ABOUT STEM ALLIANCE

The STEM Alliance – inGenious Education and industry – brings together Industries, Ministries of Education and education stakeholders to promote Science, Technology, Engineering and Maths education and careers to young Europeans and address anticipated future skills gaps within the European Union. With the support of major industries and private partners, the STEM Alliance promotes STEM jobs in all industrial sectors and contributes to building a STEM-skilled workforce. The STEM Alliance will join forces to improve and promote existing industry-education STEM initiatives (at national, European and global levels) and contribute to innovation in STEM teaching at all levels of education.

More information: www.stemalliance.eu

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The STEM Alliance is coordinated by European Schoolnet (www.europeanschoolnet.org) and CSR Europe (www.csreurope.org). More information: www.stemalliance.eu

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