



# **Engineering Literacy Online - Teachers as Medium for Change**

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## **IO1 – A3 Needs and Gap Report - Region**

**Italy**

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**Project ELIC**  
**Italy**  
**Needs and Gaps Report**

This short summary serves as starting point for identifying common needs and GAPS of the ELIC primary target group and serves as a main reference point for all following intellectual outputs.

**Country:** Italy

Firstly it was necessary to conduct a desk research. During the desk research the main aim was to identify the context regarding the educational offer in Italy in the field of STEM disciplines. Therefore, we analysed competences in regional teaching plans at secondary schools, existing further education and trainings for secondary school teachers to teach interdisciplinary experiments and also planned initiatives related to teaching interdisciplinary experiments for secondary school teachers (focus to Electronics, Software, Mechanics, Mechatronics, Biochemistry, Renewable Energy etc.)

During our Focus Group Interview, the teachers told us about a lack of continuous education programs which combine engineering literacy in a practical way and teaches them about experiments etc. which could be used in class. Furthermore, it was highlighted a lack of online teaching also because requires a lot of work for the teachers. The planned initiatives are strictly organized and centralized by the Ministry of Education.

Then, the most common issue is, that there is often no time available due to the many teaching hours, where the teachers can attend training and curricula.

One of the Italian problems in developing an engineering mindset concerns the profound difference between high schools and technical schools and between different areas of the country. In the regions: Friuli Venezia Giulia, Veneto, Lombardia, Piemonte, Emilia Romagna there are virtuous examples of interdisciplinary experimentation and connections between business and school, in the rest of the country there are enormous difficulties in the scientific field and in engineering experimentation.

Despite the difficulties described above, the relationship between school and company is interesting and, in some cases, fruitful. The main issue is that it is not easy to implement. To think of creating specific laboratories aimed at testing machines is primarily expensive and therefore not compatible from the point of view of resources.

It is therefore difficult to have continuous relationships that go beyond an internship. A solid basic preparation is lacking which then gives a future. There is a common difficulty in proposing basic aspects.

There are few internship collaborations and school/work but above all with the high school not with the technicians. Nevertheless, the University focuses more on frontal lessons than on activities.

### Need identified:

- In the general high school there are not included plans with application of STEM to engineering content, programs include studies of Biology, Physics, Chemistry, and Mathematics but not applied to new technologies and engineering content.
- Especially in High school teachers and students need to develop interdisciplinary perspectives among STEM.
- On the contrary in technical schools (not vocational) we develop engineering programs in Electronic, Mechanic, chemistry, biochemistry, biotechnology, etc...
- Active teachers are open to new experiment methods in teaching and crossing contents.
- Teachers need an added number of Backoffice hours to be included in their contract.
- Missing of practical and technical laboratories in high schools.

### GAPs identified:

To sum up, there are several GAPs identified

- Not only the content, but also the form of offered courses and further education should be varied to cover the different needs and expectations of teachers, e.g. online courses for individual study, experience multi-day courses, common courses for teachers and students, etc.
- Teachers are not able to participate in further education (either financially or in terms of study or time), they do this on the basis of their own professional and individual motivation.
- Usually individual projects are not shared with other educational institute or even among teachers of the same discipline. There is a lack of coordination among school courses.
- Although the presence of good examples of trainings, it is necessary to implement a virtuous triangle (industries, universities and secondary schools) at regional and national level.
- Disciplines are studies in a deep way but not interdisciplinary perspective.
- Gaps are to be filled more in the High school than in technical schools.
- there is a lack of equipment and laboratories at the schools.