SMART COMET

EDUCATION | COMPETENCIES | INDUSTRY

MESS TÜRKİYE METAL SANAYİCİLERİ SENDİKASI
MESS EĞİTİM VAKFI
AVRUPA BİRLİĞİ BAŞKANLIĞI
Funded by the Erasmus+ Programme of the European Union
DEKRA
Fundación Laboral del Metal

Phase 0

Introduction to SMART COMET Project

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Introduction to SMART COMET Project

Project Design

The need to train qualified labor force for the needs of enterprises and compete successfully in a global scale require innovative company level VET capabilities and strategies. Many efforts to improve efficiency in manufacturing are dependent on competences of hourly workers. New efficient machinery and lean ways of working are implemented in vain, if the employees have not internalized the knowledge and gained the competences to maintain and take further the efficiency gains. Thus, there is an increasing need for manufacturing companies in Europe, especially in medium enterprises, to put in place and further develop systematic approaches for competence management. On the other hand, there are a variety of tools both at the European and national levels that are designed to help for the recognition and transparency of skills and qualification. However, most medium scale companies lack the necessary capabilities to implement those tools in a coherent and strategic approach towards managing the competences of their workforce.

In this context, this project aimed at developing, piloting and implementing a competence management system for metal (COMET) sector enterprises and schools in the framework of a school and enterprise cooperation model in partnership with European experience to help implement European and national competence management tools and systems.

The overall results reached through this project are:

- A pilot basis for school and enterprise cooperation system for the metal sector companies using a competence management (COMET) approach is developed and piloted,
- A model is created for metal enterprises to better manage their workforce through learning outcome-based competence management,
- Enterprise and school capacity to analyze, understand, express, address and manage human resource challenges including, but not limited to the ability to better manage and anticipate skill needs over a strategic horizon is improved though the model,
- Upgrading skills and qualification of all employees in metal sector in partnership with schools is facilitated,
- Schools' participation in the cooperation model to better adapt themselves to evolving labor market needs by working closer to metal enterprises is piloted.

Since the sub sectors under metal branch require well defined hard and soft skills that are not culture dependent and could easily be carried and used by individuals across borders, a European transnational approach was more likely to succeed in metal sector. The need for transnational implementation of the project arose from the need to enable an exchange of knowledge and experience between differing country experiences. German enterprises are at the forefront of skills management capabilities while Spanish enterprises and social partners have developed initiatives over the last years in the field. Some well established Turkish enterprises, too, have well-functioning talent management systems that could inspire a competence management model for metal industries. There has been a great deal of added value in bringing these three countries together for developing and piloting a system for metal sector that is more

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or less a cross boundary quality in terms of skills requirements in this project. This transnational work allowed a proper benchmarking, as well as designing elements that helped identify common and also different aspects arising from the particular needs of the respective labor markets and levels of economic development.

Participating Organizations of the Project:

Participating Organizations of the Project

Project Coordinator:

Turkish Employers' Association of Metal Industries (MESS):

Founded in 14 October 1959, MESS covers more than 200-member enterprises and is active in the metal sector such as; automotive, electronics, metal products, electrical machinery, iron and steel etc.

The main objectives of MESS are; to bring together the employers carrying out activities in the metal industry, to represent its members, to protect and promote their common economic and social rights and interests in their labor relations within the scope of existing legislations.

In cooperation and solidarity with the employers in the metal and electronic industries, MESS aims to develop well-balanced, reliable, and stable industrial relations, while increasing the competitiveness and the productivity of industry. Headquartered in İstanbul, Turkey MESS has three regional representative offices in Ankara, İzmir and Bursa.

Project Partner:

MESS Training Foundation (MEV):

MESS Training Foundation is founded under the leadership of Turkish Employer's Association of Metal Industries (MESS). It holds a leader position in the education of Turkey's labor force with training and consultancy services that have been provided to these employers and more than 720 thousand people have been trained since its establishment in 1986.

MESS, together with MEV, have been providing free of charge trainings to its membership since. Every year, engineers and managers from the shop floor to HR and engineer staff from MESS member companies attend training sessions at MESS headquarter and regional offices. On average 3000 staff are being trained every year in these sessions. The Foundation also runs social responsibility activities of MESS, having a specific focus on vocational education and training; like supporting VET students with monthly stipends. It is also working on programs according the changing needs of the industry; like providing coding and robotics workshops for the students at high school level.

Project Partner:

Ministry of National Education Directorate General for VET (MoNE DG VET):

The vocational and technical education system in Turkey includes two main dimensions: theoretical (school training) and practical (in-company training). Vocational education policies and activities are mostly carried out by the MoNE DG VET. There are more than 3700 vocational and technical high schools affiliated to DG VET.

Its mission is to meet the labour demands of economic and social sectors through vocational education, to train manpower who hold vocational qualifications in accordance with international standards, to develop and implement policies, strategies that will make the vocation valuable and provide everyone a profession.

It visions to be a leading institution established its quality values, raising creative, innovative, entrepreneurial and productive skilled labor force in its schools who add value to the economic growth, recognized by national and international vocational qualifications in cooperation with the economic and social sectors.

Project Partner:

DEKRA Akademie GMBH:

DEKRA Akademie, together with its affiliate, DEKRA Qualification, is one of the leading educational providers in **Germany** and boasts more than 30 years of experience in vocational and further education. In more than 100 permanent locations, DEKRA Akademie offers a wide range of products and services, including day seminars as well as tailor-made long-term training concepts. Eight decentralized competence centers are in charge of developing and maintaining various product lines: logistics, craft and industry, commerce, IT and media. The DEKRA Akademie was involved in the development of the German system of advanced IT-training system (APO-IT) from the very beginning and is a member of the CEN ICT Skills Workshop. There are strong connections to the affiliate DEKRA Certification, one of the leading certification companies in Germany.

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Project Partner:

Fundación Laboral del Metal:

The Fundación Laboral del Metal is a non-profit organization oriented to provide services for the Metal Industry in Cantabria region, **Spain**. It was created in March 2004 by the most important regional Labor and Trade Unions – FEDERACIÓN MINEROMETALÚRGICA DE CC.OO., MCA-UGT CANTABRIA and PYMETAL CANTABRIA, which together offer continuous training and employment solutions to 20,000 workers and 3,000 companies in the region. Annually the Foundation delivers professional training and updates technical skills to more than 1,200 workers.

The Foundation designs and implements integrated projects with private and public institutions on new technologies and methodologies related to qualifications, training and competencies development as well as in social realms as social & labor integration of vulnerable groups. The organization has implemented a variety of EU projects in the last 10 years in all these areas. Currently Fundación Laboral del Metal is comprised by a team of 10 employees, 30 teachers and 1,200 students/year.

Methodology of the Project Implementation:

The first phase of implementation involved preparatory studies and initial information activities. In this phase, selection of enterprises and schools was formalized and protocols were signed. Another project of MESS, called METAD was also combined here with SMART COMET project in a sense that the same schools and enterprises were engaged in the project activities. Though METAD, 18 enterprises and 21 VET school signed a total of 23 project Protocols (See Annex 1).

ENTERPRISE	PROVINCE	SCHOOL
TürkTraktör Farm Machinery Company	Ankara	Ankara Gazi VET School
Borçelik Steel Company	Bursa	Gemlik VET School
Borusan Mannesmann Pipe Company	Bursa	Gemlik VET School
Borusan Mannesmann Pipe Company	Bursa	Orhangazi VET School
Componenta Foundry Company	Bursa	Orhangazi VET School
Bosch Industry and Trade Company	Bursa	Nilüfer Atatürk VET School
Tofaş Turk Automobile Company	Bursa	Hürriyet VET School
İçdaş Steel Energy Shipyard and Transport	Çanakkale	İçdaş Biga VET School
İçdaş Steel Energy Shipyard and Transport	Çanakkale	İçdaş ÇİB VET School
Arçelik Refrigerator and Compressor Plant	Eskişehir	Odunpazarı Atatürk VET School
Anadolu Isuzu Automotive	İstanbul	Küçükyalı VET School
Mercedes-Benz Turk Company	İstanbul	Kıraç İMKB VET School
Ege Industry and Trade Company	İzmir	Konak Mersinli VET School
İzeltaş İzmir Hand Tools Company	İzmir	Konak Çınarlı VET School
Arçelik Washing Machine Plant	Kocaeli	Deniz Yıldızları VET School
Çolakoğlu Metallurgy Company	Kocaeli	Ali Nuri Çolakoğlu VET School
Çolakoğlu Metallurgy Company	Kocaeli	İzmit VET School
Ford Automotive Company	Kocaeli	Gölcük VET School
TürkTraktör Farm Machinery Company	Sakarya	Fatih VET School

BSH Home Appliances	Tekirdağ	ÇOSB VET College
BSH Home Appliances	Tekirdağ	Halit Narin VET School
Termoteknik Radiator Manufacturing	Tekirdağ	Mehmet Rüştü Uzel VET School

Enterprises and Schools signed collaboration Protocols as a part of METAD Project (also included in SMART COMET Project)

Analysis studies are made from different parties, including visits to member enterprises in order to identify participants' requirements for intellectual outputs, which included initial researches as well. Field studies was another method used in order for 3 different countries to see different implementations in other countries. For Turkey, it was about seeing European Union member countries applications, although Turkey and Spain were a bit more similar to each other in terms of cultural understanding towards VET, and Germany seemed more advanced in their successful applications with dual education system.

The field visits were also used during competence management framework and IT tool development. Ford, İçdaş, Türk Traktör and Arçelik were 4 enterprises visited during this development in Turkey, and partners from German and Spain gave their feedbacks. Testing and piloting on the ground for the project took 12 months and then the reports started to be written; at this stage, literature review studies was used. At all stages of the project, dissemination and quality assessment had been a focus point.

Study Visits:

Study visit to Santander, Spain, April 24-29, 2017

PARTICIPANT	INSTITUTION	POSITION
Necdet Kenar	MESS Training Foundation	General Manager
Fatih Tokatlı	MESS	Director of External Affairs, Training and Projects
Müge Yaman	MESS Training Foundation	Specialist
Enver Türkoğlu	Konak Mersinli Vocational and Technical High School	Principal
Yaşar Doğan	Çerkezköy Halit Narin VET School	Assistant Principal
Osman Yalçın	Ministry of National Education DGVET	Project team
Balkır Özünlü	Ministry of National Education DGVET	Specialist
Nigar Aydın	Ministry of National Education DGVET	Project team
Okan Yosunlu	Arçelik enterprise	Specialist
İsmail Lami Kaşka	İzeltaş enterprise	HR Manager
Adil Reha Aktan	Ege Industry enterprise	HR Operations Chief
Dolunay Yılmaz	BSH Hausgeräte enterprise	HR Manager

A study visit was held in Santander, Spain consisting a series of training, interviews and meetings between the dates of 25th and 29th of April, 2017.

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During the study visits, key stakeholders of the Spanish vocational training system were interviewed. Organized by Fundación Laboral del Metal, the SMART COMET project partner in Spain, participants have visited the regional vocational education institutions and enterprises with production facilities in the city. Institutions were all very well experienced organizations, every one of them continue to work on School-Enterprise Collaborations:

- DGFP - Public Vocational Education Institution
- Ferroatlántica Corporation
- IES N. Sra. Remedios - Vocational and Technical Education Institution
- Talleres Cobo Corporation
- IES Centro Integrado uno Vocational and Technical Education Institution

DGFP - Public Vocational Education Institution

Ferroatlántica Corporation

At the end of the visit, outstanding issues of the focus group meeting were as follows;

- It appears that the number of VET students in Spain stays relatively low, even in the largest vocational education school in the region, there were about a thousand of students. Accordingly, the number of students per teacher is much less compared to Turkey. This situation gives Spain an advantage in terms of the quality of vocational and technical education.
- Enterprises included in dual vocational education system are included in the system with as many students as they are able to employ and guarantee the employment of students when the program is over. The representatives of HR unit participated in the meeting explained this situation underlying the fact that it is easier for the companies in Spain to make projections about their short - term employment needs. As for Turkey, these kinds of projections become harder.
- Financial support from national government for vocational education in Spain is high. One of the reasons may be the number of schools' being low than it is in Turkey and another reason is that spending on education is determined at the regional level. As a natural consequence, School - Enterprise Cooperation is not based on a financial dependency but is based more on increasing the quality of VET.
- Some of the enterprises in Spain are benefitting from VET students in Research and Development since they are more capable of thinking out of profit-oriented production which make them capable of having more innovative ideas. This increases the quality of School – Enterprise Cooperation.

IES N. Sra. Remedios - Vocational and Technical Education Institution

Study visit to Stuttgart, Germany, May 14-19, 2017

PARTICIPANT	INSTITUTION	POSITION
HAKAN YILDIRIMOĞLU	MESS	Secretary General
NECDET KENAR	MESS Training Foundation	General Manager
FATİH TOKATLI	MESS	Director of External Affairs, Training and Projects
BURCU KARACAR	MESS	Director of Corporate Communications
H. OĞUZ ÇİNELİ	Arçelik enterprise	Industrial Relations Manager
MÜGE YAMAN	MESS Training Foundation	Specialist
EMRE BÜLBÜL	Borçelik enterprise	Management Systems Unit Head
YÜKSEL AKBÖRÜ	Termoteknik enterprise	HR Manager
GÜRHAN HÖKE	TürkTraktör enterprise	HR Expert
İRFAN KARAÇAYIR	Fatih Vocational and Technical High School	Principal
İSMAİL ÇİFTÇİ	Küçükyalı VET High School	Vice Principal
KÜBRA GÖZELYURT	Ministry of National Education DGVET	Project team
HATİCE ÖKSÜZ	Ministry of National Education DGVET	Project team

A study visit was held between the 14th and 19th of May, 2017 to Stuttgart, Germany under competency management component of the project. Visitors have gained important insights from key stakeholders about competence management and vocational education system in Germany, while having had an opportunity to see their work on the Industry 4.0.

SMART COMET project partner in Germany, DEKRA Akademie, hosted this visit at Stuttgart where its Headquarter is located. DEKRA HQ was visited on first day of the visit, which was established in 1925 as German Automotive Inspection Association in Berlin in order to ensure safe and controlled use of the new technologies. Today, it operates in more than 50 countries conducting testing and conformity assessment activities and carrying out documentation procedures on behalf of the state. Participants have gotten

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information about subsidiaries of DEKRA worldwide together with its training and inspection activities. Another visit was made to DEKRA Akademie, training center of DEKRA and a presentation was given by experts on innovations envisaged in future business, private and education lifestyles with the impact of Industry 4.0. Social life and educational needs to be changed with Industry 4.0 were deeply discussed having references to earlier industrial eras.

Fraunhofer Future Laboratory

DEKRA Akademie

Participants met Dr. Martin Rost from Stuttgart University and heard about his work in competence management both from theoretical and practical side. He started emphasizing the very definition of 'competence' together with others close concepts to it. He, then, explained his consultancy activities in detail in metal sector with reference to competence management.

One of the most unique experiences of this visit was the Fraunhofer Future Laboratory. The prototypes developed by Laboratory on Industry 4.0 were seen and experienced by visitors and participants got to learn about the work of this research institute and its partnership with the sector, as well as their predictions on the future of Industry 4.0.

The German vocational education system was introduced to participants in order for them to be able to compare German school – enterprise cooperation model with the one that Turkey has. German experiences in dual education system were discussed together with German administration system and demographic structure. Südwestmetall of the Southwest German Metal Employers' Union was then visited where German employer and employee association system was discussed and visitors learned about the training they provide for blue and white collar workers. Alkompass software, developed for competence management, was also introduced while discussing the associations' working fields in Germany and in other countries to provide employment.

The vehicle factory of Daimler, Mercedes – Benz Sindelfingen, established in 1915, employing more than 25 thousand of workers was also visited. Visitors got the opportunity to observe production lines at the factory where robotics and automation are replacing the human labor and conventional production models with Industry 4.0. At Mercedes Museum, history of the motor and the car was examined, while evaluations relating the history of production to the history of Europe and whole world were made.

Fraunhofer Future Laboratory

LAPP Cabel Company Facilities

The last visit was made to Scharnhaussen factory of Festo company. The factory has been exporting valves and electronic products to the world and it was interesting for the visitors with its energy efficient, sustainable and green high-quality products. In addition to manual production, the factory also has new production lines complying with the changing competition conditions brought by Industry 4.0 and robots have been seen working side by side with human workers in these lines.

During the focus group meeting at the end of the visit, German VET system is compared with the one in Turkey. The general idea was that; in Germany, Industry 4.0 has spread to the whole industry and therefore to all areas of life, meaning that it has to be present for the determination of qualifications. Thus, individuals in the labor market is expected to be more qualified than today's employees. Which in the end brought the following issues to be emphasized both by Ministry representatives and especially by the HP representatives of the enterprises as the points to bear in mind for a comprehensive competence management process or system:

- Legal problems are to be occurred following the high-level usage of technology; like drones taking part in trainings and production.
- Since the way how people work is being diversified some people will have hard times motivating themselves although some others will be more motivated than before. Most probably people will start to get distracted more and more easily, for instance.
- Socio – cultural disputes will occur because the I 4.0 is boosting individualism and the number of actual humans will be decreasing while the number of robots will be increasing.
- It will be hard for the individuals to choose between too many data they have been exposed to, which will bring the need of learning to learn.
- Doing the same job constantly creates stress, rotation is an important effect in reducing stress and inaccuracies. However, for rotation, individuals must have more than one competency, and in some cases cross-cutting competencies which may cause both psychological and physical burden to the individuals. The trainings of the individuals will have to have a multi-disciplinary approach.
- Although transparency will be a concept that will rise with digitalization, data security will follow since it will be hard to protect confidential information.

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Study visit to İstanbul, Turkey, March 13 – 18 2018

The study visit covering both Component 1 and Component 2 of SMART-COMET Project was held in İstanbul between the dates of 13th and 18th of March, 2018.

NAME	SURNAME	INSTITUTION NAME	JOB POSITION
José Miguel	**Soler del Río**	Centro Integrado Uno	Principal of VET School
Alejandro	**Berrocal Revilla**	Centro Integrado Uno	Director of Academic Studies Department and Welding Professor
Patricia	**Barroso Ruiz**	IES Remedios	Apprenticeship Coordinator and Welding Professor
Alfredo	**Quintana Cubero**	IES Remedios	Director of Academic Studies Department and Welding Professor
Diana Maria	**Balbás Polanco**	Cisternas Cobo	HR Director
Juan	**Diego Lucas**	Ministry of Education	VET and Lifelong Learning Unit Coordinator
Antonio	**Vega Omaña**	Ministry of Education	Pedagogical Technical Adviser of Vet and LLP unit
Karin	**Volpato**	FLM	R&D
Carmen	**De la Torriente Diez**	FLM	General Manager
Eren	**Yenigün**	MESS	External Affairs, Training and Projects Manager
Müge	**Yaman**	MESS Training Foundation	Project Specialist
Balkır	**Özünlü**	Ministry of National Education	Expert of the Department of Social Partners and Projects

During the visits, stakeholders of the Turkish vocational education and training system were shown to the participants. Organized by the Turkish Employers Association of Metal Industries (MESS); member enterprises of the association, both national and international companies were visited together with the VET schools in Turkey. The visit gave an opportunity to observe the required skills for relevant occupations and provide an understanding of managing the skills from VET schools to working life as a scope of life-long learning. The competence model and it's applications on the field that based on European Qualification Framework and National Vocational Qualifications Authority has been observed during enterprise visits.

This organization also covered schools and enterprises that are engaged with partnerships as a part of the School and Enterprise Cooperation subtitle of METAD – Full Support to Vocational Education for Turkey Project of MESS, MoNE and MESS Training Foundation.

One of the best practices of dual system in terms of school and enterprise cooperation model has observed during visits.

A case about the School – Enterprise Cooperation, METAD (Full Support to Vocational Education for Turkey) was shared with the participants.

Institutions visited are listed above.

Arçelik enterprise:

- Production facilities
- Arçelik Workshop 4.0 Applications and Experience Center
- Arçelik Garage Research and Development Center
- Competence management applications

Denizyıldızları Vocational Education and Training High School

Ford Otosan enterprise

- Production facilities
- Industry 4.0 applications
- Competence management applications

Gölcük Vocational Education and Training High School

Bosch enterprise factory

- TGA – Vocational Training Center
- School and enterprise cooperation
- Industry 4.0 application

Hürriyet Vocational Education and Training High School

- Ministry of National Education Regional Unit: presentation on Turkish VET system

The focus group meeting was organized at the end of the visits and the feedbacks of visitors are as follows;

- Visitors from Spain explained that they are pleasantly surprised about the fact that some serious investment is made on dual system in Turkey by Bosch enterprise and that it employs all the students included in their dual training program. Another positive observation from this dual training was the teachers' trainings in the Center and it also contributes the knowledge transfer from teachers to students.

- The number of "Erasmus+ projects" and both teachers and students including in Erasmus+ exchanges are found impressive by the participants. They said it is often hard for school administrations in Spain to find participants to be sent abroad for exchange projects. It becomes even harder for teachers to travel abroad for trainings and they first need to be convinced. Thus, possible cooperation models are discussed between schools from Spain and Turkey, and representatives of VET schools from Spain said they would be glad to host students coming from Turkey.

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- Participants explained that the commitment from enterprises but also from VET schools to Industry 4.0 and its applications were also more impressive than they were expecting.

- Hearing about Full Support to Vocational Education for Turkey (METAD) Project; visitors said the school-enterprise cooperation models in Spain tend to ignore the “gender equality” as an issue to be discussed although the number of female students is low rate in Spain as well. As a result, the number of women working in metal sector is also dramatically low, like it is in Turkey. Another issue they found important to take note about METAD Project was the industry 4.0 trainings and the fact that it has been underlined during career guidance seminars to students of VET schools.

- They asked the development plans of operators who have skills gap occurred during the transition from VET schools to enterprises. The explanation also given by the enterprises’ representatives; besides the school-enterprise cooperation model, enterprises are also investing money for the internal, on-the-job trainings.

Closure meeting

Study visit to Stuttgart, Germany, September 10 – 15 2018

A study visit as a part of SMART – COMET Project C2 pillar was held in Stuttgart, Germany between the dates of 10th and 15th of September, 2018 including a series of informative sessions, site visits and meetings.

Participants of the visit are as follows;

NAME SURNAME	CITY	INSTITUTION	TITLE
EREN YENİGÜN	İSTANBUL	MESS	External Aff., Training and Projects Manager
BİROL KORKMAZ	İSTANBUL	MESS TRAINING FOUNDATION	General Manager
MÜGE YAMAN	İSTANBUL	MESS TRAINING FOUNDATION	Team Leader
NADİRE MELDA POLAT	İSTANBUL	ARÇELİK	HR Manager
ŞAHİGAN GURBET	BURSA	BOSCH	Training and Development Manager
ELİF SINMAZ	KOCAELİ	FORD OTOSAN	Training and Development Manager
BALKIR ÖZÜNLÜ	ANKARA	MoNE (DGVET)	SMART COMET MoNE Project Coordinator
NURHAYAT CANATAN	ANKARA	MoNE (DGVET)	Project Team
SEMRA APİŞ	ANKARA	MoNE (DGVET)	Project Team
ÖMER PINARLI	BURSA	VET School	School Principal
SELAHATTİN DURAN	KOCAELİ	VET School	Vice Principal

The visit was organized by Dekra Akademie, SMART COMET project partner in Germany and all different parties composing German vocational education and training system, the dual education were introduced to the participants during the visit.

It started with Dekra Akademie representative giving a presentation on the essentials of German dual education system where participants had opportunity to compare the education systems of two countries and had a general understanding about the institutions included in the system.

Die IHK, Stuttgart Chamber of Commerce and Industry was visited by the delegates and the industry in the region together with their role in dual education system was explained in detail. The Chamber, the authority that signs the agreement between students and enterprises has a significant role in this system, as well as handling the mid–term and final exams of the apprentices through which they earn certificates to qualify for certain jobs. Participants were interested in learning about the details of all vocational education activities that the Chamber is undertaking.

KS 1 Stuttgart, the biggest vocational school of business administration in Federal State of Baden – Wuerttemberg was also a part of this visit. The school has many different branches and 5.000 students in total who come to school part time as a part of their dual education, for which they need to work 3 days in a company and 1 day or 1,5 days in a vocational school in general. Participants had the chance to ask the administrative details of the system and to see the classroom environment of the country in general.

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KS 1 Stuttgart VET School

Another meeting was at the Headquarter of **IG Metall**, the biggest trade Union for workers in metal-industries in Germany. The Head of Stuttgart branch welcomed participants, and representative of Daimler Sindelfingen plant and Unit Head of Youth were both present in the meeting, first two being Executive Board Members of the Union with 2,2 million workers. They gave information on the union system in Germany and explained the position they have in dual education. They are preparing the content for exams of the students which gave them a strategic position and complete the inclusive structure of the dual education system.

The last important component of dual education, a company was also visited as a part of the study trip, **Lapp Kabel Company**, a cable company with 4.000 employees worldwide hosted the participants in their premises where they saw the production process of multiple cables produced from different materials. The key intake from this visit was their workshops for apprentices. All materials used in the training was shown and students also explained the work they have been doing in the company. The e-learning platform that students are using as a part of their dual education, called 'Christiani' was discussed with the group. The company is also providing apprentices with a training along 2 weeks in their premises in France where they learn to give the cable some certain shapes. It further supports the students if they wish to get trainings in another country, while receiving foreign students in their workshops.

Lapp Company apprentice training room

In addition to these informative sessions on School – Enterprise Cooperation, Competence Management part was also included in the study visit. Dr. Martin Rost, from University of Stuttgart gave a presentation on competence management explaining both from theoretical and practical side of the discussion. He started emphasizing the very definition of competence together with close concepts to it. He explained his consultancy activities in detail in metal sector and enterprise representatives had the opportunity to compare his work with the competence management practices they have in their companies.

In order to offer the participants, the chance to see some cultural venues; an exhibition visit to New Stuttgart Railway Station project was planned. In this way, participants got ideas on popular discussions and on the daily life of the residents. Another visit was to the Porsche Museum, where the delegates listened to history of the brand together with historical milestones of the country in general.

A wrap up meeting was held as a focus group discussion in Dekra office and the Quality Manager of the project, Hanna Schankel was present there at this meeting.

Wrap up meeting and a focus group discussion for the study visit

The outstanding points of this meeting were as follows;

- With all the information gathered from different parties of dual education; ECVET tools were asked to the specialists of Dekra and they gave brief information on the partially integrated system that allows free flow of workers between different European countries. This means, they generally have free movement of labor force when it comes to technical positions employed by private sector; whereas it is hard to employ workers educated in other countries to public positions.

- Almost all participants claimed that they are inspired from what they have seen and they now will try to be integrating this education structure to their work back in Turkey.

- Participants from public side emphasized that they are impressed from seeing all different social partners adopting the system in a way that they claim their responsibility in the running of this system.

- Company representatives claimed these visits had been enriching for them since it gave them different perspectives to take back with them.

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Study visit to Basque Country, Spain, October 9-13, 2018

The last study visit as a part of C1 pillar was held in autonomous Baque Country of Spain between the dates of 9th and 13th of October, 2018 including a series of site visits, meetings and discussions.

During the study visit to the Basque Country, professional training of the schools and enterprises in the region and the competency development models of the employees of enterprises were examined.

Participants of the visit are as follows;

NAME SURNAME	CITY	INSTITUTION	TITLE
EREN YENİGÜN	İSTANBUL	MESS	External Aff., Training and Projects Manager
BİROL KORKMAZ	İSTANBUL	MESS TRAINING FOUNDATION	General Manager
MÜGE YAMAN	İSTANBUL	MESS TRAINING FOUNDATION	Team Leader
HASAN KARADENİZ	İSTANBUL	Esenyurt Kıraç IMKB VET School	Vice Principal
SERDAR ÇAKIR	KOCAELİ	Darıca Deniz Yıldızları VET School	Vice Principal
KENAN KARAN	SAKARYA	Adapazarı IMKB Sakarya VET School	Department Head
ABDÜLKADİR YILDIZ	ANKARA	MoNE (DGVET)	Project Team
NEJMİ SAKAOĞLU	ANKARA	MoNE (DGVET)	Unit Manager
FATMA ÜNLÜ	ANKARA	MoNE (DGVET)	Head
HÜSEYİN YAKUP TEMUR	KOCAELİ	FORD OTOSAN enterprise	Learning and Development Senior Specialist
PINAR ÇAĞLAR GÖRÜRGÖZ	İSTANBUL	ARÇELİK enterprise	Human Resources Senior Specialist
MALTE STAMER	STUTTGART	Dekra Akademie	Project Manager
ULRICH KOHLER	STUTTGART	Dekra Akademie	VET Director

Tknika premises

The visit was organized by INDEO – Fundación Laboral del Metal (FLM), SMART COMET project partner in Spain and FLM wanted to show the innovative applications on VET in Basque Country to the participants. Representatives of MESS member companies, Ministry of National Education General Directorate of Vocational and Technical Education and managers of vocational and technical Anatolian high schools were present during the visit. Two participants from another partner of the project, Dekra Akademie also joined this study visit and visited schools and companies, and public institutions.

The visit started with getting the expectations of participants and the first visit was to Tknika Research and Innovation Center.

Established under Ministry of Vocational Education, Basque Country offers training programs for teachers and employees both from Spain and around the world. The Center also conducts research projects for small and medium-sized enterprises that do not have R & D centers. The center includes relevant schools to these project teams and provides bridges between schools and enterprises in this way. With this feature, Tknika is a center where new technologies are produced, training methodologies are developed and all of these are promoted by SMEs and schools and all these were shown to visitors through visits to all different workshop areas of the Center.

New technologies and innovations in Turkey and many European Union member states are transferred to schools after being developed in private sector enterprises; however, Tknika, provides specific support to enterprises without R & D units and adds a distinctive and innovative dimension to vocational education and training.
All these developed projects are being disseminated through teacher trainings and employee trainings designed in various sub-headings and durations.

Usurbil GLBHI Vocational Training Center was another institution visited. The school, which has become a reference point for the area of climate change and sustainable energy production, produces projects with companies through Tknika. New training methodology Ethazi applications developed and disseminated by Tknika in the institution were observed and information about the reflections of the applications on students were obtained. With Ethazi learning methodology, students are removed from traditional classroom environment and they are divided into groups by teachers for this challange-based learning method and try to find solutions to the problems they are facing with.

Students need information on many different subjects such as physics, mathematics, languages, while solving these challenges. In this way, they experience and internalize the multidisciplinary working principles of the private sector, meaning that they are trained for the industry.

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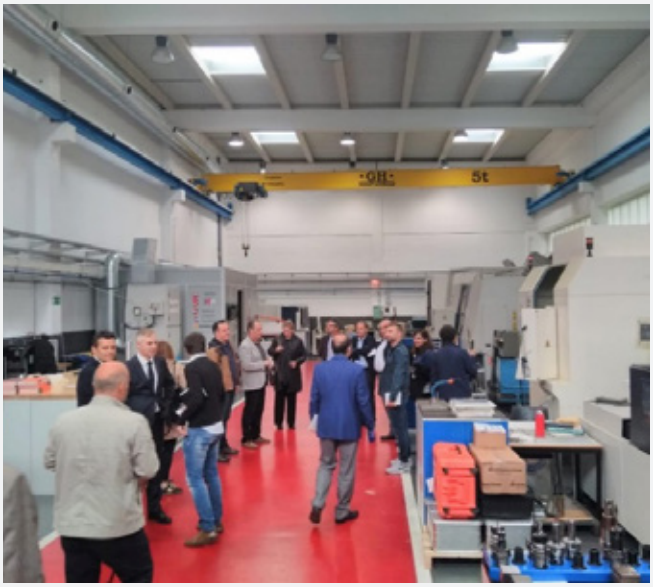
Another school that was toured within the program was Instituto de Máquina Herramienta-IMH, which specializes in the metal industry and provides vocational training in the field of machine tool from initial level of VET to the master education level including a specialization program.

The Ethazi method was also observed in this school and Elgoibar, a medium-sized company in which this school is in cooperation was another stop visited right after. Company's cooperation with school and its production areas were introduced to participants, and information was also provided on models that employees and students applied on competence management.



IMH workshops

Focus group discussion

A wrap up meeting was held as a focus group at the end of study visit.

The outstanding points of this meeting were as follows;

- A Ministry of Vocational Education was established in Basque Country showing the importance they are giving to VET and the perspective of the regional government.
- Seeing that a public institution, Tknika, is providing innovation for the enterprises, although these enterprises are SMEs, is said to be quite visionary for the schools and Ministry representatives.
- The Center is providing teacher's training in a way that they are disseminating the information to the students.
- Having close relations and engaging in projects with the private sector, workshop standards of the schools were also high meaning that students get the chance to keep up with the latest technology.
- There is a performance system in schools for the teachers. This was also impressing for participants since this supports the creativity and motivation of teachers to apply innovative learning and teaching methods.

Pilot Application:

In the scope of competence management model appealing to the metal industry as a whole, that is introduced to be implemented in an operational and occupational basis. As a result of this application, feasibility of the model and development areas related to the implementation of the model in the field have been determined.

10UY0002-3 National Qualification of Mechanical Maintenance Operator (Level 3) developed by MESS with the participation of all related stakeholders (vocational education and training institutions, enterprises, NGOs and occupational chambers, etc.) has been chosen for the pilot implementation by project team and enterprises due to its significant role in Industry 4.0 transformation and for metal industry. The model application was developed by the project team, Human Resource experts of the enterprises and machine maintenance operators contains two parts; theorical and practical.

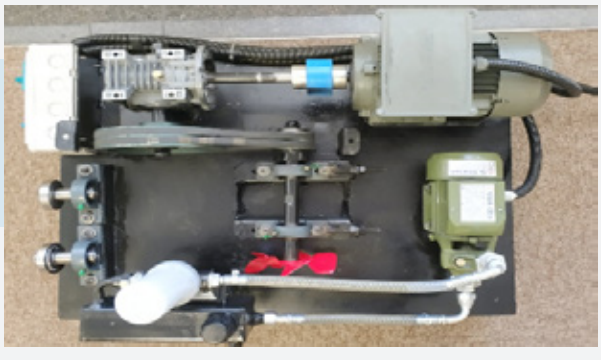
PROJECT TEAM			
NAME - SURNAME	**INSTITUTION**	**COUNTRY**	**TITLE**
Eren Yenigün	MESS	Turkey	External Affairs, Training and Projects Manager
Can Yılmaz	MESS	Turkey	Project Support
Gökhan Demirbaş	MESS Examination and Assessment Center	Turkey	Project Support
Birol Korkmaz	MESS Training Foundation	Turkey	General Manager
Müge Yaman	MESS Training Foundation	Turkey	Technician
Karin Volpato	FLM	Spain	Researcher
Malte Stamer	Dekra Akademie	Germany	Researcher
Şuay Nilhan Açıkalın	MESS	Turkey	Researcher
Hürriyet Ergazi	MESS	Turkey	Researcher

Theorical Application:

- A1 Occupational Health and Safety, Environment and Quality Qualification Unit: 20 applications
- B1 Preventive Maintenance Qualification Unit: 25 applications
- B2 Corrective Maintenance Qualification Unit: 20 applications

Practical Application:

- The performance – based application involved B1 and B2 unit Prototype machine and manual that was prepared by the technicians in the project team.



Prototype Machine

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Enterprises included in the application, and dates and flow of the day are as follows:

Enterprises	City	03.07.2018	08.08.2018	10.08.2018	14.08.2018
Ford Otosan	Kocaeli		✓		
Arçelik	Kocaeli				✓
TürkTraktör	Ankara			✓	
İçdaş	Çanakkale	✓			

Flow of the day	Participant 1	Participant 2
Theoretical App. **1st session** **10.00 – 11.30**	✓	✓
Practical App. **2.1st session** **11.30 - 13.00**	✓	
Practical App. **2.2nd session** **14.00 – 15.30**		✓

Observations and findings from the focus group study after the application are summarized as follows:

- Participants had difficulties in recognition of the existing visual and directory signs in their work field.
- Statements regarding the purpose and types of machine maintenance; preventive, corrective and improvement maintenance were not clearly understood by the participants.
- The lack of environmental awareness in terms of the use and disposition of consumable materials has been observed.
- Participants began to implement work orders without understanding the parts and principles of the pilot machine and examining the technical drawings in the Machine Catalog that are designed to guide them through the process.
- There is a lack of knowledge on the oils used in the machines and the intended use of oil.
- Participants had troubles with the use of measuring tools and did not follow proper procedures according to control steps when removing and installing parts.
- Even though participants were quite successful to implement work orders, they had difficulties to document the work on a previously prepared template and they needed support.
- Feedbacks and evaluations of project partners were all collected and a **"Framework" – "Pilot application" and Practical Manual** is finalized which was shared with Human Resources specialists of the 4 enterprises first and then disseminated via project web site as an open source publication; which paved the way for the IT Tool of the project.

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Annex 1. School-Enterprise Cooperation Protocol

GOVERNORSHIP

THE PROTOCOL RELATION TO DEVELOPMENT OF SECTOR-SCHOOL-ENTERPRISE COOPERATION BETWEEN …… VOCATIONAL AND TECHNICAL HIGH SCHOOL, THE ENTERPRISE AND MESS TRAINING FOUNDATION

February - 2019

…….. GOVERNORSHIP

THE PROTOCOL RELATION TO DEVELOPMENT OF SECTOR-SCHOOL-ENTERPRISE COOPERATION BETWEEN THE VOCATIONAL AND TECHNICAL HIGH SCHOOL, THE ENTERPRISE AND MESS EDUCATION FOUNDATION

Parties

Article 1- Parties of this protocol … Vocational and Technical High School, Enterprise and MESS Education Foundation. All kinds of notification and communication addresses of the parties are as follows.

a) Vocational and Technical High School

Address :

Phone :

Fax :

E-mail :

b) Enterprise

Address :

Phone :

Fax :

E-mail :

c) MESS Training Foundation (MEV)

Address :

Phone :

Fax :

E-mail :

Definitions

Article 2- In this Protocol;

MEB : Ministry of National Education,

MTEGM : General Directorate of Vocational and Technical Education,

MESS : Metal Industrialists' Union of Turkey,

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MEV	:	MESS Training Foundation,
School	:	Vocational and Technical High School,
School Directorate	:	School Directorate of Vocational and Technical High School,
Ministry Protocol	:	The protocol signed between MEB and MESS on 29.06.2016
METAD Project	:	Train qualified labor for metal sector, improve the quality of vocational and technical education, enhance the charm, the Project which is carried out by MEB-MTEGM, MESS and MEV cooperation and base on Sector-School-Enterprise Cooperation model obtained finance by MESS for support economic and social development**.**
Enterprise	:	… Enterprise
Scholarship	:	Enhance the quality of vocational and technical education; give a reward to zealous students , financial support for students in order to enhance cooperation of sector-school-enterprise,
School METAD Responsible	:	The person assigned to carry out the works within the scope of the project in the school,
Enterprise METAD Responsible	:	The person assigned to carry out the works within the scope of the project in the enterprise,
Skill training in enterprise	:	Practical training which be given by enterprise to students in the workplace within the scope of the protocol,
Career development, guidance and counseling support	:	Personal development trainings, guidance and consultancy services to be given to students under the coordination of MEV,
Student Mentor	:	Business employee providing consultancy and guidance services for the personal development of the students within the scope of the project,
Sector-School-Enterprise Cooperation Model	:	Sector-School-Enterprise Cooperation Model, jointly developed by parties,

Department	:	Metal Technology, Motor Vehicle Technology, Electrical Electronics Technology, Industrial Automation Technologies, Machinery Technology, Metallurgy Technology, Plastic Technology, Design Technologies, Installation Technology and Air Conditioning departments,
Management and Leadership Trainings	:	Management and leadership trainings to be given to school administrators,
Teacher Training	:	On-the-job trainings for school teachers at workplaces based on needs analysis,
Laboratory Support	:	Support of the tools and equipment to be provided voluntarily by the Enterprise according to the laboratory needs of the school,
Impact Analysis and Reporting	:	Regular monitoring and reporting of the works carried out within the scope of the cooperation,

PURPOSE

Article 3- In order to provide the qualified labor force needed by the metal sector, to contribute to the improvement of the quality of vocational and technical education, thus to support economic and social development, to establish cooperation between the Enterprise and the School within the scope of the Protocol dated 29.06.2016 in cooperation with the Ministry of National Education and MESS and MEV and to develop existing cooperation are intended.

SCOPE

Article 4- This protocol, providing management and leadership trainings to school administrators, in-service trainings to teachers and laboratory support to the school, and scholarships to business employees' children who are educated in the field of metal sector and students who is successful in other certain fields, in their schools and institutions connected with the MTEGM, providing skills training and internship opportunities in enterprises, providing career development and guidance services trainings, it covers the procedures and principles for providing vocational training to the employees by the school, joint project development in school-enterprise cooperation and R&D activities.

BASE

Article 5- This protocol, 1739 numbered Basic Law of National Education, 3308 numbered Vocational Education Law, 652 numbered Decree Law on Organization and Duties of Ministry of National Education, Regulation on Secondary Education Institutions, 2015-2018 Turkey Industry Strategy Document and the 2014-2018 Turkey Vocational and Technical Education Strategy Document and Action Plan are prepared on the basis of development of Sector-School-Enterprise Cooperation. between "Ministry of National Education, Vocational and Technical Education General Directorate and Turkey Metal Industrialists Union and MESS Training Foundation.

Works to be done under the Protocol

Article 6- The activities to be carried out within the framework of the School-Enterprise Cooperation

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Model within the scope of this protocol are listed below.

6-1. Providing career development, guidance and counseling services for school students studying in the areas of metal industry,

6-2. Providing skills training and internship opportunities in the enterprise for school students studying in the areas of metal industry,

6-3. Providing employment priority to the field graduates for the metal sector in the enterprise,

6-4. To organize "Management and Leadership'' trainings for school managers,

6-5. To organize in-service trainings for the school teachers on the basis of needs analysis,

6-6. Providing tools and equipment support to the laboratories of the school on a voluntary basis by the Enterprise according to their needs,

6-7. Implementation of joint projects to improve the quality of vocational and technical education and to achieve the objectives of the Protocol,

6-8. R & D studies between school and enterprise,

6-9. Communication works and press announcements with the purpose of creating awareness towards protocol,

6-10. Providing regular monitoring and dissemination of the studies carried out within the scope of the protocol.

Obligations of the Parties

Article 7- The obligations of the parties are as follows.

7-1. Obligations of the School

6-0.1 To assist students, enterprises and MEV in scholarship procedures,

6-0.2 Determining the METAD responsible for the school,

6-0.3 Informing MEV about the success, attendance status of students,

6-0.4 To cooperate with MEV and the Enterprise on the career development, guidance and counseling services to be provided to the students,

6-0.5 Assisting student mentors in mentoring services,

6-0.6 To make plans in cooperation with Management and MEV in order to enable field students to do skills training and internship in enterprises,

6-0.7 To cooperate with the Enterprise so that graduates can benefit from employment priority according to their wishes,

6-0.8 Providing to participate administrative staff who are in school management in the management and leadership trainings to be organized within the scope of the project.

6-0.9 To cooperate with MEV and the Enterprise about the needs of teacher training, to ensure the participation of teachers in need of training in line with the need's analysis.

6-0.10 R&D studies with the Enterprise,

6-0.11 Developing joint projects in school and enterprise cooperation,

6-0.12 To share the necessary data for impact analysis and reporting with MEV.

7-2. Obligations of the Enterprise

6-1.1 To contribute to the development of curricula and content in accordance with the competencies of the workforce that the enterprise needs,

6-1.2 To determine METAD responsible, to report duties and responsibilities, to follow up the studies,

6-1.3 Identifying students' mentors in enterprise, reporting their duties and responsibilities, and following up on their work,

6-1.4 To cooperate with MEV about training of students' mentors

6-1.5 Support to MEV and the school about carrying out of skills training and employment priority processes,

6-1.6 Provide skills training opportunity for scholarship students in their enterprises,

6-1.7 To provide priority to employment for the scholarship students within the framework of the employment / HR policy of the enterprise,

6-1.8 To arrange organizations such as personal development seminars and career promotion days that will contribute to the development of students,

6-1.9 Organize joint R & D projects with schools and supporting the studies which related to organize the projects,

6-1.10 Coordinated work with the school directorate and school METAD supervisor,

6-1.11 To organize practical trainings for teachers, to cooperate with the School and the Ministry on this subject,

6-1.12 To make joint projects with the school,

6-1.13 To share the necessary data for impact analysis and reporting with MEV.

7-3. Obligations of MEV

7-3.1 To provide career development, guidance and counseling support to students,

7-3.2 To provide skills training to the students which are intended to fields of metal industry in enterprises,

7-3.3 To ensure that graduates are given priority in employment in MESS member enterprises,

7-3.4 To give ''Management and Leadership Trainings'' to school administrators,

7-3.5 To assist in teacher training needs analysis, to organize in-service trainings to be carried out in the enterprise and school for teachers based on needs analysis,

7-3.6 Informing MESS member enterprises about the cooperation with vocational and technical education schools / institutions, raising awareness and organizing field trips and organizing workshops to promote cooperation opportunities and tools,

7-3.7 To ensure the regular follow-up and dissemination of works carried out under the protocol,

7-3.8 Performing impact analysis and reporting,

Changes that could be made to the protocol

Article 8 In case of need by the parties within the period in which the protocol is in force, amendments and additions may be made in writing, with the principles remaining the same.

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Resolution of Disputes

Article 9 The matters not be ensured in the Protocol and the provisions not in its relevant legislation be resolved within the framework of good faith, mutual understanding and agreement rules between the parties.

Other provisions

Article 10 Work and transactions in accordance with this Protocol, be made a transaction in accordance with the provisions of the relevant legislation on matters other than those specified in the Protocol.

Article 11 The school, enterprise and MEV which are parties to the Protocol, may not transfer its obligations and powers under the Protocol to any other natural or legal person.

Article 12 Within the scope of the protocol, the trainings to be given to the students, teachers and school administrators and the workshops could be held are carried out in the enterprise and / or in the school. Catering, necessary stationery equipment's etc. expenses relating to the trainings are covered by the MEV or the enterprise.

Duration of the Protocol

Article 13 The duration of this Protocol is 5 (five) years. In case of written request of any of the parties before the deadline, it can be extended about a set time by the agreement of the parties.

Executive and enforcement

Article 14 The provisions of this Protocol are carried out jointly by the School, the Enterprise and the MEV. The protocol which consist of 7 (seven) pages and 14 (fourteen) articles come into force by signed in triplicate by authorities of the parties on …/…./2017.

SCHOOL	ENTERPRISE	MESS TRAINING FOUNDATION

Respectfully submitted with proper opinion

Provincial Director of National Education

APPROVAL

GOVERNOR

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Phase: 1.1.

ANALYZING CURRENT PRACTICES OF EU COUNTRIES VIS A VIS ECVET

Phase: 1.2.

A COMPREHENSIVE REPORT ON COMPETENCE MANAGEMENT PRACTICES IN EU COUNTRIES

Phase: 1.3.

EXPLAINING CURRENT PRACTICES OF SCHOOL-ENTERPRISE COOPERATION IN METAL SECTOR

Table of Contents

SMART - COMET Project is Funded by the Erasmus+ Program of the European Union. However, European Commission and Turkish National Agency cannot be held responsible for any use which may be made of the information contained therein.

INTRODUCTION

Within the scope of the project, three main themes have been examined under various headings. The main themes consist of ECVET, Competence and School-Industry Cooperation. In the section related to ECVET, the question that "what is ECVET program" is covered in a broader context. Then, ECVET applications in Turkey, Germany and Spain are also mentioned. The second section on the theme of competence focuses on the concept of competence, the importance of competence management for countries and the competence-based training in vocational education and training (VET). In the third section on the theme of school-industry cooperation, firstly the recent importance of school-industry collaboration in terms of vocational education and training (VET) has been emphasized. After the necessary literature review and general outlines on this topic are revealed, the school-industry cooperation in the selected countries has been dealt with in detail. These countries are Turkey, Spain and Germany, which are project countries. Finally, these issues were summarized in a broad framework at the end of Phase 1.

Phase 1.1.

EUROPEAN CREDIT SYSTEM FOR VOCATIONAL EDUCATION AND TRAINING (ECVET)

What is ECVET?

As living organisms, all types of institutions, including higher education institutions, are affected by events that cause change as much as they are in the world. Since the 1980s, three major developments have affected the landscape of higher education institutions; these are globalization, increasing requirements for lifelong learning, and rapid and intensive developments in information and communication technologies (Erçetin and Açıkalın, 2018a). In Europe, education and training reform is seen as a fundamental requirement to support competitiveness objectives by providing education and training that will respond more to labor market needs and encouraging labor mobility (Winterton, 2011). Europeanization can be seen as an intuitive concept for solving a two-stage process of institutional change. The first process, the "European" arena of change, is concerned with the change initiated by domestic actors in response to EU initiatives; the second process of change, the "in-home" change arena, is concerned with the ever-increasing internal change underneath the arena of Europeanizing institutional change and independently of internal institutions (Trampusch, 2009). Since 1999 and 2002, the processes of Bologna and Copenhagen in higher education (HE) and VET have added these comprehensive objectives to European skill formation (Powell and Trampusch, 2012). In this context, in each country, a different competence model based on different VET systems has been adopted (Brockmann, Clarke and Winch, 2009).

ECVET is a credit transfer system developed for the purpose of providing, recognizing and accumulating transfer of knowledge, skills and competences acquired through different learning paths in vocational education and training. ECVET supports mobility in the learning process by creating a common language across Europe through the transfer, recognition and accumulation of learning outcomes.

ECVET facilitates the understanding and recognition of the knowledge, skills and competences that individuals acquire in a different country, in a different educational and educational institution and in a different learning environment. Thanks to ECVET, which adopts the accumulation of learning outcomes and transfer approach, the qualification systems in countries can be easily comparable (ECVET, 2015). In other words, ECVET is a useful tool to facilitate the transfer and accumulation of learning outcomes of individuals who transition from one learning environment to another and / or from one system of qualifications to another. Açıkalın and Erçetin (2018) stated that in active learning environments, learning activities of learning and teaching staff of students develop because these environments are student centered and improve student experience.

EVCET's development began in 2002 after the Copenhagen Process, underlining the need for a VET-related credit system. The system was developed in cooperation with the European Commission by member states and social partners and was adopted in 2009 by the proposal of the European Parliament and the Council. The application of ECVET is a voluntary process. The preparations of Member States for the implementation of ECVET are in progress and many countries have made progress in establishing the necessary conditions. However, despite the adoption of the ECVET principles and its adoption, full and systematic implementation is still far from many member states. In addition to the understanding, adoption and implementation of the principles that emphasize ECVET, there is ongoing works across Europe in piloting modular training systems and preparing learning outcomes with pilot studies in member and candidate countries (Ata and Ucal Çepni, 2015: 14)

ECVET's competency typology had to be comprehensive enough to accommodate different models of competence and to capture the different aspects of competence in a real business context (Brockman et al., 2009). In the implementation of ECVET, transparency, understanding of common qualifications, development of the framework of national qualifications and learning outcomes approach should be established. At the same time, the implementation of ECVET requires preparations for the transfer and validation of learning outcomes (CEDEFOP, 2012).

History of ECVET?

When?

This initiative (ECVET) builds upon the achievements of the Higher Education Credit Transfer System (ETCS) initiated in 1989. ETCS has been developed to provide recognition and transparency of the education the individual trains in a country outside his own country (Ulusal Ajans, 2012).

The development of ECVET began with the Copenhagen Declaration in 2002 and continued with Maastricht 2004, Helsinki 2006, Bordeaux 2008, which supports the creation of a credit transfer system in vocational education and training (VET). In Europe, many steps have been taken and progress has been made in the historical process of ECVET. Countries are trying to adapt ECVET to education systems. Since 2002, the ECVET has a development process as follows (Ata and Ucal Çepni, 2015: 2-3):

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- It was emphasized by the European Commission in 2002 that a transfer of credit in Vocational Education and Training should be developed in Copenhagen Declaration.

- Reports from the following years (Maastricht 2004, Helsinki 2006, Bordeaux 2008) indicate that a credit transfer system related to VET should be established. At the same time, a number of national and European level testing and consulting activities have been initiated to create a convincing ECVET proposal that can be submitted for approval by the official authorities, including many sectors and organizations. In order to support the development of ECVET partnerships and to encourage the testing and experiencing of ECVET, it has been decided by the EU Commission that ECVET should be a priority in the projects. As a result, 11 pilot projects related to ECVET have been financed.

- On 18 June 2009, the proposal of the European Parliament and Council for the "Establishment of the European Credit System for Vocational Education and Training (ECVET)" sets out the common ECVET principles, the determination of the technical priorities of ECVET and the necessary measures for the implementation of ECVET in member and candidate countries.

- Since 2009, members and candidate countries have been encouraged in Europe to establish the conditions under which ECVET can be used by all students in VET. In 2010, the European Commission approved the further financing of 8 pilot projects related to ECVET and emphasized national practices in these projects. In addition, ECVET has become one of the priorities of the Leonardo da Vinci sectoral program (one of the four sector programs that make up the European Commission Lifelong Learning Program between 2007 and 2013).

- In 2011, the 14 National Agencies responsible for managing national implementations of the Lifelong Learning Program conducted studies on the preparation of ECVET-related supporting documents under the leadership of the German National Agency (NA BIBB). These national agencies networks, known as NetECVET (http://netecvet.com/), have made the network of ECVET Toolkit (ECVET useful documents and tools) available to users (ECVET Toolkit).

- In 2014, the EU Council and Parliament requested from member states and the EC Commission on ECVET to report on their performance from 2009 onwards.

Why?

The reasons for the need for ECVET can be explained as follows:

- Problems with the training of qualified personnel required by competitive economies and sustainable development models and the provision of vocational training participation

- Reasons why individuals cannot get a job despite having vocational education and training
- The need for a solution proposal from the EU point of view on the existing problems of vocational education and training (VET).
- Member States have agreed that at least 6% of students or adults receiving vocational education and training should complete some of their vocational training outside of their country up to 2020.
- For the development of information society in Europe a high level of general and vocational education is essential. For this reason, general and vocational education is an important element of the 2020 European strategy.
- Besides, there are two main goals of ECVET. These are (ECVET, 2015):

Facilitate the mobility of individuals among countries: It enables the transfer of learning achievements that individuals successfully achieve to a system of competences among countries at national level.

Support lifelong learning: Lifelong learning is supported by the knowledge, skills and competences acquired in another learning environment while mobility among countries and sectors is achieved.

APPLICATION OF ECVET IN PROJECT COUNTRIES

(Turkey, Germany and Spain)

TURKEY

The future of education is taking a shape in the effects of the relation between technological and social changes (Erçetin and Açıkalın, 2018b). The ECVET system is a system based on the certification and validation of all knowledge, skills and competence that individuals get in Europe. Since 2005 significant works associated with ECVET have been carried out in Turkey. These developments can be briefly explained as follows;

One of the most important developments in ECVET was the foundation of VQA (Vocational Qualifications Authority) in Turkey in 2006. VQA has made important contributions to the creation of the National Qualifications Framework.

The VQA was established as a result of a two-year intensive workshop with the Ministry of National Education, Higher Education Council (YÖK), related stakeholders and social partners on an EU-funded Vocational Education and Training project. The VQA provides national coordination point in the National Qualifications Framework in Turkey. The Board of Turkish Qualifications Frameworks comprising VQA MoNE and CoHE have responsibility for referencing

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national qualification to the European Qualifications.

ECVET's support studies in Turkey, established by the Turkish National Agency has continued and even strengthened in 2014 by the National ECVET Team. The team has an extremely broad participatory structure consisting of representatives of the Ministry of National Education, - General Directorate of Lifelong Learning, General Directorate of Vocational and Technical Education, Vocational High Schools, CoHE, VQA, TÜRK-İŞ, HAK-İŞ, TİSK and TESK.

The Turkish National Agency continues its activities related to ECVET with the Ministry of Education units and sector cooperation. ECVET Thematic Monitoring Meeting held on December 25-26, 2015 is one of the important works for ECVET in Turkey. This study provides support for the ECVET issue in Turkey and is one of the most important studies that revealed all the details.

In Turkey, ECVET has been implemented with projects about some sectors such as automotive, exporting / importing, electric-electronic, tourism, easy metal, etc. The achievements obtained from ECVET context in Turkey can be handled under six titles:

1. European Qualification Framework Process and Establishing Vocational Qualification Authority in Turkey

The EQF refers to itself as a common reference framework which links countries' qualifications systems together, acting as a translation device to make qualifications more readable and understandable across different countries and systems in the Europe. One of the important goals of Turkey Qualifications Framework certified qualifications in Turkey (diploma, certificate, professional qualification certificates, etc.) recognized in European Union countries and provide it to become valid. The first step in the process of achieving this goal is to put into force on 11.19.2015 of Turkey Qualifications Framework. TYC (TQF) was presented to the European Commission by Vocational Qualification Authority on 30 December 2016. It was referenced to EQF in March 2017.

2. Development of National Occupational Standards

The EU Commission has decided to recommend all member and candidate countries to establish national professional qualification standards by the end of 2010 and to adapt them to the EU professional qualifications framework. The studies start in Turkey after the Commission's recommendation continuing this work. One of the main works in this area was to establish Vocational Qualification Authority (VQA) in 2006. More than 700 national occupational standarts were prepareted by VQA cooperation with public and private institutions, NGO, professional bodies, industry and trade unions

3. Regulations about Recognition of Prior learning by Ministry of Education

In particular, the process of documenting the professions learned by working with or developing by someone else has gained tremendous momentum with the “Directive Regarding Procedures and Principles Related to Recognition, Equivalence and Measurement and Evaluation of Prior Learning” issued by MoNE on 02.10.2017.

4. Evaluation of Apprenticeship Training in the Scope of Compulsory Education

Law no. 6764 issued on 23.12.2016 was enacted and provisions related to apprenticeship education were added to the basic law of national education. With this law, apprenticeship education is included in compulsory education, and a major deficiency in the legislation due to the extension of compulsory education to 12 years has been eliminated.

5. Setting Up the Certification and Examination Centers (VOC-TEST)

161 (VOC-TEST) Certification and Testing Center (VOC-TEST) has been authorized by VQA and continues its activities. The process of establishing the accredited test centers through the VOC-TEST Centers project is ongoing. 5568 certificates have been issued by these centers regarding learning outcomes.

Students and Teachers Views on ECVET

In order to examine perceptions of teachers and students regarding mobility and training in different countries and also the ECVET program in Turkey, the interviews were conducted with 36 teachers and 27 students. The data obtained at the end of the interviews were analyzed through content analysis. As a result of the examinations, the opinions and responses of students and teachers are categorized as opportunities, difficulties and contributions as follows;

The Views of Students

Opportunities

They express the opportunities provided for the students abroad as follows:

- Basic needs such as food, accommodation and transport
- Free city travels
- The opportunity to see new cities and get to know new people
- Touristic trips
- Social events

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- Language training
- Effective working environment
- Various materials and equipment
- Performance-oriented training
- Applied and theoretical training
- Workshops
- Debate platforms
- Innovative technology
- Robotic systems

Difficulties

The students expressed the difficulties arising from social life as follows:

- Family and homeland longing
- Some hotels are out of town and limited activities
- The problem of not communicating with people in the vicinity due to different language
- Students participating in the program seem to have had almost no problems with accommodation.
- When it comes to transportation difficulties, it is seen that buses and metro lines are mixed only during the integration process by the students.

Contributions

This section is examined under two main themes and firstly, the contribution of the program to the students in social and personal development aspects is presented:

- Making new friends
- The opportunity to live and coalesce with the community of people from different cultures
- Tour of historical and touristic places
- Foreign language learning

- Recognizing different lifestyles and cultures
- Development of horizons with different perspectives
- Having fun and big time
- Improve the ability of reasoning and analysis
- Gaining experience in various subjects
- Development of sense of responsibility
- Sharing with various people
- Broad scanning
- Increase of self-confidence

In this section, the contributions about the professional and academic (the development of professional skills) dimension of the program are listed:

- Participation in an efficient vocational internship program
- Gaining experience in vocational skills and professional management
- To be able to make a comparison of professional practices abroad and domestically
- Increasing the level of knowledge in specific areas
- Cooperation and solidarity
- Creating academic awareness
- Use of all kinds of materials for professional development
- Meeting with various material, equipment and projects
- Being in various applications
- Practice with a consultant
- Professional development opportunities in a different environments
- Opportunity to follow developments in specific areas
- Developing academic knowledge and skills
- Changing future expectancy
- Utilizing different sources

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Analysis of the Students' Responses

When the opinions of the students about the opportunities of the program are examined, it can be seen that the opportunities can be handled in two areas, socio-cultural and vocational. It seems that all the mandatory requirements of the students like nutrition, accommodation, transportation, etc. are provided free of charge. Besides, students have socio-cultural opportunities such as visiting new cities, travelling to historical and touristic places experience new cultures, social activities and language learning. From a professional point of view, they have stated that they are in **educative, helpful and comfortable** environments. These opportunities are also thought to positively influence their practical and theoretical training. In addition, they have the opportunity to use innovative technologies and to participate workshops that they cannot reach in their own countries. When students' opinions on difficulties are examined, it is seen that they rarely meet only some difficulties in the social direction. Family and homeland longing are at the beginning of these difficulties. However, some students stated that they had difficulties due to foreign language but solved the situation with accompanying guides. Some students stated that they have limited activities due to its distance from the city center. However, in general, it has been found that students rarely encounter any problems. Students participating in the program seem to have had almost no problems with accommodation. The students think that the program has many contributions for them. When we look at the contributions of the program to the students, these contributions can be handled under two main headings as social and occupational. One of the most important aspects of social contributions is to recognize different cultures and make friends from those cultures. In addition, students also have the opportunity to learn a new foreign language. One of the contributions of the project is the increased self-esteem and self-esteem of the students themselves. Taking part in a project and having social activities also enabled them to have a broad perspective on various issues. Looking at the contributions in terms of occupation, it is seen that most of the learners mentioned that they has the possibility to make compare VET with their own countries and project country. In addition, students have developed cooperation and solidarity skills within the project. It is also seen that the academic awareness of the students who found the application field in a professionally equipped environment is increased. Açıkalın and Erçetin (2018) stated that in active learning environments, learning activities of learning and teaching staff of students develop because these environments are student centered and improve student experience. In this context, it is obvious that this program has many professional advantages for the students.

The Views of Teachers

Opportunities

The opportunities provided for the teachers abroad are expressed by them as follows:

- Basic needs such as food, accommodation and transport
- Touristic trips and free city travels
- Training on vocational competence and vocational training
- Technological and equipped training environments
- The opportunity to see new cities and get to know new people from different cultures
- Social events
- Language training
- Participation in practice
- Opportunity to see and examine workshop applications and site applications
- Effective working environment
- Various materials and equipment
- Applied and theoretical training
- Information and technology resources
- Following technological developments in the specific fields
- Meeting with different teaching methods and techniques
- Informing about various professional systems
- Technical school trips and (industry) sector trips
- On-site monitoring of applications
- Information on dual vocational education system, workplace based learning, firms' vocational education systems

Difficulties

- Nutrition problem caused by difference in food culture
- The problem of not communicating with people in the vicinity due to different language
- Family and homeland longing
- Difficulty in making friends

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Contributions

This section is examined under two main themes and firstly, the contribution of the program to the teachers in social and personal development aspects is presented:

- Making new friends
- The opportunity to live and coalesce with the community of people from different cultures
- Knowledge on life in different cultures, technological knowledge, social life communication and globalization
- Broad scanning
- The importance of issues such as respect, orderliness, etc.
- Cooperation and solidarity
- Increase of self-confidence
- Meeting different cultural and social structures
- Communicating with people who speak different languages
- Recognizing cultural differences
- To communicate with people in different cultures, to have information about social experiences and to go abroad easily
- Taking part in new projects

In this section, the contributions about the professional and academic (the development of professional skills) dimension of the program are listed:

- Developing professional experience through training methods and techniques experienced
- Realizing the importance of practice in vocational education
- Explaining the necessity of vocational education in the business world
- Meeting “Industry 4.0.” and having detailed information about it
- Developing professional competences in different environments and cultures
- Having knowledge about pedagogical methods in Europe
- Increasing the level of knowledge in specific areas
- Professional development opportunities in a different environments

- Opportunity to follow developments in specific areas
- To be able to make a comparison of professional practices abroad and domestically
- Use of all kinds of materials for professional development
- Informed of technological developments visually and tactically
- Meeting with various material, equipment, applications and projects
- Finding a source of inspiration from a professional perspective
- Developing academic knowledge and skills
- Gaining project writing competence
- Meeting with new vocational courses
- Changing future expectancy
- Recognizing how disabilities are facilitated in educational environments and social life
- Academic comparison of trainings between domestic and abroad
- Building academic awareness
- Transporting overseas applications to their home country
- Recognizing the education system of a different country
- Liaise with the people and institutions that we can collaborate with in next projects

Analysis of the Teachers' Responses

When teachers' opinions about the program are examined, it seems that they have similar views with the students. First of all, when the problems of the program are examined, it is seen that the teachers have family and home longing. In addition, it is seen that some teachers have difficulty in acquiring a friend because of lack of foreign language. Another distress appears to have emerged in the nutritional dimension due to the different culinary culture. Opportunities and contributions of the program can be examined together. Teachers had the opportunity to see different cities within the program, to recognize new people and cultures. Teachers who have established social relations with new people also have the opportunity to cooperate in future projects. The project has also been an effective factor in increasing teachers' self-esteem. In general, teachers have put more emphasis on professional contributions. Teachers from different fields have indicated that they have new knowledge and skills related to their field. For example, there are different specific areas such as industry 4.0, metals, tourism, pedagogy, etc. Teachers have had the opportunity to improve themselves both in theoretical and practical terms in these subjects. This situation has contributed positively to their professional and academic awareness. As a result, the teachers stated that their thoughts about the future have changed. This suggests that innovations occurred at the point of view of the teachers of the progeny. In addition, teachers have indicated that they have the opportunity to transfer their learning to their own country. In addition, teachers who have found the opportunity to dispose of new projects are clear that they are pleased with the project.

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GERMANY

ECVET, developed in 2003-2006 in the context of the Copenhagen process for enhanced co-operation in VET, aims to facilitate the validation, recognition and accumulation of work-related skills and knowledge acquired during a stay in another country or in different situations. It is an instrument to improve the quality of VET mobility and as a tool to organize labor market relevant requalification measures.

The development and implementation of the European Qualifications Framework as a meta framework for mutual recognition of transparency, quality assurance, mobility and qualifications have led to some challenges. These are partly due to different definitions of competence, skills and knowledge. Taking German-speaking countries as an example, the author underlines the difficulties of developing a common terminology on a basis of common reference levels and discusses some possible conclusions about the implementation of the European Qualifications Framework in these countries (Bohlinger, 2008).

The main institutions in the German Vet System are companies and schools. The majority of schools are open to the public, but there are some private schools recognized by the government due to the traditions and needs of the labor market. According to the most important legislation for vocational education, social partners behave competently for many tasks in their systems. They are supported by the government research institute “BIBB”.

The development of a Credit System for Vocational Education and Training - VET (DECVET) was established by the Federal Ministry of Education and Research in 2007. Ten pilot projects have been implemented to develop credit transfer methods for identification, approval and validation of learning outcomes under national legislation and practice. National Lifelong Learning Institutions have established a national steering committee. This committee includes ministries, social partners, chambers (through umbrella organizations), Lander, national LLL institutions and trade unions. In Germany, as in other countries, ECVET’s legislative entry has brought about the development of the appropriate National Qualifications Framework (NQF) for the European Qualifications Framework (EQF). In Germany there is not yet a system to link NQFs and credit systems, whereas the framework of national qualifications in EQFs is completed. However, since the German system is already compatible with ECVET, no changes have been made to the regulations. In Germany, BIBB, the national institution and the ECVET national coordination point organize seminars and workshops. Qualification modules (Qualifizierungs-und Ausbildungsbausteine) make it easier for young people to get education and they can also be used when entering higher education. Germany has decided to implement a program under the name of DECVET for piloting ECVET. Under the DECVET program, 10 pilot projects related to ECVET in Germany were completed in 2012 (Ata and Ucal Çepni, 2015: 7).

Within the scope of the DECVET program, a number of technical components related to ECVET have been tested: units, credits, partnerships; evaluation; procedures for recognizing learning outputs; and documentation methods are some of them. Education and training providers are mainly interested in testing ECVET. On the other hand, the boards of commerce and industry are

very interested in ECVET. It is still unclear when a policy decision on the implementation of ECVET will be taken. Many stakeholders are skeptical of ECVET because they believe that ECVET and the German VET system are not fully compatible. They are also against the integration / modularization of training programs and competences. Stakeholders should be convinced of the added value of ECVET and the recognition of learning outcomes, especially in other learning contexts. There are many practical problems with the development of ECVET. The DECVET program could bring some answers. However, more pilot projects need to be implemented (Ata and Ucal Çepni, 2015: 8)

In addition to this information, the data obtained at the end of visits to Germany by the Ministry of National Education are presented in this section. According to the data, the results can be explained as follow:

Vocational education is given in Germany for both the employees of member businesses of DEKRA and the unemployed people in Germany.

a. Vocational education for the unemployed people is given in metal, transportation, electronics, storage, and health sectors.

b. Expert trainings/courses; apprentice training from 3 months to 2 years for occupational safety, storage, carriage of dangerous goods, waste management, high voltage technology, electronic fire protection sectors and for the drivers of forklift and truck.

There is an inclination in vocational education in Germany towards competence management. Companies want to measure people's competence. Competence measuring of people in the working life is carried out together with government. Wage concept is based on performance. For instance, the government has competence acquisition and certification trainings for someone who becomes unemployed at the age of 50.

Germany makes a complete use of technology brought in by Industry 4.0 revolution. Even more, it aims to take this technology even further through constant innovation. It is seen that Industry 4.0 spread in every area of industry and life in Germany and it has an effect on how the things are done and that it is expected from people to be more competent if they take a place in labor marker and that the competencies should be revealed to determine the qualifications.

SPAIN

VET plays an important role in supporting the workforce and having the qualifications to meet the needs of young people in the labor market. It is at the center of Spain's education and employment policies to modernize vocational education and training (VET) and to make it more flexible by lifelong learning and support for employability (CEDEFOB, 2016).

The European Commission Recommendation of 2009 for the creation of ECVET proposes to

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the EU Member States to define the necessary conditions and take measures, where appropriate, so that from 2012, in accordance with national legislation and practices and on the basis of trials and tests, it is possible that ECVET can be gradually applied to VET qualifications at all levels of the EQF and used for the purpose of transferring, recognizing and accumulating the individual learning outcomes obtained in a formal context and, where appropriate, non-formal and informal.

The Spanish Constitution establishes that public authorities have to promote the right to education and professional re-qualification. Two systems have been developed, one in the educational field (the regulated VET system which is based on the Ministry of Education, Culture and Sport and on the Autonomous Communities) and another in the labor market (the VET system is connected to the Ministry of Employment and Social Security, which depends on the SEPE – State Public Employment Service – and the Autonomous Communities). Both share the same advisory bodies but their qualification governance and objectives, as well as their programs, are quite different.

The National Professional Qualifications Catalog (CNCP) occupational standards constitute the base for both systems' qualifications. Therefore, some of the parties may concede to a mutual recognition of the acquired training. They also share the regulatory procedures for recognizing the professional competences acquired through work experience and the implementation of the dual system. The training programs are modulated and always include compulsory training at the workplace, at the end or during the training period. Students need to pass all modules to obtain the degree. However, modularization allows for a partial recognition and subsequent re-engagement within a lifelong learning context.

Regarding the institutions involved, educational and labor authorities are mainly responsible for VET, while the National Vocational Evaluation and Training System is the benchmark of the training programs that lead to the formal qualifications these authorities accredit. The General VET Council is the government's advisory body on Vocational Training, being composed by representatives of the public national and regional administration authorities and social partners such as business organizations and trade unions. The interested parties have developed the occupational standards and have participated in the elaboration of the National Professional Qualifications Catalog (CNCP) which serves as a reference so that the educational and labor authorities can design the VET qualifications and programs in such a way that they can meet the needs of the labor market.

In order to analyze the situation of ECVET and its possibilities of application of VET programs in Spain it is necessary to take into account the current situation of the Spanish Qualifications Framework (MECU) and the Vocational Training and Recognition of Labor Competence systems in the context of the National System of Qualifications and VET (Law 5/2002).

The Spanish Qualifications Framework MECU (NFQ) is in development. Eight levels are established for the classification of Spanish qualifications, and the descriptors of each are defined. The criteria to determine the levels are based on the results of learning, that is, on the capacities that have been acquired, independently of the learning mode (in the education system, at work ...).

The MECU will allow to compare the qualifications recognized in Spain with those of the rest of Europe through the EQF (European Qualifications Framework for Lifelong Learning).

The SNCFP (National System of Qualifications and Professional Training) in Spain has the following objectives (CEDEFOB, 2014):

- Guide training to the demands of qualification of productive organizations,
- Facilitate the matching between supply and demand in the labor market,
- Extend training throughout life, beyond the traditional educational period,
- Promote the free movement of workers, so that it plays an essential role in the workplace and training

The Vocational Training in Spain is articulated through two subsystems:

Education Vocational training system. Regulated by the Ministry of Education and Culture and Sport.

Vocational Training for Employment. Regulated by the Ministry of Employment and Social Security

The parts involved in the governance of the ECVET are the Department of Education and Culture and Sport and the Department of Employment and National Health Service. The vocational training in Spain is integrated by two subsystems: Subsystem of Initial or Ruled Vocational training, which depends of Department of Education and Culture and Sport and of the Autonomous communities. Subsystem of Vocational training for the Employment linked to the Department of Employment and National Health Service and to the Autonomous Communities.

The Department of Education and Department of Employment and Immigration will be responsible of the preparations of the ECVET on the initial vocational training, and the Department of Employment it will be in turn of the constant vocational training. The Point of National Coordination is the Headquarter of Vocational training of the Department of Education, Culture and Sports.

The first priority is the development of the Marco Nacional of Qualifications. It is fundamental that the frame is prepared before taking any decision on the ECVET. The Technical Committee for the Vocational training, the General Advice(Council) of Vocational training, the School board of the State and the Sectorial Conference on Education they are approaching the situation of the ECVET. The financing for the development of the system ECVET, according to CEDEFOP's report, more than 80 % of the financing sources comes fundamentally from European Funds. Spain, contributes with national financing according to general budgets of the State, granted to the Department of Education, Culture and Sport.

In Spain, the vocational training is coherent with the philosophy of the European System of Credit transfer for the Education and the Vocational training (ECVET), since the system of vocational training is based on modular programs of learning. All the degrees of initial vocational training of the educational system are 2.000 hours(o'clock) of duration, both the degrees of average degree (CINE-3B) and the degrees of top degree (CINE-5B), and express in results of learning and in allowing the acquisition of professional competences following the standards established in response to the needs of the productive sector. All the diplomas support the acquisition and improvement of personal and social competences and citizenship activates. In the new system for the recognition of the professional competences acquired across the professional experience there is established the evaluation and partial accreditation of the units of competence of the professional qualifications (established standards) included in the degrees

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of vocational training or in the certificates of professionalism.

Thus, the units of competence accredited there can give place to the confirmation or exemption of the formative modules correspondents included in any of the degrees of vocational training or in the certificates of professionalism. For the present time, the procedure of confirmation alone is in use for the education and vocational training in levels, way and Superior. Nevertheless, the Department of Education is employed at the legal frame for the confirmation of the university level. The first draft of the Royal decree recognizes the autonomy of the universities and establishes that every university will decide what modules or units it will confirm, up to a maximum of 15 %, as well as the method that will be in use. As soon as there comes near to an official decision on the ECVET in the government, the workgroups, included all the interested parts and the entail to the different consultative groups, it will be possible implement.

One of the short-term events on the ECVET is the approval of The Spanish Frame of Qualifications (MECU). In the current draft of Royal decree eight levels are established for the classification of the Spanish qualifications, and the describers are defined of each one. The criteria to determine the levels are based on the results of the learning, that is to say, on the capacities that have been acquired, independently of the way of learning (in the educational system, in the work). The MECU is going to allow comparing the qualifications recognized in Spain with those of the rest of Europa by means of the EQF (Marco Europe of Qualifications for the Learning along the Life).

The principal problem is that ECVET is not a system consolidated yet, to the being a system that voluntarily receives every country, attending to recommendations not legislated of the EU. It is possible to think that the absence of a national frame of qualifications determines the lack mistake of impulse, though from a functional point of view, one believes that in these moments, the absence of the MECU is not an important obstacle, since all qualifications have a level the assigned one. One of the principal obstacles in centers of training they are located in the scanty knowledge of the system ECVET on the part of the forming ones and teachers, as well as of parents and student body.

In relation to the Recommendation of 2009, it can only still for defining how it is the procedure of assignment of credit points ECVET, though the value of the above mentioned points is not considered to be important, since the results of learning are knowledge and demonstrable skills. Another important obstacle in the area of the centers of training is small mobility of the pupils, fundamentally for the barrier of the language and much more in not qualified workers and of major age. Likewise, is observed as an obstacle the traditional absence of mobility of the pupils / workers between contexts of learning.

It is important to create and to support networks for the collaboration and the credit transfer between the centers of training. The collaboration between professionals and companies of different countries is scanty and residual. In this respect one emphasizes that the problem can be serious if there are neither financing nor incentives for the mobility ECVET. It thinks that it is necessary to experiment more on the processes of recognition of the formal and not formal experience, as well as to spread the existence of the process of recognition of the citizenship, which nowadays is removed from this information.

It is necessary to realize a clear differentiation between mobility in the labor area and in the area of the learning. It is necessary to bear in mind that the labor mobility is not AN ECVET's object, only it is the mobility in contexts of learning. The labor mobility does not treat itself directly from ECVET, since it is an object of Europass' documents and, of specific form, from the regular professions.

Likewise, it is necessary to highlight that, nowadays, one does not see with clarity that is suitable to use Europass in the processes ECVET, since Europass is a document that is received at the end of the learning process. If it is estimated suitably as a describer of competences. Before the raised difficulties it is necessary to begin to work from the different organizations involved in the FP and, of special form, from the centers of national reference of vocational training and from the integrated centers.

The interview forms created with the purpose of the ECVET evaluation program in Turkey was also sent to the Spanish authorities. Analyzing the questionnaire from the authority in Spain, the difficulties, opportunities and contributions of the program were addressed separately. Participants in the program participated in the program; think that they could have a better job and status in the future. First, when we examine the area of the program's challenges, it is seen among the student community who take part of EU mobility schemes funded by Erasmus+ there is no difficulties in since all is funded by the program. When the opportunities in the program and contributions of the program are examined, they stated VET pathways in the metal sector in all schools interviewed provide a solid ground of professional knowledge and a quick way to be integrated in the labor market. Besides, in this way, the students profit greatly since to be employed in good metal companies in such unstable times provide them with self-confidence and security that impact positively in their social and personal lives. There is a lack of qualified workforce in mature sector, where Metal sector is included. Plenty of opportunities are available for the ones qualified properly at VET level. The training contribution of the schools paves the students' way to cement a sustainable professional career. In addition, it allows them to be quickly integrated in the labor market. In addition to this information, the data obtained at the end of visits to Spain by the Ministry of National Education are presented in this section. According to the data, the results can be explained as follow:

When the workload of vocational and technical education schools or of state ministry is compared to that of those in Turkey, it is seen that their workload is a lot less than ours. For instance, total number of students in vocational and technical education in this state is about 3000 and thus, the workload and number of students in vocational and technical schools is very low, and working hours are very short; however, the time is used more efficiently and of more quality, and therefore, the resources management is more efficient and of more quality.

It was observed that the technology used in vocational schools were similar to the current technology used in industrial institutions and that people or students who learn the occupation do so using machinery and equipment appropriate for current manufacturing conditions, which, in return, ensures that students do not have difficulty in performing their job, or have a lot less difficulty when compared to Turkey, in industrial institutions during their internship and after they complete their education. It was observed that the areas of vocational and technical schools where workshops and laboratories are located are clean and organized in a way to be appropriate for human health and occupational safety rules.

It was also seen that the way teachers working in vocational and technical education are trained differs from that of ours in that these teachers are people who are competent in practicing the occupation they teach and who received pedagogical formation to work in these schools. Therefore, the way they learn the occupation is production and practice-oriented rather than theoretical.

When compared with Turkey in terms of school-business collaboration, it is seen that dual education system is better in Turkey. In Spain, the contribution of businesses as equipment to schools is relatively weak (). However, it is seen that VET education in Spain is ahead of academic education. In particular, the inability of college graduates to find a work and their re-orientation to VET is an example of this. The number of

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students in schools is much lower than the number of student in the schools of Turkey. So, unlike Turkey, they are expecting the student to come to school. The low number of students makes it possible for students to receive individualized training in laboratories and for teachers to have fewer burdens. This leads to an increase in the quality of education.

It is observed that there is a good level of involvement, guidance and control mechanisms for the students on vocational guidance. Although the business receives a limited number of students according to their capacity, they are highly informed about the vocational technical training. Businesses in Turkey are more moderate in accepting students and they accept students even if they do not need them. It has been seen that the most of the teachers had sectorial experience in their pasts. Provided that 70% of the programsare determined at the national level, 30% of it can be changed according to the regional needs. Transitions are also possible between programs. The diversity of the programs can address to every segment. The fact that the teachers are able to provide education at both the secondary education level and Vocational High School level provides an economic education with a single infrastructure.It is seen that Spain attaches great importance to the occupational health and safety and they apply it in every field. In particular, laboratories are equipped directly by the government. Vocational and technical education institutions provide basic/ intermediate and advanced education. Businesses are very active in the content of their programs and have very professional training.

In brief, ECVET came up with the Copenhagen Declaration in 2002, is a relatively new program in Europe. The aims of ECVET are to provide, recognize and accumulate transfer of knowledge, skills and competences acquired through different learning paths in vocational education and training. ECVET also provides mobility to individuals across different countries and supports lifelong learning. In this respect, the program has very significant returns for the countries.

In Turkey, five important achievements of ECVET are emphasized. These can be listed as European Qualification Framework Process and Establishing Vocational Qualification Authority in Turkey; **Development of National Occupational Standards;** Regulations about Recognition of Prior learning by Ministry of Education;; Evaluation of Apprenticeship Training in the Scope of Compulsory Education and Setting Up the Certification and Examination Centers (VOC-TEST).

In Germany, Development of Credit System for Vocational Education and Training - VET (DECVET) was established in 2007 by the Federal Ministry of Education and Research. Some technical components related to ECVET have been tested under the DECVET program: units, loans, partnerships; evaluation; procedures for recognizing learning outcomes; and documentation methods. Education and training providers are mainly interested in testing ECVET. On the other hand, trade and enterprise boards are very interested in ECVET. In Germany, however; there are many practical problems with the development of ECVET. The DECVET program can bring some answers. In addition, more pilot projects need to be implemented.

In Spain, it is necessary to take into account the current status of the Spanish Qualifications Framework (MECU) and the Recognition of Vocational Training and Job Competence Systems for ECVET in the context of the National Qualifications and Vocational Education System (Law 5/2002). Spanish Qualifications Framework MECU (NFQ) is under development. Eight levels have been created for the classification of Spanish qualifications and descriptors of each have been identified. The departments in the governance of ECVET are the Ministry of Education and Culture and Sports and the Ministry of Employment and National Health. In Spain, vocational education is in line with the European Credit System transfer philosophy for Education and Vocational Training (ECVET); because the vocational education system is based on modular learning programs.

References

- Açıkalın, Ş.N. and Erçetin, Ş.Ş. (2018). Staff Experiences Regarding Student Engagement in Active Learning and Social Environments in New Generation Universities. In Ş.Ş. Erçetin (Ed.) Chaos, Complexity and Leadership 2016. Springer Proceedings in Complexity, Ch 6, pp. 67-82, Switzerland: Springer International Publishing, DOI https://doi.org/10.1007/978-3-319-64554-4_6

- Ata, V. & Ucal Çepni, S. (2015). Avrupa'da Modüler ECVET Sistemi'nin Geliştirilmesi ve Test Edilmesi (MECVET) Projesi Avrupa ve Ortak Ülkelerde ECVET Analizi. İstanbul Aydın Üniversitesi Dergisi Anadolu Bil Meslek Yüksekokulu (ABMYO). 39 (1- 15).

- Beeson, W. Geofferey. (1996). Teaching and Learning in a Global Higher Education Context,. International Journal of Innovative Higher Education, 12.

- Bohlinger, S. (2008). Competences as the Core Element of the European Qualifications Framework. European journal of vocational training, 42(1), 96-112.

- Brockmann, M., Clarke, L. and Winch, C. (2009). Competence and competency in the EQF and in European VET systems. Journal of European Industrial Training, 33, Issue 8/9, pp. 787–799.

- CEDEFOB, (2014). Spain: VET in Europe: country report 2014 http://libserver.cedefop.europa.eu/vetelib/2014/2014_CR_ES.pdf Date Accessed: 24.06.2018

- CEDEFOB, (2012). Necessary Conditions for ECVET Implementation. http://www.cedefop.europa.eu/files/4113_en.pdf Date Accessed: 24.06.2018

- CEDEFOB, (2016). Spotlight on VET Spain. http://www.cedefop.europa.eu/files/8104_en.pdf Date Accessed: 24.06.2018

- ECVET, (2015). Ecvet nedir? http://ecvet.ua.gov.tr/en/page/ECVET_Nedir Date Accessed: 18.05.2018

- Erçetin, Ş. Ş. (2001). Biz akademisyenler geleceğin yükseköğretim kurumlarını yaratmaya hazır mıyız? Kuram ve Uygulamada Eğitim Yönetimi, 25, 75–86.

- Erçetin, S. S. (2002). Profile of the new university teacher: The views of Turkish postgraduate students. Journal of Manas University Social Sciences, 4, 53-58.

- Erçetin, Ş.Ş. and Açıkalın, Ş.N. (2018a). Student Engagement in Active Learning and Social Environments in New Generation Universities: Experiences of Students. In Ş.Ş. Erçetin (Ed.) Chaos, Complexity and Leadership 2016. Springer Proceedings in Complexity, Ch 10, pp. 125-145, Switzerland: Springer International Publishing, DOI https://doi.org/10.1007/978-3-319-64554-4_10

- Erçetin, Ş.Ş. and Açıkalın, Ş.N. (2018b). Understanding the New Generation Universities: Learning, Teaching and Managing. In Ş.Ş. Erçetin (Ed.) Chaos, Complexity and Leadership 2016. Springer Proceedings in Complexity, Ch 16, pp. 209-215, Switzerland: Springer International Publishing, DOI https://doi.org/10.1007/978-3- 319-64554-4_16

- OECD, (2017). Education at a Glance 2017 OECD Indicators. http://www.oecd.org/education/education-at-a-glance-19991487.htm Date Accessed: 18.05.2018

- Pépin, L. (2007). The History of EU Cooperation in the Field of Education and Training: how lifelong learning became a strategic objective. European Journal of Education, 42(1), 121-132.

- Powell, J. J., & Trampusch, C. (2012). Europeanization and the varying responses in collective skill systems. The political economy of collective skill systems, 284-313.

- Trampusch, C. (2009). Europeanization and institutional change in vocational education and training in Austria and Germany. Governance, 22(3), 369-395.

- Ulusal Ajans, (2012). Ecvet. http://www.ua.gov.tr/programlar/erasmus- program%C4%B1/mesleki-e%C4%9Fitim-program%C4%B1/ecvet Date Accessed: 21.05.2018

- Winterton, J. (2011). Competence in European policy instruments: A moving target for developing a national qualifications framework?. Journal of Contemporary Educational Studies/Sodobna Pedagogika, 62(5).

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Phase 1.2.

COMPETENCE MANAGEMENT SYSTEMS AND APPLICATIONS IN ITALY, UK, SPAIN AND GERMANY

COMPETENCE MANAGEMENT IN VOCATIONAL EDUCATION

The creation of a common European labor market by providing equivalence between qualifications has been at the height of the European Union (EU) agenda. The European Qualifications Framework (EQF) is among the policy instruments for establishing comparability of transparency and competences, together with the European Credit Transfer System (ECVET) for vocational education and training, to improve the mobility of the labor force. Besides, EU member states represent different VET and labor market traditions that have different meanings to the principles and concepts underlying VET. This is the case where countries seemingly adopt similar systems as those based on competences (Brockmann, Clarke, Méhaut & Winch, 2008).

The development of the concept of competence is increasingly on the development of curricula and teaching methods for vocational training programs. Competence-based education is an answer to the changing needs of vocational education and contemporary societies (Sturing, Biemans, Mulder & De Bruijn, 2011). Competence refers to the capacity required for effective and sufficient performance in a particular discipline or in a particular professional initiative (Billett 2003). Competence-based education exhibits a comprehensive and situational approach that prioritizes the convergence of knowledge, skills and attitudes (Eraut 1994).

Many countries now have problems in transitioning their graduates to the labor market. Students have a lot to learn in order to be able to do as expected. Competency-based VET academic disciplines are no longer the starting point for curriculum development. However, they have the competencies to work in practice. Therefore, there is an expectation that working careers can perform better than they do at the beginning, as students are being prepared for the labor market based on the competencies needed for the labor market (Wesselink, Biemans, Mulder, & Van den Elsen, 2007).

Interest on competence-based education and training appeared in the United States in the 1960s and 1970s as a result of several publications on competence-based organizational training and qualification based teacher education. Grant et al. (1979) concluded that competence was a broad term and indicated that he and his colleagues were very different in terms of theoretical orientations, scopes, intentions and scientific focus of competency-based training programs they were working on. Grant et al. defined competence-based education as follows: “Competence based education tends to be a form of education that derives a curriculum from an analysis of a prospective or actual role in modern society and that attempts to certify student progress on the basis of demonstrated performance in some or all aspects of that role” (as cited in: Biemans et al., 2009).

Towards the end of the last century, a global policy consensus emerged on the need to adopt educational and curricular competence-based approaches designed in terms of learning outcomes in education. The aim of this is to make education and training more suitable for the needs of the labor market; to encourage labor mobility by establishing a common framework for recognizing the qualifications underlying different qualifications; increase the permeability between vocational education and training (VET) and higher education (Winterton, 2011).

Competence-based education is the leading paradigm for innovation in terms of learning environments and system. An important reason for the popularity of the concept of competence is the attitude of many stakeholders in the field of VET, the difference between the labor market and education can be reduced through competence based training. The underlying idea is that vocational education can enable students to acquire the competencies they need in their future professions and in society as a whole. Besides, while working professionally, they should continue to develop their competencies in their work (and outside) to ensure that they are able to react and predict future developments. For this reason, there is a growing recognition that the need for vocational education not only to obtain a diploma but also to lead to developing competencies is increasingly recognized (Biemans et al., 2009).

The most important theoretical concepts are briefly addressed in ten principles for competency based learning (Mulder, 2004):

- **Principle 1:** 'Verify in which jobs and roles students end up after completing their studies and determine which vocational core problems are critical in those jobs and roles.'
- **Principle 2:** 'Identify vocational core problems which lead to curriculum development.'
- **Principle 3:** 'Rewarding competence developments should be done through assessment by different assessors.'
- **Principle 4:** 'Before the learning trajectory the competencies already developed have to be assessed.'
- **Principle 5:** 'Learning has to be situated in recognisable and meaningful contexts.'
- **Principle 6:** 'Connecting theory and practice is necessary. Let students acquire experience and let them reflect on these experiences.'
- **Principle 7:** 'Knowledge, skills and attitudes should be integrated into learning trajectories.'
- **Principle 8:** 'Make it possible for students to be both increasingly responsible for their own learning processes and steering them.'
- **Principle 9:** 'Teachers have to be stimulated to fulfil their role as coaches.'
- **Principle 10:** 'In a curriculum a basis must be formed to develop competencies for the future career, with specific attention on learning to learn competencies.'

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THE RELATIONS OF COMPETENCE MANAGEMENT AND ECVET

The qualification requirements for VET specialists and ongoing training vary considerably from country to country. For this reason, the formation of a competence framework that is consistent for teachers and leaders can help develop vocational education and training in Europe. The definition of standard professions that describe the basic skills and competences that vocational teachers and trainers should possess is quite common. This relates to the European Qualification Framework (EQF). The development of the European Qualifications Framework and national qualification frameworks (NQF) can be seen as a demonstration of a more positive attitude towards qualifications frameworks and their use in improving the professionalism of both individuals and working communities (CEDEFOP, 2009). Since 1999 and 2002, the processes of Bologna and Copenhagen in higher education (HE) and VET have added these comprehensive objectives to European skill formation (Powell and Trampusch, 2012). In this context, in each country, a different competence model based on different VET systems has been adopted (Brockmann, Clarke and Winch, 2009).

The European Parliament has launched an initiative on ECVET, a European credit system with vocational education and training, aimed at facilitating the recording and accumulation of skills that people seeking to qualify for a structured and widespread context since 2009. ECVET is designed as a tool to improve applicability, comparability and complementarity between credit systems used in vocational education and training and European Credit Systems. Besides, ECVET is a system that contributes to transparency among different levels of education and training and facilitates the transfer of defined learning outcomes in the context of flexible structuring and common ways.

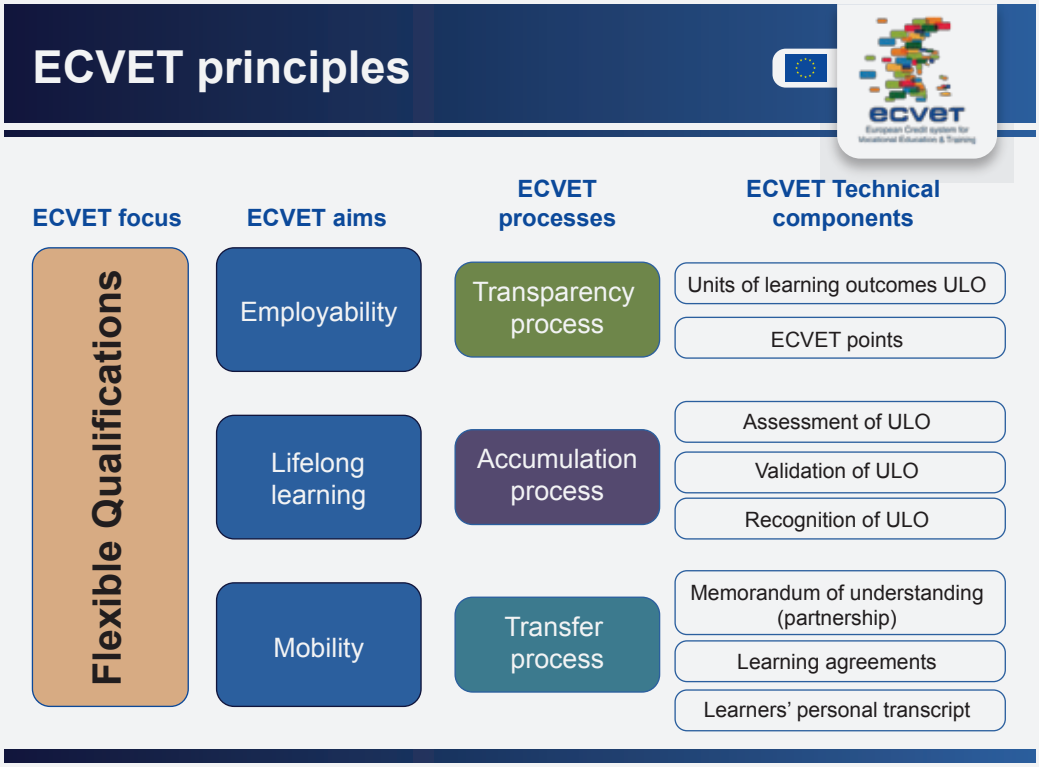

Figure 1: The principles of ECVET

ECVET is a credit transfer system developed for the purpose of providing, recognizing and accumulating transfer of knowledge, skills and competences acquired through different learning paths in vocational education and training. ECVET supports mobility in the learning process by creating a common language across Europe through the transfer, recognition and accumulation of learning outcomes. ECVET facilitates the understanding and recognition of the knowledge, skills and competences that individuals acquire in a different country, in a different educational and educational institution and in a different learning environment. Thanks to ECVET, which adopts the accumulation of learning outcomes and transfer approach, the qualification systems in countries can be easily comparable (ECVET, 2015).

Competence typology of ECVET is presented in different ways to accommodate different competence models and competence in a real business context (Winterton, 2011). ECVET's competency typology had to be comprehensive enough to accommodate different models of competence and to capture the different aspects of competence in a real business context (Brockman et al., 2009). In the implementation of ECVET, transparency, understanding of common qualifications, development of the framework of national qualifications and learning outcomes approach should be established. At the same time, the implementation of ECVET requires preparations for the transfer and validation of learning outcomes (CEDEFOP, 2012).

ECVET AND COMPETENCE MANAGEMENT APPLICATIONS IN ITALY

ECVET encourages mutual understanding of the content of qualifications and the skills for which individuals have gained as a result of an overseas mobility. The technical structure of the learning output units has a positive character, which is a functional aspect of the ability to achieve a more flexible structure. Among the ECVET Documents, the Memorandum of Understanding and Learning Agreement is the source of support for the transfer of the largely accepted learning outcomes.

A reform process (2012) initiated by laws and other legal innovations on the right to Life-long Learning, which is followed in the direction of the EU as the result of the Economic Crisis (2008), was enacted in 2010-2015 in Italy. The different steps of the national lifelong learning strategy have been put into practice on a gradual basis, based on the transfer, validity, accumulation and transparency of skills and competences acquired through individualization in different settings. At all levels, working conditions play an important role in the learning process. Experiences in workplaces and organizations offer professional qualifications in order to fulfill the task that they are undertaking in order to acquire the individual skills required by the universal labor market, ignoring student sufficiency titles.

In 2015, Law No. 107/2015 initiated a reform process within the Education and Training System under the authority of the Ministry of Education at national level. The "Good School" aims to develop the skills and competencies required for the future job market.

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Main innovations are:

- To offer a proposal that fits students' needs more and can guide them to future job market needs
- To develop a plan for the digitization of schools by allocating 30 million euros to schools in 2015 for the development of qualification and digital tools for digital innovation
- To develop special skills linked to key issues of the EU 2006 Recommendations
- Development of content and methodology
- The fact that the transition to school-work alternative (double Italian system) is now mandatory at the high school level of the education and training system

ECVET has a potential that allows learning outcomes obtained outside formal education to be assessed more effectively during the restructuring of vocational training. Based on the results of the external evaluation, it can be said that the development of ECVET is limited to the rigidity of vocational education systems in Italy. Given the benefits of ECVET in Italy, ECVET has three advantages: the implementation of an application on the basis of learning outcomes, the mutual confidence development among the system and the countries, the enhancement of the quality of mobility experiences.

As a result of this practice, competence-based learning has passed on to practice in all schools, even in other ways that are understood to be unsuitable for learning with work experience. This model transcends the difference between knowledge-based learning and practice experiences. The integration of theory and practice of knowledge and experience is functional for special talents and opportunities. It is planned that competence-based learning experiences support transition from the education system to the labor market. Despite their different roles, schools and organizations are a cultural change that requires mutual social responsibility and further education and interaction for student development in order to sustain personal and professional growth.

Main points compatible with ECVET:

- Qualification departments are organized for practice / work around to gather the student's own skills and creativity
- Determination of the learning outcomes unit to be developed during the options
- The flexibility of the offer made by organizations that allow more individuality
- Development of expertise through experience within an institution for the development of key expertise (EU Recommendations 2006/962 / EC) and entrepreneurial skills such as creativity, innovation, risk management, project planning and managing ability to achieve learning outcomes within three years

In this section, some criticisms regarding ECVET have been put forward by looking at the practices in Italy and other countries. It is known that ECVET scores (credit scores) are unnecessary items and are not very clear when viewed from a technical standpoint. The ambiguity in the interpretation is related to the fact that the points can be divided into units and used in the transition and gathering process. Furthermore, on several fronts covering the academic world, the current status of ECVET points does not enable them to be used for automatic switching in all circumstances. Besides, the compatibility of ECVET with other systems is not simple and automatic. The only tool that can be applied together in simple form is EUROPASS. For example; The ECVET and the European Credit Transfer System (ECTS) are two poorly harmonized systems; their approach to credit / credit scores and learning outcomes is an important convergence between the two systems. ECVET is a partnership initiative, while it is being conducted as part of the process of centralization with the official members of the European Qualifications Framework (EQF). The two instruments are mutually reinforced: Standardized ways to give individual results clearly and openly to EUROPASS and EUROPASS documents are presented. The most important EUROPASS document on ECVET is EUROPASS Mobility, which acts as a tool for recording learning outcomes.

COMPETENCE MANAGEMENT APPLICATIONS IN UNITED KINGDOM (UK)

In Europe, the education and training reform is seen as a fundamental requirement to support competitiveness objectives by providing education and training that will respond more to labor market needs and encouraging labor mobility. In the United Kingdom, competence-based approaches have been adopted for vocational education (Rainbird, 1990).

Historically, institutional links or forms of social partnership are relatively weak VET institutions in UK, so it is not surprising that there are no records of initial VET and IVET qualification contracts. In the UK, for example, IVET is regulated by the Office of Education and Skills (DFES) through the Qualifications and Curriculum Authority (QCA). Therefore, in this sense, qualification education is related to education. The development of skills in the UK is now being carried out by the SSDA (Sector Skills Development Agency) with Skills of Business Skills (www.ssda.org.uk). The SSDA is responsible for financing, supporting and monitoring the SSC (Sector Responsibility Councils). These councils work on sector qualification strategies (SQS). The SSC describes the skill needs of the sectors and the current and future learning needs of the SQS of employers in different sectors. The disagreement between education, training and employment needs should be improved by SQS. It is represented by NVQs (National Vocational Qualifications) based on NOS as a measurement through NOS (National Occupational Standards) in the SQS competency and within the VET proficiency (Weigel, Mulder, & Collins, 2007).

In the UK, the introduction of the NVQ system in 1986 suggested that a qualification-based model was moving towards the right direction. However, this model was very different from the French approach. The system aimed at expanding access to qualifications is specifically designed to accredit skills acquired at work, independent of any formal learning. The qualifications mentioned in the NVQs are generally not dependent on the VET programs, but are based on performance appraisal. This marks a radical break with the more holistic VET model that remains linked to the curriculum. Indeed, it implies a clear shift from a knowledge-based VET model to a “training” system for the production of skills that require little or no supportive knowledge. While NVQs exist alongside structured VET programs such as the BTEC National Diplomas, the older ones are often

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work-based educators at the expense of knowledge-based elements (Brockmann, Clarke, Méhaut, & Winch, 2008).

Recognizing the endemic shortcomings of skills formation in the United Kingdom, the government introduced a competence-based approach in Vocational Education and Teaching (VET) to create a system of nationally integrated, work-based qualifications (Winterton & Winterton, 1998). Competence in the UK is determined within the scope of National Vocational Qualifications (NVQ) (Weigel, Mulder & Collins, 2007). NVQs emerged in the 1980s when the UK first introduced a new Vocational Education approach based on competency-based outcomes. The professional qualities created in the new framework were known as NVQ (Winterton, 2011). The intent of the NVQs was to raise the performance potential of Britain's workforce (Handley, 2003).

NVQ is designed to meet the requirements of the long-term labor market and at the same time to increase flexibility, transparency, transparency and overall access to professional qualifications (QCA, 2002). The NVQ system claims to use a "professionally competence", while not providing an official definition of qualification. The UK Department of Employment and Learning has defined the professional standards on which NVQs are based as a description of something a person working in a profession must be able to do (NCVQ, 1991). So the focus point is that an employee can perform according to the standards required by their professional position (Weigel, Mulder & Collins, 2007).

These occupational standards are identified by a set of 'qualification units' divided into subgroups as 'qualification elements' that include each NVQ. The standard defines all business functions in a given profession and is classified at five occupational levels (these levels are determined by the level of business activity and the level of responsibility required by the job) as follow (Source: http://www.qca.org.uk/610_1744.html [19.01.2006] as cited in Weigel, Mulder & Collins, 2007):

- **Level 1:** Competence which involves the application of knowledge and skills in the performance of a range of varied work activities.
- **Level 2:** Competence which involves the application of knowledge and skills in a significant range of varied work activities, performed in a variety of contexts.
- **Level 3:** Competence which involves the application of knowledge and skills in a broad range of varied work activities performed in a wide variety of contexts, most of which are complex and non-routine.
- **Level 4:** Competence which involves the application of knowledge and skills in a broad range of complex, technical or professional work activities performed in a wide variety of contexts and with a substantial degree of personal responsibility and autonomy.
- **Level 5:** Competence which involves the application of skills and a significant range of fundamental principles across a wide and often unpredictable variety of contexts.

To sum up, competence development in the UK is carried out with the aim of increasing productivity. Since the best way to do this differs from sector to sector, a strategy to develop sector skills is followed. Initiatives also focus on a strong conclusion about the opportunities and procedures for direct assessment and accreditation. Competences are in National Vocational Standards and

National Vocational Qualifications, where five levels of competence are separated (Weigel, Mulder & Collins, 2007).

COMPETENCE MANAGEMENT APPLICATIONS IN SPAIN

The notion of competence officially recognized and common in the educational and vocational education environment, is defined within the framework of the National Qualifications and Vocational Education System legally formulated in the Organic Law on Qualifications No 5/2002. According to the art. 7.3 OL 5/2002, "Professional competence is understood to mean the set of knowledge and abilities needed to perform an economic activity according to the requirements of production and employment" (SEPE, year UK).

Competence-based education and, more specifically, competence-based learning is a pioneering paradigm for innovation and development in knowledge societies. The concept of competence (and learning outcomes) finds the same ground as in several European countries for the reorganization of proposals for future curricula in Spain. While the widespread perspectives of qualification based learning in Europe are related to constructivist theories, there is increasing criticism about the concept of confusion, debate and competence. At this point it is impossible to obtain a definition to define or make impossible a coherent theory or to reconcile the different ways in which the term is used. It can also be said that there is no theoretical framework for competence. Trainees are in the early stages of exploring the meaning and effects of competencies and learning outcomes in practice (Edwards, Sánchez-Ruiz, & Sánchez-Díaz, 2009).

Institutions should be careful about the validity and reliability of competencies, while providing meaningful information to improve their initiatives by seeking and improving the involvement of different stakeholders. Potential participants include employers who employ faculty, academics, graduates, students and graduates. Once the faculty has identified and reviewed relevant and potential competences, it is important to determine the best strategy to obtain official feedback from the electorate. These formal strategies are often based on research to identify relevant competences and require a systematic analysis of the results to make the information meaningful, useful and valid. The participation of the educational community, its commitment and its critical reflection, is a mechanism of building a practice community and activating the development of competence to "theoretic practice" (Edwards, Sánchez-Ruiz, & Sánchez-Díaz, 2009).

The National Professional Qualifications Catalog (CNCP) occupational standards constitute the base for both systems' qualifications. Therefore, some of the parties may concede to a mutual recognition of the acquired training. They also share the regulatory procedures for recognizing the professional competences acquired through work experience and the implementation of the dual system. The training programs are modulated and always include compulsory training at the workplace, at the end or during the training period.

The practical work centers training module is conceived as the practical training acquired through the competences gained during the training activity within a real productive field. Therefore, this

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module is not linked to a single unit of competence (as is the case with the training modules), but to all the units of competencies defined for the professionalism certificate.

Today, there is a competence curriculum: in other words, a curriculum that is defined by learning achievements and structured as goals and conceptual, procedural and attitudinal content. Content is a means to acquire learning capacities and competences, meaning qualification (SEPE, year UK). In Spain, The Ley Orgánica de Calidad de la Educación (LOCE, 2002) refers to competence, although it does not specifically define competencies. These competences have been seen in the Spanish Education System for the past 4 years together with the Ley Orgánica de Educación (LOE, 2006). Some core competencies in the curriculum are addressed within the scope of objectives. These competencies are (Andrés, 2012):

- Competence in Linguistic Communication
- Mathematical Competence
- Competence in Knowledge of and Interaction with the Physical World
- Competence in Processing Information and Use of ICT
- Competence in Social Skills and Citizenship
- Cultural and Artistic Competence
- Learning to Learn
- Autonomy and Personal Initiative.

The characteristics of these "basic competencies" in the Spanish national curriculum are the following (Andrés, 2012):

1. They have a holistic and integrated character (knowledge, abilities, attitudes, values and emotions cannot be understood separately)
2. They have a contextual character (all competencies are performed and developed in different action contexts)
3. They have an ethical dimension (competencies are continuously fed by attitudes, values and commitments adopted by individuals in their lives)
4. They have a creative transferring character (understood as a creative adaptation process depending on the context)
5. They have a reflexive character (as they imply a permanent reflexive process so as to optimize the initial intentions with the real possibilities of every context)
6. They have an evolving character (either they are developed, perfected, widened throughout life or they are deteriorated and restricted)

COMPETENCE MANAGEMENT APPLICATIONS IN GERMANY

Vocational education and training (VET) in Germany is expected consciously and reasonably to shape the industrial balances, economic conditions and other social aspects (Bohne, Eicker, & Haseloff, 2017). The German Vet-system is based on three different pillars:

- School-based programs
- Company and school based programs (dual system)
- Transition area

Within this system nearly 30 % of the students are part of the dual system, which is mainly represented in traditional qualifications in industry and craft. In some areas like digital qualification, education or health care there only. Due to serious problems at the labour market more or less 30 % of the students are in a kind of transition period. This means that they not formally qualified for the vet-system or, didn´t find a company for the dual education. They are supported and qualified in the vet schools as a preparation for the dual education.

The German vocational education and training (VET) system and in particular the dual apprenticeship system have an excellent reputation in the international context of Vocational Education and Training. However, increasing challenges are troubles for the current construction and change in learning and business processes of globalization and rapid technological progress. Flexibility and adjustability appear to be key words in this regard, and the German dual apprenticeship system is particularly vulnerable due to the extremely rigid and highly regulated structures (Helwig, 2006).

The Vocational Education Act, which entered into force in 1969 and was revised in 2005, regulates the work-based component of VET. In accordance with the provisions of this Law, training regulations and standards are defined for initial training in the regulations dual apprenticeship system (Ausbildungsordnungen) and for higher level indicators such as Meister and Fachwirt (Fortbildungsordnungen). In the dual system, Ausbildungsordnung is available. This consists of an Ausbildungsprofil (an effective occupational standard), an Ausbildungsrahmenplan (framework curriculum of knowledge, skills and abilities) and a set of exam requirements for each profession (Beruf) (Religa, & Lester, 2016).

Competence debate entered the German literature in the early 1990s. The priority issues to be addressed in this regard are the identification and recognition of the concept of qualification and competence. In other words, competence in Vocational Education in Germany was first applied in 1970s with the concept of key qualifications (Helwig, 2006). In Germany, unlike England, there is a dual system based on a negotiation process to discuss the competence of the representatives of the state, the chambers of commerce and different employers' organizations and their role in the development of VET. More than three hundred professions are registered in the dual system (Weigel, Mulder & Collins, 2007).

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Evaluation in the dual system is performed in the form of midterm and final exams determined by the federal and / or local examination boards. These boards consist of representatives of the social partners. In general, exams relate to the performance of demonstrating duties and testing the theoretical knowledge (Straka, 2004, as cited in Weigel, Mulder & Collins, 2007).

The competence of professional action is addressed in three categories by KMK:

- Domain or subject-competence
- Personal competence
- Social competence

According to Helwig (2006), current and reformed approaches, as well as political and educational objectives, show that aspects of an educational competence-based approach are increasingly integrated into the German VET system. However, training based on vocational training competence is neither expected nor feasible but, it is a realistic goal, including aspects of a competence-based approach such as flexibility and partial modularity, in accordance with the principles of the vocational principle, and is essential for maintaining a high quality and competitive workforce of the German VET system.

To sum up, VET in Germany is characterized by a dual system. It can be said that in the workplace there is a vocational education system which is strongly regulated with a theoretical and practical part in which the learner plays an important role. Over time, emphasis is placed on general competencies (basic qualities) with higher abstraction and better transfer potential. There are now five areas of competence: action, subject, personal, social and methods, or learning competence (Weigel, Mulder & Collins, 2007).

In brief, the concept of competence in vocational education and training (VET) is becoming more and more important. In Vocational Education and Training, the concept of competence comes into prominence in the creation of curricula and in the development of teaching methods in this direction and it is discussed in the literature considerably. At the same time, competence-based education is seen as a key concept for changing needs in the global economy market and for contemporary societies. Therefore, it is felt that countries focus on this concept. Considering the concept of competency management in countries, National Vocational Qualification (NVQ) is designed to meet the needs of the long-term labor market and at the same time to increase flexibility, transparency, transparency and general access to professional qualifications in the United Kingdom (UK). VET in Germany is characterized by a dual system and the competence of professional action is addressed in three categories (domain or subject-competence, personal competence, social competence) by KMK. In Italy, competence-based learning has been implemented in all schools, even in other ways, which seems to be unsuitable for education through work experience. Competency-based learning experiences support the transition from the education system to the labor market.

References

- Andrés, J. B. (2012). CLIL: Perspectives from a competency-based approach in the Spanish context. In Estilos de aprendizaje: investigaciones y experiencias:[V Congreso Mundial de Estilos de Aprendizaje], Santander, 27, 28 y 29 de junio de 2012.
- Biemans, H., Wesselink, R., Gulikers, J., Schaafsma, S., Verstegen, J., & Mulder, M. (2009). Towards competence based VET: dealing with the pitfalls. Journal of Vocational Education and Training, 61(3), 267-286.
- Bohne, C., Eicker, F., & Haseloff, G. (2017). Competence-based vocational education and training (VET) An approach of shaping and networking. European Journal of Training and Development, 41(1), 28-38.
- Brockmann, M., Clarke, L. and Winch, C. (2009). Competence and competency in the EQF and in European VET systems. Journal of European Industrial Training, 33, Issue 8/9, pp. 787–799.
- Brockmann, M., Clarke, L., & Winch, C. (2008). Knowledge, skills, competence: European divergences in vocational education and training (VET)—the English, German and Dutch cases. Oxford review of education, 34(5), 547-567.
- Brockmann, M., Clarke, L., Méhaut, P., & Winch, C. (2008). Competence-based vocational education and training (VET): the cases of England and France in a European perspective. Vocations and Learning, 1(3), 227-244.
- CEDEFOB, (2012). Necessary Conditions for ECVET Implementation.
- CEDEFOP. (2009). Continuity, consolidation and change. Towards a European era of vocational education and training. Cedefop Reference series; 73 Luxembourg: Office for Official Publications of the European Communities
- ECVET, (2015). Ecvet nedir? http://ecvet.ua.gov.tr/en/page/ECVET_Nedir Date Accessed: 18.05.2018
- Edwards, M., Sánchez-Ruiz, L. M., & Sánchez-Díaz, C. (2009). Achieving competence-based curriculum in engineering education in Spain. Proceedings of the IEEE, 97(10), 1727-1736.
- Handley, D. (2003) Assessment of competencies in England's National Vocational Qualification system, in: G. Straka (Ed.) Zertifizierung non-formell und informell erworbener beruflicher Kompetenzen (Münster, New York, München & Berlin, Waxmann).
- Hellwig, S. (2006). The competency debate in German VET: an analysis of current reform approaches. International Journal of Training Research, 4(1), 1-16.
- Powell, J. J., & Trampusch, C. (2012). Europeanization and the varying responses in collective skill systems. The political economy of collective skill systems, 284-313.
- QCA (2001) The NVQ code of practice (London, Qualifications and Curriculum Authority).
- Rainbird, H. (1990). Training matters: Union perspectives on industrial restructuring and training. Oxford: Blackwell.
- Religa, J., & Lester, S. (2016). Models and uses of competence in six countries' VET systems. Publication of the project ComProCom, available from http://www. comprocom. eu/products/41-review-on-current-situation.
- SEPE, (year UK), Skills and Competences Development and Innovative Pedagogy in Spain. https://www.sepe.es/contenidos/personas/formacion/refernet/pdf/Tema_7_EN_PUBLICAR_octubre2008.pdf Date Accessed: 18.05.2018
- Sturing, L., Biemans, H. J., Mulder, M., & De Bruijn, E. (2011). The nature of study programmes in vocational education: Evaluation of the model for comprehensive competence-based vocational education in the Netherlands. Vocations and Learning, 4(3), 191-210.
- Weigel, T., Mulder, M., & Collins, K. (2007). The concept of competence in the development of vocational education and training in selected EU member states. Journal of Vocational Education & Training, 59(1), 51-64.
- Wesselink, R., Biemans, H. J., Mulder, M., & Van den Elsen, E. R. (2007). Competence-Based VET as Seen by Dutch Researchers. European journal of vocational training, 40(1), 38-51.
- Winterton, J. (2011). Competence in European policy instruments: A moving target for developing a National Qualifications Framework?. Journal of Contemporary Educational Studies/Sodobna Pedagogika, 62(5).
- Winterton, J. and Winterton, R. (1998) Validation and recognition of competences and qualifications in the UK, Employment Research Institute, Napier University, Final UK Report of Leonardo da Vinci Project VALID.

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Phase 1.3.

SCHOOLS - ENTERPRISE COOPERATION AND APPLICATIONS IN PROJECT COUNTRIES

SCHOOLS - ENTERPRISE COOPERATION

As scientific and technological achievements emerge and change very quickly, schools must be thought of in a close relationship with society and closeness because of frequent changes in socio-economic life and global trends in the world, and the ability to adapt to flexibility and social change must increase considerably (EUI-Net., 2007). Partnerships between schools and enterprises are not new. The emergence of school-enterprise programs occurred in the context of historically high levels of participation in the upper middle years: Changes in young people's opportunities for full-time employment, the recognition of the results of the work of deferred entry for individual development; and new student learning topics that emphasize the importance of the context in which learning takes place (Ainley, & Fleming, 1997). Partnerships between schools and enterprises are viewed as strategies to improve real experiences, which are generally achieved through community involvement (Watters, Hay, Dempster, & Pillay, 2013).

Donnelly (2009) found that the vocational orientation of the school curriculum is less understood and locally conditioned than the traditional academic education, with the literature in line with aligning the school curriculum with vocational training needs. Vocational education has a low status, especially in the field of science, less skilled and marginalized (Watters, Hay, Dempster, & Pillay, 2013). For this reason, schools should offer a different perspective on how science and related workplace-based information should be presented for students moving from their traditional narrow focus to their professional careers in the field for further studies (Munro and Elsom, 2000).

In this context, the cooperation and applications between schools - enterprises in the project countries have been extensively reviewed below.

SCHOOLS - ENTERPRISE COOPERATION APPLICATIONS IN COUNTRIES

(Turkey, Spain and Germany)

TURKEY

Vocational and Technical Education in Turkey

Vocational and technical education is vital for the Turkish economy. The level of education of society and workforce constitutes the most important driving force of socio - economic development and it is the most important factor for productivity to increase.

It is vital since the main objectives of vocational and technical education are;

- to prepare young people for the life and the upper learning,
- to develop quality work force for the industry and
- to increase the knowledge, skills and competencies of the workforce in employment.

Ministry of National Education (MoNE) in Turkey recognizes this increasing importance of VET and takes action for its improvement.

MoNE aims to base VET on:

- demands and requirements of the labor market
- a participatory approach
- international employability of VET graduates and
- continuous development and quality improvement.

VET legislation[1] of Turkey:

The Constitution of 1982 (Art. 10, 24, 42, 62, 130, 131) stipulates all basic responsibilities of the State with regard to education and training. The Basic Law of National Education No. 1739 of 1973 (amended) specifies objectives, basic principles and general structure of education. It outlines requirements for education institutions at all levels; teaching staff; school infrastructure; material and equipment; as well as duties and responsibilities of relevant bodies.

The Apprenticeship and Vocational Training Law No. 3308 of 1986 (amended by Law No. 4702 on Vocational Education Law) was adopted with the aim to improve VET. Law No. 5544 of 2006 stipulates the creation of Vocational Qualification Authority for the purpose of establishing a national qualifications framework for VET based on national and international occupational standards. The Non - Formal Education Institutions Decree of 2006 regulates activities of non - formal education. Law No. 4702 of 2001 amends exiting laws and stipulates the creation of Vocational and Technical Education Zones that comprise of VET upper secondary institutions. It grants access for graduates of VET upper secondary schools to two-year tertiary level education.

Higher Education Law No. 2547 of 1981 outlines goals and principles of higher education. It defines principles related to the administration and management of higher education institutions. The Law reforms higher education and incorporates teacher training schools and institute of education into the system. Law on Primary Education and Education Law and Amendments to Certain Laws, no 6287 dated March 30, 2012.

Types of programs and institutions and duration of programs

Formal educational services at all educational levels are provided substantially (more than 90%) by public education institutions. However, private education institutions also exist. Individuals, corporations or other types of institutions; such as associations, foundations may open and run private schools at pre - primary, primary and secondary levels. Private education institutions are subject to the same regulations with public institutions in terms of educational arrangements

1 Unevoc.unesco.org. (2017). UNESCO-UNEVOC World TVET Database. [online] Available at: http://www.unevoc.unesco.org/go.php?q=World+TVET+Database&ct=TUR [Accessed 29 Nov. 2017].

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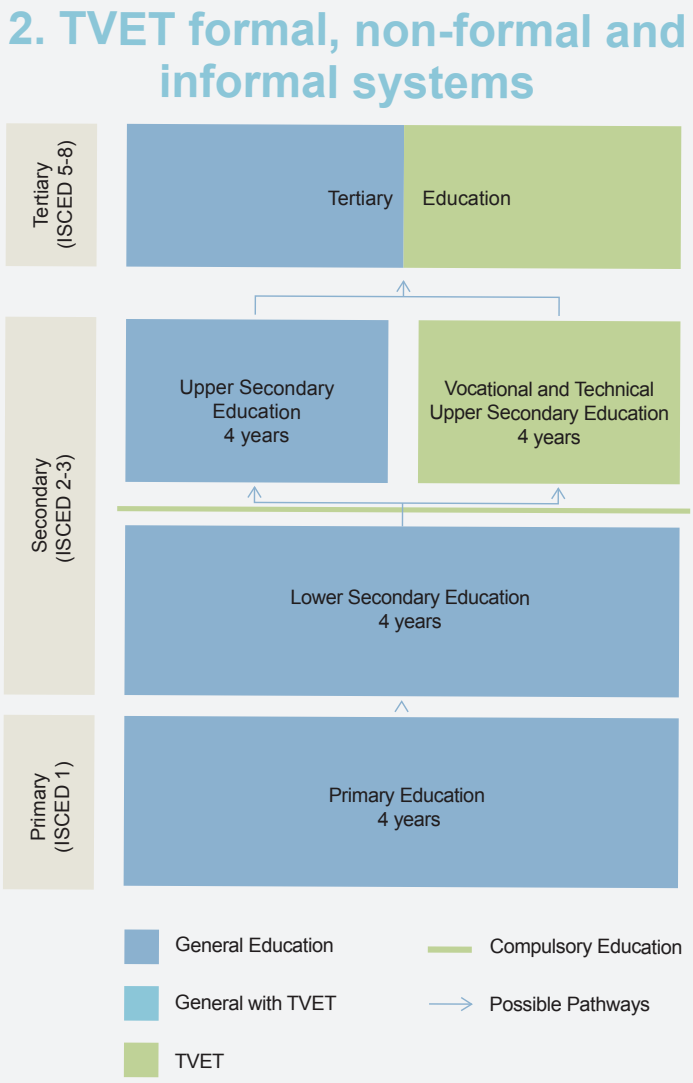
and certification (curricula, teacher qualifications, length of school day / week / year, assessment, progression, diploma etc.). At higher education level, only 'foundations' can run private, not-for-profit, and institutions. Public funds can be provided for private higher education institutions within some limits upon meeting certain criteria. Although private higher education institutions are substantially autonomous in terms of their administration and management, they are subject to the same regulations regarding educational standards with public institutions. Administrative legislation and supervision related to formal and non - formal education (except for higher education) are under the responsibility of MoNE.



MoNE is responsible for planning, programming, conducting, monitoring and supervising education and training services.. Educational activities in the provinces are organized by the Provincial Directorates of Education appointed by the Minister. Supervision of educational institutions is carried out at both central and regional (local or provincial) level. The supervision of primary education institutions is performed at provincial level by primary education inspectors, while inspectors delegated by MoNE supervise secondary education institutions.

Figure 2: Educational Grades in TURKEY

Higher education institutions are autonomous for purposes of education and research. However, they have to submit annual reports to Council of Higher Education (CoHE) which is responsible for

the planning and coordination of higher education. Institutions are monitored at least once a year by Higher Education Supervisory Board acting on behalf of the CoHE.

Turkish National Education System is determined by National Education Basic Act No. 1739, which consists of two main parts, namely “formal education” and “non-formal education”.

Formal VET system

Upper Secondary (General and Vocational) Education

Upper secondary education includes all education institutions of a general or vocational and technical character with duration of at least four years following lower secondary education. The objectives of upper secondary education are to give students a common minimum overall knowledge, to familiarize them with problems of the individual and society and to seek solutions, to ensure that they gain the awareness that shall contribute to the socio-economic and cultural development of the country and to prepare them for both higher education and a profession or for life and employment, in line with their interests and aptitudes.

There are two types of upper secondary education: general and vocational – technical secondary education schools last a minimum of 4 years including 9th and 12th grades and cover the age range from 14 to 17. Some institutions have a 5 – year duration, including a foreign language preparation grade.

VET system in Turkey includes two main dimensions:

- theoretical - school training
- practical - in company training/ in workshop and laboratory of school
- Vocational education policies and activities are mostly carried out by MoNE within the framework of Law No. 3308, which brought about changes to the system, establishing new and strong links of co-operation with industry and commerce. The vocational education system includes:
- In vocational and technical high schools education programmes in 54 fields and in 199 branches are applied.
- Apprenticeship training, which is a combination of mainly practical training provided in enterprises and theoretical training provided in vocational education centers.
- Non - formal education is provided primarily through public education centers. Non - formal education provides educational services in line with the general aims and basic principles of national education to citizens who have never entered or who are at a certain level of the formal education system or who have left formal education.
- The provision of VET is centralized. Frame curricula are determined at national level, and are approved by the National Board of Education. Provincial Directorates of the Ministry oversee the VET provision in each of the province and informing the Ministry.

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School / Institution and Program Types

The field courses in secondary education institutions offering vocational and technical education consist of courses developing competencies towards various professions. Furthermore, each field consists of various branches. Weekly timetables and curriculums implemented in Anatolian vocational and technical high schools are similar with the general Anatolian high schools as of the common general education courses are compared.

- Present fields in vocational and technical education institutions are as follows:

Justice, family and costumer services, footwear and leather goods technology, information technologies, biomedical device technologies, office management, child development and education, maritime, entertainment services, electrical-electronic technology, craft technology, industrial automation technologies, journalism, shipbuilding, food technology, graphics and photography, beauty and hair care services, public relations and organization services, map-land registry and cadastre, patient and elderly services, livestock raising and health, construction technology, firefighting and fire safety, chemical technology, accommodation and travel services, jewelery technology, laboratory services, mining technology, machine technology, printing technology, metal technology, metallurgical technology, meteorology, furniture and interior design, fashion design technologies, motor vehicle technology, accounting and financing, musical instruments construction, marketing and retail, plastic technology, radio-television, rail systems technology, health services, art and design, ceramic and glass technology, civil aviation, agriculture, design technologies, textile technologies, installation technology and air conditioning, aircraft maintenance, transport services, renewable energy technologies, food and beverage services

There are 3636 vocational and technical education institutions in Turkey.

Open Vocational High School

As a result of feedback received from implementations to date, scientific and technological developments, face-to-face education and practical training; it became necessary to establish Open Vocational High School in order to implement vocational secondary education programs more effectively which already exist in Open High School programs.

Although Open Vocational High School carries out the same system in terms of formal education program content, it is unique and different from the other formal education institutions in terms of structure and functioning. In 2006, along with all high schools Open Vocational High School was also extended to 4 years.

Common and elective courses taught in Open Vocational High School are determined in parallel with the formal education by the Board of Education. Education is delivered through TV and radio and supported by printed materials. Vocational courses are taught face to face. Printed materials are sent to students' addresses by mail and published as e-books on the internet as well. Graduates of the middle school enrolled to Open Vocational High School can graduate in a minimum of 4 years.

Work-Based Learning (Apprenticeship Training)

As the duration of compulsory education was prolonged to 12 years, the structure of the apprenticeship training has also changed. Apprenticeship training is a dual training system in which theoretical training is given in vocational training centers and practical training is in the workplace. Students must be lower secondary level graduates and enrolment to Open Vocational High School is compulsory. While they continue their upper secondary education in Open Vocational High School; they may attend the apprenticeship programs in Vocational Education Centers (VECs). Apprenticeship training is provided for those who have not been able to continue their education after formal lower secondary education or who have been left out of formal education for various reasons.

Apprenticeship training[2] is the type of training that covers the theoretical and practical training of those who have completed compulsory basic education and are working to learn a job at a workplace. 14 years of age must be completed to start. Those who have completed compulsory education but are under the age of 14 start apprenticeship training with apprentice candidate status.

There are 4 stages in apprenticeship training: apprentice candidacy, apprenticeship, foremen and mastery. A young person who wants to start an apprenticeship education finds the workplace he or she will study first. Before starting work, a standard contract is signed between the business owner or the deputy and the parent of the candidate, determined by MoNE. Apprentice candidates and apprentices are students in the "apprentice student" status and benefit from all the rights recognized for the students. Apprenticeship duration varies between 2 and 4 years according to profession and is continuous. Apprentices receive theoretical training in the education unit of work places suitable for MoNE or in vocational training centers once a week and receive practical training at the workplace remaining days of the week.

Practical training is conducted under supervision of master trainers. An arrangement made in 2001 led to apprenticeship training for those who received general education at upper secondary and higher level. Apprenticeship training begins with a trial period, which varies from one to three months, depending on the profession's characteristics. Employers must pay apprentices and apprentice candidates at least 30 percent of the minimum wage. Apprentice candidates and apprentices are insured against occupational accidents, occupational and other diseases, insurance premiums are paid by the state.

Those who have completed apprenticeship training may take the exam for 'foreman'. Those who have succeeded in theoretical and practical examination are awarded a foreman document. The training of foreman is given in order to attain mastery level. Three-year program based on footwork is provided at the Vocational Training Centers of MoNE. During this time, they continue to work in their workplaces. Those who have completed their training and have been documented in their profession for at least five years after receiving the certificate of merit are eligible for the mastery exam. Also, those who finish the vocational high school have the mastery certificate without entering the test. Apprenticeship training institutions are "Vocational Training Centers" located all around Turkey , "Training Units" and "On-the-Job Training Centers" established within the enterprises. Apprenticeship training is mainly applied to small scale craftsmen and craftsmen enterprises.

Compared with other types of formal education, apprenticeship education has a smaller place in numerical terms. However, those who complete apprenticeship training are easier to transfer to employment and have higher employment rates than vocational high school graduates.

Non - formal and informal VET systems

Non - formal educational services are provided by the Directorate General for Lifelong Learning through the following institutions;

- Public Education Centers
- Maturation Institutes
- Open Lower Secondary School, Open Upper Secondary School, Open Vocational and
- Technical School

2. Messegitim.com.tr. (2017). YAYGIN EGİTİM KAPSAMINDA MESLEKI EGITIM SISTEMI - Makaleler - MESS Egitim Vakfi. [online] Available at: http://www.messegitim.com.tr/ti/579/0/YAYGIN-EGITIM-KAPSAMINDA-MESLEKI-EGITIM-SISTEMI [Accessed 30 Nov. 2017].

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	Total	Male	Female
Public Training Centers	**6 180 197**	**3 110 042**	**3 070 155**
Vocational Training Centers	**213 028**	**169 114**	**43 914**

Table 1: The Number of Attending and Graduate Trainees (Extracted from TÜİK Website, 2015)

Non - formal education is delivered through short courses, public training and distance learning in public and private schools which operate under the coordination of the Ministry of National Education. In accordance with the general objectives and basic principles of national education, non - formal education covers citizens who have never entered the formal education system or are at any level of it or have left at that level, and it may accompany formal education or be independent of it.

Public Education Centers

Education activities, carried outside of formal education institutions, take place mainly in public training centers throughout the country. **These centers offer:**

- Literacy courses
- Vocational courses
- Socio - cultural courses and activities

A significant development in this respect is Law No.5544, adopted in 2006. As noted in the previous European Inventory report for Turkey this Law on the Vocational Qualifications Authority (VQA) indicated the start of a new period regarding the recognition and certification of professional competences. The Law aims to determine principles of national qualifications in technical and vocational fields and to establish VQA to set up and operate the national qualifications system in accordance with the European Qualifications Framework. The law also states that, based on a list of questions tailored to each profession, a document or a certificate approved by the VQA indicating professional (technical or vocational) competency level will be awarded to individuals who succeed in examinations. Although the law does not explicitly state that this competency certificate can be awarded regardless of where the learning took place, there is an emphasis on lifelong learning and recognition of prior learning and it can be assumed that in general, individuals will be awarded the certificates, regardless of the learning process. These certificates are different to those awarded through the formal education and training system and can currently only be provided via a process of validation. This is because the process of aligning formal and non - formal curricula in relation to the standards is still ongoing. Once the system of standards is established, qualifications in the formal system will be aligned with those used in non - formal / informal learning. Thus in the future, once the quality assurance of training institutions is completed, formal training institutions will also be able to award these secondary - level VET qualifications.

National and European Qualifications Framework Levels

Turkey has developed and is implementing a comprehensive national qualifications framework (Turkish qualifications framework, TQF). The regulation on the procedures and principles of its implementation (TQF Regulation) and the description of the Turkish qualifications framework (TQF Document) were adopted by a Ministerial Decision of the Ministry of Labour and Social Security

in 2015 and published in the Official Journal in November 2015 and January 2016, respectively. The framework aims to bring together a national vocational qualification system (NVQS), led by the Vocational Qualifications Authority (VQA), a qualifications framework for higher education, developed in the Bologna process, and integrates them with the qualifications awarded by the Ministry of National Education. The framework will be open for all quality assured qualifications. Passing the VQA law (Law No 5544, 2006) was the first important step in developing a NVQS of labor market oriented qualifications. Through the law amendment (November 2011), the framework became more broadly defined as '**principles of qualification designed in compliance with the European qualifications framework** (EQF) and gained through vocational, general and academic education and training programs including primary, secondary and higher education as well as other learning routes'.[3] The law of Vocational Qualifications Authority (VQA) was accepted by Turkish Grand National Assembly in September 2006 and was published in the official gazette on 07 October 2006. The establishment of VQA will achieve a system that will enable mobility among academic and vocational fields appropriate for assessment at all levels, grading and certification based on the accepted occupational standards. VQA has two major responsibilities that are crucial to the strengthening of the relationships of the VET system to employment:

- VQA is expected to develop occupational standards based on actual competencies required by the labor market. These will shape the development of training standards to be used by all training institutions in the country. They will provide VET schools with much needed objectives in terms of competencies-based curricula. To the extent that social partners are involved in this task their commitment to VET system will increase and the relevance of VET to employment will improve.

- VQA also has important responsibilities in the area of student assessment and certification. It will contribute to overcome a major weakness of the Turkish VET system, namely the lack of standardized mechanisms to assess and control the quality and the relevance to employment of the learning process that takes place in training institutions.

European Qualification Framework (EQF) is being used as a reference to develop the Turkish Qualification Framework (TQF). TQF will encompass all levels of education including adult learning, initial VET, secondary education, teacher training and higher education.

As the ultimate goal is to introduce a single comprehensive national framework, encompassing all stages of formal and all kinds of informal learning, it will also be important to develop effective and sustainable cooperation between stakeholders across all three sectors, the VQA, the CoHE and MoNe. Strengthening and adjusting governance structures are also needed and are being discussed. The TQF regulation deal with the issues mentioned above and strengthens the basis for TQF.

One important objective of the TQF is to use it as vehicle for developing new national occupational standards and qualifications, required by the labor market, and to use these for validation and reform of curricula. To retain employer engagement in qualifications development seems crucial.

3 European Training Foundation (2016). Inventory of NQF recent developments in ETF partner countries: Turkey (Latest update from ETF, October 2016). https://connections.etf.europa.eu/wikis/home?lang=en#!/wiki/Wf591e43b607

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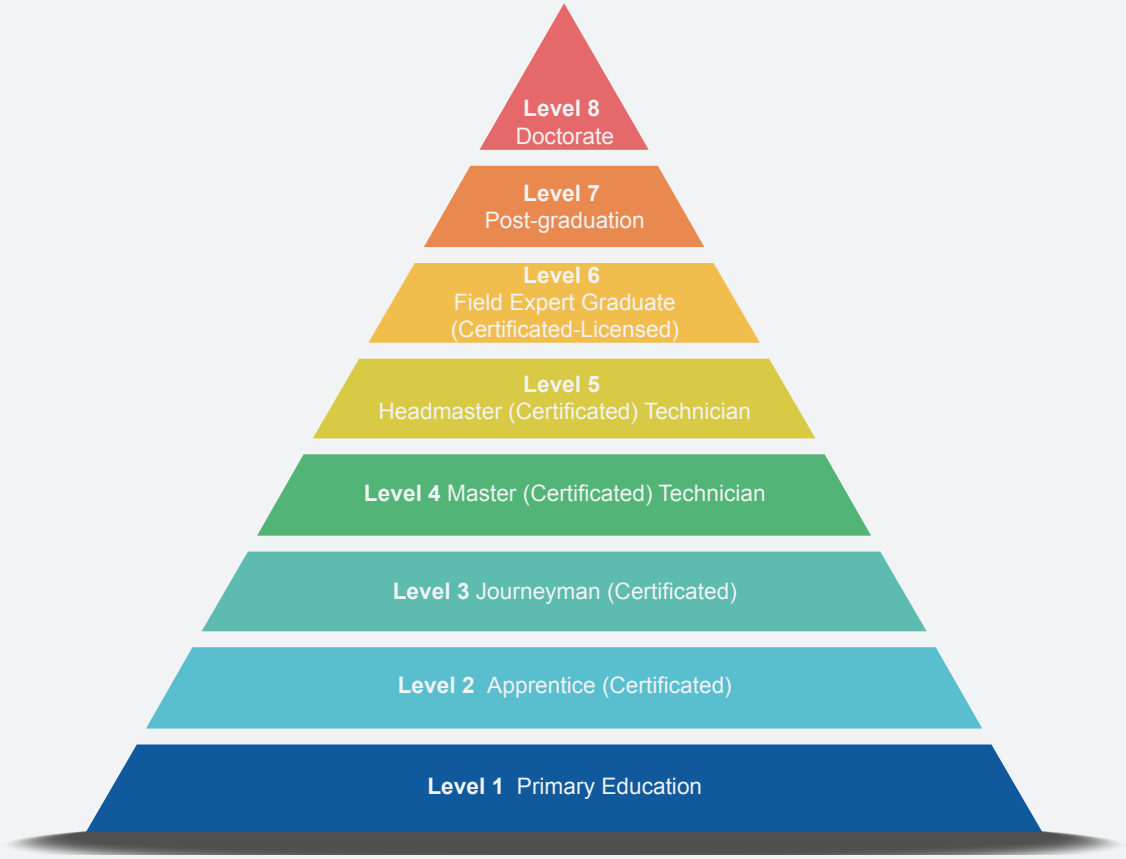

Figure 3: Educational Levels in TURKEY (extracted from Vocational Qualifications Authority (VQA) website)

Turkey is developing an overarching Turkish Qualifications Framework that is going to be referenced to the EQF. The levels for the framework have already been discussed and technical work is on its way. The overarching framework is bringing together developments in adult learning, initial VET, secondary education, teacher training and higher education to establish a framework for recognition of lifelong learning.

Three sub-systems that are also under development are being linked through TQF:

National Vocational Qualifications System is being implemented by Vocational Qualifications Authority since 2007, and is developing a quality assured system of vocational qualifications based on national occupational standards which is driven by economic sectors. Sectorial awarding bodies (VocTest Centres) are established around the country. This system provides qualifications for continuing vocational education.

Turkey is also establishing a Higher Education Qualifications Framework in line with the Qualifications Framework of the European Higher Education Area. The Council for Higher Education is coordinating this work. Ministry of National Education is responsible for initial VET qualifications, secondary education and teacher qualifications.

Selection and placement of students

Students in Turkey may choose vocational high schools after completing the 8-year-long primary education. However, most students take a National Placement Exam[4] in order to continue their education in more prestigious Anatolian General High Schools or Science High Schools which are selective in their recruitment and base their judgement solely on students' scores from this national exam. This led to most vocational schools being populated with students with very low scores and low school performance.

There is a compulsory internship in 11th and 12th Grade of technical programs and for vocational programs there is compulsory on the job trainings. To be able to graduate; technical program students should complete a total of 300 hours of internship at various companies and be evaluated on their internship reports by school teachers. Upon completing their education, vocational high school graduates may pursue two - year polytechnic courses or may continue with a related tertiary degree.

Governance

In Turkey, nationally the main actors in VET governance are the Ministry of National Education (MoNE), responsible for higher vocational schools (postsecondary VET is under the Council of Higher Education); the Ministry of Family, Labour and Social Services (MoFLSS); and the Ministry of, Industry and Technology (MoSIT). MoNE is engaged most in VET governance although MoFLSS is also involved. Other strategic actors are MoNE's directorates – Board of Education, Directorate General for Vocational and Technical Education, Directorate General for Lifelong Learning and Directorate for Strategy Development. All are involved in the majority of governance functions of VET. Vocational Education Council (VEC), however, has a crucial role, as it is engaged in almost all governance functions. It comprises representatives of the ministries, trade and employers' unions, public institutions and agencies and other key social partners[5].

Government sees social dialogue in VET as very important. NGOs and social partners are involved all in decision making. Most active of these are the Union of Chambers and Commodity Exchanges of Turkey (TOBB), business confederations and associations, and other trade and employers' unions and associations. They are involved in many functions of governance, through public bodies like VEC or public - private partnerships for skills development or capacity building. At regional and local level, the provincial and district national education directorates, Provincial Employment and Vocational Education Board and Provincial Employment Agency are in charge of both implementing VET policy and developing public - private partnerships at provincial, district and municipal levels.

Vocational Education Council was established in accordance with the main VET law of the Constitution of Turkish Republic; the law number 3308 passed in 5th of June, 1986.

4 It is important to note that this placement system has also been revised in the 2017 – 2018 Education Year. Only few prestigious schools will implement a placement exam to the students while other schools will select students according to their school grades.

5 ANON, (2017). [online] Available at: https://www.etf.europa.eu/webatt.nsf/0/71AD8569528AC9D7C-12581590039179C/$file/VET%20governance_Turkey.pdf [Accessed 29 Nov. 2017].

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Article 4 of the Second Part - First Chapter of this respective law suggests that;[6] Vocational Education Board shall be established in order to take decisions and give opinions to the Ministry, on planning, development and evaluation on all types and levels of vocational and technical education and training programs.

VET has a centralized multi level governance structure. Policy is steered by MoNE's Directorate General for VET for IVET and by CoHE at tertiary level. Provincial and District National Education Directorates across 81 provinces support the implementation of policy. Numerous other bodies help shape policy.

In particular, Vocational Education Council takes decisions on the planning, development and evaluation of VET in all types of formal, non - formal and apprenticeship education, vocational and technical education schools and institutions, and enterprises where VET programs are implemented. Vocational Education Council (VEC) also engages in planning and development; and the Vocational Qualifications Authority (VQA) aligns VET professional qualifications with professional standards. The highly centralized, bureaucratic structure limits the capacity of schools to address immediate challenges.

Quality assurance is defined in general terms as 'systematic monitoring and evaluating different aspects of a project, service or institution in order to determine that quality standards are met'. The extent to which the understanding of quality assurance is shared among stakeholders requires further investigation. MoNE, the Turkish Quality Association (KALDER), Board of Inspection, Internal Audit Unit and provincial organizations have a mandate in relation to quality assurance in IVET. VQA has that mandate for CVET and adult education. The IPA IQVET-1 (2012) and IQVET-2 projects support the development/ evaluation of a National Quality Assurance Centre for VET (VET - NQAC), which will steer various groups involved in the NQAC (MoNE, related institutions, NGOs, training providers and social partners) and the development of a quality assurance framework using the EQARF as a reference standard.

Financing

VET in Turkey is funded by allocations in the national budget. Central and provincial governments are responsible for personnel and financial management of schools. Although funding has increased in the past decade, data suggests primary and secondary education is underfunded compared to other OECD countries.

The Ministry of Finance and MoNE agree an annual subsidy for VET schools in Organized Industrial Zones. Other sources are funds from international projects, and income from the public sector and NGOs, and from revolving fund enterprises in schools.

The amount of the building facility payment distribution by school or service type is shown in the graph. Accordingly, the most investment payment seems to be devoted to vocational and technical education schools.[7]

Figure 4: Distribution of the Plant Building Budget for 2017

6 EĞİTİM, T. (2017). TÜRKİYE MESLEKİ EĞİTİM KURULU - MESLEKİ EĞİTİM. [online] Meslekiegitimkurulu.gov.tr. Available at: http://meslekiegitimkurulu.gov.tr/kategori.php?k=1&i=7364802 [Accessed 29 Nov. 2017].

7 Egitimreformugirisimi.org. (2017). [online] Available at: http://www.egitimreformugirisimi.org/wp-content/uploads/2017/03/KaynakBilgiNotu.29.06.17.web_.pdf [Accessed 18 Dec. 2017] .

International donors support initiatives and projects. Turkish Employment Agency (ISKUR) finances vocational courses for unemployed people. Non - profit education providers, like NGOs, and sometimes industry finance postsecondary education. Lifelong learning is financed by the state and the private sector. Citizens also finance it through fees, unemployment insurance, union membership and charitable donations. Several employers finance VET through training, and contributing to employers associations' training funds.

Vocational education and training activities in enterprises

Vocational education and training activities of the enterprises can be separated into two. The first one is the apprenticeship and upper secondary education students' skills trainings implemented within the enterprises premises within the scope of Law no. 3308. Apart from apprenticeship training, according to the law, vocational high school students in the last grade (4th grade) are given skills training in the workplaces.

Last grade VET students participating in this practice attend the theoretical education two days a week and practical training in the workplace three days a week. Theoretical training, which is 12 hours a week, is be done either in the school or at the educational units of the enterprises. With the legislative amendments made in 2001, obligations have been introduced in this respect. According to this; enterprises with less than 20 employees can offer skills training to VET students if they wish to do so. Enterprises with more than 20 employees which are within the scope of vocational education according to its location and occupations, however, are obliged to provide skills training to VET students. These enterprises are also obliged to provide training to at least 5% of the number of employees and 10% at most. In addition, enterprises with more than 200 employees are required to set up a training unit for skills training and to recruit training personnel there.

Procedures

While diplomas and workplace opening certificates are given to students who have completed vocational and technical education in formal education institutions, a certificate approved by the Ministry of National Education is given to those who have completed vocational education within the scope of non - formal education. Those who follow the mastership training in vocational education centers can open workplaces with their mastership certificates [Master Craftsperson]. Moreover, the training of individuals who attend vocational courses is evaluated for mastership certificates in line with the Regulation on Secondary Education Institutions. According to Law No 5174 and Law No 5362, chambers can devise courses in the professional branches that have not been included in Vocational Education Law No 3308, and issue certificates related to the implementation of the courses. In addition, within the scope of Article 7 of Metropolitan Municipality Law No 5216, the metropolitan municipalities have a duty and the authority to devise and operate courses to enable students to access professions and acquire skills. They are also required to cooperate with universities, colleges, vocational high schools, government agencies and NGOs when providing these services. According to Prime Minister's Notice No 2007 / 17, cooperation with the Ministry

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of National Education is obligatory for these courses. Under Vocational Qualifications Authority Act No 5544, certification of national qualifications is legally given to the VQA. Candidates are entitled to the certificates issued by the VQA once they have been subjected to assessment by the authorized institutions. In this context, the VQA initiated the Strengthening the Vocational Qualifications Authority Project and the National Qualifications System in Turkey. The latter aims to develop national occupational standards; support the vocational qualifications certification centers; and establish and operate an efficient and sustainable National Qualifications System based on an appropriate measurement assessment and certification system in line with the EQF and accepted national occupational standards. At secondary school level, quality assurance is the responsibility of the Ministry. School evaluations focus on compliance with central regulations and are a combination of external evaluation by ministerial school inspectors every 3 years and internal evaluation. Inspectors' reports are monitored and evaluated by the Directorate of Guidance and Inspection. VQA defines standards and appropriate procedures for quality assurance in CVET and authorizes certification of organizations accredited in multilateral recognition with TURKAK (Turkish Accreditation Authority). CoHE is responsible for quality assurance in HE. Monitoring of HEIs is carried out by the Higher Education Supervision Board, which is part of the Higher Education Council and in charge of the external evaluation of universities, affiliated units, academic staff and their activities. In 2005, the Regulation for Academic Assessment and Quality Improvement in HEIs was adopted. The TQM approach has been used for quality assurance QI in VET schools since 2009. Many schools carry out self-assessment following the Excellence Model developed by the European Foundation for Quality Management (EFQM) applied as the basis of the continuous improvement of areas of concern. Self-assessment is not mandatory but TQM Provincial Facilitators offer consultancy to schools / institutions planning a self-assessment process. To motivate schools to become involved in quality improvement (QI), MoNE introduced a range of awards for quality in education for formal and non - formal VET providers, according to a range of criteria focusing on management, performance and satisfaction ratings of stakeholders. MoNE also promotes use of the ISO 9001 certificate. Further investigation is required in relation to social partners' engagement in the governance arrangements for quality assurance related to VET provider institutions and VET provider self-evaluation standards, mechanisms, processes and procedures.[8]

Views and expectations of parties

According to a country report paper basing on the research done by European Training Foundation (ETF), several policy recommendations are given for policy makers at national level. This report suggests that:[9]

Simplification and rebuilding of the system is quite urgent. Lack of this simplification creates a complicated structure hard to grasp for students, parents, as well as counsellors. This also creates problems in regard to obligating students to remain in the field they started with. This lack of flexibility in terms of changing fields is problematic and creates additional exclusion and inevitable

8 Eqavet.eu. (2017). [online] Available at: http://www.eqavet.eu/Libraries/Website_Update_2016_Reports/2_TR_final_Template_for_updating_info_on_the_EQAVET_website.sflb.ashx [Accessed 1 Dec. 2017].

9 Etf.europa.eu. (2017). [online] Available at: http://www.etf.europa.eu/eventsmgmt.nsf/(getAttachment)/868061B2B8A4EB64C1257C28002CCE91/$File/TURKEY%20-%20FINAL%20Report.pdf [Accessed 18 Dec. 2017].

increase of dropouts by the alienated students.

Another issue is students in most VET high schools do an internship in their final year of high school. While some policy makers think period for internship should be extended, others think this would take away from academic training and may lead to abuses of this youth labor. Based on the interviews conducted with the localities, it is believed that rather than quantity of time spent in the industry before graduation, the quality of the learning environment should be the focus of discussion.

The issue of guidance is vital to increase both the quality of education and level of social inclusion in VET in Turkey. Some aspects to the guidance problem may be handled by local level policy makers and NGOs. The voluntary based social responsibility projects try to take initiative in these matters. The voluntary based individual coaching system developed by Koç Holding social responsibility project confirm this point as they noted that students and even parents were in great need for counseling.

Since the cooperation between the sector and VET schools has been relatively low and is mostly tight to schools' demanding physical needs from enterprises in practice, parties tend to misunderstand each other which results in a lose – lose situation for both sides. Observing this problem, and following the social responsibility project of Koç Holding, MESS Training Foundation (MEV), started a project funded by Turkish Employer's Association of Metal Industries (MESS).

The project pioneers signing of School – Enterprise Cooperation Protocols between vocational and technical high schools and companies and organizes trainings for teachers, students and administrators in these schools. The project also includes organizing enterprise visits and many other activities like implementing a mentorship program, study abroad activities for schools, matching the schools with the companies for internship etc. It develops national and international projects and works in different fields of industry by participating in project partnerships. MEV provides MESS Vocational Education Scholarship Program funded by MESS and provides scholarship support to vocational and technical education students as a part of this project. It is called Vocational Education and Training Support for Turkey (Türkiye için Mesleki Eğitime Tam Destek – METAD) Project and it was launched in 2016 with a 10 - year long Project Protocol signed between the parties; MESS, MEV and Ministry of National Education Directorate General of Vocational and Technical Education.

As a part of this project, several workshops have been organized by MEV with the participation of different NGOs, public institutions and private enterprises. Reports from these workshops suggest that by building bridges between schools and enterprises; upgrading education system and curriculum according to the recent technological developments, increase of teacher and managerial competencies, internships, scholarships, mentoring opportunities to the students, visits of the teachers' to enterprises and the technological developments adaptation of technical infrastructure to schools, increase in the quality of trainings within enterprises are crucial for an increase of the attractiveness of vocational and technical education.

Another output suggested in these workshops is that; with Industry 4.0, vocational education is becoming even more important. With this new industrial revolution, digitalization in production, transition to cyber - physical systems have been the issues of discussion. Development and education

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integration of topics such as big data analysis, intelligent robots, simulation - cyber planning, IoT (internet of things), 3D, 4D, cloud, augmented reality, horizontal and vertical software integration, cyber security, have all become necessities for the development of vocational education.

From the public side, Ministry of National Education explained what they have been doing in developing VET system as MoNE and incentives within the scope of vocational education offered for the private sector in these workshops. General Directorate of Vocational and Technical Education Department of Social Partners and Projects stated that administrators, academicians, sector representatives, provincial chambers of commerce and industry representatives, chambers of artisans and NGOs came together in 24 provinces in order to determine the problems encountered in the vocational and technical education system and to propose solutions for these problems.

As a result, amendments were made in the Law No. 6764 and the changes introduced are:

- Apprenticeship training is included in 12 years compulsory education.
- It is ensured that 2 to 3 out of the employer paid skill training and internship fees are met by the government.
- Students are insured against occupational accidents and diseases in the 10th, 11th and 12th grade by the government.
- All vocational and technical secondary education graduates are given the title of technician.
- Vocational schools have been removed from the transition without examination, replaced with additional points.
- 73 protocols signed with 84 institutions and organizations in cooperation with public / private institutions (associations, foundations and non - governmental organizations) are being implemented.
- 26 protocols were signed with the sector and vocational school teachers were provided with training in real operation environments.
- Protocols were signed with universities in 81 provinces to support the vocational and general knowledge teachers' professional development in their fields
- Giving the right to use professional orientation tests which currently belongs to the General Directorate of Employment Agency to the schools has reached the stage of completing preparations so that tests can be applied to the students.

SPAIN

Spanish cooperation between training centers and work centers

Types of programs and institutions

The Spanish Constitution establishes that public authorities have to promote the right to education and professional re-qualification. Two systems have been developed: One in the educational field (the regulated VET system which is based on the Ministry of Education, Culture and Sport and on the Autonomous Communities) and another in the labor market (the VET system is connected

to the Ministry of Employment and Social Security, which depends on the SEPE – State Public Employment Service – and the Autonomous Communities). Both share the same advisory bodies but their qualification governance and objectives, as well as their programs, are quite different.

The National Professional Qualifications Catalog (CNCP) occupational standards constitute the base for both systems' qualifications. Therefore, some of the parties may concede to a mutual recognition of the acquired training. They also share the regulatory procedures for recognizing the professional competences acquired through work experience and the implementation of the dual system. The training programs are modulated and always include compulsory training at the workplace, at the end or during the training period. Students need to pass all modules to obtain the degree. However, modularization allows for a partial recognition and subsequent re-engagement within a lifelong learning context.

Regarding the institutions involved, educational and labor authorities are mainly responsible for VET, while the National Vocational Evaluation and Training System is the benchmark of the training programs that lead to the formal qualifications these authorities accredit. The General VET Council is the government's advisory body on Vocational Training, being composed by representatives of the public national and regional administration authorities and social partners such as business organizations and trade unions. The interested parties have developed the occupational standards and have participated in the elaboration of the National Professional Qualifications Catalog (CNCP) which serves as a reference so that the educational and labor authorities can design the VET qualifications and programs in such a way that they can meet the needs of the labor market.

Program levels and duration

The qualifications of the regulated VET are accredited by the educational administration (VET degrees) and certify the trainees' educational level (secondary and tertiary), professional skills and competencies. The qualifications accredited by the labor administration (professionalism certificates) certify three levels of qualification and accredit the professional capacities and competences achieved in each one.

The educational VET system was reformed in 2013 with the LOMCE (Organic Law 8/2013, of December 9th, for the improvement of educational quality). As of the 2014/15 year, qualifications are offered in 3 levels. VET take two years (2,000 hours), in which a minimum of 20% of the time has to be spent training in a company and up to a maximum of 80% in the VET center. In general, 70% of the training time is based on work (workshops, laboratories, simulations or training in the company) and 30% on theoretical learning.

The educational reform also offers the opportunity to acquire initial CET degrees in a dual modality (with or without a work contract). In this case, the program can last for up to three years.

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The three levels are:

1. Basic VET

Valid since September 2014, these courses are aimed at students aged between 15 and 17 who have not been able to complete the compulsory secondary education, but have reached the 3rd year of CSE (in some cases, they can access after completing the 2nd year of CSE). This training (unlike the old PCPI) leads to a qualification with an academic and professional value and allows students who pass it to gain an intermediate VET degree.

2. Intermediate VET degree

One can access these studies after passing the CSE or by being in possession of a basic VET degree. Without an academic qualification, one can access it after passing the access test, although the candidate must be at least 17 years old, or have passed the specific training course to access these courses. With these studies, one obtains a technician qualification, being able to access educational formative superior degree or bachelor courses.

3. Superior VET degree

One needs to have obtained a Bachelor degree, or pass the corresponding entrance exam after having obtained the Intermediate Technical Degree. One can also pass a specific training course. These studies lead to a superior technical degree. Since 2011, Superior VET degrees fall under tertiary education in Spain, for which they are considered as higher education and are the first of the four levels of the Higher Education Qualifications Spanish Framework (MECES). The recognition of a certain number of European credits and their transfer and accumulation allows for the graduates of a Superior VET course to progress into university degrees within the same field.

In 2007, the educational administration began updating and revising the intermediate and higher degrees curricula, based on the competency units (UC) of the CNCP qualifications.

On the other hand, the Royal Decree 1529/2012, of November 8th, developed the training and learning contract and established the bases for the dual VET, showing that companies are firmly committed to participating, not only in the training design, but also in sharing the responsibility of the teaching and learning process. The development of these projects is implemented by the Autonomous Community with regulations tailored for each Autonomy. The number of students, training centers, and work centers has not stopped growing since the aforementioned Royal Decree was created.

The LOMCE defines the dual VET as the set of actions and training initiatives, mixed employment and training, which are aimed at the professional qualification of workers under an alternating regime of working in a company and the training received within the VET system framework for employment or the education system. The following will be considered as a dual VET: a) a training activity that inherently belongs to training and learning contracts and b) projects developed in the

educational system field. The idea is that, in co-responsibility with the companies, and with the objective of getting the people to obtain a professional qualification, the teaching and learning processes are harmonized between the educational centers and the work centers.

The aim of the training and apprenticeship contract is the professional qualification of the workers, in a regime that alternates paid work within a company, and the training activity received within the VET system framework for employment (Professionalism Certificates) or the educational system (VET Degree). This is an instrument designed to favor the employment of young people. The workers are required to: a) have no qualification for an internship contract and b) have an age of: between 16 and 25 years (under 30 years until the unemployment rate is below 15%) and without an age limit for people with disabilities, socially excluded groups in insertion companies and students that belong to School-Workshop, Employment-Training Workshops and Employment Training Programs. It must last for at least 1 year to a maximum of 3 years (Minimum 6 months by collective agreement) and the salary must not be lower than the Minimum Inter-professional Salary (SMI).

The working day will be distributed based on the following percentages: the first year 75% of work activity, 25% training activity; second year: 85% of work activity and 15% of training activity; and third year: 85% of work activity and 15% of training activity.

The worker's activities within the company must be related to their training activity. The objective of the training is for the worker to achieve their professional qualification. It can be an Intermediate or Superior VET degree or a professionalism certificate (of any level), it can also include complementary training included in the Training Specialties Catalog. The employment training system can be implemented face-to-face or through tele-training in the accredited/registered centers. The educational system may be taught face-to-face or in a distance learning mode.

The professional training initiatives for employment as set out in article 8 of the Law 30/2015 of September 9th, which regulates the VET employment system in the workplace, are:

- Training scheduled by companies for their workers.
- Competent administrations offering training for employed workers, constituted by the sectoral training programs and the transversal training programs, as well as the qualification and professional recognition programs.
- Training offered by the competent administrations for unemployed workers, which includes training programs aimed at covering the needs detected by public employment services, specific training programs and training programs with hiring commitments.
- In addition to other initiatives such as:
- Individual Training Permits (PIF).
- Training alternated with employment.

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- Training of public employees.
- Private training to obtain professionalism certificates.
- Training people in liberty deprivation situations.
- Training soldier or marine troops.

People over 16 can enroll in VET programs of various durations (250 to 1,150 hours) that lead to professionalism certificates. Access and duration requirements vary depending on the level of learning outcomes that have to be acquired.

The professionalism certificate is the official professional qualifications accreditation instrument of the National Professional Qualifications Catalog within the Labor Administration field that accredits training for the development of a work activity with employment significance. A professionalism certificate entails a professional profile which is understood as a set of professional competences that are identifiable in the productive system, and recognized and valued in the labor market. Professionalism certificates will have official status and professional validity throughout the national territory, accredit the corresponding professional qualifications to those who have obtained them, and are issued by the Public State Employment Service (SEPE) or, where appropriate, by the Autonomous Communities. There are three certificate levels: I, II and III.

Both certificates and VET require an internship in a company. These internships are compulsory and no degree will be achieved without them. Their objective is to practice everything that has been learned during theoretical training.

Within the company – training center collaboration, we can also find the internship contract. This is a contract that aims to help the worker obtain the professional practice that is appropriate to the level of studies they have completed. It is not only about acquiring experience for a specific job, but about using said experience on the studies taken. This contract can be entered upon by those who have a university degree or an intermediate or superior VET degree or any equivalent title, in accordance with the current educational system regulating laws, or a professionalism certificate, in accordance with the provisions of Organic Law 5/2002, of June 19th, on Vocational Evaluation and Training, which allow for internships. No more than five years may have elapsed, or seven if the contract involves a worker with a disability, since the completion of studies (if the worker is under 30 years, the date of completion of studies will not be taken into account).

These internship contracts are characterized by:

- formalizing them in writing, stating explicitly the worker's qualification, the duration of the contract and the position to be performed during the internship.
- communicating with the State Public Employment Service within 10 days of entering the contract, and its extensions.

- If it is a part-time contract, the number of ordinary hours of work per day, week, month or year and their distribution must be included.
- Its duration may not be of less than six months or exceed two years; within these limits, the sectorial Collective Agreements may determine the duration of the contract.
- The probationary period may not be longer than one month for workers who are in possession of a bachelor's degree or level 1 or 2 professionalism certificate, or two months for workers who are in possession of a higher degree or level 3 professional certificates, except under collective agreement.
- The worker's salary will be set in a collective agreement for trainees, without being less than 60% or 75% during the first or second year of validity of the contract respectively, of the salary fixed for a worker who performs the same or equivalent job. In no case shall the salary be less than the minimum inter-professional salary. If the workers are hired part-time, the salary will be reduced based on the agreed working day.
- Upon termination of the contract, the employer must issue a certificate for the worker stating the duration of the internship, the position or jobs occupied and the main tasks performed in each of them.
- No worker may be hired as an intern in the same or in a different company for more than two years under the same degree.
- If at the end of the contract the worker continues working in the company, a new trial period cannot be arranged, while the duration of the internship will be taken into account for the purposes of seniority within the company.

EQF Referencing process [10]

Spain is currently developing an NQF for lifelong learning (Marco Español de Cualificaciones, MECU), based on learning outcomes. Even though the NQF is ready and by additional legal regulations the link and coordination among different education and training subsystems is already in place, The framework is not yet operational. The Royal Decree on the introduction of MECU will establish the legal basis for its implementation but this has yet to come into force due to delays on approval at national parliament levels. The framework will include qualifications obtained in compulsory education, in post-secondary and higher education and will integrate validation of non-formal and informal learning processes.

This NQF defines levels and level descriptors as the basis for referencing the MECU to the EQF levels. It has been supervised and positively reported by the national advisory bodies.[11] It was expected to be adopted in 2013 and currently pending of approval.

The higher four levels of MECU will be linked to the qualifications framework for higher education (Marco Español de Cualificaciones para la Educación Superior, MECES), which has been put in place separately.[12]

10 Source: Analysis and overview of NQF developments in European countries Annual report 2012. CEDEFOP
11 Spanish qualifications framework. State-of- play. October 2012 [internal].
12 http://www.boe.es/boe/dias/2011/08/03/pdfs/BOE-A-2011-13317.pdf [accessed 5.12.2012].

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Student selection and location

All the training cycles' curricula always include a professional work centers training module (FCT), and passing them is an essential requirement for obtaining the degree.

The professional Work Centers Training module, according to the purposes included in the current legislation, has four objectives:

a) Completing the acquisition of professional skills based on each degree achieved in the educational center.

b) Acquiring a motivating identity and professional maturity for lifelong learning and to adapt to changes that generate new professional qualification needs.

c) Acquiring a complete knowledge of production, marketing, economic management and company social and labor relations systems, to facilitate their employment.

d) Evaluating the most relevant aspects of the professionalism the student reached in the educational center and a credit the aspects required during employment, which require real work situations to be verified.

The professional Work Centers Training module (FCT) is training, and not labor, focused and therefore does not involve a contractual relationship between the student and the company.

The students enrolled in the module that certifies a minimum work experience of one year can request the total or partial exemption of the professional Work Centers Training module (as long as the corresponding time coincides with a full working day), based on the training cycle they are currently enrolled in. Under Royal Decree, the work experience must guarantee that the student has achieved the learning results required by the professional Work Centers Training module they are enrolled in.

The documentation required to request said exemption shall be provided to the Center Secretariat of the center in which the student is enrolled, the request shall be addressed to the Center's Director before the FCT start date, the procedure and term will be specified by each educational administration, and finally, all documentation shall be delivered to the same VET center secretariat.

The following must be attached as general documentation, in addition to all the specific documentation requested or which the applicant may consider as necessary:

For salaried workers:

- Social Security General Treasury (Working Life), or Social Navy Institute Certification, or of the mutuality to which they were affiliated, stating the company, labor category (contribution group) and contract period, and
- Work Contract or company certification where they acquired the work experience, specifically stating the duration of the contract, the activity carried out and the time interval in which the activity was carried out.

For self-employed workers:

- Social Security General Treasury (Working Life), or Social Navy Institute Certification for the Social Security registration periods that correspond to their special regime and
- Description of the activity developed and the time interval in which it was carried out.
- For volunteer workers or scholarships:
- Certification of the organization where assistance was provided, specifying the activities and functions performed, the year in which they were carried out and the total number of hours dedicated to them.

The competent administrations will promote the establishment of an electronic communication system with the Social Security General Treasury for the transmission of this information. And the VET center director, in view of the evaluation report issued by the teaching staff for that training course, will resolve the request for the total or partial exemption of the professional FCT module, in accordance with Royal Decree 1147/2011, which established the general organization of professional training within the educational system as well as the corresponding autonomous regulatory development. The resolution, be it positive or negative, will be communicated in writing to the interested party before the start of the FCT module and will be included in the student's file, once the professional FCT module tutor has been duly informed. If the result is positive, they will state whether it is a total or partial exemption and, for the latter, the activities to be carried out.

The professional work centers training module must be completed once the positive evaluation has been achieved for all the professional modules carried out in the educational center. The tutor designated by the corresponding work center for the student's stay must collaborate with the educational center tutor to evaluate this professional module. Said professional module will be qualified as APPROVED or NOT APPROVED.

This professional training module will be carried out at the end of the training cycle and will represent 25% of this cycle's teaching time. The duration of the internship period, both for the intermediate and superior degree, will last for 400 hours as a general rule.

The daily schedule for the internship at the workplace shall be equal or similar to the company's working hours, usually between 700 and 2200 hours, and follow-up, periodic and mandatory meetings, will be held with the FCT tutor at the educational center.

Specialization courses (which complement the skills of those who already have a VET qualification and facilitate lifelong learning) may also, when deemed necessary, incorporate a professional Work Centers Training module (FCT) that will be adjusted to what is established for the VET courses FCT module.

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Regarding a dual VET and the selection of students, according to the study carried out by Fernando Marhuenda, María José Chisvert and Davinia Palomares-Montero 'Dual professional training in Spain. Considerations about the centers that implement it'[13] in most regions, students are selected to participate in the dual VET based on their good grades, similarly to what used to happen in the VET voluntary alternation system in the mid-eighties.

Regarding VET in the workplace, one of the main novelties of the professionalism certificate regulated by the RD 34/2008, of January 18th is that they include a Practical Training Module in Work Centers in their training schedule. The development of this module will comply with the provisions of Order ESS/1897/2013, of October 10th, in which the aforementioned Royal Decree is developed, which regulates the professionalism certificates, as well as the Royal Decrees, by which professionalism certificates dictated under their application are established.

In the professionalism certificates training actions, in which the practical work centers training module are developed once the other training modules have been completed, this module must begin less than four calendar months after the last training module has been completed. For certain professionalism certificates which, due to their nature, present difficulties with meeting the aforementioned deadline, an extension may be requested from the competent administration.

The following students are exempt from doing this module: a) Students belonging to training programs that alternate with employment, in the area that corresponds to their professionalism certificate, and those following the dual VET framework and, specifically, those who have a training and learning contract. b) Those who accredit a work experience of at least three months, with a minimum of 300 hours worked in total, within 5 years of applying for the exemption, and which corresponds to the capacities included in the aforementioned professionalism certificate module. This work experience shall be accredited with documents.

The practical work centers training module is conceived as the practical training acquired through the competences gained during the training activity within a real productive field. Therefore, this module is not linked to a single unit of competence (as is the case with the training modules), but to all the units of competencies defined for the professionalism certificate.

This practical training module must be programmed through training actions that are aimed at obtaining a complete certificate or when the training actions are aimed at completing the training schedule of a certificate that has previously been subjected to partial accreditations. The practical work centers training module linked to a certain professionalism certificate may be offered independently in the following cases:

- When participants come from the VET Employment Subsystem and have obtained the "approved" qualification in all their professionalism certificate training modules.

- When participants come from the educational system professional training without having passed the professional work centers training module, and who present the academic certificate that certifies them passing each specific professional module and their relationship with the accredited units of competence that make up the professionalism certificate.

13 FLUIXÁ, Fernando Marhuenda; TARAZONA, María José Chisvert; MONTERO, Davinia Palomares. La formación profesional dual en España: Consideraciones sobre los centros que la implementan. RIO: Revista Internacional de Organizaciones, 2016, no 17, p. 43-63.

The duration of the internship module is established in the professionalism certificate. The practical work centers training module will be carried out once the rest of the professionalism certificate training modules are completed, although they may be developed simultaneously with these, if the student has previous authorization from the Public Employment Services. This authorization will be resolved by the competent Public Employment Service.

Governance

In accordance with Royal Decree 1147/2011, of July 29th, which establishes the general professional educational system training organization, it will be the educational Authorities who will determine the time at which the professional work centers training module shall be completed, based on each training course's characteristics, seasonality, type of offer and training positions availability within the companies. In any case, the royal decrees that establish the VET qualifications may determine the professional modules that must at least have been passed to carry out the Work Centers Training module.

The FCT module regulation is developed by each educational Authority and just like the rest of the professional modules, it will be managed and organized by each educational center based on the Professional Family department schedule of the VET center and the competent Council's instructions for each Autonomous Community's Educational matters.

The duration of the professional Work Centers Training module, is determined in each training cycle's official curriculum. Internships are carried out throughout the school year, in the work center or in established work centers and except for exceptional situations, due to the professional family or other causes, school vacation periods must be excluded.

Calendars shall be agreed between the educational center tutors and the company tutors based on each professional profile's schedule and within the aforementioned periods. Within this period, the daily duration of a training day in the workplace must be equal or similar to the company's working hours, usually between 700 and 2200 hours, and follow-up periodic and mandatory meetings must be held with the FCT tutor from the educational center.

Within the VET titles we can differentiate:

- In the Basic VET Degrees, the duration of the professional Work Centers Training module will generally represent a minimum of 12% of the total duration of the training cycle, that is, 240 hours.

- In the Intermediate and Superior Degrees, adapted to the Organic Law of Education (LOE), the duration of the professional Work Centers Training module will always be 400 hours. The internships will take place in the first semester of the second school year, usually between March and June.

- In the training cycles, both for the Intermediate and Superior Degrees, according to LOGSE, with a duration of 1200 to 1400 hours, the practices will take place between September and December of the second academic year and in those of 2000 hours, the practices take place in the first semester of the second school year, generally between March and June. The duration usually ranges from 350 to 700 hours, depending on each title.

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In the training and apprenticeship contracts, participant companies must sign a training agreement with the training center and the worker (the student), which must be attached to their contract. Those responsible for the student's training in the training center and the company, as well as the characteristics and contents of the learning program, will also be specified in the agreement.

Regarding the practical work centers training module, it will be usually developed in a work center, although it can be developed in the training center itself, if authorized by the competent Administration, because one cannot complete it in work centers due to a lack of adequate centers or due to other duly justified reasons. Completion of this module will be articulated through agreements or contracts between the training centers and work centers.

Carrying out a practical work centers training module entails, on the side of the students, performing a series of professional activities that allow them to complete the professional competences they did not acquire during the training context. A workday will last for at least 4 and up to 6 hours and will be adjusted to the business hours of the company where they are working.

The practical work centers training module for the professionalism certificates, must be supervised by a tutor appointed by the training center and who belongs to the trainers or tutors-trainers who have taught the training modules of the corresponding professional certificate.

Regarding the training program, the practical work centers training module tutor will be responsible for planning the module's training program with the tutor designated by the company. When establishing the training program, the capacities, evaluation criteria and contents established by the professionalism certificate for this module will be considered. Said program must include observable and measurable evaluation criteria. The student's monitoring and evaluation will be performed jointly and documented by the training center tutor and the tutor appointed by the company.

Students who pass the practical training module will receive a certification signed by both tutors and the person in charge of the company, based on the module included in the current law, which will be necessary to certify said training by the competent labor administration to be able to request the corresponding professionalism certificate.

Financing

In regulated training, the professional Work Centers Training module has no work or scholarship relationship, students who do it receive no compensation and continue to be enrolled in regulated education and are not official workers of the workplace where they are performing their FCT.

According to the study cited above on "Dual professional training in Spain. Considerations about the centers that implement it" in Spain, there are six regions whose regulations foresee an economic compensation for the companies that participate in the dual VET system: Valencia, Castilla y León, Extremadura, Galicia, Murcia and the Basque Country; even though only four of them have a budget for it. Asturias is the only region that clearly forbids paying companies for their participation in the dual VET.

Regarding the training and apprenticeship contract, there are some incentives for the companies: a business fees reduction (100% for companies with less than 250 workers and 75% for companies with more than 250 workers) and training financing (bonuses in business fees for a number of hours and additional bonuses to finance the company's tutoring costs). As for the workers, their quota is reduced by 100%.

Training costs are financed through bonuses for Social Security business quotas.

Continuous training aimed at workers, employees or the unemployed, can be demanded for both direct training from the company and for individual training permits from formal qualifications and funded by social security bonuses. A continuous VET is also part of active employment policies, promoting people's re-qualification and competence improvement and programs, including professionalism certificates (although training for professionalism certificates is modular and training modules can be programmed, and even independent training units, and financed with the same grant as the one provided for the other training modules) based on the CNCP qualification standards. These training action offers are financed with grants.

They are financed mainly with resources acquired from professional training fees, which companies and workers contribute to Social Security (0.7% on the contribution base for common contingencies of which 0.6% are provided by the company and the remaining 0.1% by the worker). Other resources from the European Social Fund are added to this, as well as contributions made by the State through the Public State Employment Service Budget.

In accordance with Law 30/2015, which is responsible for regulating the VET system for employment in the workplace, the cash unit of the professional training quota and access to sufficient, stable and equitable financing for the entire VET employment system is a basic principle of the VET employment system, including any funding from said quotas that has a finalist nature. Any remainders of the credit destined to the professional training system for employment in the labor scope that could remain at the end of each exercise in the State Employment Public Service credit reserve will be incorporated to the credits that correspond to the following exercise, according to what is provided in the General State Budget Law for each year.

When the competent Public Administrations choose to apply the subsidy granting regime, these will be governed by the regulatory bases established by the Ministry of Employment and Social Security director.

These regulatory bases will be applicable to the different Public Administrations who are in charge of managing the professional employment training funds and will contemplate, in addition to the provisions contained in Law 30/2015, the regulation of, at least, the following aspects:

a) Requirements and obligations of the beneficiaries.

b) Requests.

c) Instructions on the concession procedure and collegiate body.

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d Criteria for granting and quantifying for the subsidy.

e) Economic modules, financing costs and imputation criteria.

f) Concession resolution.

g) Communication of the beginning and execution of the subsidized activity.

h) Justification and payment of the subsidy, including foreseeing the concession regime and justifying the subsidies through modules.

i) Application, selection and obligations of the participants.

j) Non-compliances and refunds.

Notwithstanding the foregoing, the competent Public Administrations may also apply a public procurement regime, or any other legal form, adjusted to Law, that guarantees publicity and concurrence, any provisions of said law with respect to the economic modules, as well as the other provisions gathered in the law related to the VET employment system's fund management, its monitoring and control, as well as the quality and evaluation of the training provided.

Any training initiative not financed with the public funds foreseen in Law 30/2015 may be addressed both by the training actions linked to professionalism certificates and to those aimed at obtaining key competences that allow access to said certificates' training. In these cases, authorization, monitoring and evaluation of these training actions will be carried out under the terms established in the regulatory development regulations for professionalism certificates.

Regarding the practical work centers training module, the competent Administrations may grant subsidies to the training centers or entities to finance the costs of the tutor's activity. The amount of this subsidy will be calculated by applying a specific maximum of 3 euros per student and hour of internship at the work centers. Granting this subsidy, except for the amount indicated, will be regulated in accordance with the provisions of Order TAS/718/2008, of March 7th, for the other training modules.

Distribution of tasks between the educational centers and work centers

The FCT is a practical training phase that takes place in the workplace, in the real environment of the company, and only once all professional modules of the training cycle have been passed.

The professional Work Centers Training module has the same structure as the other modules that make up the VET training courses (and passing them is mandatory to be able to obtain any VET degree).

The activities that students will carry out in their internship period will depend on the professional profile of the VET degree they are studying and which is included in a training program.

While Training in the Work Centers the student will not have an actual position and the student's activity will adjust to the training program established by the FCT tutor and the collaborating company, so that any repetitive tasks or tasks that do not correspond to the qualification profile associated with the corresponding Training Course will be avoided.

The responsibility of the teaching component of this professional module will lie with the faculty of the professional training specialty who is teaching the training course in the professional modules associated with the competency units that integrate it.

The student will be appointed an Educational Center Tutor and a Work Center Tutor who will previously define the training program to be carried out by the student, coordinate their development, set visit dates and evaluate their performance, issuing all appropriate reports. This professional module is developed within the company, and therefore the student will be able to observe and perform activities and functions from various job positions that pertain their professional profile and get to know how the productive or service processes and labor relations are organized, always remembering that the attending students continue to be students enrolled in regulated education. Therefore, all FCT students will be covered by a civil liability and accident insurance signed by each educational administration for this purpose.

Evaluating the FCT professional module will aim to determine if the student acquired the degree's general competence, by obtaining the expected learning results for the training module, which the teacher doing the monitoring will perform for each student.

The evaluation criteria will help prove, once the learning process is completed, if the student has reached the established professional competences.

The work centers training module may be evaluated in two parts, unlike all the other professional modules that make up the degree, which will be evaluated in four parts.

Regarding the dual VET, in all regions, the only responsibility of the educational center teachers is to evaluate. Except in Aragón, where the company's instructor has to write a report on the tasks the student performed, which the faculty can then take into account. The Dual VET student may not carry out the FCT module in Galicia, Aragón and the Canary Islands, while in the Basque Country and Valencia the contract can last for more than a year, as well as in Castilla-La Mancha, where the FCT is validated within the dual VET system.

According to the aforementioned study by Fernado Maruhenda on the dual VET, there is a certain reluctance from companies to evaluate the student's learning, including on their ability to perform in the organization and on the way in which the instructor is selected. More than 50% of the dual VET teachers consider that there are several differences in the evaluation, methodology and contents of the training program.

Quality of control in the workplace should be a factor in the implementation of the dual VET. The aforementioned study states that at least two-thirds of the faculty consider it appropriate, and very

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relevant to the FCT. However, 15.5% of teachers stress the lack of control in the dual VET, slightly above the values that correspond to the FCT. It is surprising that part of the faculty notices that there is no clear attempt for introducing indicators to control and improve the quality of such a new and complex program as the dual VET. If attention is paid to the companies participation' in the dual VET, it is worth noting that even though the professional administration area is the broadest of the dual VET, it is private companies, rather than the public administration companies, who participate in the dual VET. In addition, some sectors such as health and education, in which despite the fact that public administration is the main employer, have various difficulties, exposed by public administrations, with getting involved in the dual VET.

Regarding the Practical Work Centers Training Module, it will be necessary to designate two tutors: one by the corresponding company and another by the training center, who belongs to the teaching staff of the professionalism certificate.

The people in charge of tutoring will have the following functions:

Training center tutor:

- Agree on a training program with the company.
- Carry out, along with the tutor appointed by the company, the students' follow-up and evaluation.

Company tutor:

- Direct the students' formative activities at the work center.
- Guide students throughout their internship period at the company.
- Assess the students' progress and evaluate them along with the training center tutor.

In accordance with the Royal Decree 694/2017 of July 3rd, under which the law that regulates the professional training system for employment in the workplace was developed, it should be considered that training entities will need to adopt any measures necessary for protecting the participants from any risk that may arise from performing the training actions from their beginning to their completion. Said measures must cover the theoretical-practical training period, as well as the movement of said participants to any other company or establishment to support the development of the training actions. If the aforementioned training entities acquire an accident insurance policy for the participants following the training or practical training module linked to the professionalism certificates, or the internships at the companies, said policy may also include civil liability towards third parties, in order to cover any damages that may occur during the participants' training. A group insurance policy may also be chosen, under the aforementioned indications, to cover all the students of the approved project.

Procedures

For the Work Centers Training, the usual procedure will be:

- Signing an Agreement between the Teaching Center and the Company. This document will contain the company and the Educational center's information. Signed by the Teaching Center Director and the company's legal representative.
- Selection of the students to be incorporated, following the method that the Teaching Center and company may select (either through personal interviews, by sending a curriculum...)
- Preparation of a list of students to be incorporated and other legal aspects, before the internships commence, which shall be signed and sealed.
- Elaboration of a Training Plan in which the activities that the students will perform as well as the follow-up that will take place will be detailed and temporized.
- At the end of the period, the student will be qualified as approved or not.
- Likewise, meetings must be held between the tutor appointed by the company and the educational center tutor.

When considering how to organize a dual VET, most regions accept the possibility of providing a dual VET without signing a contract with the student. Three regions require a contract for participating in a dual VET in their regional laws: Aragón, Castilla y León and Baleares. Most other regions accept a scholarship instead of a contract or, even, validate that the student will not receive any kind of payment.

In the employment VET field, and in accordance with Royal Decree 694/2017, any training aimed at obtaining professionalism certificates shall be accredited by issuing the corresponding professionalism certificate or its cumulative partial accreditations. To this end, accredited training entities, in order to provide professionalism certificates, will provide participants with the necessary information and documentation so that, if all the modules corresponding to a professional certificate are passed, these will be issued by the competent Public Administration. The same will be followed so that any participant who doesn't pass all the modules associated with the professionalism certificate and the modules associated with one or several of its competence units, receive a certification of the modules they did pass, which can be used for the cumulative partial accreditation of the professional competences acquired.

Professionalism certificates and, where appropriate, cumulative partial accreditations will be included in the corresponding regulated registries of the Royal Decree 34/2008, of January 18th. Likewise, professionalism certificates and, where appropriate, cumulative partial accreditations will be reflected in the worker's Training Account.

If training is not aimed at obtaining professionalism certificates, a diploma must be given to each participant who has passed the training with a positive evaluation, at least stating the training

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action, the training contents, the mode of delivery, action duration and period of delivery. Also, any participant who did not complete the training with a positive evaluation will receive a certificate of attendance.

The certificate of attendance or, where appropriate, the diploma must be delivered or sent, or made available on the online platforms, by the entity responsible for imparting the training to the participants within a maximum period of two months from of the date of completion of the formative action in which they participated.

Regarding the Practical Work Centers Training Module, all activities to be developed will be included in the so-called Activities and Evaluation Training Plan, where everything related to training and evaluation will be recorded. The Plan must specify:

- What to evaluate,
- The competences to be developed during the internship,
- The different activities to be carried out, scheduled on time and specified throughout training positions and methods of implementation and activities.
- The observable and measurable evaluation criteria
- The indicators to measure the level achieved by the students during the internship.

The person in charge of teaching the module at the training center will be responsible for agreeing on a training program with the company and performing the students' monitoring and evaluation along with the tutor appointed by the company.

Students who pass this module will receive a certification signed by both tutors to be able to request the corresponding professionalism certificate.

Parties' visions and expectations

Considerations about the centers that implement it' is that the General Law of Education, approved in 1970, established a professional training with a compensatory educational character to benefit groups that were about to leave the educational system. This circumstance delegitimized the value of this degree in the collective imagination. Since the mid-1980s, a consensus has increased in Spain on the importance of VET and the need to improve its quality. This consensus is based on a different principle: training in companies. Only in 1984, when the first VET students, before completing their training, began to gain work experience in real companies, did the VET begin to acquire a certain prestige, began to appreciate the training and quality of work of the student body. The dual VET seems to be useful in countries such as Germany, Austria, Switzerland or Denmark, that is, where the economy develops under stable and growing conditions. It is harder to complete a dual VET when there is no economic growth, while VET systems that have a more limited participation from companies in the learning processes seem to respond better to economic crises. In 2012, Spain was still undergoing the financial crisis that began in 2007, and it is still in force, with high unemployment levels, especially among young people.

Different agents (the European Union, trade unions, and international corporations) state that educational and practical training in companies are key VET factors for combating youth unemployment. Surprisingly, these groups do not address the fact that the ordinary VET system includes practical training in companies

as an obligatory part of the training process for all students since 1993. They argue that the dual VET will cause a change by getting more students hired. On this regard, examples can be found in the European Alliance for Promoting Learning, which is supported by the European Trade Union Confederation (2014). Institutions such as the European Union, Bertelsmann or chambers of commerce have also supported the idea of promoting practical training in companies, considering that the best and only option is the dual VET, as is in German-speaking countries. Perhaps the efforts made by the BundesInstitut für Berufsbildung have also played a role in this matter. This institution, funded by the German Government chambers of commerce, sent delegations to export the values of the dual VET to countries as varied as China, Canada, Mexico, Costa Rica or Spain. This practice has been criticized due to the enormous difficulties involved in transferring educational systems to other contexts. A particular modality of these efforts is the offer of a German dual VET system for young Spaniards – even if they already have a VET qualification or a university degree – to fill vacant learning positions in German internships. Thus contributing to the reduction of unemployment among the Spanish youth.

The desire to improve professional education as a means to reduce youth unemployment by introducing the dual VET is one of the main reasons for creating the decree that regulates apprenticeships and dual VET, which was approved in late 2012. However, the Government and the employment administrations have not made any effort to carry out an appropriate follow-up on the impact this measure has had on the number of youth contracts. No evaluation has been carried out on how many jobs were rescued or generated thanks to the apprenticeship contracts or in which regions or professional areas they occurred.

A first conclusion is that the implementation of the dual VET does not correspond to the most demanded occupations. In fact, companies not only do not offer jobs in these areas, they also do not offer apprenticeship contracts for young people under the dual VET system, given that in many cases companies consider these as an opportunity to reduce personnel costs. There is no teaching-learning relationship and the employability increase that this decree proclaims as its greatest benefit is not real either.

The dual FP provides a broader period of work experience within companies. Work experience in companies was regulated in Spain in 1974 and was applied firstly applied in 1983-1984 as a voluntary module – then called alternation training – which became mandatory for all VET students in 1990 – when it received the name of FCT. To benefit from the FCT, students had to have had previously passed other subjects, so alternation became impossible.

According to the study 'Dual professional training in Spain, considerations about the centers that implement it' if the tools used to evaluate learning are taken into account, at least two-thirds are based on memories while at the workplace, while only 58.1% are based on performance observations. Only a fourth perform a final evaluation, that is, actual competence learning is not verified. There is hardly any attitude assessment (24.3%), self-assessment (14.3%) or portfolio (7.4%), which would be relevant elements for evaluating learning in real work environments.

The process of implementing the dual VET has been irregular and has not been normalized, which has also caused confusion among the companies invited to participate. The deregulation of the labor market – more than 30 reforms in the last 40 years – now seems to be accompanied by the deregulation of the professional education system, to which both the basic and dual VET have contributed.

It can not be forgotten that the VET has been one of the greatest areas of pedagogical innovation in the last 20 years in Spain and, therefore, teachers are prepared to be part of the experimentation and modify their traditional practices, as they have frequently done in the past. While in the other levels of the educational system, reforms have mainly focused on the curriculum, in the VET, the educational services' organization has been constantly changed, to search for improvement and innovation.

Replacing the current training system with a dual one, even though the Ministry of Education announced it in its political projects, does not seem possible: the main political parties and social agents have negotiated and agreed on the Spanish VET system for a long time, for which there are no demands for change, and therefore, no support for the creation of a dual VET.

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Work experience is a good general motivation, no matter what training system is followed, be it the FCT or the Dual. The normative VET regulation attempts to act on three areas. The main one is, without a doubt, improving young people's employability. The second, in order of relevance, is improving the VET's quality. And lastly is the improvement of the labor market.

Another question that must be answered is whether the learning model can vary without having to change the pedagogical foundations that support it. Of course, this will not be possible if greater company participation is not taken into account, something that has not been considered until now in the process of implementing the dual VET. Perhaps this question is related to the scarce learning and education culture, which has not been sufficiently integrated into the entrepreneurial spirit promoted in the country.

Its implementation has been rushed and accelerated, forgetting to plan and monitor its control measurements. All this has decreased the process's quality and has caused confusion and pressure among VET students, companies, social agents, and families, as well as inequalities among the students involved within the same professional training system. Acting on behalf of the companies, without taking them into account, while sending them teaching staff to promote an idea that should have come from the companies themselves and not from the Administration has been particularly worrying. The administrations did not listen to the companies' demands, their suggestions or requirements, and the system was launched without their agreement; a flexible system, of course, but a very confusing one, due to the lack of definition and enormous deregulation in the state legislation. A dual VET without a private initiative, and without counting on the company, cannot be universalized.

The current VET policy, which emerged in response to the increased youth unemployment of recent years, focuses on reducing early education and VET abandonment; improving the population's qualification levels and employability; implementing the dual system (apprenticeship training); implementing tele-training (e-learning) and appropriate evaluation and quality control procedures; evaluating the VET system to improve its quality and efficiency; improving the attractiveness of VET qualifications and maintaining their suitability in the labor market; developing an integrated national qualifications framework and improving the implementation of European instruments and principles to promote mobility and lifelong learning.

The 2013 educational reform seeks to respond to the students' various motivations and encourage them to progress in their qualifications, by introducing flexible itineraries in upper secondary education and VET programs. The purpose of the new two-year basic VET degrees is to offer young people who are at risk of leaving compulsory secondary education, the necessary skills to not only get a job, but also to continue their studies by accessing the intermediate degree VET and improve their employability.

The VET is also one of the implementation pillars of the 2013-2016 Entrepreneurship and Youth Employment Strategy. Different short-term measures are being implemented at the regional and national level. The quality and efficiency of continuous training financed with public funds are to be guaranteed by a training providers accreditation system, especially for the development of formal qualifications. Monitoring training actions, including the transition to the labor market, seeks to support the efficiency of employment training. Social agents and autonomous authorities participate to ensure the quality of a continuous professional training.

GERMANY

Introduction

The german VET System has a wide-spread structure which enables learner to identify a learning pathway which fits exactly to their individual needs on the one hand, but which matches to the needs of the labour market on the other hand.[14]

14 Hippach-Schneider, U.; Huismann, A. (2016). Vocational education and training in Europe – Germany. Cedefop

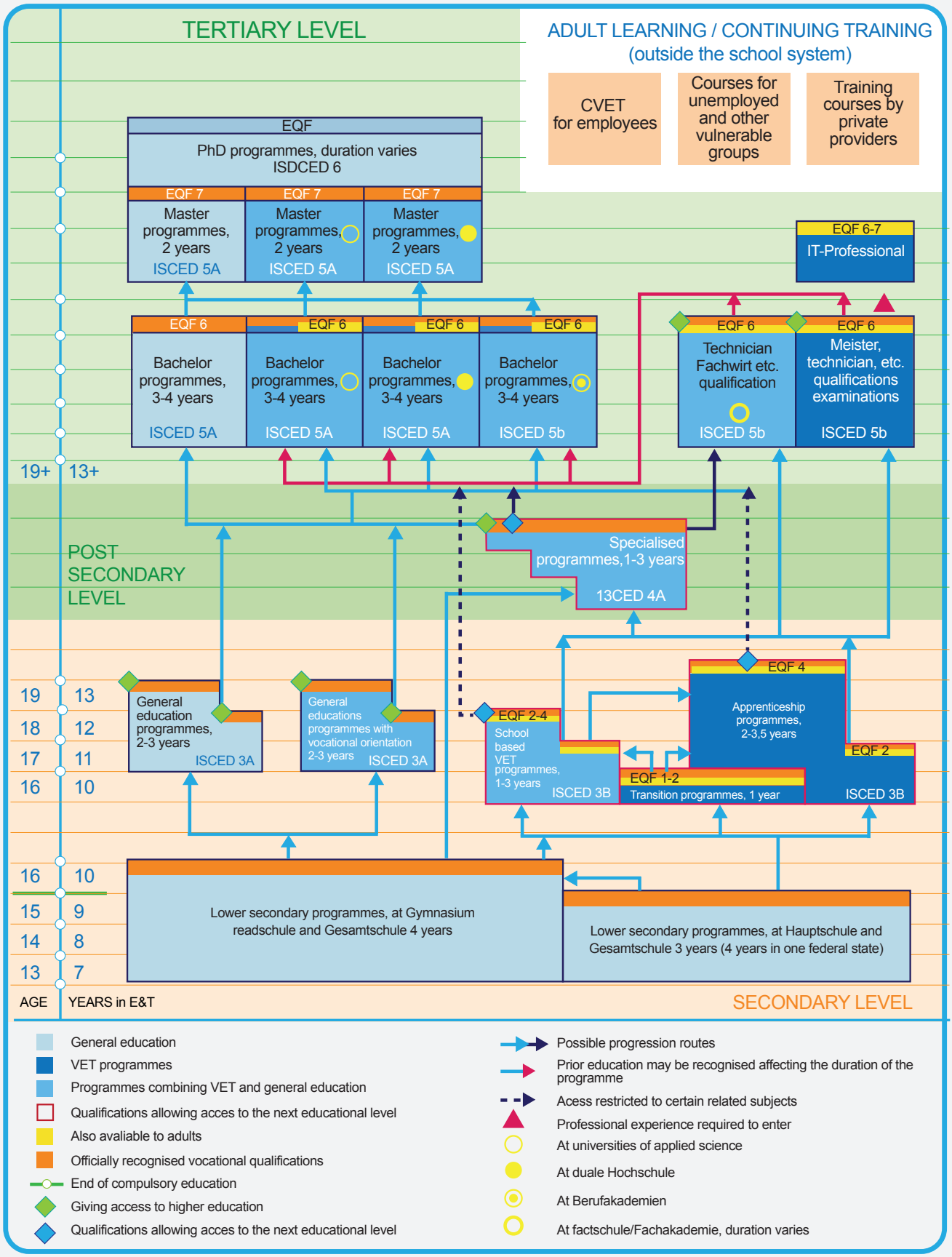

Figure 5: VET in German Education and Training Systems

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As Germany is a Federal State within this structure, there are lot of different pathways due to the regulations of the federal states in Germany. The area of general education is only regulated by the "Bundesländer" (federal states) on their own responsibility due to the "Grundgesetz" (basic law). In the VET-System the school-based part is regulated by the federal states as well, but the company-based training is regulated by a national law in close cooperation of ministry of education and commerce.

Based on this legal framework there is an old tradition of cooperation between the social partners to act in different areas on behalf of the government.

Allthough Germany is famous for his dual system the role of the dual system became weaker and weaker in the last years. Having in mind one set of ages 50 % (400.000) of them leave the school with the German Abitur, the entrance level to the higher education at the university. More or less the same number of young people starts an education in the Vet system.

Type of programs

The entrance level of the vet-system in Germany is, as a minimum, the successful examination of the "Hauptschule" with the age of 15/16 or "Gesamtschule/Realschule" with the age of 16/17.

Vocational education is given in Germany for both the employees of member businesses of **DEKRA** and the unemployed people in Germany.

a. Vocational education for the unemployed people is given in metal, transportation, electronics, storage, and health sectors.

b. Expert trainings/courses; apprentice training from 3 months to 2 years for occupational safety, storage, carriage of dangerous goods, waste management, high voltage technology, electronic fire protection sectors and for the drivers of forklift and truck.

The german Vet-system is based on three different pillars:

- School-based programs
- Company and school based programs (dual system)
- Transition area

Within this system nearly 30% of the students are part of the dual system, which is mainly represented in traditional qualifications in industry and craft. In some areas like digital qualification, education or health care there only. Due to serious problems at the labour market more or less 30% of the students are in a kind of transition period. This means that they not formally qualified for the VET system or, didn't find a company for the dual education. They are supported and qualified in the vet schools as a preparation for the dual education.

In Germany the "Deutscher Qualifikationsrahmen" adopted in 2011 the European Qualification Framework as a result of discussions with the stakeholders and the governmental institutions.[15] Germany decided to adopt the descriptors to the german tradition by adding one definition:

Level indicator			
Structure of requirements			
Professional competence		Personal competence	
Knowledge	Skills	Social competence	Autonomy
Depth and breadth	Instrumental and systematic skills, judgment	Team/leadership skills, involvement and communication	Autonomous responsibility/ responsibility, reflectiveness and learning competence

Table 2: Level Indicator in DQR[16]

But the DQR corresponds very close to the same eight levels of the European Qualification Framework:

Level 4			
Be in possession of competence for the autonomous planning and processing of technical tasks assigned within a comprehensive field of study or field of occupational activity subject to charge.			
Professional competence		Personal competence	
Knowledge	Skills	Social competence	Autonomy
Be in possession of deeper general knowledge or theoretical professional knowledge within a field of study or field of occupational activity.	Be in passion of broad spectrum of cognitive and practical skills which facilitate autonomous preparation of tasks and problem solving and the evaluation of work results and processes according consideration to alternative courses of action and reciprocal effects with neighboring areas/ provide transfers of methods and solutions.	Help shape the work within a group and the learning or working environment of such a group and offer ongoing support/ justify processes and results. Provide comprehensive communication on facts and circumstances.	Set own learning and work objectives, reflect on and assess such objectives and take responsibility for them.

Table 3: Definition of level 4 in EQF[17]

15 https://www.dqr.de/media/content/The_German_Qualifications_Framework_for_Lifelong_Learning.pdf
16 3 https://www.dqr.de/media/content/The_German_Qualifications_Framework_for_Lifelong_Learning.pdf, p. 13
17 4 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:111:0001:0007:EN:PDF; Annex II

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	Knowledge	Skills	Competence
	In the content of EQF, knowledge is described as theoretical and/or factual	In the content of EFQ, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instrument)	In the content of EFQ, competence is described in terms of responsibility and autonomy
Level 1 The learning outcomes relevant to level 1 are	basic general knowledge	basic skills required to carry out simple tasks	work or study under direct supervision in a structured context
Level 2 The learning outcomes relevant to level 2 are	basic factual knowledge of a field of work or study	basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools	work or study under direct supervision with some autonomy
Level 3 The learning outcomes relevant to level 3 are	knowledge of facts, principals, processes and general concepts, in a field of work or study	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information	take responsibility for completion of tasks in work or study adapt own behaviour to circumstances in solving problems
Level 4 The learning outcomes relevant to level 4 are	factual and theoretical knowledge in broad contexts within a field of work or study	A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	exercise self-management within the guidelines of work or study contexts that are usually predictable, but are subject to change supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities

Table 4: Definitions of level 1 – 4

The German Referencing team decided not to allocate qualifications directly to the levels, but to identify type of qualifications to German Qualification framework As the level 6- 8 correspond directly to the framework of higher education the allocation is based on this simple scheme:

DQR/ EFQ level	Qualifications
1	**Vocational training preparation [berufsausbildungsvorbereitung]** • **Employment agency measures (vocational preparation schemes) [Maßnahmen der Arbeitsagentur (Berufsvorbereitende BildungsmaBnahmen-Bvb)]** • **Pre-vocational Training Year [berufsvorbereitungsjahr (BVJ)]**
2	**Vocational training prepration [berufsausbildungsvorbereitung]** • **Employment agency measures [Mabnahmen der arbeitsagentur]** • **Year of pre-vocational training [berufsvorbereitungsjahr (BVJ)]** • **Introductory training for young people (Einstiegsqualifizierung.EQ)** **Berufsfachschule [full-time vocational school] (Basic Vocational Training [Berufliche Grundbildung])**

Table 5: Level 1 + 2: Preparation of vocational training

These are qualification with a weak relation to companies, although they have a kind of internship included.

3	**Dual vocational education and training (2-year training courses)** **Berufsfachschule (Mittler Schulabschluss) [full-time vocational school] (general education school leaving certificate obtained on completion of grade 10 at Realschule or, under certain circumstances, at other lower secondary school types)**
4	**Dual vocational education and training (three-year and three-year-and-a-half-year training courses** **Berufsfachschule [full-time vocational school (assistant occupations)** **Berufsfachschule [full-time vocational school (full vocational qualifications)**

Table 6: Level 1 + 2: Preparation of vocational training

The 2-year training courses are adressed to students, who probably are not able to pass the examination on the higher level due to learning limitations. The majority of qualifications in the dual system (nearly 400) is allocated to level 4.

The majority of apprentices in Germany still go for one the nearly 400 occupation within the "Dual System". Although there are a lot of deflections according the needs of the sector or the company the core elements of the system are still valid[18]:

Figure 6: Two Coorninated Learning Venues for each VET Programme and Dual VET Training Plan for a Given Occupation

The qualifications typically lasts three years and every year covers 480 hours in schools and 1280 hours in the company:

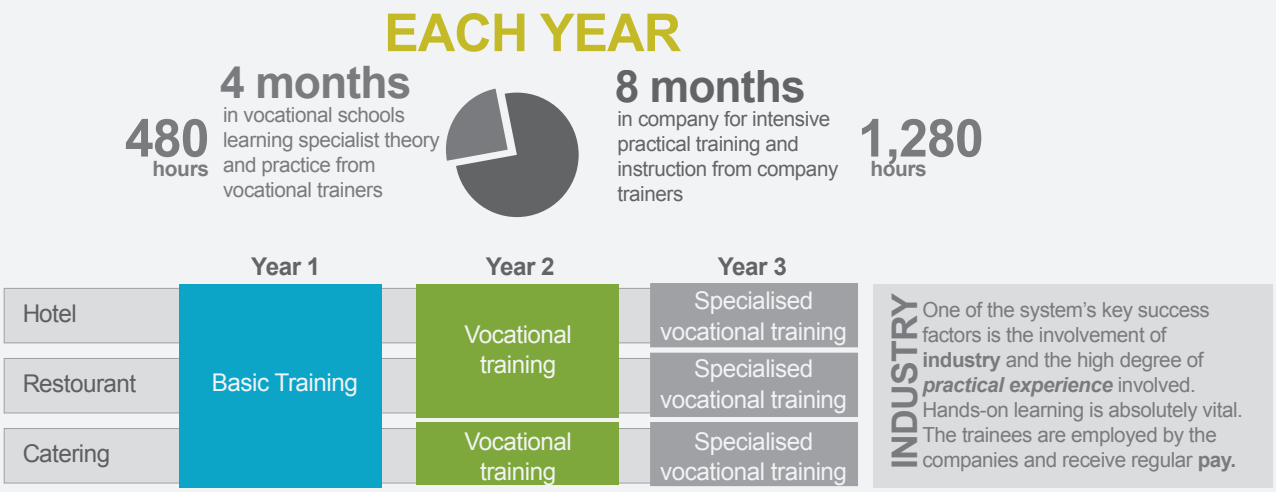

Figure 7: The Sysyem of School – Enterprise Cooperation for a Year

The success of the dual system is based on a close cooperation between schools and companies.

18 https://www.bibb.de/govet/de/5487

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Types of institutions in VET

The core institutions in the German VET-System are companies and schools. The majority of schools are public, but due to traditions and needs of the labor market there are some private driven schools, which are recognized by the government. According the most important law for VET the social partners act as competent bodies for a lot of tasks within the vet-systems. They are support by the governmental research institut, the “BIBB”.

There is a shared responsibility within these institutions:

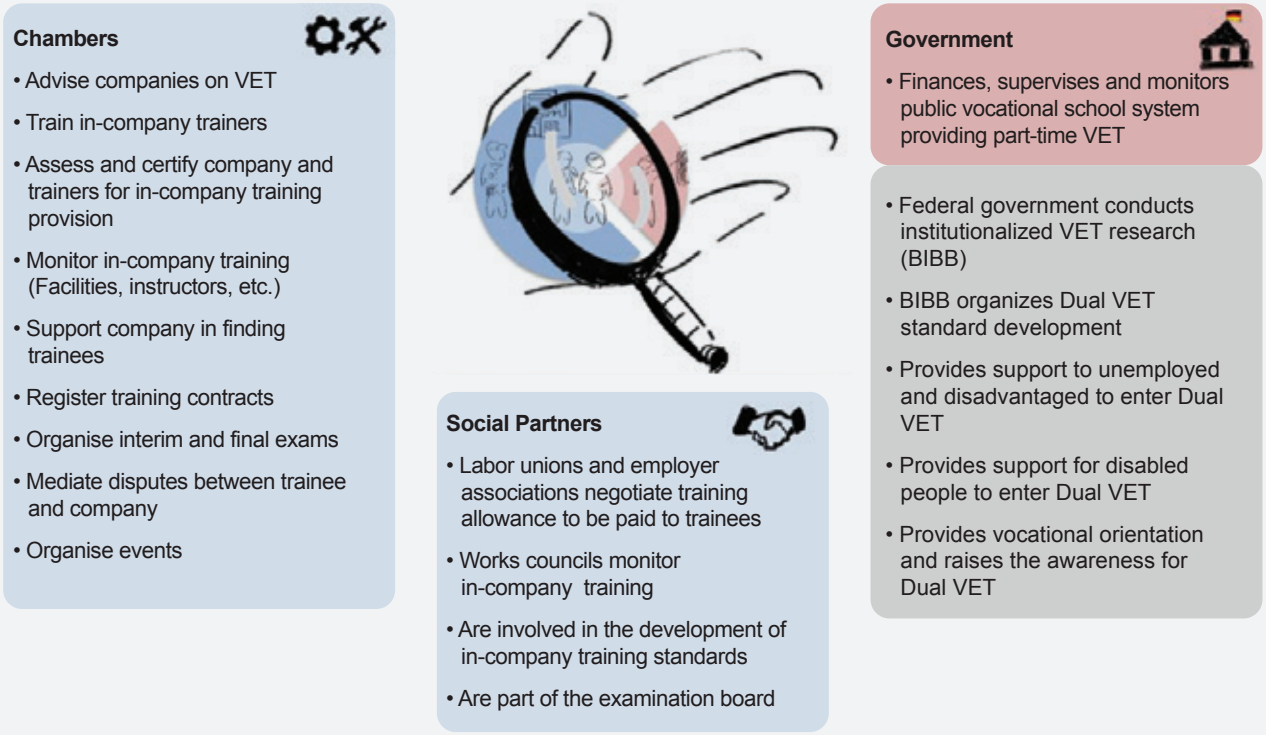

Figure 8: The Responsibilities of the Institutions

The role of the central government

The federal government is responsible for designing the dual system content for the occupations it has recognized. The nationally binding recognition of the training occupations ensures the basic principles agreed with industry and the states are taken into account, and that training for a recognized occupation adheres to the regulations adopted by the federal government. The federal government´s responsibilities are not limited to implementing joint agreements; it also takes independent measures to promote dual training.

The role of state government

According to the Constitution, responsibilities for school education lies with the state ministries of education and cultural affairs. Their ministries participate in a standing committee to ensure a certain degree of uniformity and comparability, especially in school and higher education policies. The committees decisions are only recommendations, and only some legally binding when passed by the individual state parliaments. The states have vocational state committees, with equal representation of employers, employees and the highest state authorities. They advise the state governments on vocational training issues in schools and also contribute to designing schemes that support disadvantaged youths and provide opportunities for additional qualifications the require school-based training.

The role of social partners

Employer and employee representatives play an important role at the national, state and regional/ local, sectoral and enterprise levels. These representatives are members of most important scientific institution on behalf of the central government "BiBB". Work on training regulations and framework curricula is an ongoing process by the social partners. Mainly the employers and employees are represented by the Chambers of craft or industry. Training advisers from the chambers verify the capacity of companies and ability of trainers to train and advise both companies and apprentices. They receive training contracts, check, register and monitor them and provide counselling services.

Selection and placement of students

The German dual system is based on the concept of qualifications ("Beruf"). Every qualification has a legal framework ("Ausbildungsordnung"), which is recognized by the social partners but legally published by the government. In 2017 in there are 328 qualifications regulated in published.[19] These qualifications usually are more or less well known. Within the Agency of Labor there is a special department for explaining and even demonstrating the qualifications.

They even come to schools of general education to consult the pupils.

The dual qualification is based on a contract for two or three years between employer and student. It is a kind of protected labor contract. This requires that the students have to apply for a contract and to pass a kind of assessment procedure. The application procedures usually starts at the beginning of the year and the apprenticeship starts first of September. For some of the popular qualifications the selection procedure starts one year in advance. The companies usually analyze their demand in the next years and decide about the types of qualifications they offer and the number of students they will accept. If a company refuses a student, he has to apply for another company. That's why students typically apply for a lot of companies. There is no guarantee for the applicant to sign a labor contract in his most preferred qualification or company!

19 Liste der Ausbildungsberufe 2017, BiBB 2017

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The selection criteria are only defined by the company!

On the other hand, a lot of companies are bothering about low qualified applicants. Those applicants who fail in this matching procedure will be supported in the transition system until they will succeed.

Governance

Basic regulations

The Basic Law (Grundgesetz) regulates the distributed responsibilities for VET in Germany. The details are described in the Vocational Training Act (BBiG). One of the core elements is the regulation of occupations (Section 4). Apprenticeship schemes in the dual system are limited to a recognized occupation: "Young people under the age of 18 may not receive initial training in occupations other than recognized training occupations unless such initial training prepares them for advanced qualification pathways".[20] These regulations guarantee a national standard. The federal government is responsible for designing the dual system training content for the occupations it has recognized.

Furthermore the law regulates:

1. The initial training regulations shall specify
2. The designation of the training occupation to be recognized;
3. The duration of initial training, which shall not be more than three or shorter than two years;
4. The vocational skills, knowledge and qualifications to at least be imparted in the course of initial training (training occupation profile);
5. An outline of the syllabus and timetable to be followed when imparting the vocational skills, knowledge and qualifications (overall training plan);
6. The examination requirements

Employer and Employee representatives play an important role at the national, state, sectoral and enterprise level. Employers and unions play an important role initiating new or updating existing occupations. According quoted law the Chambers of Commerce or Crafts act as a "competent body", which means they act on behalf of the government in their own responsibility. Training supervisors from the chambers verify the capacity of companies and ability of trainers to train and advise both companies and apprentices. They are in charge of documentation for the training contracts. They receive all training contracts, check, register and monitor them and provide counselling services. The chambers organize the examinations supported by staff from the trade unions, companies

20 Vocational Training Act Berufsbildungsgesetz (BBiG) of 23 March 2005 (Federal Law Gazette [BGBl.], Part I, p. 931)

and teachers and trainers. For this purpose they establish examination committees. Finally the certificate is issued by the chamber.

The content of the training is realized by companies and schools. Usually the apprentices go to school for two days the week and to the company for three days. Due to the occupation and the number of apprentice this might by organized as blocks: 2 months school, three months company. Based on the national law every federal state regulates the content of the subjects in terms of knowledge, skills and competences on their own. For the period of training in the company there is only a framework defining the main content for each year of qualification. The companies is free to decide about the duration and sequencing.

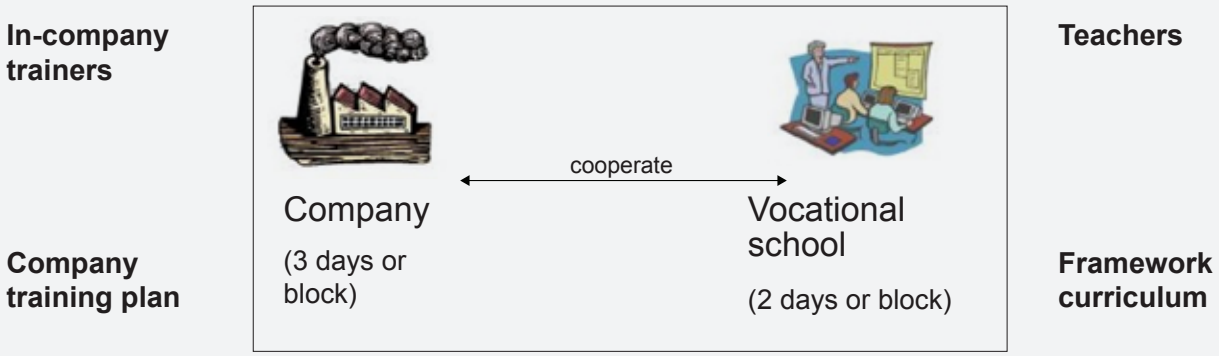

Figure 9: The Content of the Training Realized by Companies and Schools

The law defines minimum requirements for the staff dealing with the apprentices:

"(1) Trainees may only be engaged by training employers who have the necessary personal qualifications. Trainees may only be trained by persons who have the necessary personal and technical qualifications." The trainer have to pass a final examination in a technical field corresponding to the training occupation and they have to pass an additional examination related to the specifics of the dual education ("Ausbildereignungsverordnung"). This examination is organized by the chambers. Typically the preparation course has a duration of more or less 100 hours. This is the main content:

In Germany, according to legislation, the responsible trainers should have necessary vocational qualifications and educational qualifications according to the Ordinance (regulation) on trainer aptitude (AEVO), which is acquired through an examination. AEVO is a minimum requirement and is supported by enterprises too.

Fields of activity and associated competences

1. Assessing vocational training requirements and plan training:

a) present and justify the advantages of in-company vocational training;

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b) participate in training planning activities and decisions, respecting the company's training needs and the legislative background, collective agreements and operational conditions;

c) present structures of the VET system and its interfaces;

d) choose the occupations to be trained by the company and justify the choice;

e) assess the company's suitability for providing IVET for the selected occupation and assess whether and to what extent the training content can be taught outside the training company, particularly as collaborative vocational training, inter-company vocational training or externally;

f) assess possibilities of using preparatory measures for the individual;

g) coordinate the tasks and responsibilities in the company of the persons who participate in conducting training, taking into account their functions and qualifications.

2. Preparing training and participating in trainees' recruitment:

a) develop company's training plans based on training regulations for the particular occupation, geared to work and business processes typical of that occupation;

b) take into account possibilities of involving employees' representatives regarding provision of IVET;

c) determine the need for cooperation in coordinating content and organisation of training with other institutions, particularly with part-time vocational schools;

d) apply criteria and procedures for selection of trainees, taking into account their heterogeneity;

e) prepare training contracts and arrange to have the signed contracts registered with the competent body;

f) examine possibilities for conducting parts of the training abroad.

3. Conducting training:

a) establish learning-conducive conditions and a motivating learning culture, give and receive feedback;

b) organise, structure and evaluate the probationary period;

c) develop and structure operational learning and work assignments based on the company's training plan and work and business processes typical of the occupation;

d) select training methods and materials appropriate for the target group and use them according to the respective situation;

e) assist trainees with learning difficulties by individualising their training and through guidance, when necessary use aids that support training and examine a possibility of extending the period of training;

f) offer trainees additional training options, particularly for additional qualifications, and examine a possibility of shortening duration of training and early admission to the final examination;

g) foster trainees' social and personal development, identify problems and conflicts in a timely manner and work towards a solution;

h) determine and assess trainee performance, evaluate performance assessments issued by third parties and examination results, conduct appraisal interviews, draw conclusions for the remainder of the training;

i) foster intercultural skills.

4. Concluding training:

a) prepare trainees for the final examination or journeyman's examination according to examination dates and bring the trainee's training to a successful conclusion;

b) ensure that trainees are registered with the competent body for the examinations and indicate to the competent body any particularities relevant to conducting the examination;

c) help prepare a written letter of reference based on the trainee's performance assessments;

d) inform and advise trainees on development and career paths and possibilities for CVET.

Division of tasks between schools and enterprises

There is no regulated cooperation between schools and companies. All institutions have their own fixed regulation.

The schools offer training for 480 hours per year, splitted in 160 hours in general subjects and 320 hours in specific subjects. The teachers are public servants in full-time jobs. They have finished a qualification in the occupation they teach and a qualification at the university. The content of the training is regulated on a state level. Twice per year there is a meeting of few hours between the teachers and the representatives of the companies per group in the school.

The companies are obliged to give the apprentices the opportunity to attend the school regularly. The in-company-training is based on a state regulation in terms of content. But they are flexible in terms of duration and section of rotations.

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Financing

The governments on national and state level share the expenditures with the enterprises.

For the whole period of the apprenticeship scheme the company pay every month, even during school days or periods, wages, taxes and social insurances. Paying the fees for the Chambers they cover a part of the supporting system with consultancy, supervisions etc. Large enterprises even have their own laboratories or workshops.

The financing scheme for the schools is a shared responsibility between the state government and the local authorities. The state covers all costs related to the teachers. The communities cover the buildings, the workshops and the daily administration.

Views and expectations of the parties

Young people

Young people have the opportunity to learn and to earn money. They finish as a skilled staff with a title which is highly accepted all over the world. For their future they have the opportunity to climb up different careers paths in the chosen qualification or to go to the university. Especially for the young people (15/16) it is still a challenge to work 8 hours per day plus arrival and departure. Three years are a long period for these youngsters still growing up.

Employer

Companies invest a lot in resources andlabor force. For the most qualifications there is a golden rule valid: In the first year you only invest; in the second year you don´t loose money any more and in the third year, you start to earn money. They have the opportunity to educate the young people and to train them for the special needs of the company. At the end of the apprenticeship scheme you can hire highly qualified staff prepared for a lot of different tasks as they know all the different aspects of the needs in the company.

Government

The dual system reduces the costs for the risk of unemployment tremendously. The system of recognized occupations enables the skilled staff to work in a wide range of companies in their sector. Furthermore the costs are shared with the companies and acting the chambers on behalf of the government as a company body reduces the costs for administration and bureaucracy.

Comparison of Germany, Spain, Turkey in terms of School-Enterprise Cooperation Status

In this section, the comparison of Germany, Spain and Turkey in terms of School-Enterprise Cooperation Status was conducted by using SWOT analysis. In other words, the strengths and weaknesses of the three countries have been handled comparatively and the opportunities and threats are also presented by comparing countries.

Considering the strengths of the countries, Spain can achieve a cultural shift among the individuals, favoring professional training and attracting them towards a more permanent training, allowing for a more prolonged active life with the creation and development of the Qualifications Recognition System. The number of workers participating in training programs for employment has really grown and this has made the efficiency to improve as well as through the initiation of the certification process in Spain. On the other hand, Germany has advantages such as qualification of high skilled staff, monthly payments (wages, social insurance, taxes) for apprentices, low risk of unemployment, low costs for the government. In Turkey, some serious investment is made on dual system by some enterprises and that they employ all the students included in their dual training program. Another positive observation from this dual training was the teachers' trainings and it also contributes the knowledge transfer from teachers to students. Besides, the number of "Erasmus+ projects" and both teachers and students including in Erasmus+ exchanges are impressive. Strengths reveal that each country has many benefits thanks to VET and school-indusrty cooperation.

When the weaknesses of the countries are addressed, it is seen that Germany has problems like high costs for the companies, low level of specialization, no upskilling of teacher, the need of a lots of support and cooperation, weak recognition in the society, long period of training. On the other part, Spain is trouble in the complexity of the VET system, due to its large scope, lack of adjustment to the demands of the productive sector, both in regulated professional training and employment VET, less participation in the less qualified individuals' employment training subsystem. Besides, it is seen that there are important territorial inequalities, both in regulated professional training, with a different public centers presence, and in employment VET in Spain. In Turkey, since the cooperation between the sector and VET schools has been relatively low and is mostly tight to schools' demanding physical needs from enterprises in practice, parties tend to misunderstand each other which results in a lose – lose situation for both sides. Besides, "gender equality" is a problem in Turkey. The number of women working in sector is also dramatically low in Turkey, like other countries. In the context of the school enterprise cooperation, although there is a need for female employees in the enterprises, it is seen that there are almost no female students in vocational schools. In plain words, every country needs to make more efforts to overcome these weaknesses.

When opportunities are examined, Spain has better coordination between the centers and companies and a greater involvement between the training and occupational fields as well as the coordination of the state government with their own administration (labor and education) and the Autonomous Communities for the preparation of the National Qualifications Catalog. Besides, it is really important potentialities that individuals may accredit the knowledge they acquired during their work experience in Spain in addition to the internationalization of VET through community programs and initiatives. On the other hand, Germany has opportunities like being flexible to handle emerging qualifications, having a model for higher education, offering a wide range of further qualifications and career pathways. In Turkey, the commitment from enterprises but also from VET schools to Industry 4.0 and its applications are also impressive This can be described as an opportunity for rapid developments in this area.

Finally, when threats are taken into consideration, the system is not valid for a range of new jobs like healthcare or Information Technologies. It is seen that there is a lack of teachers and trainers in terms of demographic gap. On the other side, Spain has threads such as the traditional pejorative view with which the Spanish society perceives regulated professional training studies, the complexity of the configuration due to the involvement of numerous agents: educational and labor administrations, at national, regional and local level, employer and worker associations and the training centers and territorial inequalities that contribute to a shortage of qualified labor in some sectors and territories. In Turkey, lack of simplification creates a difficult structure to grasp for students, parents and counselors. Also simplification and reconstruction of the system is quite urgent in Turkey. It is really significant for the countries to take the necessary precautions in these vital matters.

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References

- Ainley, J., & Fleming, M. (1997). School-Industry Programs. National Survey 1996. Australian Student Traineeship Foundation, Level 9, 76-80 Clarence Street, Sydney N5W 2000, Australia.
- BIBB, (2017). Datenreport zum Berufsbildungsbericht 2017. https://www.bibb.de/dokumente/pdf/bibb_datenreport_2017.pdf Date Accessed: 25.07.2018
- BIBB, (2017). Presentations on the German VET system. https://www.bibb.de/govet/en/54879.php Date Accessed: 26.07.2018
- BIBB, (2017). ReferNet Germany - VET in Europe - 2016 Country Report. https://www.bibb.de/veroeffentlichungen/en/publication/download/9016 Date Accessed: 25.07.2018
- BOE, (2011). Boletín Oficıal Del Estado http://www.boe.es/boe/dias/2011/08/03/pdfs/BOE-A-2011-13317.pdf Date Accessed: 25.07.2018
- CEDEFOB, (2013). Analysis and overview of NQF developments in European countries: Annual report 2012 http://www.cedefop.europa.eu/files/6117_en.pdf Date Accessed: 24.07.2018
- CEDEFOP, (2013). Spain - European inventory on NQF 2012. http://www.cedefop.europa.eu/files/NQF_developments_2012-SPAIN.pdf Date Accessed: 25.07.2018
- CEDEFOP, (2016). Germany: VET in Europe: country report 2016. http://libserver.cedefop.europa.eu/vetelib/2016/2016_CR_DE.pdf Date Accessed: 25.07.2018
- Destatis, (2011). Die neue Berufsbildungsstatistik. https://www.destatis.de/DE/Publikationen/WirtschaftStatistik/BildungForschungKultur/Berufsbildungsstatistik2011.pdf Date Accessed: 25.07.2018
- DIHK, (2017). Success around the World wih Vocational Education and Training in the Dual System. https://www.dihk.de/ressourcen/downloads/vetnet-englisch-2018.pdf Date Accessed: 25.07.2018
- Donnelly, J. (2009). Vocationalism and school science education. Studies in Science Education, 45(2), 225-254. doi: 10.1080/03057260903142301
- Egitimreformugirisimi.org. (2017). Türkiye'de Eğitime Ayrılan Kaynaklar. http://www.egitimreformugirisimi.org/wp-content/uploads/2017/03/KaynakBilgiNotu.29.06.17.web_.pdf Date Accessed: 25.07.2018
- Eqavet.eu. (2017). European Quality Assurance in Vocational Education and Training http://www.eqavet.eu/Libraries/Website_Update_2016_Reports/2_TR_final_Template_for_updating_info_on_the_EQAVET_website.sflb.ashx Date Accessed: 25.07.2018
- Esparrells, M. D. C. P., & López, M. R. (2009). La formación profesional en España y el mercado de trabajo: desafíos y oportunidades. In XVI Encuentro de Economía Pública: 5 y 6 de febrero de 2009: Palacio de Congresos de Granada.
- EUI-Net. (2007). Teaching and Research Synergy in the context of University-Industry cooperation. Eindhoven: Chevalier de Seyn Publishers.
- European Commission (EC), (2013). German EQF Referencing Report - European Commission. https://ec.europa.eu/ploteus/sites/eac-eqf/files/German_EQF_Referencing_Report.pdf . Date Accessed: 19.07.2018
- European Training Foundation (ETF), (2016). Inventory of NQF recent developments in ETF partner countries: Turkey (Latest update from ETF, October 2016). https://connections.etf.europa.eu/wikis/home?lang=en#!/wiki/Wf591e43b607e_4ccf_8d94_a3256a255147/page/Turkey%20-%20NQF%20Inventory Date Accessed: 20.07.2018
- European Training Foundation (ETF), (2017). VET governance partner country profiles – Turkey.chttps://www.etf.europa.eu/webatt.nsf/0/71AD8569528AC9D7C12581590039179C/$file/VET%20governance_Turkey.pdf Date Accessed: 24.07.2018
- FLUIXÁ, Fernando Marhuenda; TARAZONA, María José Chisvert; MONTERO, Davinia Palomares. La formación profesional dual en España: Consideraciones sobre los centros que la implementan. RIO: Revista Internacional de Organizaciones, 2016, no 17, p. 43-63.
- MEK (2017). Türkiye Mesleki Eğitim Kurulu - Mesleki Eğitim http://meslekiegitimkurulu.gov.tr/kategori.php?k=1&i=7364802 Date Accessed: 25.07.2018
- Messegitim.com.tr. (2017). Yaygın Eğitim Kapsamında Mesleki Eğitim Sistemi http://www.messegitim.com.tr/ti/579/0/YAYGIN-EGITIM-KAPSAMINDA-MESLEKI-EGITIM-SISTEMI Date Accessed: 26.07.2018
- Munro, M., & Elsom, D. (2000). Choosing science at 16: The influences of science teachers and careers advisors on students' decisions about science subjects and science and technology careers. Cambridge: Careers Research and Advisory Centre (CRAC).
- Unevoc.unesco.org. (2017). UNESCO-UNEVOC World TVET Database http://www.unevoc.unesco.org/go.php?q=World+TVET+Database&ct=TUR Date Accessed: 26.07.2018
- Watters, J. J., Hay, S., Dempster, N., & Pillay, H. (2013). School industry partnerships: An innovative strategy for vocational education. In Proceedings of the ECER VETNET Conference 2013. WIFO.

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CONCLUSION

The rapid changes and developments in the global scale require many areas to adapt to these changes. One of these areas is Vocational Education and Training (VET). Vocational Education and Training (VET) plays an important role in the development of each country. Since, in the economy market, having a say in the market depends on Vocational Education and Training (VET). Within the scope of SMART COMET project, three main themes related to VET have been examined under various headings so far. The main themes consist of ECVET, Competence Management and School – Enterprise Cooperation. Since the project was carried out in partnership with three countries, the practices in these countries were examined in detail: Turkey, Germany and Spain.

In the section related to ECVET, the question that "what is ECVET program" is covered in a broader context. ECVET, which came up with the Copenhagen Declaration in 2002, is a relatively new program in Europe. The aims of the program are to provide, recognize and accumulate transfer of knowledge, skills and competences acquired through different learning paths in vocational education and training. ECVET also provides mobility to individuals across different countries and supports lifelong learning. In this respect, the program has very significant returns for the countries.

In Turkey, five important achievements to ECVET are emphasized. These can be listed as follows:

1. European Qualification Framework Process and Establishing Vocational Qualification Authority in Turkey
2. Development of National Occupational Standards
3. Regulations about Recognition of Prior learning by Ministry of Education
4. Evaluation of Apprenticeship Training in the Scope of Compulsory Education
5. Setting Up the Certification and Examination Centers (VOC-TEST)

In Germany, Development of Credit System for Vocational Education and Training - VET (DECVET) was established in 2007 by the Federal Ministry of Education and Research. Some technical components related to ECVET have been tested under the DECVET program: units, loans, partnerships; evaluation; procedures for recognizing learning outcomes; and documentation methods. Education and training providers are mainly interested in testing ECVET. On the other hand, trade and industry boards are very interested in ECVET. In Germany, however; there are many practical problems with the development of ECVET. The DECVET program can bring some answers. In addition, more pilot projects need to be implemented.

In order to analyze the status of ECVET and the possibilities of implementing vocational training programs in Spain, it is necessary to take into account the current status of the Spanish Qualifications Framework (MECU) and the Recognition of Vocational Training and Job Competence Systems in the context of the National Qualifications and Vocational Education System (Law 5/2002). Spanish Qualifications Framework MECU (NFQ) is under development. Eight levels have been created for the classification of Spanish qualifications and descriptors of each have been identified. The departments in the governance of ECVET are the Ministry of Education and Culture and Sports and the Ministry of Employment and National Health. In Spain, vocational education is in line with the European Credit System transfer philosophy for Education and Vocational Training (ECVET); because the vocational education system is based on modular learning programs.

The second section on the theme of competence management focuses on the concept of competence, the importance of competence management for countries and the competence based training in vocational education and training (VET). The importance of the concept of competence becomes increasingly important for vocational education and training. Competence is one of the concepts emphasized and discussed in the creation of curricula and the development of teaching methods for vocational and technical education. At the same time, competence-based education is the answer to the changing needs of vocational education and contemporary societies.

When the competence and competence management in countries are examined, various findings have emerged. For example, In Italy, competence-based learning has been implemented in all schools, even in other ways, which seems to be unsuitable for education through work experience. Competency-based learning experiences support the transition from the education system to the labor market. In the UK, NVQ is designed to meet the needs of the long-term labor market and at the same time to increase flexibility, transparency, transparency and general access to professional qualifications. In Spain, there is a curriculum structured as learning conceptual, procedural and attitudinal content by learning successes and goals. Content is a way to gain learning capacities and competences. VET in Germany is characterized by a dual system and the competence of professional action is addressed in three categories (domain or subject-competence, personal competence, social competence) by KMK.

In the third section on the theme of school-industry cooperation, the recent importance of school-enterprise cooperation in terms of vocational education and training (VET) has been emphasized. Partnerships between schools and enterprise are often seen as important in developing strategies to improve real experience with community participation. Therefore, it is of great significance that countries support this cooperation. When the school-enterprise cooperation in the countries is examined, it is seen that each country has its strengths and weaknesses. The number of employees involved in training programs for employment has really increased and this has led to an increase in productivity with the introduction of the certification process in Spain. However, Spain has difficulty in the complexity of Vocational Education and Training, due to its wide scope, both due to the lack of adaptation to the demands of the productive sector, both because of the regulated vocational training and employment in the VET, and because of the less participation of the less qualified individuals in the employment education subsystem.

Some investments in dual systems are made by some companies in Turkey and all the students are situated in the dual training program are employed. Another positive conclusion from this dual education is the training of teachers. It also contributes to the transfer of knowledge from teachers to students. In addition, the number of “Erasmus + projects and Erasmus + changes are high. However, lack of simplification creates a difficult structure to grasp for students, parents and counselors. This creates problems with the students who have to stay in the area where they start in Turkey. In Germany, the cooperation with school - entrance has the advantages of high qualified staff, monthly payments for apprentices (wages, social insurance, taxes), low unemployment risk, low costs for governments. Nevertheless, Germany has problems such as high costs for the companies, low level of specialization, no upskilling of teacher, the need of a lots of support and cooperation, weak recognition in the society, long period of training. Finally, if countries want to benefit more from school-entreprise cooperation, they need to do much more in this regard and the systems need to address their shortcomings.

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A “framework” – “pilot application” and practical manual for the management of competences in metal enterprises

Development of a "framework" – "pilot application" and practical manual for the management of competences in metal enterprises

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O1. Competence Management Methodology and Pilot Application

Introduction

The intellectual output, O1 of SMART - COMET project consists of developing a learning outcome based competence management framework for metal industry. The development of this framework has been done based on the analysis of various competence management tools and methodologies from project countries; Turkey, Germany, Spain and other EU country practices; Italy and the UK has also been worked on and have been beneficial in the comparison. A coherent, adaptable and practical enterprise level competence management system, covering ECVET tools and learning outcomes is the result of this work.

Research and Development Team:			
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Analysing existing competence management models with the use of desk research and interviews with enterprise representatives; the project experts concluded that there are three main steps of a concrete competence management model:

1. Identify critical competencies
2. Measure and evaluate competencies
3. Determine knowledge gaps and give feedback
4. Create development plans

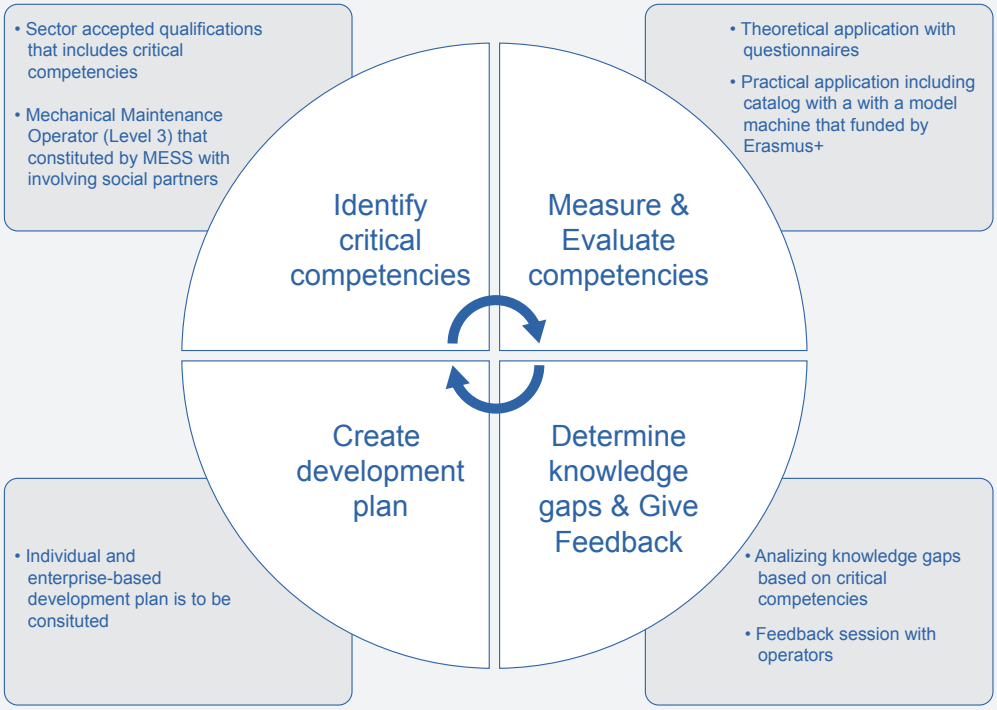

Figure 1. Competence Management Framework

The initial step starts with analysing already **identified critical competencies** determined by Vocational Qualifications Authority[1] (VQA) of Turkey. It uses national occupational standards and national qualifications in certifying the employees in order to prove that they are capable of doing this certain work. To be able to get the certificate, the employees' know-how, attitude and capabilities are evaluated by accredited trainers and institutions. MESS is one of these accredited institutions. The national occupational standards and occupational qualifications are defined and drafted with participation and feedback from different stakeholders; VET schools, enterprises, NGOs and other relevant public institutions. These standards and qualifications are recognised by the whole industry and are also referred both nationally, internationally and at the supranational; EU level, serving as a base coming from European Qualifications Framework (EQF).

26 national occupational standards developed so far by MESS using VQA standards and qualifications in metal sector were then individually analysed. **Mechanical Maintenance Operator Level 3** was chosen to be examined in this study, because it has a key role in the industry and yet it is not easy to find a high - qualified machine maintenance operator in the sector. This position will also have a critical role in Industry 4.0 transition period, and analysing member enterprises operating in metal sector, it is possible to say that almost all member companies have at least a couple of Machine Maintenance Operators in their production. This means all of them need qualified machine maintenance operators, so there is a serious gap between the number needed by the industry and the already existing number of workers. The project team, together with project partners decided that understanding knowledge gaps of the machine maintenance employees in different enterprises and then coming up with a comprehensive competence management model will be beneficial for the whole industry.

1 For detailed information on Vocational Qualifications Authority (MYK) of Turkey, please refer to page 9.

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The following step is to **measure and evaluate competencies** chosen. For this, a pilot application is created and done in 4 MESS member enterprises. The results are also exploited in **determining knowledge gaps and giving feedback**.

In the mainstream exam based system, VQA accredited institutions are using examination method and providing a certificate if the candidate counts qualified. It is important to note that the employees are taking this exam unless they are graduate of vocational and technical (VET) schools and the certificate is valid for 5 years. Each enterprise also has their own customised competence model, so the project team offered a technical development based system and a development plan analysing the results from different companies and a development based competence management model is also being created basing on the application done in 4 different enterprises; Ford, Arçelik, TürkTraktör and **İçdaş**. In this way, the result was a coherent sector based system that is disseminated to the metal sector as a whole. This system also contributes to the free movement of labour force within the metal sector and creates a common understanding about development of technical competencies through skill needs.

This pilot application is done in two stages; theoretical and practical stages. The theoretical part of the application was composed of three parts;

- A1: Occupational Health and Safety, Environment and Quality
- B1: Preventive Maintenance
- B2: Corrective Maintenance

Theoretical part was then followed by an on-the-job pilot application with the help of the prototype machine and equipment designed for the project. Participants applied what they apply on the field using the prototype machine.

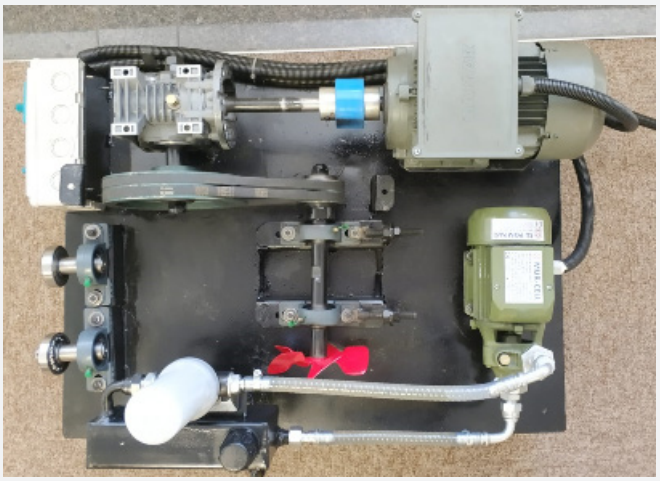

Figure 2. Prototype Machine

The last step of competence management model is **creating development plans**. Following pilot exercises in 4 different enterprises, project research and development team will create a development plan in order to increase capability of Mechanical Maintenance Operator Level 3

competencies in Turkey.[2] The evaluations of expert technician and researchers form a basis for this report. According to the capabilities which are open for improvement, technical trainings will be developed which are offered by the research team. The development plan will have a key role regarding competency model which will be designed at the end of the process.

1. Pillars of Vocational Qualifications

1.1. European Qualifications Framework

European Qualifications Framework (EQF) is a European-wide qualifications framework which brings the qualifications of different European countries together. In a way, it is a translation of different national qualifications which makes qualifications in different countries easier to understand. The EQF aims to facilitate mobility of students and workers within Europe in order to encourage development of mobile and flexible workforce and to help developing lifelong learning (Cedefop, 2018).

EQF opens up the ability for employers, individuals and institutions to better understand the qualifications of employers, learners in other countries and serves as a benchmark for comparing the qualifications systems of countries.

EQF was formally adopted by the European Parliament and the Council in April 2008. EQF Advisory Group is consisted of 28 EU member countries; candidate 5 countries, 3 non-EU-member European Economic Area member countries; a total of 36 countries (Myk.gov.tr, 2018).

EQF Advisory Group is consisted of European Commission, Council of Europe, Europe Vocational Training Development Center (CEDEFOP), European Education Foundation (ETF), European level roof representatives of institutions, social partners and stakeholders.

The EQF enables learners, learning providers and employers to compare qualifications between different national systems. This is thought to help increase mobility in the labor market within and between the countries because it makes it easy to determine a person's level of qualification which in turn will improve the balance between demand and supply of knowledge and skills. This framework comprises general, higher and vocational education and training, and should lead to better transparency, comparability and portability of citizens' qualifications (e.g. diplomas, certificates etc.) (Eqavet.eu, 2018).

The EQF recommends that each level of qualification should, in principle, be attainable by way of a variety of educational and career paths. This should foster lifelong learning and increase the employability, mobility and social integration of workers and learners. The recommendation should also facilitate building bridges between formal, non-formal and informal learning.

The EQF neither replaces nor defines national qualification systems. It does not describe any particular qualifications or individual competencies but describes the eight EQF levels via

2 Please refer to the last part of this manual for development plan.

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descriptors for the three categories “knowledge”, “skills” and “competencies”.

States are encouraged to develop national qualifications frameworks that rely on and are linked to the EQF.

1.2. National Qualifications Framework

Countries develop **national qualifications frameworks** (NQFs) in order to implement the EQF. Frameworks help to make qualifications easier to understand and compare. They can also encourage countries to rethink and reform national policy and practice on education, training and lifelong learning.

National qualifications frameworks (NQFs) classify qualifications by level, based on learning outcomes. This classification reflects the content and profile of qualifications that is, what the holder of a certificate or diploma is expected to know, understand and be able to do. The learning outcomes approach also ensures that education and training sub-systems are open to one another. Thus, it allows people to move more easily between education and training institutions and sectors.

All countries committed to the EQF are developing or implementing national frameworks mostly covering all levels and types of qualifications: the 28 Member States, Iceland, Liechtenstein, Norway, Switzerland, Albania, Bosnia and Herzegovina, the Former Yugoslav Republic of Macedonia, Montenegro, Serbia and Turkey.

1.2.1. Vocational Qualifications Authority (VQA) of Turkey

Vocational Qualifications Authority (VQA) was established on September 21, 2006. Establishment of sector committees, creation of business environment with workers, employers and other professional organizations, publication of national occupational standards to Official Gazette, establishment of assessment and certification infrastructure and authorization of certification bodies have all started to be presented as of 2008, as the main activities of the organization.

Significant developments have been made in the European Union (EU) to improve the quality and mobility of the labor force when VQA started its activities. The “European Qualifications Framework for Lifelong Learning (EQF)” issued by the European Parliament and Council has been issued. In this decision, it is recommended that EU member and EU candidate countries establish national competence frameworks to link national qualifications with EQF levels and take all necessary measures to ensure that all qualifications documents have a reference to EQF levels.

In Turkey, VQA has been designated as the EQF National Coordination Point and in 2008 it started to represent Turkey in the EQF Advisory Board. In this context, VQA has undertaken an important task in Turkey Qualifications Framework (TQF) creation and referencing it using EQF (Myk.gov.tr, 2018).

1.2.2. Turkish Qualifications Framework (TQF)

Turkey Qualifications Framework (TQF); designed to be compatible with the European Qualifications Framework; refers to the framework of national qualifications that demonstrate all the qualification principles gained in vocational, general and academic education and training programs, including primary, secondary and higher education, and other learning pathways.

'Qualification' under the TQF represents Certificate, Mastery Certificate or VQA Professional Qualification Certificate obtained in the event that the responsible institution acquires an evaluation and validation period in which the individual acquires learning achievements in accordance with certain criteria.

2. National Standards and National Qualifications

2.1. Development of National Occupational Standards

National Occupational Standard is a minimum norm in terms of required know-how, capability, attitude and approach in order to perform an occupation with success. These national standards of occupations are determined by industry and educational institutions considering their requirements.

Vocational Qualifications Authority is authorizing the institutions and organizations that operate in the sector in which the certain National Occupational Standard is decided to be created, providing that these institutions and organizations meet the certain necessities.

National Occupational Standard (NOS) is prepared in accordance with the format of approved occupational standard, which is prepared by examining the international examples in terms of form, content and gathering opinion from the sector committee. The proficiency levels of National Occupational Standards are determined in accordance with the qualification levels adopted by European Union and European Qualification Framework (EQF).

Thus, the National Occupational Standards are prepared and in the process of preparation all carry the following basic principles:

- It is based on job analysis.
- Effective participation of the relevant social partners in the preparation process is essential.
- It reflects the professional competence levels.
- It includes health, safety and environmental protection requirements related to the occupational field.
- It is written clearly and explicitly.
- It is compatible with lifelong learning principles.
- It does not include the discrimination of any kind.

Standards to be prepared are determined by Executive Board of the VQA, taking into account priority needs of job market and educational institutions and recommendations of the sector committees.

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2.1.1. Steps of Preparing a Standard

In order to recognize the draft occupational standards prepared by VQA approved institutions or the working groups established by the VQA within the framework of the relevant legislation as National Occupational Standard, the applicant must firstly issue the "Occupation Map" for the relevant sector (Myk.gov.tr, 2018).

While extracting occupational maps related to the sector, the main sections (sub-sectors) of the sector are classified into groups and the occupations, boundaries and levels of each group are determined.

The purpose of occupational map is to make a general analysis of the industry, thus providing a general picture of sub-sectors, occupations, employee numbers, key trends in the sector, employment characteristics and priorities. Draft national occupational standards, comments and evaluation forms and other related documents are examined by the relevant sector committee of VQA. The draft national occupational standards examined by the sector committee are presented to the VQA Executive Board.

National Occupational Standards approved by the Executive Board are published in the Official Gazette and gain the National Occupational Standard. For reassessment of National Occupational Standards that have been going on for five years since its publication in the Official Gazette, the institutions and organizations that have developed the standard are called up first and the relevant standard is updated if necessary.

2.1.3. Content of a National Occupational Standard

Introduction of Occupation

Introduction of Occupation: The statements which determines borders of occupation and includes briefly duties of occupation.

Place of Occupation in International Classification Systems: In this section, ISCO-08 code in coding system (International Occupation Standard Classification) is indicated.

Health, Security and Environmental Arrangements: In this section, precautions in terms of OHS and environmental protection are defined alphabetically.

Other Legislations Regarding Occupation: It can be stated as required legislations of occupation. In this context, borders of occupation, duties in the scope of occupation and legislation regarding capabilities of employee are stated alphabetically. Defined legislations must be related to occupation.

Work Environment and Provisions: The conditions of occupation are evaluated. In this context, work environment in terms spatial features such as lighting, noise, climate, individual or team work facilities and risk of occupational accidents are defined.

Other Requirements Related to Occupation: In this section, the documents, certificate and state of health which the employee requires are defined.

The Profile of Occupation

Duty: General term which defines basics of occupation. It should be individually meaningful.

Operations: Unit of work which has measurable and observable factors. Start and finish time intervals must be determined.

Performance Index: The capability to profess is evaluated objectively in terms of national and international accepted standards. Performance index focuses on "how?" instead of "what?".

Required Equipment: The equipment which are used in order to profess the occupation. Employee must have technical know-how using tools.

Information and Capabilities: In this section, information and capabilities which an employee require are alphabetically defined. It should include duties and operations related to required performance index

Attitude and Behaviors: In this sections attitudes and behaviors which should be practicing by employee are alphabetically defined. These attitudes and behaviors should be parallel to work environment and occupation.

2.2. Definition of National Qualifications

2.2.1. Preparing National Qualifications

National Qualifications are prepared based upon national and international occupational standards. National Qualifications are constituted in order to illustrate the process how to assess related competences and know-how. The documents are authorized by Vocational Qualifications Authority.

Assessments are made by instructions which is authorized by vocational qualifications authority. If an individual succeeds these assessments, deserves to get a certificate. This certificate certifies this individual is capable to do certain occupation.

Qualification unit; is mandatory or selective qualifications section which is stated in national qualifications. It is transferrable and it is measured objectively.

Learning outcome; Knowledge, skill (know-how), competence after completing any learning process (formal or non-formal training).

National Qualifications are prepared by institutions which are authorized by Vocational Qualifications Authority or study group which is created by them.

National qualifications which are prepared by instructions are investigated in terms of methodology and are presented to interested parties in order to get their comments. During preparing these

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drafts the comments are getting into consideration and if they are accepted, these comments become a part of qualifications. After completing interpretation process, intuition that prepared national qualifications a pilot assessment and controls its applicability and measurability. Sector committee examines reasons of updates and presents to submit to the approval of Vocational Qualifications Authority Board. National Qualifications approved by board are published on web site of Vocational Qualifications Authority and goes into operation.

After completing updating process, intuition informs licensing organization (assessor) regarding final outcome. In case, there are respectable number of updates, licensing organization updates documentation and licensing processes.

3. Methodology and Approach to Pilot Application

3.1. Introduction to the Methodology and Approach to Pilot Application

Mechanical Maintenance Operators in enterprises are generally composed of people graduated from VET schools and /or in some instance gained experiences from a master in workshop conditions without having any vocational training.

Operators who got experiences in the workshop, without having an academic knowledge and technical background, has contributed to working life with the help of the maintenance person in the direction of the knowledge and experience gained in the current working environment. Knowledge and skills gained by these workers need to be recorded and documented professionally.

Therefore, "National Occupational Standards" was initiated by the government, following the European Qualifications Framework standards. VQA (Vocational Qualifications Authority) was established, and it works with Metal Sector Committee to examine and approve the occupational standard called the National Qualification of Mechanical Maintenance Operator (Level 3).

"Regulation on the Preparation of National Vocational Standards and National Qualifications" has been taken into consideration as the basic criteria in the preparation of this qualification.

3.1.1. Basic Criteria for National Qualifications

- National Qualification of Mechanical Maintenance Operator (Level 3) is based on national vocational standards and / or international standards".
- National competence has been prepared with a participatory approach and the opinions and contributions of related stakeholders have been taken.
- National competence covers occupational health and safety, environment and quality aspects.
- National competence is written to be understood by users.
- National competence encourages self-development and career advancement within the framework of long-life learning principles.
- National competence does not include any discriminatory elements, open or confidentiality.

- National competence includes elements which are ensuring that the individual's knowledge, skills and competence are measured within quality assurance.

3.2. Scope of Work

National Qualification of Mechanical Maintenance Operator (Level 3) is selected to be worked on for this study. Detailed information may be found at:

http://www.smart-comet.eu/wp-content/uploads/2018/08/National-Qualification.pdf

3.3. National Qualification Structure

Structure of a national qualification is divided into "Compulsory Units" and "Elective Units"

Compulsory Units

A1: Occupational Health and Safety, Environment and Quality

Elective Units

B1: Preventive Maintenance

B2: Corrective Maintenance

Participants is expected to complete compulsory units of group A and at least one of elective units in group B in order to be considered as successful. This means; A1, B1 or A1, B2 or the option of A1, B1 and B2 may also be chosen.

Theoretical and performance based applications in the units may be done separately for each unit or together at the same time. However, evaluation of each unit is performed independently.

4. Pilot Application

The pilot application consisted of a focus group discussion with the employees of the factory whose vocational qualifications were observed, it was followed by a both theoretical and practical application on the qualification.

For these two parts, following documents have been created by the project team:

- Machine Catalogue (Turkish and English)
- Theoretical Application Booklet (Turkish and English)

4.1. A1 - Occupational Health and Safety, Environment and Quality Unit

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Theoretical Application

Theoretical application with equal points each and a minimum of 20 written applications are given to participants.

No points are deducted from incorrect applications.

Participants are given 1.5 minutes for each application.

A participant who completes at least 60% of the applications in written application is considered qualified.

The following items were taken into consideration while preparing the theoretical applications;

- Occupational health and safety
- Environmental protection measures
- Quality requirements

In addition, for a total number of 20 theoretical applications related to this merit is taken as reference Appendix A1-2 list of relevant National Competency catalogue. It includes all the expressions mentioned below and proposed to be measured.

BG1. Explains basic rules on occupational health and safety.

BG2. Explains personal protective equipment suitability for work and workshop.

BG3. Describes the functions of protection and intervention of OHS.

BG4. Describes how to install warning signs and plates with locking and labelling systems for the workshop.

BG5. Explains warning signs and plates for work done.

BG6. Explains how to contribute in identifying of risks at the work.

BG7. Describes the reduction of risk factors.

BG8. Explains machine-specific emergency procedures.

BG9. Describes exit or escape procedures in emergency situations.

BG10. Explains what the environmental risks are.

BG11. Describes how the environmental risks will be reduced.

BG12. Describes the storage period of recycled materials.

BG13. Sorts the processes of saving money in consumption of business resources.

BG14. Explains what quality requirements are involved in maintenance jobs.

BG15. Explains quality assurance techniques in maintenance work.

BG16. Explains the faults and errors that are detected during the operation.

4.2. B1 – Preventive Maintenance Unit

Theoretical Application

Theoretical application with equal points each and a minimum of 25 written applications are given to participants.

No points are deducted from incorrect in the applications.

Participants are given 1.5 minutes for each application.

A participant who completes at least 60% of the applications is considered successful.

The following items were taken into consideration while preparing the theoretical applications;

- Machine, hardware and material preparations
- Preventive maintenance activities

In addition, for a total number of 25 theoretical applications related to this merit is taken as reference Appendix B1-2 list of relevant National Competency catalogue. It includes all the expressions mentioned below and proposed to be measured.

BG1. Explain the eligibility criteria for OHS for materials, tools and materials.

BG2. Defines the negativities that affect the safety of work in the environment where the machines placed.

BG3. Lists any negativity that should be controlled such as sound, temperature, smell and pollution.

BG4. Explain the eligibility criteria for OHS in working environment.

BG5. Explains the basic working principles and technology of the machine.

BG6. Explains the basic features of spare parts and consumables of the machines.

BG7. Lists the consumables required for maintenance work.

BG8. Lists of the apparatus, tools and equipment required for operation.

BG9. Lists the measurement and control instruments to be used in the process.

BG10. Explains the control steps of the work equipment and safety mechanisms.

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BG11. The sequence of operations to be performed on the connections of electricity, water, com pressed air, steam and gas installations before maintenance activities.

BG12. Sorts the parts of the machine that need to be lubricated.

BG13. Explains oil types and usage areas.

BG14. Sequences the parts and connections that may be able to loosen in the machines.

BG15. Explains the cleaning procedures involved in preventive maintenance activities.

BG16. Sorts the cleaning materials in preventive maintenance activities.

BG17. Explains the procedures for oil change.

BG18. Sorts usage areas and types of filters, seals, sealants, bearings and belts.

BG19. Sorts the consumables for limited shelf life.

BG20. Sequences the setting operations to be done in the changed parts.

BG21. Explains the simple setting operations performed on the machines.

BG22. Explains maintenance information to be given to the machine operator.

BG23. Describes the relevant maintenance information to be given to the appropriate supervisor.

BG24. Explains maintenance procedures to be processed on control cards.

Performance Based Application

In the B1 unit for performance based application, “Skills and Competencies” are carried out according to the checklist defined below. Participants must achieve a minimum of 80% to qualify in the overall performance, provided that they perform all of the critical steps to prove to be sufficient enough in the performance application.

Performance based applications are carried out in a real or fictitious work environment.

In addition, for performance based application related to this merit is taken as reference Appendix B1-2 list of relevant National Competency catalogue. It includes all the expressions mentioned below and proposed to be measured.

BY1. Examines basic operating principles of machines.

BY2. Examines machine’s catalogues, recognizes machine elements from technical drawings.

BY3. Prepares consumables in accordance with the work to be done.

BY4. Makes ready necessary apparatus, machinery and equipment for operation.

BY5. Prepare measurement and control instruments according to the specified process.

BY6. Controls the operation of the safety mechanisms of the machine to be maintained in accordance with the instructions.

BY7. Takes necessary safety precautions about the machine.

BY8. Closes or controls all power supply connections that may be associated with the machine or workspace to be maintained.

BY9.* The machines must be lubricated in accordance with the operating instructions or maintenance instructions.

BY10. Performs the tightening process by checking possible loose parts and connections.

BY11.* Cleans the machine from foreign substances such as oil, dust, rust, metal fragments.

BY12.* Makes the oil change of the machines.

BY13. Makes necessary measurements using micrometre, calliper and appropriate measuring instruments.

BY14.* Changes the filter.

BY15.* Replaces sealing element.

BY16.* Replaces V-belt.

BY17.* Replaces bearing

BY18. Adjusts the parts that need to be changing and setting allows them to work in the desired way.

BY19. Starts the machine and make the final checks.

BY20.* Records performed operations on maintenance control cards.

BY21.* Implements the OSH rules in the works.

BY22.* Implements environmental protection measures in the works.

BY23.* Conducts quality requirements in the works.

(*)Mandatory critical steps to be accomplished in the performance applications.

4.3. B2 – Corrective Maintenance Unit

Theoretical Application

Theoretical application with equal points each and a minimum of 20 applications are given to participants.

No points are deducted from incorrect applications.

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Participates are given 1.5 minutes for each application.

A participant who completes at least 60% of the applications is considered successful.

The following items were taken into consideration while preparing the theoretical application questions;

- Machine, hardware and parts preparation
- Simple faults handling
- Post-maintenance finishing
- OHS, environmental and quality requirements

In addition, for a total number of 20 theoretical application related to this merit is taken as reference Appendix B2-2 list of relevant national qualifications catalogue. It includes all the expressions mentioned below and proposed to be measured.

BG1. Explain the eligibility criteria for OHS for materials, tools and materials.

BG2. Defines the negativities that affect the safety of work in the environment where the machines placed.

BG3. Lists any negativity that should be controlled such as sound, temperature, smell and pollution.

BG4. Describes safety criteria for working environment.

BG5. Explains the basic working principles and technology of the machine.

BG6. Explains the basic features of spare parts and consumables of the machines.

BG7. Lists the consumables required for maintenance work.

BG8. Lists of the apparatus, tools and equipment required for operation.

BG9. Lists the measurement and control instruments to be used in the process.

BG10. Explains the control steps of the work equipment and safety mechanisms

BG11. The sequence of operations to be performed on the connections of electricity, water, compressed air, steam and gas installations before maintenance activities.

BG12. Sorts types of sealing elements.

BG13. Explains the mechanical components of the machines.

BG14. Sorts the spare parts to be used in the elimination of mechanical failures.

BG15. Explains maintenance information to be given to the machine operator.

BG16. Describes the relevant maintenance information to be given to the appropriate supervisor.

BG17. Explains maintenance procedures to be processed on control cards.

Performance Based Application

In the B2 unit for performance-based application, "Skills and Competencies" are carried out according to the checklist defined below. Candidates must achieve a minimum of 80% to qualify in the overall performance, provided that they successfully perform all of the critical steps to ensure success in the performance application.

Performance-based applications are carried out in a real or fictitious work environment.

In addition, for performance-based application related to this merit is taken as reference Appendix B2-2 list of relevant National Competency catalogue. It includes all the expressions mentioned below and proposed to be measured.

BY1. Examines basic operating principles of machines.

BY2. Examines machine's catalogues, recognizes machine elements from technical drawings.

BY3. Prepares consumables in accordance with the work to be done.

BY4. Makes ready necessary apparatus, machinery and equipment for operation.

BY5. Prepares measurement and control instruments according to the specified process.

BY6. Controls the operation of the safety mechanisms of the machine to be maintained in accordance with the instructions.

BY7. Takes necessary safety precautions about the machine.

BY8. Closes or controls all power supply connections that may be associated with the machine or workspace to be maintained.

BY9.* Resolves the fault caused by the sealing element.

BY10. Makes necessary measurements using micrometre, calliper and appropriate measuring instruments.

BY11.* Takes precautions to ensure the safety of the work environment, such as keeping foreign / dangerous items away.

BY12. Adjusts the parts that need to be changing and setting allows them to work in the desired way.

BY13.* Parts that need to be disassembled in order to reach the disruptive parts should be disassembled according to instructions and manuals.

BY14.* Replaces new parts according to instructions or manuals.

BY15.* Repairs defects caused by mechanical parts.

BY16.* Starts the machine and make the final checks.

BY17. Records performed operations on maintenance control cards.

BY18.* Implements the OHS rules in the works.

BY19.* Implements environmental protection measures in the works.

BY20.* Conducts quality requirements in the works.

(*) Mandatory critical steps to be accomplished in the performance applications.

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4.4. Prototype Machine

A prototype machine is designed for this pilot application, shown below to implement all the performances defined in “Skills and Competences”.

Although this prototype machine is designed for the pilot application, it is lightweight and portable, so it offers an advantage for real application where all performances may be performed on this machine.

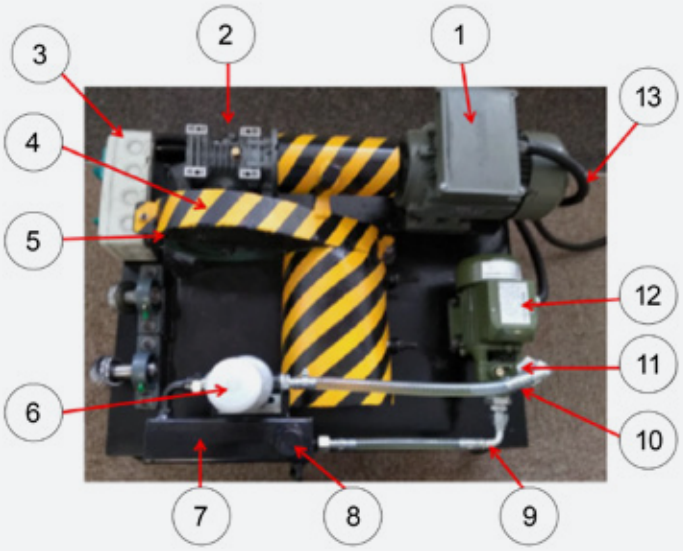

Figure 3. Prototype Machine and its components

1. Electric Motor
2. Reduction Gearbox
3. Control Panel
4. Top Protection Cover
5. Belt and Pulley Assembly
6. Oil Filter
7. Oil Tank
8. Oil Filler Cap and Strainer
9. Oil Return Line
10. Oil Feeding Line
11. Oil Pump
12. Electric Motor
13. Power Supply Line

4.5. Evaluation Approach

The results of the application and the evaluation of the candidates are defined in the National Qualification of “10UY0002-3 Mechanical Maintenance Operator (Level 3)”.

For the theoretical applications, the correct responses marked by the participant in the application guide are summed up and divided by the total number of applications to obtain the percentage of success (%).

- Difficulty ratings of questions in theoretical practice; (1= Easy), (2 = Medium) ve (3 = Difficult)

A1 - Occupational Health and Safety, Environment and Quality Unit (Theoretical Application);

- Difficulty level 1 = 9 applications (% 45)
- Difficulty level 2 = 8 applications (% 40)
- Difficulty level 3 = 3 applications (% 15)

B1 - Preventative Maintenance Unit (Theoretical Application);

- Difficulty level 1 = 11 applications (% 44)
- Difficulty level 2 = 9 applications (% 36)

- Difficulty level 3 = 6 applications (% 24)

B2 - Corrective Maintenance Unit (Theoretical Application);

- Difficulty level 1 = 5 applications (% 25)
- Difficulty level 2 = 9 applications (% 45)
- Difficulty level 3 = 6 applications (% 30)

In the performance based application; a “Work Order” is given. The participant completes the preparatory work with the work order given to him. Reads through machine instructions, prepares replacement spare parts within periodic control card and keep present consumables.

The examiner evaluates the technical methods and approaches used by the candidate and the criteria such as hand skill, quickness, point of view to quality approach, checking at the end of the work and recording the work done.

4.5.1. Evaluation Method and Applications Set

The content applications may be found in the Appendix.

Candidates in Theoretical Applications;

“A1 Occupational Health and Safety, Environment and Quality Qualification Unit” is a compulsory application that the candidates who succeed at least 60% of the total 20 applications.

“B1 Preventive Maintenance Qualification Unit” is a selective application that the candidates who succeed at least 60% of the total 25 applications.

“B2 Corrective Maintenance Qualification Unit” is a selective application that the candidates who succeed at least 60% of the total 20 applications.

Candidates in Performance Applications;

The performance-based application for B1 unit is carried out according to **“Skills and Competencies”**. The participant must demonstrate at least 80% success in the overall application, provided that all critical steps are successfully performed to ensure success in the B1 performance application.

The performance-based application for B2 unit is carried out according to **“Skills and Competencies”**. The participant must demonstrate at least 80% success in the overall application,

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provided that all critical steps are successfully performed to ensure success in the B2 performance application.

4.5.2. Personal Application in Target Enterprises

Dates of applications are pre-planned within the target enterprises to be performed and the application will be done as seen in the following chart.

The trial participants are two persons from each unit and there will be a total of 8 people in four enterprises.

Date of Performance	Target Enterprise	Theoretical Application	Performance Application
01.08.2018	Ford Otosan / Gölcük	10:00 – 11;40	13:00 – 14:30
			14:40 – 16:00
03.08.2018	İçdaş /Biga	10:00 – 11;40	13:00 – 14:20
			14:30 – 15:40
10.08.2018	TürkTraktör / Ankara	09:15 – 10;55	11:00 – 12:30
			13:30 – 15:00
14.08.2018	Arçelik / Çayırova	09:00 – 10;40	11:00 – 13:10
			13:15 – 14:45

4.5.3. Evaluation and Observations

A1 - Occupational Health and Safety, Environment and Quality Unit Assessment and Surveillance Data

Qst. No	No	Expression Information	Ford OTOSAN		İÇDAŞ		TÜRK TRAKTÖR		ARÇELİK		Note	Evaluation
			Tech. 1	Tech. 2	Tech. 3	Tech. 4	Tech. 5	Tech. 6	Tech. 7	Tech. 8		
1	BG1	Explains basic rules on occupational health and safety.	D	D	D	D	D	D	Y	D	14/16	88%
2			D	D	D	D	D	D	Y	D		
3	BG2	Explains personal protective equipment suitability for work and workshop.	D	D	D	D	D	D	D	D	8/8	100%
4	BG3	Describes the functions of protection and intervention of OHS.	D	D	Y	D	D	D	D	D	7/8	88%
5	BG4	Describes how to install warning signs and plates with locking and labelling systems for the workshop.	D	Y	Y	Y	Y	Y	D	Y	8/16	50%
6			D	D	D	Y	D	Y	D	D		
7	BG5	Explains warning signs and plates for work done.	D	D	D	D	D	D	D	D	8/8	100%
8	BG6	Explains how to contribute in identifying of risks at the work.	D	D	D	D	D	D	D	Y	7/8	88%

9	BG7	Describes the reduction of risk factors.	D	D	D	D	D	Y	Y	D	6/8	75%
10	BG8	Explains machine-specific emergency procedures.	D	D	D	Y	D	D	D	D	7/8	88%
11	BG9	Describes exit or escape procedures in emergency situations.	D	D	Y	D	D	Y	D	D	6/8	75%
12	BG10	Explains what are the environmental risks.	D	Y	D	D	Y	Y	Y	D	12/16	75%
13			D	D	D	D	D	D	D	D		
14	BG11	Describes how the environmental risks will be reduced.	D	D	D	D	D	D	D	D	8/8	100%
15	BG12	Describes the storage period of recycled materials.	Y	Y	Y	Y	Y	Y	Y	Y	0/8	00%
16	BG13	Sorts the processes of saving money in consumption of business resources.	Y	D	D	D	D	D	D	D	7/8	88%
17	BG14	Explains what quality requirements are involved in maintenance jobs.	D	D	D	Y	D	D	Y	D	6/8	75%
18	BG15	Explains quality assurance techniques in maintenance work.	D	D	D	D	D	D	D	D	14/16	88%
19			D	D	D	D	Y	Y	D	D		
20	BG16	Explains the faults and errors that are detected during the operation.	Y	Y	Y	Y	Y	Y	Y	Y	0/8	00%
RESULTS			85	80	75	70	75	60	65	80		74%

B1 Preventive Maintenance Unit - Assessment and Surveillance Data

Qst. No	No	Expression Information	Ford OTOSAN		İÇDAŞ		TÜRK TRAKTÖR		ARÇELİK		Note	Evaluation
			Tech. 1	Tech. 2	Tech. 3	Tech. 4	Tech. 5	Tech. 6	Tech. 7	Tech. 8		
1	BG1	Explain the eligibility criteria for OHS for materials, tools and materials	Y	Y	D	Y	Y	Y	D	Y	2/8	25%
2	BG2	Defines the negativities that affect the safety of work in the environment where the machines placed.	D	D	D	D	D	D	D	Y	7/8	88%
3	BG3	Lists any negativity that should be controlled such as sound, temperature, smell and pollution	D	D	Y	Y	D	D	Y	D	6/8	75%
4	BG4	Explain the eligibility criteria for OHS in working environment	D	D	D	D	D	D	D	D	8/8	100%

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5	BG5	Explains the basic working principles and technology of the machine.	Y	D	D	D	D	Y	Y	D	10/16	63%
6			D	D	Y	Y	D	D	D	Y		
7	BG6	Explains the basic features of spare parts and consumables of the machines.	D	D	Y	D	D	D	D	D	7/8	88%
8	BG7	Lists the consumables required for maintenance work.	D	Y	Y	Y	Y	Y	Y	Y	1/8	13%
9	BG8	Lists of the apparatus, tools and equipment required for operation.	D	D	D	D	D	D	D	D	8/8	100%
10	BG9	Lists the measurement and control instruments to be used in the process.	D	Y	D	D	D	D	D	Y	6/8	75%
11	BG10	Explains the control steps of the work equipment and safety mechanisms.	D	D	D	D	D	D	D	D	8/8	100%
12	BG11	The sequence of operations to be performed on the connections of electricity, water, compressed air, steam and gas installations before maintenance activities.	Y	D	D	D	D	D	D	Y	6/8	75%
13	BG12	Sorts the parts of the machine that need to be lubricated.	D	D	D	D	D	Y	D	D	7/8	88%
14	BG13	Explains oil types and usage areas.	Y	Y	D	Y	D	D	Y	D	4/8	50%
15	BG14	Sequences the parts and connections that may be able to loosen in the machines.	D	D	D	D	D	D	D	D	8/8	100%
16	BG15	Explains the cleaning procedures involved in preventive maintenance activities.	D	D	D	D	D	D	D	Y	7/8	88%
17	BG16	Sorts the cleaning materials in preventive maintenance activities.	D	Y	D	Y	D	Y	Y	Y	3/8	38%
18	BG17	Explains the procedures for oil change.	Y	Y	D	Y	Y	D	Y	D	3/8	38%
19	BG18	Sorts usage areas and types of filters, seals, sealants, bearings and belts.	Y	Y	D	Y	D	Y	D	Y	3/8	38%
20	BG19	Sorts the consumables for limited shelf life.	D	D	D	D	D	D	D	D	8/8	100%
21	BG20	Sequences the setting operations to be done in the changed parts.	D	D	D	D	D	D	D	D	8/8	100%
22	BG21	Explains the simple setting operations performed on the machines.	D	D	D	D	Y	Y	Y	D	5/8	63%

23	BG22	Explains maintenance information to be given to the machine operator.	D	D	D	D	D	D	D	D	8/8	100%
24	BG23	Describes the relevant maintenance information to be given to the appropriate supervisor.	D	D	D	D	D	D	Y	D	7/8	88%
25	BG24	Explains maintenance procedures to be processed on control cards.	D	D	D	D	D	D	D	D	8/8	100%
RESULTS			76	72	84	68	84	72	68	64		74%

B2 Corrective Maintenance Unit - Assessment and Surveillance Data

Qst. No	No	Expression Information	Ford OTOSAN		İÇDAŞ		TÜRK TRAKTÖR		ARÇELİK		Note	Evaluation
			Tech. 1	Tech. 2	Tech. 3	Tech. 4	Tech. 5	Tech. 6	Tech. 7	Tech. 8		
1	BG1	Explain the eligibility criteria for OHS for materials, tools and materials.	D	D	D	D	D	D	D	D	8/8	100%
2	BG2	Defines the negativities that affect the safety of work in the environment where the machines placed.	D	D	D	D	D	D	D	D	8/8	100%
3	BG3	Lists any negativity that should be controlled such as sound, temperature, smell and pollution.	Y	Y	D	Y	Y	Y	Y	D	2/8	25%
4	BG4	Describes safety criteria for working environment.	D	D	D	D	D	D	D	D	8/8	100%
5	BG5	Explains the basic working principles and technology of the machine.	D	D	D	Y	D	D	Y	D	6/8	75%
6	BG6	Explains the basic features of spare parts and consumables of the machines.	D	D	D	D	D	Y	Y	D	13/16	81%
7			D	D	D	D	D	D	Y	D		
8	BG7	Lists the consumables required for maintenance work.	D	D	D	D	D	D	Y	Y	6/8	75%
9	BG8	Lists of the apparatus, tools and equipment required for operation.	D	D	D	D	D	D	D	D	8/8	100%
10	BG9	Lists the measurement and control instruments to be used in the process.	Y	D	Y	Y	D	Y	D	Y	3/8	38%
11	BG10	Explains the control steps of the work equipment and safety mechanisms.	D	D	D	Y	Y	Y	D	Y	4/8	50%

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12	BG11	The sequence of operations to be performed on the connections of electricity, water, compressed air, steam and gas installations before maintenance activities.	D	D	D	Y	Y	Y	Y	D	4/8	50%
13	BG12	Sorts types of sealing elements.	D	Y	Y	D	Y	Y	Y	Y	2/8	25%
14	BG13	Explains the mechanical components of the machines.	D	Y	Y	D	Y	Y	Y	Y	2/8	25%
15	BG14	Sorts the spare parts to be used in the elimination of mechanical failures.	D	D	D	D	D	D	D	D	13/16	81%
16			D	Y	Y	D	D	D	D	Y		
17	BG15	Explains maintenance information to be given to the machine operator.	D	D	D	D	D	D	D	D	8/8	100%
18	BG16	Describes the relevant maintenance information to be given to the appropriate supervisor.	D	Y	Y	D	D	D	D	Y	5/8	63%
19	BG17	Explains maintenance procedures to be processed on control cards.	D	D	D	D	D	D	D	D	13/16	81%
20			D	D	Y	D	Y	D	Y	D		
RESULTS			90	75	70	75	70	65	55	65		71%

B1 – Performance Based Application - Assessment and Surveillance Data

Qst. No	No	Expression Information	Ford OTOSAN		İÇDAŞ		TÜRK TRAKTÖR		ARÇELİK		Note	Evaluation
			Tech. 1	Tech. 2	Tech. 3	Tech. 4	Tech. 5	Tech. 6	Tech. 7	Tech. 8		
1	BY1	Examines basic operating principles of machines.	3	3	3	3	3	3	3	3	3	(24 / 24) 100%
2	BY2	Examines machine's catalogues, recognizes machine elements from technical drawings.	3	3	3	3	3	3	3	3	3	(24 / 24) 100%
3	BY3	Prepares consumables in accordance with the work to be done.	3	3	3	3	3	3	3	3	3	(24 / 24) 100%
4	BY4	Makes ready necessary apparatus, machinery and equipment for operation.	3	4	3	4	4	4	4	4	4	(30 / 32) 94%
5	BY5	Prepare measurement and control instruments according to the specified process.	-	-	2	3	4	4	-	-	4	(13 / 32) 40%

6	BY6	Controls the operation of the safety mechanisms of the machine to be maintained in accordance with the instructions.	4	3	3	4	4	4	3	4	4	(29 / 32) **90%**
7	BY7	Takes necessary safety precautions about the machine.	4	3	3	4	4	4	3	4	4	(29 / 32) **90%**
8	BY8	Closes or controls all power supply connections that may be associated with the machine or workspace to be maintained.	5	5	5	5	-	5	5	5	5	(35 / 40) **88%**
9	BY9	The machines must be lubricated in accordance with the operating instructions or maintenance instructions.	4	4	5	4	5	5	5	4	5	(36 / 40) **90%**
10	BY10	Performs the tightening process by checking possible loose parts and connections.	4	3	5	4	4	5	5	5	5	(35 / 40) **88%**
11	BY11	Cleans the machine from foreign substances such as oil, dust, rust, metal fragments.	5	4	4	4	5	5	5	4	5	(36 / 40) **90%**
12	BY12	Makes the oil change of the machines.	5	5	5	4	5	5	5	5	5	(39 / 40) **98%**
13	BY13	Makes necessary measurements using micrometre, calliper and appropriate measuring instruments.	-	-	3	4	4	3	-	-	5	(14 / 40) **35%**
14	BY14	Changes the filter.	5	5	3	5	4	5	5	5	5	(37 / 40) **93%**
15	BY15	Replaces sealing element.	5	5	4	5	4	5	5	5	5	(38 / 40) **95%**
16	BY16	Replaces V-belt.	5	5	3	5	4	5	4	3	5	(34 / 40) **85%**
17	BY17	Replaces bearing.	4	4	4	5	5	5	4	3	5	(34 / 40) **85%**
18	BY18	Adjusts the parts that need to be changing and setting allows them to work in the desired way.	3	3	2	3	3	3	2	3	3	(22 / 24) **92%**
19	BY19	Starts the machine and make the final checks.	3	3	2	3	3	3	2	3	3	(22 / 24) **92%**
20	BY20	Records performed operations on maintenance control cards.	4	4	4	4	4	4	4	3	4	(31 / 32) **97%**
21	BY21	Implements the OHS rules in the works.	4	4	3	4	3	4	4	3	4	(29 / 32) **90%**

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22	BY22	Implements environmental protection measures in the works.	4	3	4	4	3	4	3	4	4	(29 / 32) 90%
23	BY23	Conducts quality requirements in the works.	4	4	3	4	4	4	3	3	4	(29 / 32) 90%
24	BY24	Leaves the work place well organized.	3	3	3	3	3	3	2	3	3	(23 / 24) 96%
RESULTS			87	83	82	94	88	98	82	82	100	87%

B2 – Performance Based Application - Assessment and Surveillance Data

Qst. No	No	Expression Information	FORD OTOSAN		İÇDAŞ		TÜRK TRAKTÖR		ARÇELİK		Note	Evaluation
			Tech. 1	Tech. 2	Tech. 3	Tech. 4	Tech. 5	Tech. 6	Tech. 7	Tech. 8		
1	BY1	Examines basic operating principles of machines.	3	3	3	3	3	3	3	3	3	(24 / 24) 100%
2	BY2	Examines machine's catalogues, recognizes machine elements from technical drawings.	3	3	3	3	3	3	3	3	3	(24 / 24) 100%
3	BY3	Prepares consumables in accordance with the work to be done.	3	3	3	3	3	3	3	3	3	(24 / 24) 100%
4	BY4	Makes ready necessary apparatus, machinery and equipment for operation.	3	4	4	4	4	4	4	4	4	(31 / 32) 97%
5	BY5	Prepare measurement and control instruments according to the specified process.	-	-	2	4	4	4	-	-	4	(14 / 32) 44%
6	BY6	Controls the operation of the safety mechanisms of the machine to be maintained in accordance with the instructions.	4	4	3	4	4	4	4	4	4	(31 / 32) 97%
7	BY7	Takes necessary safety precautions about the machine.	4	4	3	4	4	4	4	4	4	(31 / 32) 97%
8	BY8	Closes or controls all power supply connections that may be associated with the machine or workspace to be maintained.	5	5	5	5	5	5	5	5	5	(40 / 40) 100%

9	BY9	Resolves the fault caused by the sealing element.	8	8	7	9	8	8	7	7	10	(62 / 80) 78%
10	BY10	Makes necessary measurements using micrometre, calliper and appropriate measuring instruments.	5	3	3	5	4	3	-	3	5	(26 / 40) 65%
11	BY11	Takes precautions to ensure the safety of the work environment, such as keeping foreign / dangerous items away.	4	4	4	5	5	4	4	3	5	(32 / 40) 80%
12	BY12	Adjusts the parts that need to be changing and setting allows them to work in the desired way.	4	4	4	5	5	5	5	4	5	(36 / 40) 90%
13	BY13	Parts that need to be disassembled in order to reach the disruptive parts should be disassembled according to instructions and manuals.	4	4	4	5	5	4	5	4	5	(35 / 40) 88%
14	BY14	Replaces new parts according to instructions or manuals.	8	8	7	8	8	8	8	7	10	(62 / 80) 78%
15	BY15	Repairs defects caused by mechanical parts.	4	5	4	5	5	4	5	4	5	(36 / 40) 90%
16	BY16	Starts the machine and make the final checks.	4	4	5	5	5	5	4	5	5	(37 / 40) 93%
17	BY17	Records performed operations on maintenance control cards.	3	4	4	4	4	4	4	4	4	(31 / 32) 97%
18	BY18	Implements the OHS rules in the works.	4	4	4	4	4	4	4	4	4	(32 / 32) 100%
19	BY19	Implements environmental protection measures in the works.	4	4	3	3	3	4	4	4	4	(29 / 32) 90%
20	BY20	Conducts quality requirements in the works.	4	4	3	3	3	4	3	4	4	(28 / 32) 88%
21	BY21	Leaves the work place well organized.	3	4	3	3	3	4	3	4	4	(27 / 32) 84%
RESULTS			84	86	81	94	92	91	82	83	100	87%

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Observations

Each of the evaluation and surveillance data obtained from the theoretical and performance applications made within the framework of the qualification units are considered separately and evaluated as follows.

In both applications;

- Performing basic training for the subjects between 0 and 60 points
- Performing an improvement study for the subjects between 61 and 80 points
- For the subjects between 81 and 100 points evaluated, it was concluded as SUFFICIENT.

A1 - Observations on the THEORETICAL application in the Occupational Health and Safety, Environment and Quality Unit;

BG4 - In the application "5 and 6" about "Describes how to install warning signs and plates with locking and labelling systems for the workshop", candidates completed 8 out of 16 applications. So the performance was 50%.

BG12 - In the application "15" about "Describes the storage period of recycled materials", candidates could not give any correct response. So the performance was 0%.

BG16 - In the application "20" about "Explains the faults and errors that are detected during the operation", candidates could not give any correct response. So the performance was 0%.

A1 - Occupational Health and Safety, Environment and Quality unit is averaged 74% for the THEORETICAL application.

B1 - Observations on the THEORETICAL application in the Preventive Maintenance Unit;

BG1 - In the application "1" about "Explain the eligibility criteria for OHS for materials, tools and materials", candidates completed 2 out of 8 applications. So the performance was 25%.

BG5 - In the application "5 and 6" about "Explains the basic working principles and technology of the machine", candidates completed 10 out of 16 applications. So the performance was 63%.

BG7 - In the application "8" about "Lists the consumables required for maintenance work", candidates completed 1 out of 8 applications. So the performance was 13%.

BG13 - In the application "14" about "Explains oil types and usage areas", candidates completed 4 out of 8 applications. So the performance was 50%.

BG16 - In the application "17" about "Sorts the cleaning materials in preventive maintenance activities", candidates completed 3 out of 8 application. So the performance was 38%.

BG17 - In the application "18" about "Explains the procedures for oil change", candidates completed 3 out of 8 applications. So the performance was 38%.

BG18 - In the application "19" about "Sorts usage areas and types of filters, seals, sealants, bearings and belts", candidates completed 3 out of 8 applications. So the performance was 38%

BG21 - In the application "22" about "Explains the simple setting operations performed on the machines", candidates completed 5 out of 8 applications. So the performance was 63%.

B1 - Preventive Maintenance Unit is averaged 74% for the THEORETICAL application.

B2 - Observations on the THEORETICAL application in the Corrective Maintenance Unit;

BG3 - In the application "3" about "Lists any negativity that should be controlled such as sound, temperature, smell and pollution", candidates completed 2 out of 8 applications. So the performance was 25%.

BG9 - In the application "10" about "Lists the measurement and control instruments to be used in the process", candidates completed 4 out of 8 applications. So the performance was 50%.

BG10 - In the application "11" about "Explains the control steps of the work equipment and safety mechanisms", candidates completed 3 out of 8 applications. So the performance was 38%.

BG11 - In the application "12" about "The sequence of operations to be performed on the connections of electricity, water, compressed air, steam and gas installations before maintenance activities", candidates completed 4 out of 8 applications. So the performance was 50%.

BG12 - In the application "13" about "Sorts types of sealing elements", candidates completed 2 out of 8 applications. So the performance was 25%.

BG13 - In the application "14" about "Explains the mechanical components of the machines", candidates completed 2 out of 8 applications. So the performance was 25%.

BG16 - In the application "18" about "Describes the relevant maintenance information to be given to the appropriate supervisor", candidates completed 5 out of 8 application. So the performance was 63%.

B2 - Corrective Maintenance Unit is averaged 74% for the THEORETICAL application.

B1 - Observations on the PERFORMANCE application in the Preventive Maintenance Unit;

BY5 - Candidates scored 13 points on a total of 32 points for "Prepare measurement and control instruments according to the specified process". So the performance was 40%.

BY13 - Candidates scored 14 points on a total of 40 points for "Makes necessary measurements using micrometre calliper and appropriate measuring instruments". So the performance was 35%.

B1 - Preventive Maintenance Competence Unit is averaged 87% for the PERFORMANCE application.

B2 – Observations on the PERFORMANCE application in the Corrective Maintenance Competence Unit;

BY5 - Candidates scored 14 points on a total of 32 points for "Prepare measurement and control instruments according to the specified process". So the performance was 44%.

BY9 - Candidates scored 62 points on a total of 80 points for "Resolves the fault caused by the sealing element". So the performance was 78%.

BY10 - Candidates scored 26 points on a total of 40 points for "Makes necessary measurements using micrometre calliper and appropriate measuring instruments". So the performance was 65%.

BY14 - Candidates scored 62 points on a total of 80 points for "Replaces new parts according to instructions or manuals". So the performance was 78%.

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B2 - Corrective Maintenance Unit is averaged 87% for the PERFORMANCE application.

4. Recommendations

4.1. Improvement Areas

Improvement areas were identified according to the competence units in the evaluation data obtained from the observations.

Theoretical Application;

- **A1 - Occupational health and Safety:** There was no sufficient information and experience about the Visual and Guidance Signs used in Occupational Health and Safety,
- **A1 - Environment:** There was no sufficient information and experience about the Visual and Guidance Signs used in environment,
- **A1 - Quality:** The statements regarding Preventive maintenance, Corrective maintenance and Improvement maintenance work being applied for maintenance were not clearly understood,
- **B1 - Preventive Maintenance / Environment:** The lack of environmental awareness of the disposal of consumable materials were used during maintenance,
- **B1 - Preventive Maintenance / Principle of Basic Machine Work:** Work done before the detailed preliminary inspection of the machines is studied,
- **B1 - Preventive Maintenance / Consumables:** The permanent parts of the machine and the consumables used for maintenance were not clearly understood,
- **B1 - Preventive Maintenance / Oils:** The appropriate use of oil in the machines could not be selected properly,
- **B1 - Preventive Maintenance / Cleaning Materials:** The cleaning materials used during the maintenance of the machines were not clearly understood,
- **B1 - Preventive Maintenance / Machine Parts:** It was not clearly understood what the mechanical parts of the machine are functioning,
- **B1 - Preventive Maintenance / Basic Settings:** No simple presets were performed,
- **B2 - Corrective Maintenance / Technical Terms:** It was not understood what is the meaning of technical terms for the machines used for,
- **B2 - Corrective Maintenance / Measuring Tools:** Candidates do not have enough knowledge about measuring tools/instruments,
- **B2 - Corrective Maintenance / Control Steps:** When removing and installing a machine part, they did not follow the order of the process,
- **B2 - Corrective Maintenance / Technical Drawing:** Candidates were not friendly to technical drawing and circuit symbols,
- **B2 - Corrective Maintenance / Procedures:** Any of procedure was not followed after maintenance and repair work.

Performance Based Application;

- **B1 - Preventive Maintenance / Measuring and Control Tools:** During the preventive maintenance, no measurement and control tools were prepared.
- **B1 - Preventive Maintenance / Measuring and Control Tools:** During the preventive maintenance application, the measurements were made visually to be determined without the need for measuring tools.
- **B2 - Corrective Maintenance / Measuring and Control Tools:** During the corrective maintenance, no measurement and control tools were prepared

- **B2 - Corrective Maintenance / Sealing Elements:** Precisely selection of spares, dismantling and fitting of the sealing elements need to be paid attention. No care and attention was shown when working on sealing elements during application.
- **B2 - Corrective Maintenance / Measuring and Control Tools:** During the corrective maintenance application, the measurements were made visually to be determined without the need for measuring tools
- **B2 - Corrective Maintenance / Part Replacement:** Selection and replacement of new parts must be done according to the manual and / or machine catalogue. No reference was used for the part replacement application.

The Vocational Qualification Authority described the level of knowledge, skills and competence at the third level (Level 3) in Turkey Qualifications Framework - Level Descriptors as follows (myk.gov.tr., 2018):

Knowledge: To have an initial level of theoretical knowledge and an intermediate level of factual knowledge in a business or learning area.

Skill: To have the ability to select and use necessary data, methods and tools to perform tasks and solve problems.

Competence: To take responsibility in performing task; to complete the task by taking conditions changing into account; to identify and meet learning needs with guidance under the lifelong learning approach.

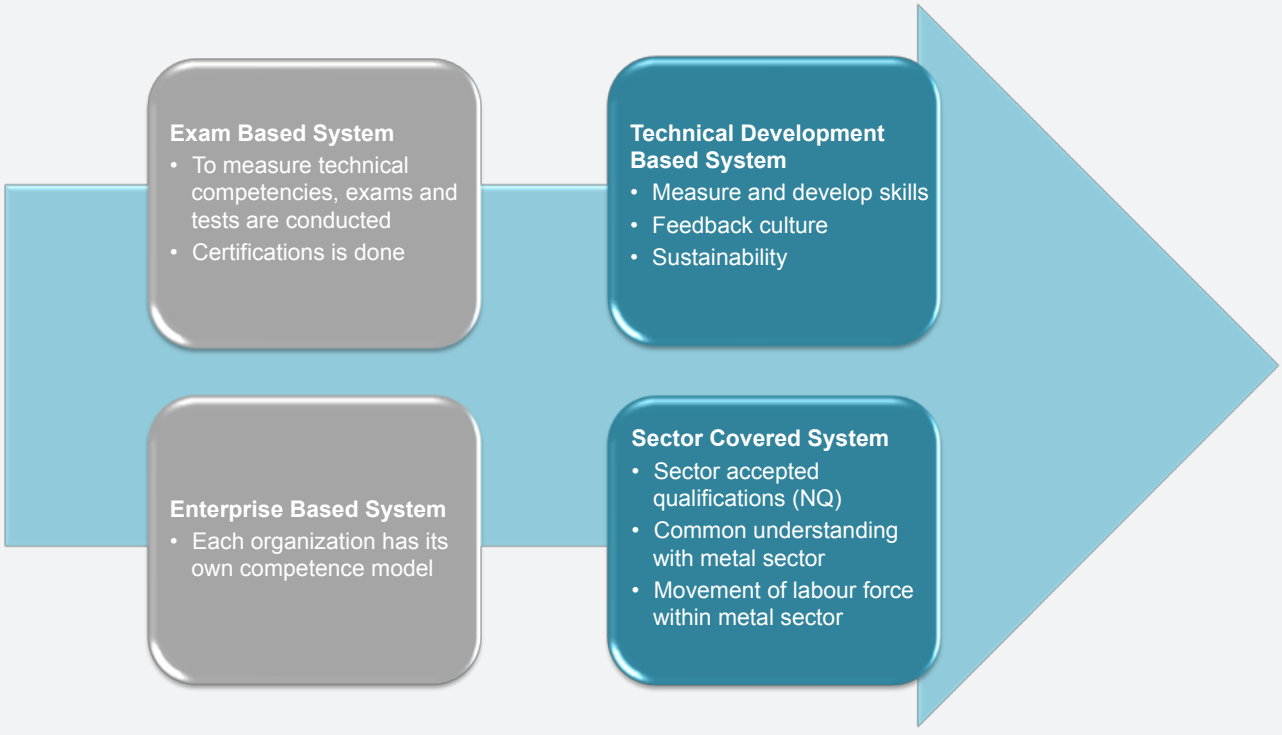

Figure 4. Changing mindset

The pilot application was implemented in a workshop-based system. At the end of the project, it is seen that some arrangements should be made for the development on the basis of knowledge, skills and competence of Mechanical Maintenance Operators (Level 3) who have a critical role in Industry 4.0. transition period. Besides, it is found that employees have difficulty in documenting their work on a previously prepared template and needed support although the participants were quite successful in implementing their work orders. For this reason, it is also important

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to determine the knowledge gaps and give some feedbacks. As a result of the pilot application consisting of two stages as theoretical and practical, the recommendations for changing mindset are presented in three main areas:

The implementation of workshop-based system

Within the framework of the pilot application, it is recommended for each metal industry enterprise to open a workshop in their companies. Thus, each company will create a learning, training and application area. This recommendation will also highlight a significant benefit. Production in the company will continue to occur without stopping learning. In other words, the aim is to realize learning without stopping production and to keep production at maximum level.

Transition from an exam-based system to a technical development evaluation based system for competence model

Assessing the expected competencies is a challenging process at the end of an application. In this process, the use of an exam-based system for evaluation is a question mark in the correct evaluation of competence. In an application-oriented system, the measurement of competencies through tests puts the question in terms of the validity and reliability of the assessment. Because, using only tests can measure that knowledge has been acquired, but it may not be able to measure behavior acquired. Therefore, it is recommended to implement a technical development evaluation based system rather than a test-based system in the process of implementing competence. The aim at this point is to evaluate skills effectively and gain new skills in a process-oriented system. Thus, the development of individuals can be monitored and feedbacks can be taken systematically. As a result, sustainability will be provided effectively.

Transition from an enterprise-based system to a sector-covered system

With the results of the project, it is recommended that the workshop-based system should be implemented in the sector-covered system instead of the enterprise-based system. With the purpose of widespread impact of the project, it is of great importance to ensure that these practices continue in the metal sector because it is recommended to implement the applications on a sectoral basis and to obtain results on a sectoral basis.

When applications remain on the basis of enterprise, each enterprise will try to build its own competence model. However, what is desired is the spread of applications to sector in general. Therefore, it is important to establish the standard qualifications accepted in the sector. At this point, it is necessary to create a common sense and understanding for qualifications in the metal sector. This common sense and understanding is expected to increase the movement of labour force in the metal sector.

Briefly summarizing the improvement areas;

- Participants had difficulties in recognition of the existing visual and directory signs in their shopfloor.
- Statements regarding the purpose and types of machine maintenance; preventive, corrective and improvement maintenance were not clearly understood by the participants.
- The lack of environmental awareness in terms of the use and disposition of consumable materials has been observed.
- Participants began to implement work orders without understanding the parts and principles of the pilot machine and examining the technical drawings in the Machine Catalogue that are designed to guide them through the process.
- There is a lack of knowledge on the oils used in the machines and the intended use of oil.
- Participants had troubles with the use of measuring tools and did not follow proper procedures according to control steps when removing and installing parts.
- Even though participants were quite successful to implement work orders, they had difficulties to document the work on a previously prepared template and they needed support.

REFERENCES

- Cedefop. (2018). European qualifications framework (EQF). [online] Available at: http://www.cedefop.europa.eu/en/events-and-projects/projects/european-qualifications-framework-eqf [Accessed 20 Jun. 2018].
- Eqavet.eu. (2018). European Qualifications Framework - Eqavet. [online] Available at: https://www.eqavet.eu/What-We-Do/European-VET-Initiatives/European-Qualifications-Framework [Accessed 26 Jun. 2018].
- Myk.gov.tr. (2018). Avrupa Yeterlilikler Çerçevesi. [online] Available at: https://www.myk.gov.tr/index.php/tr/avrupa-yeterlilikler-cercevesi [Accessed 21 Jun. 2018].
- Myk.gov.tr. (2018). Ulusal Meslek Standardı Hazırlama Süreci. [online] Available at: https://www.myk.gov.tr/index.php/tr/ulusal-meslek-standard-hazrlama-suereci [Accessed 4 Jul. 2018].
- Myk.gov.tr. (2018). Ulusal Yeterlilik Hazırlama Süreci. [online] Available at: https://www.myk.gov.tr/index.php/tr/ulusal-yeterlilik-hazrlama-suereci [Accessed 6 Jul. 2018].
- Myk.gov.tr, (2018). [online] Available at: https://www.myk.gov.tr/images/articles/strateji/stratejik_plan/MYK_Stratejik_Plan .pdf [Accessed 27 Jun. 2018].
- Myk.gov.tr. (2018). TYÇ Seviye Tanımlayıcıları [online] Available at: https://www.myk.gov.tr/images/articles/TYC/seviye_tanimlayicilari.pdf [Accessed 4 Nov. 2018]

APPENDIX

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MACHINE MAINTENANCE LEVEL 3			
ABOUT THE PARTICIPANT			
ID No: Name, Surname:		Signature:	
ABOUT THE APPLICATION			
Application Name: SMART COMET Pilot Application Date:		Place: Time:	
ABOUT THE QUALITION UNIT			
Qualification Units Success Rate		Exercises	Duration
10UY0002-3/A1: Occupational Health and Safety, Environment and Quality		20	
10UY0002-3/B1: Preventive Maintenance		25	
10UY0002-3/B2: Corrective Maintenance		20	

10UY0002-3/A1: Occupational Health and Safety, Environment and Quality

This section involves 20 exercises.

1 Human-caused faults in Industries are the most common cause of emergency.

Which of the following **is not** among the reasons**?**

a) Inadequate training

b) Insufficient maintenance / repair

c) Safe working

d) Excessive fatigue

2 Which of the following statement is the first in the causes of an accident?

a) Insecure movement

b) Inexperience

c) Unexpected causes

d) Disease

3 What is the meaning of below security sign?

a) Use Glows

b) Use ear plug

c) Fire hazard

d) Use face mask

4 Which of the following is **not available** in first aid locker?

a) Pain reliever

b) gauze

c) Oxygen water

d) Wound band

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5 Which of the following item **<u>is not</u>** correct information about fire extinguishers**?**

a) Be in visible and accessible locations

b) There should be no obstacles in front of them

c) Be in accordance with the nature of work being done

d) There must be a 6 kg of fire extinguisher for each 100 m^2

6 What is the meaning of hazard symbol shown in the below figure?

a) Explosive substance

b) Toxic substance

c) Prohibited substance

d) Flammable material

7 What is the meaning of below security sign?

a) Use Glows

b) Use ear plug

c) Fire hazard

d) Use safety shoes

8 Which of the following statement is **<u>wrong</u>** for the emergency exit doors?

a) The number and the placement must be determined according to the number of employees

b) Must be locked and not connected

c) Must open to inward

d) It should not be a railed or revolving door

9 Which of the following **is not** the cause of a job accident**?**

a) Unprotected machines

b) Defective or slippery floor/ground

c) Use of personal protectors

d) Insufficient lighting

10 Which of the following item is necessary in the emergency action plan?

a) Fire

b) Earthquake

c) Chemical substance leakage

d) All

11 Which of the following emergency statement is proposed during the maintenance of a machine?

a) Continues to work

b) Informs to colleagues

c) An environmental abnormality report is prepared

d) The possibility of intervention is investigated and informed to the professional teams

12 Which of the following is eye-catching color?

a) White

b) Purple

c) Yellow

d) Red

13 Which unit is used for the measure of a sound intensity?

a) Decibel

b) Parameters

c) Histogram

d) Seismograph

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14 Employee Ramazan, a pointed object falls into his head while working at his job and then Ramazan had a work accident.

In order to avoid such an accident, which of the following safety measures have to be taken by Ramazan?

a) Must use a helmet**.**

b) Must wear gloves.

c) Use protective goggles.

d) Must wear work wear.

15 What is the color of the recycling bin for collection of plastic and metal products?

a) Blue

b) Yellow

c) Green

d) Grey

16 Which one of the following **is not** the cause of wastage**?**

a) Un-education

b) Advertisements that are blown away

c) Slow development of fashion

d) Determination of needs by others

17 Which of the following can be occurred, if quality-specified technical procedures **are not properly applied** during maintenance and repair?

a) Producing of quality products

b) A safe and peaceful working environment

c) Incorrect production

d) Production without any deviation

18 What is the purpose of quality control processes in general?

a) To examine the material structure of the product

b) To determine the conformity of the product or work to specified standards

c) To control the design features of the product

d) To check the dimensions of the product

19 What is called the confirmation process based on objective evidence that the specified conditions are fulfilled?

a) Verification

b) Recovering

c) Error

d) Check

20 What are the activities to remove the root cause of a specified non-conformity and preventing to be reproduced?

a) Improvement

b) Preventive action

c) Corrective action

d) Review

This section is done.

Please move on to the next section.

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10UY0002-3/B1: Preventive Maintenance

This section involves 25 exercises.

1 What should be done after the cleaning of the cotton and fabric staffs used for cleaning?

a) Should be discarded.

b) Must be returned to unused staffs.

c) It should be left on the machine base.

d) Must be disposed into used staffs.

2 Which of the following is the most appropriate action to be taken in maintenance work to prevent strangers from entering the work area?

a) Lock the workshop door

b) Keep someone at the workshop entrance

c) Attract safety band to work area

d) Work during the holidays

3 Dirt, dust and accumulated oil in the machines or the removed assemblies are **not cleaned** by any of the following?

a) Broom

b) Vacuum pumps

c) High power vacuum cleaner

d) Vacuum generators

4 Which of the following is **not a good** lighting pattern?

a) Adequate light intensity

b) Spread well lighting

c) No shadow and no dazzling lighting

d) Dimmed light

5 Which of the following has a lever, sprocket and screw in the working system?

a) Hydraulic jack

b) Mechanical jack

c) Pneumatic jack

d) Electric power jack

6 Which of the following is **not the task** of the cranes?

a) Fast and serial load lifting

b) Light load lifting

c) Load weighing

d) Goods transportation

7 Which of the below parts should be kept as the spare in inventory for the machines used in the production line?

a) Working head

b) Base body

c) Drive motor

d) Bearing

8 Which of the following is **not considered** as consumable item for maintenance?

a) Belt

b) Rust remover spray

c) Gear

d) Bearing

9 Which of the following produces the compressed air required for the pneumatic circuit?

a) Hydraulic pump

b) Compressor

c) Conditioners

d) Pneumatic pumps

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10 What is the device that hydraulic oil pressure measured?

a) Thermometer

b) Barometer

c) Torque-meter

d) Manometer

11 Which of the following should a machine maintainer perform periodic maintenance work according to?

a) His desire

b) The machine operating instructions

c) In case of failure

d) The maintainer's request

12 What should be the air pressure that feeds the universal machines used in the workshops?

a) 2 Bars

b) 6 Bars

c) 12 Bars

d) 16 Bars

13 Which of the following phrases defines? "Extends the machine's life, protects against corrosion, makes it work quietly."

a) Cooling liquid

b) Lubricate

c) Clean the machine

d) Regular work

14 Which of the following oil type should be used in the Reducer, Transfer box, etc?

a) Transmission oil

b) Engine oil

c) Hydraulic oil

d) Grease oil

15 During the (monthly) periodic maintenance of an air compressor, which of the following elements have to be checked for loosening and adjustment?

a) Manometer

b) V-Belt

c) Water trap filter

d) Air filter

16 Which of the following is included in the daily maintenance activity of a lathe?

a) Motor belt replacement

b) Replacement of cutter and cutting bit

c) Replacement of coolant filter

d) Cleaning of chuck and jaws

17 Which of the following materials **cannot be used** when cleaning sensitive machine parts during preventive maintenance?

a) Cotton cleaning cloth

b) Compressed air

c) Cleaning solvent

d) Soft brush

18 What is the fluidity characteristic of oils?

a) Flowability

b) Flow rate

c) Viscosity

d) Temperature

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19 What is the name of the machine part with the variously rolling parts to make it easier to rotate a shaft?

a) Gear

b) Wedge

c) The hub

d) Bearing

20 What should be called materials such as Bearing, Belt, Filter and Oil, which should be changed periodically on a machine?

a) Consumables

b) Chemical materials

c) Service materials

d) Slow moving materials

21 Which of the following options should need to be adjusted after the mechanical friction system has been changed?

a) Coupling (clutch) clearance

b) Bearing clearance

c) Pad space

d) Bearing space

22 Which one of the following settings is **not applied** on the shaft that transmits the motion between the two units via a mechanical coupling connection?

a) Axial spacing

b) Axial travel

c) Offset setting

d) Coupling parallax

23 Which of the following is **not covered** by autonomous care?

a) Cleaning of the machine by operator

b) Control of the machine by operator

c) Lubricating of the machine by operator

d) Performing major repair of the machine by operator

24 Which of the below procedure is followed after maintenance and repair of a machine?

a) Fill in maintenance form

b) Inform to the supervisor

c) Check whether the machine operates properly

d) All

25 Which of the following forms will be filled after periodic maintenance on a machine has been completed?

a) Periodic maintenance form

b) Assembly form

c) Control form

d) Repair form

This section is done.

Please move on to the next section.

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10UY0002-3/B2: Corrective Maintenance

This section involves 20 exercises.

1 Which of the following item is **not necessary** for the welding area in a maintenance workshop?

a) Welding goggle

b) Welding glove

c) Hydrant

d) Fire extinguisher

2 Which of the following behaviors is **wrong** in the electrical maintenance and repair work on the machines?

a) Working with isolated instruments

b) Cut off the electric supply of the machine

c) Wearing insulated shoes

d) Working on wet ground

3 Which of the following terms refers to “the reduction of air pressure to atmospheric pressure”?

a) Pressure

b) Atmosphere

c) Vacuum

d) Steam

4 Which of the following is **not a correct statement** for the safety of flammable and combustible materials?

a) Do not interfere oxygen tubes with oily hands and gloves

b) The materials are stored in the special area according to the instructions

c) The materials are set to the usage parameters according to the instructions

d) Materials may be kept in resting and sitting areas

5 Which of the following information is included in the manuals for maintenance, repair and use of the machines?

I. Technical features of machine

II. Machine lubrication system

III. Assembly pictures of the machine

a) Only I

b) I and II

c) I and III

d) All

6 Which criteria are considered when selecting power transfer belts?

a) Stiffness of the belt

b) Belt's brand

c) The belt sizes

d) Belt's material content

7 The main shaft bearings will be changed. Which of the following factors is **not taken** into account when choosing a bearing?

a) Bearing type

b) Bearing code

c) Bearing size

d) Bearing brand

8 Which of the following item is **not considered** as consumable for an air compressor?

a) Belt

b) Filter

c) Piston

d) Oil

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9 Which of the following tools will be used to remove the bearings for maintenance and repairs?

a) Lever

b) Puller

c) Hummer

d) Screwdriver

10 Which of the following is **not a measuring** instrument?

a) Torque wrench

b) Micrometer

c) Manometer

d) Thermomete

11 Which statement is true regarding the dismantling of defective machine parts?

a) The dismantled parts are arranged in rows.

b) The disassembled parts are collected in the box.

c) The disassembled parts are placed on the machine.

d) The dismantled parts are stored by an assitant

12 A machine is equipped with electrical, compressed air and closed type cooling water supply lines; Before starting to work, which of the following supply lines must be turned off in sequence?

a) Air, Water, Electricty

b) Electricity, Air, Water

c) Water, Air, Electricity

d) Air Electricity, Water

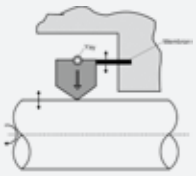
13 What type of the sealing element is seen in below picture?

a) Staffing

b) Radial felt

c) O-ring

d) Seal



14 What is the name of the machine element that transfers a linear motion into a circular motion with the aid of an arm?

a) The crankshaft

b) Arbor shaft

c) Camshaft

d) Lay shaft

15 Disassembly and reassembly of the lower oil sump housing in the machines, which of the following parts should be replaced with the new one?

a) Fixing bolts

b) Oil seal gasket

c) Caster centering pins

d) Oil filler cap

16 Which of the following constitutes a group of spare parts for which a machine must be replaced under maintenance repair or periodic maintenance?

a) Gear, Belt, Shaft, Oil, Filter

b) Filter, Bolt, Nut, O-ring, Washer

c) Oil, Filter, Gasket, Gear, Plug

d) Bearing, Gasket, Oil, Belt, Filter

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17 Which of the following documents is required for the procedure of periodic maintenance and repair?

a) Maintenance Repair Form

b) Assembly Form

c) Purchase Form

d) Material Request Form

18 Which of the following must be done after the maintenance and repair of the machines?

a) Start working immediately

b) Informing to supervisor and continue to work

c) The machine is shut down and cannot be operated

d) Expected instruction from top management

19 Which of the following information is **not presented** on the form for maintenance and repair?

a) List of materials used

b) Start and end time

c) Explanation of work done

d) Maintenance and repair cost

20 Why is the “start and end time” written on the maintenance repair form?

a) To measure annual machine performance

b) To measure machining capacity

c) To measure the performance of the operator

d) To measure the performance of maintenance staff

This section is done.

Please check your applications.

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PHASE 3

Developing a systematic approach for companies as to how to manage their competences over short, medium and long-term horizons together with schools

Developing a systematic approach for companies as to how to manage their competencies over short, medium and long-term horizons together with schools

Table of Contents

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PHASE 3

1. Introduction

In this section, it is firstly aimed to explain why such a project is needed, considering the necessities of the already existing competence management systems. Then, a new perspective is tried to be put forward bringing in a new approach in line with the results of the project. In this model, vocational education and training was associated with lifelong learning, and some recommendations for the metal sector were presented. After this stage, significant recommendations for sustainability and dissemination of project results have been developed.

2. Root Cause Analysis

Root Cause Analysis is an analysis method designed to define not only how an event occurs, but also why it is performed. In this regard, understanding why an event is being performed is the key to developing effective recommendations (Rooney and Heuvel, 2004). In this section, the reason why such a work is needed is discussed in detail. Thus, the insufficiencies in the competence management systems causing realization of the project were tried to be determined in terms of all stakeholders. As a result, a new approach has been introduced in order to provide a more efficient way of operating the system.

Vocational education and training is vital for a country's sustainable development. According to the STEM Survey (October 2014) conducted by TÜSİAD (Turkish Industry and Business Association) with its member enterprises, half of large enterprises (47%) and 43% of enterprises in the manufacturing sector benefit from graduates of VET schools and vocational higher education institutions in their R&D departments. However, an average of 87% of these enterprises are not in cooperation with either VET high schools or higher institutions. Another important point is that vocational education and training will gain even more importance for Industry 4.0 processes we are in transition. The process of I4.0 is planned to enable machines to communicate with each other and people through cyber physical processes and to create a decentralized decision-making process in the smart factories with modular structures. If the human resource does not grow in the profile required by Industry 4.0, the qualified labor shortage will continue increasing gradually; on the other hand, serious unemployment problems will occur on top of the existing unemployment levels. For both newly created jobs and existing jobs, Industry 4.0 will change the competencies of labor force and vocational and technical knowledge and competencies will gain importance during this process.

Thus; a cooperation model is a must for different stakeholders of VET; students, schools, school administrators, teachers and enterprises in the sector. Then a sustainable system is also a must for the further assessment of competencies of the employees. This Project aims at composing a comprehensive solution model for these problems by bringing together different partners from Turkey and also two other country examples of EU member states; in order to better understand the European model. The purpose of the school-enterprise cooperation model is to assist the

establishment of sustainable and structured collaborations between schools, enterprises and the sector as a whole. In addition, it was stated that vocational and technical education strengths the efficiency, performance, competitiveness, research and innovation capacity of enterprises and thus, it is of great benefit for all the stakeholders to internalize a full-fledged competence management system starting from high school level and continuing though life-long learning practices.

3. Mid-term Level Development Plan

The project has two main components to support both VET and competence management. It started with a close collabrotaion with another project implemented by MESS and MESS Training Foundation, Full Support to Vocational Education Project (METAD) in which a sector-school-enterprise cooperation model is set. 23 project protocols were signed between 18 MESS member enterprises and 21 VET high schools as a part of METAD project.

SMART COMET project covered a series of study visits for both its components. During the visits within this scope, vocational education and training and its applications were assessed on site in different countries and in different schools and enterprises, which lead to see and analyse the needs of the sector in detail. These enterprises and schools from Turkey were already the ones included in METAD project protocols which gave the chance to learn from each other through various site visits and meeting. In this way, the school-enterprise cooperation model is understood from all different angles and it is also piloted and developed though different country examples. Representatives of Spain visited Turkey to see applications in the country. A study visit, which combines the components of competency management and school enterprise cooperation, was held in Istanbul, Kocaeli and Bursa. A delegation of business representatives from Spain, the Ministry of Education and the administrators of vocational high school attended the visit. Within the scope of this study, Arçelik Çayırova Washing Machine Firm, Ford Automotive Industry Incorporated Company and Bosch Industry and Trade Company, Darıca Denizyıldızları Vocational and Technical Anatolian High School, Gölcük Vocational and Technical Anatolian High School and Bursa Hürriyet Vocational and Technical Anatolian High School were visited.

During research period, brainstorm activities, literature research and field research are done. Furthermore, project partners feedback, best practices in European Union are taken into consideration in order to create common ground between different stakeholders. After each and every study visit, a focus group discussion meeting was done in order to gather more insight information from the participants and to understand the perspectives and ideas about different models.

Two study visits, with participation of representatives of many different firms from different sub-branches of metal sector, the administrators of vocational and technical Anatolian high schools and experts from General Directorate of Vocational and Technical Education of MoNE, was made to Stuttgart, Germany. The visits were hosted by Dekra Akademie. Participants had the chance to see competence management applications of different companies, but the most important intake of Germany study visits was analyzing dual education and training. Participants had opportunity

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to compare the education systems of different countries and had a general understanding about the institutions included in the **dual education system**. Chamber of Commerce and Industry was one of the stops visited by the delegates and its role in dual education system was explained in detail. The Chamber, the authority that signs the agreement between students and enterprises has a significant role in dual system, as well as handling the mid – term and final exams of the apprentices through which they earn certificates to qualify for certain jobs. VET schools were also a part of this visit. Participants had the chance to ask the administrative details of the system and to see the classroom environment of the country in general; and learned that the students need to work 3 days in a company and 1 day or 1,5 days in a vocational school in general in this system. Companies and their production facilities were visited where materials used in dual education was shown and students also explained the work they have been doing in the company. All different platforms including e-learning was introduced by the companies in order to explain the training the apprentices are completing.

A very good example of dual education applications is **Bosch TGA Vocational and Technical Training Center** (TGA - Technisch Gewerbliche Ausbildung). In Turkey Since 1999, Bosch has been introducing students to private sector in high school. The training center has so far provided nearly 250 graduates. Ministry of National Education provides training at the TGA for 3 years, 2 days a week in school and 3 days a week in the enterprise. Established in Bursa Factory, TGA works with Nilüfer Atatürk VET School as a training partner. The program aims at supporting the development of vocational schools within its framework, which envisages training of qualified personnel in line with needs of technical departments with an educational structure within modern technical and organizational structure. Almost 250 students are graduated from TGA to date. About 70% of these students work in various positions within Bosch, and other graduates continue their undergraduate and graduate programs.

Computerized Machinery Manufacturing (Industrial Mechanics) and Industrial Maintenance (Industrial Electronics), are two branches and each year Computerized Machinery accepts 16 students while Industrial Maintenance accepts 5, 21 in total. In the 650 square meter vocational training center, there are various training environments such as application workshops, PLC, CNC, automation, measurement laboratories and theoretical classrooms. 4 technical instructors, 2 of which are industrial mechanics and 2 are in the field of industrial electronics are working within TGA. 3rd grade students are included in the field applications through rotation where they acquire their working competencies in various departments within the enterprise for 6 months. In addition to these, foreign language training is also provided, guidance and sports classes are also given to the pupils. In the training workshop within TGA, learning steps are supported with real work pieces and projects from inside the Bosch company.

Two other study visits were made to Spain; one to Cantabria region of the country and another to the Basque Country, both hosted by INDEO – Fundación Laboral del Metal (FLM). Representatives of the enterprises, Ministry of National Education, MEV and MESS attended the visits. Participants gained insight information on dual education in Spain. It appeared that the number of VET students in Spain stays relatively low and accordingly, the number of students per teacher is much less

compared to Turkey. This situation gives Spain an advantage in terms of the quality of vocational and technical education. Financial support from national government for vocational education in Spain is high. One of the reasons may be that spendings on education is determined at the regional level and the number of schools are not a lot. As a natural consequence, school and enterprise cooperation is not based on a financial dependency but is based more on increasing the quality of VET. Some of the enterprises in Spain are benefitting from VET students in Research and Development departments since they are more capable of not having a profit-oriented understanging making them capable of having more innovative and broader ideas. This also increases the quality of school and enterprise cooperation.

The other study visits to Basque Country of Spain, where training of the schools and enterprises in the region and the competency development models of the employees of enterprises were examined. The most crucial stop of this visit was the visit to **Tknika Research and Innovation Center**. Established under Deputy Ministry of Vocational Education, Basque Country offers training programs for teachers and employees both from Spain and around the world. The Center also conducts research projects for small and medium-sized enterprises that do not have R&D centers. The center includes relevant VET schools in these project teams and provides bridges between schools and enterprises in this way. With this feature, Tknika is a center where new technologies are produced, training methodologies are developed, and all of these are promoted by SMEs and schools. Tknika, provides support to enterprises without R&D units in specific needed areas and adds a distinctive and innovative dimension to vocational education and training.

The competence management component of project started with pilot application of already esisting workshop-based competence management system. A competence management model appealing to the metal industry as a whole wanted to be introduced and wanted to be implemented in an operational and occupational basis. As a result of this application, feasibility of this model and development areas related to the implementation of the model in the field was planned to be determined. **10UY0002-3 National Qualification of Machine Maintanence Operator (Level 3)** developed by MESS with the participation of all related stakeholders (vocational education and training institutions, enterprises, NGOs and occupational chambers, etc.) has been chosen for the pilot implementation by project team and enterprises due to its significant role in Industry 4.0 transformation and for metal industry. The model application was developed by the project team, Human Resource experts of the enterprises and machine maintenance operators themselves which was consisting of a theoretical and a practical stage.

Observations and findings from the focus group study after the application were listed as follows:

- Participants had difficulties in recognition of the existing visual and directory signs in their workfield.
- Statements regarding the purpose and types of machine maintenance; preventive, corrective and improvement maintenance were not clearly understood by the participants.
- The lack of environmental awareness in terms of the use and disposition of consumable materials had been observed.

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- Participants began to implement work orders without understanding the parts and principles of the pilot machine and examining the technical drawings in the Machine Catalog that are designed to guide them through the process.

- There is a lack of knowledge on the oils used in the machines and the intended use of oil.

- Participants had troubles with the use of measuring tools and did not follow proper procedures according to control steps when removing and installing parts.

- Even though participants were quite successful to implement work orders, they had difficulties to document the work on a previously prepared template and they needed support.

So, it was also important to determine the knowledge gaps and give some feedback to the employees. As a result of the pilot application, a set of recommendations for changing mindset are presented. A coherent, adaptable and practical institutional level competence management system covering **ECVET** tools and learning outcomes is seen as the result of this project. The main outcome of the project is to develop a learning outcome - based competence management framework for the metal industry. Thus, a new approach for the metal industry is presented.

Cooperation between schools and enterprises are viewed as strategies to improve real experiences, which are generally achieved through community involvement (Watters, Hay, Dempster, & Pillay, 2013). For this reason, schools should bring a different perspective on how science and related workplace-based information should be presented for students moving from their traditional narrow focus to their professional careers in the field for further studies (Munro and Elsom, 2000).

Since the 1980s, three major developments have affected the landscape of higher education institutions; these are globalization, increasing requirements for lifelong learning, and rapid and intensive developments in information and communication technologies (Erçetin and Açıkalın, 2018).

The developments in vocational education influences the various stakeholders such as employer, employee organisations, governments, educational organizatoins etc.

Schools, enterprises, sector and Vocational Qualification Authority are seen as stakeholders within the framework of continuous vocational development and learning. Another aim of the approach is to provide for all metal sector enterprises to be applicable. In this approach, competence evaluation will start from vocational training and proceed as a pyramid step by step. In other words, sustainability will be ensured along with lifelong learning.

Another important point in the model is ECVET. ECVET is a credit transfer system developed for the purpose of providing, recognizing and accumulating transfer of knowledge, skills and competences acquired through different learning paths in vocational education and training. ECVET supports mobility in the learning process by creating a common language across Europe

through the transfer, recognition and accumulation of learning outcomes. ECVET facilitates the understanding and recognition of the knowledge, skills and competences that individuals acquire in a different country, in a different educational and educational institution and in a different learning environment. Thanks to ECVET, which adopts the accumulation of learning outcomes and transfer approach, the qualification systems in countries can be easily comparable (ECVET, 2015). In other words, ECVET is a useful tool to facilitate the transfer and accumulation of learning outcomes of individuals who transition from one learning environment to another and / or from one system of qualifications to another. Therefore; the sector, the company and the schools should place special emphasis on the ECVET.

Based on the ECVET system, an important principle in the model is the transferability of learning outcomes**.** Transferability of learning outcomes in ECVET means transferring the knowledge, skill and competences acquired in another environment or country to another. In the model, the principle of transferability is emphasized by the transfer of learning outcomes (knowledge, skill and competencies) among stakeholders in every stage. Schools, enterprises, sector and Vocational Qualification Authority are seen as stakeholders within the framework of continuous vocational development and learning. Transferabilityamong these stakeholders come to the fore as learning outcomes. In other words, an individual who is involved in the system through vocational and technical education will always carry out his / her learning outcomes by developing it to the next stage.

3.1. The implementation of workshop-based system

In the approach, it is recommended to establish a workshop in the enterprises for the implementation of competency assessment practices. Within the framework of the pilot application, it is recommended for each metal industry enterprise to open a workshop in their companies. Thus, each company will create a learning, training and application area. This recommendation will also highlight a significant benefit. Production in the company will continue to occur without stopping learning. In other words, the aim is to realize learning without stopping production and to keep production at maximum level. In order to open these work places, enterprises need to invest. In these work places employees will have chance to meet with new equipments, tools and will find a chance to learn how to use them. Mentor of employee can assess technical competencies practically and can follow development process of developing competencies. Thus, enterprises should operate feasibility research before establishing a work place. Government grant or EU funds can be seen as a base for these investments.

For instance; while pilot application was realised in Türk Traktör, technical training center was used in order to implement Mechanical Maintenance Operators' (Level 3) theoric and practical assessments. In this area employees get feedback and attend on the job training. Thus, having a separate work place for such an operation, gives chance to proceed to trainings and making assessments without stopping any production line. More specifically, opportunity cost of having training or observing employee's development in this area can be high. Continuing producing

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without stopping any production line makes the model more sustainable. That is to say, having a work place will encourage enterprises to focus more on employees' developments.

Another example of this Arçelik whitegoods enterprise's different labs. The company has different training spaces to support competence development processes of employees. Workshop 4.0 (Atölye 4.0) is one of these spaces. It works as an R&D workshop; so that the ideas of all employees could be prototyped and the end result could be piloted before it will be realized on the actual line. All relevant technology-supported trainings are also given to the employees. Newly produces robots for example could be introduced to the workers at this workshop. Garage is another training space of Arçelik. Although the idea of this space is to boost intrapreneurship; it also works for testing product ideas and prototyping when necessary. This space is also useful for entrepreneur candidates; university students and suppliers of the company can be involved in different projects, so that the company gathers different R&D ideas from outside. The last training space within this company is called Techpro Academy. This works for updating employees in their fields so that they will keep being up-to-date with newly emerging technologies. All these are established by the company itself, but sometimes they are supported with small grant programs from government which helps the promotion of the spaces as other people get the chance to visit the places and bring their perspectives. This is a good example of developing employee's qualification in necessary fields with out testing them.

As a result of changing mindset, a new approach is introduced to metal industry under various titles:

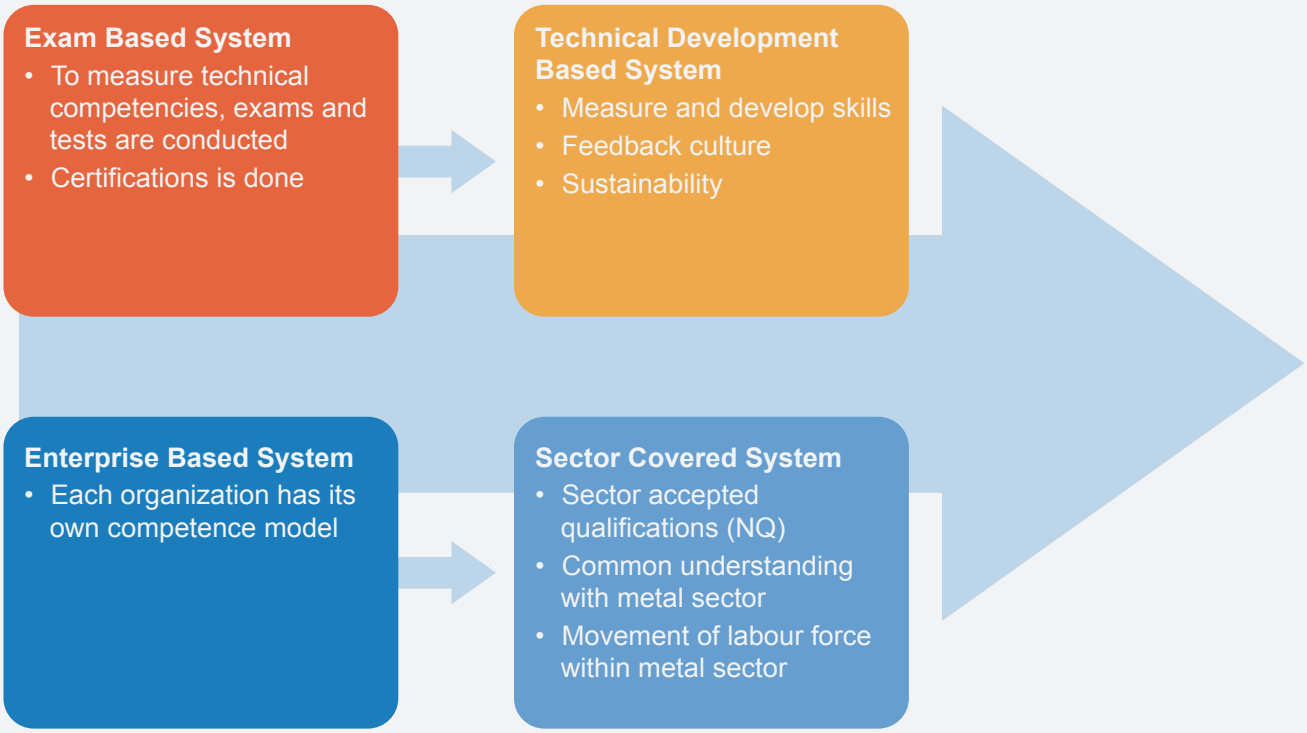

Figure 1: Learning outcome-based competence management

2.3 Transition from an exam-based system to a technical development evaluation-based system for competence model

Assessing the expected competencies is a challenging process at the end of an application. In this process, the use of an exam-based system for evaluation is a question mark in the correct evaluation of competence. In an application-oriented system, the measurement of competencies through tests puts the question in terms of the validity and reliability of the assessment. Because, using only tests can measure that knowledge has been acquired, but it may not be able to measure behavior acquired. Therefore, it is recommended to implement a technical development evaluation-based system rather than a test-based system in the process of implementing competence. The aim at this point is to evaluate competencies effectively and gain new competencies in a process-oriented system. Thus, the development of individuals can be monitored, and feedback can be taken systematically. As a result, sustainability will be provided effectively.

1.4 Transition from an enterprise-based system to a sector-covered system

With the results of the project, it is recommended that the workshop-based system should be implemented in the sector-covered system instead of the enterprise-based system. With the purpose of widespread impact of the project, it is of great importance to ensure that these practices continue in the metal sector because it is recommended to implement the applications on a sectoral basis and to obtain results on a sectoral basis.

When applications remain on the basis of enterprise, each enterprise will try to build its own competence model. However, what is desired is the spread of applications to sector in general. Therefore, it is important to establish the standard qualifications accepted in the sector. At this point, it is necessary to create a common sense and understanding for qualifications in the metal sector. This common sense and understanding are expected to increase the movement of labour force in the metal sector.

2.5 Competence Management, School Enterprise & CVET

As a result of all these observations and studies, a new model was created, and the model can be considered as the basis of a model applicable in metal industry in Turkey and European Union.

Continuing vocational education and training (CVET) is ‘education or training after initial education or entry into working life, aimed at helping individuals to improve or update their knowledge and/or skills; acquire new skills for a career move or retraining; continue their personal or professional development’ In that sense, continuing vocational education and training (CVET) is basically a part of adult learning and life-long learning oriented towards professional development.

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Figure 2: Competence Management, School Enterprise & CVET

Figure 3: Journey of an employee

As shown in the Figure 2, the individual will find herself / himself in a monitoring system as soon as s/he enters the system with Vocational Higher Education. When the individual enters the system, the competence assessment should be made for the first day. Since this evaluation process has to occur in certain periods, the development of the person can be easily monitored. In developing the competency model, support can be obtained from a committee consisting of academicians, vocational high school teachers, VQA and relevant stakeholders. Thus, a curriculum can be developed, and employees can be monitored.

Moreover, the Figure 2 illustrates that in each step of the model, there is a lifelong learning process. In this model, the scope of learning is extensive. It congregates many different parties together. It starts with vocational education, during onboarding process, employee learns his/her requirements of the profession and how to start. At adaptation process, mentor of the employee helps employee to master his/her technical competencies. At specialization process, employee learns how to mentor newly-hired employee. Lastly, employee learns how to develop enterprise specific competencies. If s/he require to use more digital tools, compared to a mid size enterprise, s/he should adapt competencies depending on the environment.

1.4.1 Vocational Education and Training (VET):

The very base of the vocational development is the vocational education and training. Although it is not easy to change the regulations of the education and training system in Turkey due to the centralist structure of the administration system, there are some projects done by the private sector companies with support from the public sector. Full Support to Vocational Education, METAD is one of these projects; bringing together the sector, schools and enterprises and other related stakeholders according to the activities supporting VET system.

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The formal education given within [1]the scope of vocational and technical education in Turkey is carried out in three types of schools: Vocational and Technical Anatolian High Schools, Multi-Program Anatolian High Schools and Vocational Training Centers. Vocational and technical education within the scope of non-formal education is given in Vocational Open High Schools (TC Millî Eğitim Bakanlığı, 2018). Graduates of VET high school education may either be included in employment, choose to continue vocational school of higher education for two years or enter into a higher education (bachelors) program or prefer to be employed if not entering into a higher education program

1.4.2 The Process of Onboarding:

The onboarding is the action or process of integrating a new employee into an organization. The enterprises take actions to adapt a newly-hired employee to enterprise. The target is to make employee efficient more quickly. After interviewing HR experts in related enterprises, onboarding process is customized for SMART COMET project.

When the employee gets required onboarding trainings and ready to work the current competencies of him/her and the knowledge acquired during the training periods should be evaluated in theoretical and practical terms. The evaluation should not only be in the process of onboarding and start-up, but also should be actively followed in the forthcoming periods.

From the first working day, the employee should be orientated and besides, the employee must be evaluated by theoretical and practical applications by expert observers from the field of technical competence in the work places and especially in the workshops to be established within the company. Employees' competencies which are open for improvement and strengths can assessed. This step will give chance to create an efficient development plan. When carrying out the evaluation, National Qualification and National Occupational Standard determined by the experts and stakeholders in the relevant sector issued by Vocational Qualification Authority, which registered officially the competencies of the employees with professional documents, should be used as base. In line with the evaluations of the relevant technical experts, the development areas of the employees should be determined in line with the observations of the mentor of the employee.

During onboarding process, superior should orientate employee and should explain the culture and dynamics of work environment. Furthermore, the superior should mention about the expectations from the position. The employee should be supported with educational activities in order to specialize in the relevant field after determining the appropriate qualifications of the employees.

Before starting educational activities, it is necessary to agree on the areas of development between the employee and the person who are capable of mentoring. Within the framework of the agreement, the development areas should be established, and a development plan should be drawn up.

Following onboarding process, technical expert and the superior will assess competencies of

1 For information on VETsystem, plesase refer to Phase 1 of this report.

employee theoretically and practically. During field visits in the extent of SMART COMET project, HR specialists mentioned that the superior's controls competencies of employee via standard check list. It is important to make an assessment by bringing together the views of the employee and his / her superior during the determination. The superior and employee should be aligned while creating development plan and should follow development process together closely. Technical and soft skill trainings should be planned in order to develop necessary competencies to do vocation.

Furthermore, Vocational Qualification Authority revises the requirements of the profession, which has published national qualification and national occupational standard within 5 years. As the basic requirements of the vocation are updated, the evaluation should be repeated by the relevant technical experts and besides, the development plan should be revised accordingly.

1.4.4 Adaptation:

During adaptation process, the superior should mentor newly-hired employee via on the job training. The employee should adapt to business life and to organization. At previous step, employee's competencies were assessed. The competencies which is required to develop, should be focused via on the job trainings. Employee will receive support by superior and more experienced peers, in case s/he has questions regarding work. During adaptation process, a guideline of work should be prepared, and this guideline should be pursued until employee has adequate maturity to handle tasks by herself/himself. Additionally, theoric and practice trainings should provide inputs while establishing development plan. These trainings should be followed by superior and responsible HR colleague.

As a part of adaptation process the competencies should be reviewed. National qualifications are updated in every 5 years routinely or in case there is a need of update, they can be updated earlier than 5 years. As soon as the updates are published on Vocational Qualification Authority's web portal, the assessment process should be reviewed and repeated. The comparison of former and latter assessments will illustrate the development of competencies of employee. Furthermore, the efficiency of development plan could be analyzed Mentor and employee as well should come together and focus on new competencies

1.5 Specialization:

During onboarding and adaptation process employee will adapt to work life and organization. Employee's competencies will develop via on the job trainings and mentoring by superior. Regular reviews on competencies will benefit employee to become more competent on vocation. The journey which starts with VET and onboarding, will help employee to develop know-how, problem solving and accountability on profession. Thus, the journey will enable his/her competencies will develop job size to expand. As an illustration, employee will start with Mechanical Maintenance Operator (Level 3) grade and assessed by competencies of Level 3 which are defined in Vocational Qualification Authority's portal. The employee will be appointed to Mechanical Maintenance

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Operator (Level 4). At this stage s/he will be able to mentor and monitor newly-hired employees. She/he will welcome new employees and manage the same process to young colleague.

1.6 The Enterprises' own needs:

While establishing a development plan for each employee, the needs of the enterprise must be taken into consideration. Although national qualification and national occupational standard issued by the Vocational Qualification Authority are considered constitutively as minimum qualifications, however maturity of the enterprises may differ. The expectations of the enterprises from the employees, above the minimum standards set by the Vocational Qualification Authority and the sector, new competencies that will address the new and future industry can be identified. In this case, each enterprise should explain what they expect from the employee and specify their goals to this extent. Specifically, the equipments used and production line can be different. Besides, clearly the employee should have different competencies in case s/he works in an enterprise which is more adapted to industry 4.0. From a different point of view, size of the enterprise plays crucial role in the aspect of required competencies of an employee. In case, in a small or mid-size enterprise employees' job definition will be wider compared to a big size enterprise due to lack of resources so s/he should be responsible for several jobs. For instance, s/he requires more digital competencies in addition to basic competencies compared to a small size enterprise.

	NQA	MESS	MoNE	Enterprise HR	Enterprise Technical Manager	Enterprise Technical Expert	Employee
1. Determining Competences		X		X		X	X
2. Onboarding		X		X	X	X	X
3. Determining Competences	X	X	X	X	X	X	X
4. Mission of the Enterprise		X		X	X	X	X

Table 2: Matrix for the Model

4. Sustainability and Further Steps on Competence Management Framework

In this section, the questions of "how to disseminate the project reflections in metal sector" and "how to sustain the model in each enterprise" are discussed. From the viewpoint of generalization to find the common ground in the sector and to provide standards for it in general dimension, the specific purpose of generalization is to enable each enterprise to create a unique system under these common denominations. From the viewpoint of sustainability enterprises should allocate time, budget and effort to interiorize this model. In the long run, return on investment can be high for enterprises in the aspect of technical development of employees. Especially, this model gives

a chance to enterprise to provide employees with the qualifications that they are required with the modern competencies of changing industry. More competent employees may also create positive effects on productivity.

To provide the sustainability of the project on metal industry a new IT tool is launched as a project output. Enterprises will have a chance to evaluate competencies of an employee from the first day and support via required trainings on development areas. To operate this system the IT Tool will be in use. In this tool, an enterprise has the chance to compare newly-hired employees' competencies via intercorporate competencies benchmark and general benchmark. IT tool will be used to standardize competence management processes in metal industry. Enterprises will use the system to follow development of their employees' competencies and to competency-based trainings.

Furthermore, a pilot application for prototype machine for Mechanical Maintenance Operators **(Level 3)** was conducted. To operate pilot application, a machine was created. It enables to shorten the duration of assessment and without stopping any production line it can be conducted. While working on machine, a mentor can give feedback to employee. 3D design of pilot machine was created so an enterprise can implement machine easily. This idea to produce a prototype machine can be generalized to other sectors and professions. Besides it can be used for employees apart form shop floor too. It is a compact tool to assess practical competencies of employee.

Additionally, in vocational and technical education and training, giving students opportunity to practice will enhance their technical competencies. This type of prototype machines can be used without sparing high amount of budget or without finding a workplace. The mentors or lecturers can show how to implement theoric knowledge on it.

Institutions which designates strategy of education system in terms of the Council of Higher Education and the Ministry of National Education play a crucial role. Especially, the Ministry should focus on vocational and technical education a bit more. With this project, the gap between schools and enterprises is planned to be bridged and public institutions is encouraged to be involved more. The training system in the end should also be established according to enterprise's own requirements. European Commission Advisory Committee on Vocational Training also underlines the importance of the link between VET and labour market saying that the link between initial and continuous VET and labour market is expected to change from a one-way to two-way avenue (ACVT, 2018). In view of developments on the labour market, increasingly lifelong development of employees will prove to be a necessity. This implicates that the current policy focus on publicly financed initial VET will have to have a broader approach where providers increasingly offer training courses for adult workers. Therefore, we need demand-driven, practice-oriented, flexible and responsive VET policies and frameworks are needed.

Enterprises are required to work closely to VET schools and should give opportunities to experience work environment to students. After constituting close relationship with schools and via financial contributions, students could be attracted by enterprises. With the help of financial contributions, students will find a chance to practice on more technological tools. Ministry of National Education should meet the high qualified employee requirement and during these years should follow progress of students.

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References

- Advisory Committee on Vocational Training (2018). Opinion on the Future of Vocational Education and Training Post 2020. Brüksel: European Commission.
- ECVET, (2015). Ecvet nedir? http://ecvet.ua.gov.tr/en/page/ECVET_Nedir Date Accessed: 18.05.2018
- Erçetin, Ş.Ş. and Açıkalın, Ş.N. (2018). Student Engagement in Active Learning and Social Environments in New Generation Universities: Experiences of Students. In Ş.Ş. Erçetin (Ed.) Chaos, Complexity and Leadership 2016. Springer Proceedings in Complexity, Ch 10, pp. 125-145, Switzerland: Springer International Publishing, DOI https://doi.org/10.1007/978-3-319-64554-4_10
- Kearns, P. (1999). Lifelong learning: Implications for VET-Discussion paper. National Centre for Vocational Education Research.
- Munro, M., & Elsom, D. (2000). Choosing science at 16: The influences of science teachers and careers advisors on students' decisions about science subjects and science and technology careers. Cambridge: Careers Research and Advisory Centre (CRAC).
- Rooney, J. J., & Heuvel, L. N. V. (2004). Root cause analysis for beginners. Quality progress, 37(7), 45-56.
- TC Millî Eğitim Bakanlığı (2018). Türkiye'de Meslekî ve Teknik Eğitimin Görünümü. [online]. Ankara: Eğitim Analiz ve Değerlendirme Raporları Serisi.
- Watters, J. J., Hay, S., Dempster, N., & Pillay, H. (2013). School industry partnerships: An innovative strategy for vocational education. In Proceedings of the ECER VETNET Conference 2013. WIFO.

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