

THE WAY FORWARD

Recommendations of the STEM Engagement Europe Project Partners on the STEM Education Policy

The STEM Engagement Europe Project

The STEM Engagement Europe Project (SEE Project) led by Zlínský kraj and involving partners from Ireland, the UK, the Netherlands and Turkey has identified the promotion of Science, Technology, Engineering and Maths (STEM) as a way to address unemployment, contribute to economic development and impact on inequalities within these vocational areas for women, those from minority backgrounds and those with disabilities. This project addresses in particular the communication from the European Commission "Improving Competences for the 21st Century, an Agenda for European Co-operation on Schools". The project addresses the image that many students have of such career areas one of "dirty, difficult and exhausting jobs".

The aim of this project is to promote STEM activity and associated careers across partners by enhancing the knowledge and skills of staff. The objectives were to exchange good practice across the partner countries through learning raids, to develop a website incorporating good practice including curriculum materials across partners, to produce a range of curriculum materials in each STEM area for partner usage, to up skill staff in each partner country including knowledge and to impact on vocational students career choices and to produce a succinct strategy paper for dissemination to strategists in each partner country.

Through 5 learning raids 120 staff from partner countries visited hosting countries and learnt from the practice there. This was organized through observation/shadowing/lecture/workshop/discussion and other practical methods. The participants were vocational teachers, strategists and a small number of STEM ambassadors all involved in STEM promotion and development.

The project developed a website, a resource directory for partner countries, a STEM in Action pack and a set of videos showcasing excellent teaching practice across the partners identified through learning raids.

This document is a result of two-years' work which consisted of learning raids, lesson observations, seminars and conferences with teachers of STEM subjects, STEM Ambassadors, academic staff at Universities, representatives of companies and other professionals in education. Although these recommendations came as a result of the practice learnt in partner countries, we believe they are an inspiration for all other countries in Europe.

Issue: The Image of STEM Careers

Recommendation

The area of Science, Technology, Engineering and Mathematics should be promoted positively in relation to the rapidly changing world, development of new technologies and the labour market needs. This can happen through cross-sectoral cooperation of schools, companies, universities and other stakeholders in the field of education and employment (Chambers of Commerce, professional associations, labour offices, local and regional authorities). Good practice examples which can be replicated are:

- STEMNet in the United Kingdom
- SMART FUTURES Initiative in Ireland
- Science Secondary Schools in Turkey
- Work-based learning in the Czech Rep.
- Science and Technology Centres with programmes for children and young people.

Rationale

Skills shortages in the European Union requires a quick and coordinated response. According to a research conducted by partners the STEM jobs are often seen as “dirty, difficult and exhausting”. Young people need to know that education in STEM subjects can lead to a prestigious career and well paid job. Following STEM careers will enable them to success in the future.

Issue: Teaching of STEM subjects

Recommendation

Teachers should be trained continuously in using new, modern and attractive methods of teaching STEM subjects. This requires the involvement of universities, research centres, IT professionals and support from the school managers.

Good practice examples which can be replicated are:

- Insight Centre of National University of Ireland in Galway where academic staff develop IT tools for teachers
- Coláiste Bhaile Chláir in Ireland where digital learning activities are applied
- Research Based Learning in the Czech Rep.

Rationale

Up skilling and training of school staff is crucial as well as the creation of new and powerful resources, the creation of a more innovative curriculum which will reflect the newest scientific and technologies’ development. This will enable students’ involvement and eliminate boredom in lessons. The long term benefits include the addressing of skill shortages through influencing and encouraging young people to choose these careers, the addressing of worklessness and dropout by improved teaching resources and a more appealing curriculum.

Issue: Wasting of Female's Potential

Recommendation

Continuous encouragement of young women to overcome biases and follow careers in STEM. This should be a part of A Gender Equality Policy of each member state. Initiatives promoting women in STEM should be supported and implemented through schools and national/local authorities. Careers counselling should reflect the students' abilities and skills not their gender. Good practice examples which can be replicated are:

- The WISE Campaign in the United Kingdom enabling and energising people in business, industry and education to increase the participation, contribution and success of women in STEM
- Girls in STEM project in Turkey

Other actions which need more attention:

- International Day of the Girl Child on 11th October
- International Day of Women and Girls in Science on 11th February

Rationale

Lack of recognition of women's achievements in STEM fields contributes to the misconception that women cannot do STEM or, at least, not as well as men. According to the UNESCO Science Report (2016) women make up 33% of researchers overall in the European Union, slightly more than their representation in science (32%). Women constitute 40% of researchers in higher education, 40% in government and 19% in the private sector. Women are consistently under-represented in engineering, manufacturing and construction as well as computer science.

Issue: European Cooperation

Recommendation

Schools should be supported in cross-institutional cooperation in STEM on the European level. This could be through Erasmus+ Programmes and other programmes and initiatives. The European Commission should support common strategic steps which would lead to discussions, trainings, and know-how exchange in order to combat the skills shortages and to enable young people to fulfil their potential.

Rationale

The STEM Engagement Europe Project partners from Ireland, the UK, the Netherlands and Turkey have identified the promotion of Science, Technology, Engineering and Maths as a way to address unemployment, contribute to economic development and impact on inequalities within these vocational areas for women, those from minority backgrounds and those with disabilities. During the project lifespan we have found out that all partner countries face similar problems but apply different strategies to resolve the issue. Partnerships in STEM education created and supported on the European level could contribute to development of the common European Strategy in STEM Education and response to the skills gap on the European labour market.