

STEM teachers' competence development in Spain

Key messages to be discussed at the Spanish multiplier event

The background

Spanish educational Laws have been changed several times during the last twenty years. Since 2013 and in process of deployment, there is a **new Educational Law** named “Organic Law for the Improvement of the Quality of Education” (LOMCE, 8/2013). Fruit of the political instability and, to a certain extent, a lack of a culture of consensus, implementation is being challenged in many levels, giving a sense of provisionality, which is reflected in the fact that regions, local authorities, and educational councils are in **continuous negotiations with the Ministry in order to modify the law**. In this situation there is certain weariness in front of the continuous legal changes and budget cut-outs.

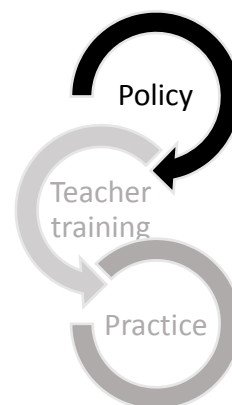
There are important changes very much in concordance with the EU policies (European Parliament, 2006/962/EC). The Law emphasises quality and employability, encouraging selecting both the professional and the academic path at earlier ages. There is **more emphasis in STEM**, more instrumental type of disciplines, and less subjects optional. Of importance is the interest of giving the **schools more freedom in terms of adapting the national curriculum** (curriculum proposal) or **introducing new methodologies** and optional subjects (didactical programme), within their legal competencies. The **curriculum is now organised according to a competency approach**, in which knowledge, skills and attitudes have been identified in all subjects and at all levels. Key competencies, named “basic competencies” inform the competence model. This panorama implied also **the reform of the Continuous Professional Development (CPD) programmes**, as well as access to the teacher profession, now based on Master’s Degree Programmes.

At macro level (policy):

Competence-based education is supported by law in all level of compulsory education and baccalaureate. Key competencies are part of the evaluation of the effectiveness of the educational system. Furthermore, STEM has more weight in the curriculum in terms of content and time. The law demands teacher education being adapted to this new situation in terms of contents and methods. In this sense, the Spanish reform recommends methods to facilitate methodological strategies that allow for classroom competencies work (ECD/65/2015).

Among the most prominent issues, we can mention:

- Weariness in front of the continuous legal changes and budget cut-outs.
- Lack of coordination among the national, regional CPD providers in terms of policies and strategic plans for STEM CPD that respond to these changes.



Prominent issues for consideration on STEM teachers' competence development in Spain

At meso level (teacher training institutions):

Universities have undergone an important challenge on creating their own Master's Degree in Secondary Education (should to be approved by a Spanish National Agency of Evaluation), with a competence approach (knowledge, skills and attitudes) that vertebrates the study programs. However, many times University teacher trainers lack experience on the reality of the school, and are more oriented to theoretical approaches.

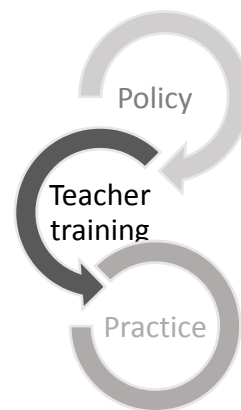
However, there is a great opportunity for the updating of both in-service and pre-service STEM teacher education programs (the new Law specifically mention 7 key competencies, including "mathematics competence and basic competencies in science and technology"). Then teacher education programmes should follow the same approach.

On the other hand, there is a persistence of providing teacher training on STEM according to the traditional subjects (physics, chemistry, technology and maths), which hinder the possibility to include methodologies that are becoming more and more popular in secondary education, as e.g., Project work. Many times University teacher trainers lack experience on the reality of the school, and are more oriented to theoretical approaches.

However, although training contents has been updated, there is a lack of EU policies insufficiently considered (e.g. OSR, STEM gender aspects, ICT, RRI, STE(ART)M), and methodological aspects (e.g. IBL, project work,) are still a challenge in teacher education programs.

Among the most prominent issues, we can mention:

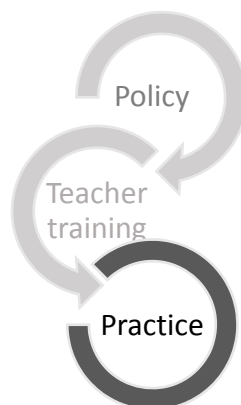
- Teacher education programmes need to get used to work according to a competence-based approach, working co-ordinately in all subjects with other key competencies (e.g. digital competencies)
- CPD programmes need to integrate those methodologies and innovations that favour the acquisition of STEM competencies, as e.g. IBL, PBL, OSR, ICT, Gender, etc
- Need to provide STEM training paths for in-service teachers in collaboration with different types of institutions, e.g. science centres, research centres, universities and governmental initiatives.



Prominent issues for consideration on STEM teachers' competence development in Spain

At micro level (students' curricula):

There should be a high level of coherence between the competencies required by teachers and those described for students in the Law of Education and further deployments in the regions. However, in practice this does not always happen for different reasons related to the day-to-day work. On the other hand STEM competencies imply a new role for students, more active and autonomous (conscious and responsible of their own learning). Finally, the participation of parents in the day-to-day of the educational centres is important at the time of pushing for STEM-related extra-curricular activities.



Prominent issues for consideration on STEM teachers' competence development in Spain

Among the most prominent issues, we can mention:

- For teachers, there is a surplus of subjects and contents, obsession for finishing the programs, as well as a tendency to use summative evaluation.
- For students, there is a lack of interest on contents because students do not find their connections with reality.
- Parents need more information on the importance of implementing STEM innovations in the schools, so they can be involved on the decision-making on their particular centres.

Main themes for the Spanish multiplier event

Focus on the STEM policies at both national and regional level, teachers' training curricula and methods – the role of different stakeholders in the teacher teachers' competences development and the role of the teachers' competences for the development of new generation of Spanish youth.

Structure of the Spanish multiplier event

