



Education for Digitalization of Energy

Deliverable 4.1

Identification and assessment of VET systems for delivery of skills and professional knowledge to address digitalization

Evaluation of VET systems across Europe

The report describes how across Europe substantial differences exist in the national policy, regulations/standards and organization of Vocational Education and Training (VET). Specifically, the lack of European standardization, the heterogeneity of national situations (at political, economic and societal level), and the discrepancies among the national targets and corresponding development paths across the economy and industry, represent major challenges for the digital transformation of the vocational education, for all occupational sectors including the Energy industry.

The European Commission (EC) has set a defined Action Plan for the digitalization of education, and several significant initiatives related to energy and digital transition have been set by the EU member States. Both the EC Action Plan and the national initiatives aim at fostering a coherent integration of the VET curricula in order to include specialized training and professional education also in the areas of IT and Modern Energy systems. Nevertheless, the process of transformation of the education has just started and meaningful results are yet to be seen. It will be important to consider and overcome the different territorial situations of the EU member States, in order to facilitate a harmonic and homogeneous development of the respective VET systems in the direction demanded by the transformation of the industry and the labor market.

Five countries have been originally selected in the EDDIE project to provide samples of already well structured and organized VET systems, with synergies and differences. These countries have also a well-established Energy industry that is undergoing a dramatic transformation due to the EU policy, the green economy and the digitalization.

Germany

The dual model represents the pillar of the VET system in Germany, and it can be framed in the context of efforts to create a qualified workforce for different industry sectors, with the threefold aim of a) supporting workforce mobility; b) improving qualifications for young people in a globalised world; and c) reduce unemployment, especially among the most vulnerable groups.

The German dual model is not easily reproducible across all Europe for a number of reason, the main two of which being:

- Many European countries do not have the institutional prerequisites, the demographics or the labor market conditions for this form of collective skill formation.

- The dual German system gives companies the autonomy to decide on the training content, which constitutes a big limitation to its transferability. In fact, while this autonomy could make the training more attractive for the industry to take on apprentices, it will also make the comparability of qualifications anywhere outside Germany more difficult and the quality of training less reliable, which in the long run can only undermine the value of vocational training as an educational option.

As for the alignment of the German VET system to the EU pathway towards Digitalization in the Energy sector and all other sectors of the industry, in terms of projections until 2035, three are the key trends for the labor market and VET in general:

1. *Digitalization will enforce structural changes of the labor market.* Projections show that 4 million jobs will be lost due to digitalization while 3.3 million new jobs will be created through the same, with a substantial shift in the kind of jobs which gain or lose importance. So, in future, the German labor market will have particular need for more highly qualified skilled professional specialists and not so much less qualified or only narrowly trained staff on jobs with returning routines.
2. *The mismatch between job/skills offer and job/skills demand is continually rising.* This will particularly affect also the IT sector as the demand for skilled workers in IT-related jobs is growing constantly but is currently not met. In some other occupations, more people are trained than actually needed by the industry. Moreover, the demand for workforce and availability of young people varies significantly from region to region: in economically strong regions of Germany having many companies that offer VET, often there are too few young people taking up a vocational training; vice versa, in some regions that have a lower number of companies providing VET, there might be an oversupply of young people interested in the vocational path.
3. *The trend towards academization continues to grow in parallel to a decrease of the number of people opting for vocational education.* Since 2000, the number of university graduates has been rising steadily, from 200,000 in 2000 to 490,000 in 2016, whereas an opposite - decreasing – trend has been experienced for the number of VET trainees.

Spain

Spanish VET provides little training offer, and no offer at the post-secondary education level. This could be the consequence of various factors. On the one hand, historically in Spain little attention has been paid to the VET system. Thus, government investment in these studies has been very precarious. Moreover, until very recently, there are no policies that allow the design of a more attractive VET training offer for students.

In Spain, pilot programs of dual VET were launched around the country in 2011, but since then there have been difficulties in the efficient implementation of this model. In fact:

- An incentive system has not yet been implemented for companies to decide to hire under the training and learning model.
- Generalized consensus on educational matters has not been implemented among social agents (government, employers and unions).
- Investment in education and salaries for apprentices is lower than in other European countries.

On the other hand, the VET system in Spain has tried to modernize itself since the 2000s following the guidelines established by the EU. The VET Modernization Plan establishes 11 areas of action, among which are the recognition and accreditation of basic and professional competencies acquired through work experience; the flexibility and accessibility of training for a single system of Vocational Training; digitalization, innovation and entrepreneurship or the promotion of dual vocational training, among others.

The Spanish society is one of the least digitalized in Europe and, as a consequence, its VET education as well. Nevertheless, based on government plans, the different Spanish regions have developed initiatives to promote the digitalization of VET studies adapting them to the characteristics of each region.

Romania

In Romania, VET is not an independent system, but a constituent part of the Education system. From this perspective, the quality of VET depends not only on the specific measures taken, but also the quality of the human resource that feeds the VET system (graduates of primary and secondary education).

National statistics show a growing concern over the last decade for professional training. Thus, according to national data, the number of adult learners who have participated in authorized training programs has increased in the last decade. The report also highlights an increasing trend in adult participation training courses provided by their employers (since 2015, participation in continuing education in enterprises has increased by 27% for the male population and by 40% for the female population).

Although the number of apprenticeship contracts is increasing, employers often perceive training as an additional cost, rather than an investment.

The National Employment Agency offers training programs based on the analysis of job vacancy data and job applications, which are formulated in the Annual National Vocational Training Plan. Thus, there are training opportunities for adults who have left education early or for other reasons.

However, participation in lifelong learning is the lowest in the EU, with a slightly downward trend compared to the upward trend in the EU.

Another relevant mention that can be added here is the confirmation from the *Strategy for digitalization of education for the years 2021-2027* that the development of digital competences at all levels in cross-curricular education, through specialty disciplines, formal and non-formal activities is one of the directions and initiatives for new opportunities in education and VET for a digital society.

Greece

There are clear signs that in Greece there is a disharmony between skills needed and their availability. It should be noted, though, that the country's major problem is creating the suitable growth conditions that will lead to job creation that would in turn contribute to direct, or at least faster, matching between skills offer and demand. This is quite crucial for the Energy sector as well, as it will be one of the driving forces of Greece's economy.

VET courses and specializations offered should reflect the needs of the economy, in order to be more attractive to young people and actually contribute to the country's progress. They should, also, be consistent with recommendations of relevant policy makers.

Except for the overall need of upgrading VET to meet the needs of the market, a wider change in society's perceptions about VET should be pursued. VET should not be considered an option for underachievers, but to do so it has to be appealing for other students too. Providing the necessary skills and competences to access the labor market, especially in accelerating sectors such as the energy one, can be a key criterion for students' choices.

It is quite crucial for Greece to progress accordingly in issues related to the digitalization of the VET education in order not only to provide to the students the necessary qualification but to also fill the gap that has been created in terms related to the use of ICTs a crucial point in the digital era. Therefore, digital skills in the energy sector should be further promoted, enhanced and finally became an integral part of it.

Sweden

VET in Sweden is characterized by a modular and flexible structure of upper secondary education. Trainees can easily change study path, and the flexible system permit students to continue working while studying and adults to even restart their studies to upgrade their competences.

Validation in adult education is one of the key characteristics of the VET Swedish System. Education providers are in charge for the validation process. Validation of Knowledge, skills and competences acquired through different experiences is possible in all municipal adult education courses at upper secondary level and in higher vocational education.

The direct effect is that participation in lifelong learning experiences is above 30% in 2017, the highest rate in the EU.

Validation of non-formal and informal learning is defined by a National Strategy for Validation (2017).

Different actions have been put in place to foster cooperation between education and the world of work. National program councils include social partners for each of the national vocational programs in upper secondary schools and guarantee the discussion about content, organization and quality of VET between national agencies and stakeholders.

Upper secondary apprenticeship education is part of the reform created in the last years. The number of upper secondary VET learners enrolled in an apprenticeship program has grown steadily but apprenticeship participation remains below expectations.

Thought the involvement of social partners involved in the design and delivery of apprenticeships has increased in Sweden in the recent years, its rate is lower than in many apprenticeship countries. While offering apprenticeships, Swedish employers have fewer responsibilities and less influence.

Further considerations

The COVID-19 pandemic has posed major challenges for the education and training systems of the EU member states, showing clearly that digital participation, education mobility and the digital transformation of VET are critical issues that need to be resolved.

In order to modernize the European VET, a strong cross-border collaboration is necessary among the member States and the institutions responsible for the national education and training systems. The modernization should tackle several aspects such as improving employability, developing a strong VET system at university level (ensuring equivalence between vocational and academic education and facilitating the transfer from one system to another), harmonizing standards and functions at European level.

As for the specifics of the Energy sector, it demands new models for the education and training. These models must integrate new contents and cover new areas of professional knowledge and training (ICT, Artificial Intelligence, Smart Grids, Renewable Energy, Machine Learning, Data Analytics, Programming), but also be so flexible to open up international opportunities. Students from academia and vocational school should experience Europe as a place of cross-border learning and working.

The review carried out in the EDDIE project has shown that, in order to be successful in its pursuit, an education and training system must provide updated instruments to meet the demand of the labor market, through a specific policy and model oriented to satisfying the industry and occupational sector (e.g., Energy and IT) at regional, national, continental level; hence, this must be done in alignment with the EU policy and economic roadmap, but at the same time has to include specific criteria of flexibility, modularity and replicability of models depending on the territorial situation.