Skills in Metal and Electro Industry

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Skills in Metal and Electro Industry – skillME ERASMUS⁺ PROGRAMME

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IMPLEMENTATION OF PILOT TRAININGS FOR STUDENTS AND WORKERS

SUMMARISED REPORT

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INTRODUCTION

In this summarised report, we present the results of the **skillME pilot trainings implementation** in the four project participating countries of Slovenia, Slovakia, Croatia and Latvia, realized within WP4 – Piloting. The work package activities were coordinated by the Latvian partner VET provider Riga Technical College (RTC) and implemented by all project partners, but especially by VET providers as the main implementers of the pilot trainings. The project partners list is accessible here: www.gzs.si/skill-me/vsebina/Project-Partners.

The purpose of the pilot trainings was to test the five curricula developed in the skillME project on two main target groups: **students** and **workers of the metal and electro industries**. The operational steps of the trainings were defined in the "**skillME Curricula Implementation Handbook**", developed by WP leader in collaboration with all partners and based on national training implementation plans.

Each national VET provider implemented the trainings in collaboration with attracted VET schools. Depending on the programme of the school, they chose to implement trainings in CAD/CAM, Machine Vision, Composite Materials or either Reading Technical Documentation for the Metal Industry or Reading Technical Documentation for the Electro Industry. The pilot trainings were organized for students and separately for workers.

As defined by the "skillME Curricula Implementation Handbook" and agreed by all partners, the aim of the piloting process was to:

- 1. Implement trainings for all 4 identified skill gaps in each country;
- 2. Implement each training for students and separately for workers;
- 3. Include 1 large and 3 SMEs per sector in each country (totalling: 2 large and 6 SMEs per country or 8 companies per country, jointly 32 companies) and
- 4. Include at least 8 participants per trainings.

Each VET provider organized the trainings according to their available facilities, the attracted companies and the specifics of the developed trainings.

The report is based on four national piloting reports and details the implementation process and results of the implemented trainings. The results are presented separately by countries as well as overall and include data on:





- a) training implementing school and trainer,
- b) date of piloting,
- c) number of training hours,
- d) number of participants (students and workers),
- e) data on participating companies per size and sector, and
- f) the success rate and number of issued certificates for each implemented training.

At the end of each pilot training, the trainings were **evaluated by participants** through questionnaires and interviews performed with both students and workers to collect feedback, observations, recommendations and comments, which will be observed and incorporated into future trainings. The feedback by participants in all countries was overwhelmingly positive. The results are presented in more detail in the **4**th **Half-year Quality Assurance report** (ASOO, June 2017). This report summarizes the evaluation of training results and provides key recommendations **based on the feedback from trainers.**

We would like to thank all the partners for the great cooperation during the study curricula development, implementation period, and feedback study. As a result, a very high percentage of participants who received new or updated existing knowledge in this area passed the tests and received certificates.





1. PILOT TRAININGS IN SLOVENIA



In Slovenia, the pilot trainings have been implemented by the skillME partner school **School Center Celje** and the attracted school **School Center Kranj.** The schools implemented **4 trainings for students** and **4 trainings for workers**, one for each identified skill gap, in the period from January to September 2017.

Implemented trainings:

- SC Celje: Machine Vision and CAD/CAM for students and workers
- SC Kranj: Composite Materials and Reading Technical Documentation for students and workers

Both schools trained **103 participants: 62 students and 41 workers from 20 companies** (8 metal, 7 electro, 5 other, of which 14 were SMEs and 4 were large companies). The **success rate** of the trainings based on the number of issued certificates was **98%**.

Pilot training	School	Trainer	Date of piloting	Total no. of hours	Number of participants	Number of issued certificates
Composite Materials	SC Kranj	Klavdija Stropnik	May-Sep 2017	24	16	16
Machine Vision	SC Celje	Peter Kuzman	January-April 2017	25	16	14
CAD/CAM	SC Celje	Roman Zupanc Feliks Lednik Ludvik Aškerc	January-April 2017	25	12	12
Reading Technical Documentation	SC Kranj	Damjan Poljanec Aleš Bregar	April-May 2017	25	18	18

Table 1: Pilot trainings for students in Slovenia



Skills-in Metal and Electro Industry

Pilot training	School	Trainer	Date of piloting	Total no. of hours	Name of participating companies, type* and sector**	Number of particip ants	Number of issued certifica tes
Composite materials	SC Kranj	Klavdija Stropnik Primož Kurent	April 2017	24	AMT PROJEKT d.o.o. (S/O) ISKRA d.d. (L/E) KOMUNALA TRŽIČ d.o.o. (M/O) LPKF d.o.o. (M/M) SAVATECH d.o.o. (L/O) TRIVAL KOMPOZITI d.o.o. (S/O)	9	9
Machine vision	SC Celje	Peter Kuzman	April–June 2017	25	AVK Avtomatizacija d.o.o. (S/E) Dravske elektrarne Maribor (M/E) Kolektor Sikom d.o.o. (L/E) Poclain Hydraulics d.o.o. (L/M) RLS d.o.o. (M/E) TIBEX storitve d.o.o. (S/E)	10	10
CAD/CAM	SC Celje	Roman Zupanc Feliks Lednik	April–June 2017	25	EMO – Orodjarna d.o.o. (M/M) JE&GR d.o.o. (S/M) Kovine Goršek d.o.o. (S/M) LIMAD-BHM d.o.o. (S/M) Metalna Senovo d.o.o. (M/M) Telkom d.o.o. (M/M)	12	12
Reading Technical Document ation	SC Kranj	Damjan Poljanec Aleš Bregar	May–June 2017	25	Goodyear Dunlop Sava Tires d.o.o. (L/O) Iskraemeco, d.d. (L/E)	10	10

* Type: S: mikro or small company; M: medium-sized company; L: large company

** Sector: M: metal sector; E: electro sector; M+E: metal and electro sector; O: other

Table 2: Pilot trainings for workers in Slovenia



Photo 1: skillME pilot trainings with students and workers in Slovenia





2. PILOT TRAININGS IN SLOVAKIA



In Slovakia, the pilot trainings have been implemented by the skillME partner school **SOŠ STARÁ TURÁ** (SOŠST) and the attracted school **SOŠIT BRATISLAVA.** The schools implemented **5 trainings for students** (Machine Vision implemented by both schools) and **5 trainings for workers** (Reading Tech. Doc. Elect. implemented by both) in the period from January to June 2017.

Implemented trainings:

- SOŠST: Composite Materials, Machine Vision and CAD/CAM for students; Composite Materials, CAD/CAM, Reading Tech. Doc. for workers
- SOŠIT BRATISLAVA: Machine Vision and Reading Technical Documentation for students; Machine Vision and Reading Tech. Doc. for workers

Both schools trained **124 participants: 48 students and 76 workers from 16 companies** (4 metal and 12 electro, of which 12 were SMEs and 4 were large companies). The **success rate** of the trainings based on the number of issued certificates was **100%**.

Pilot training	School	Trainer	Date of piloting	Total no. of hours	Number of participants	Number of issued certificates
Composite Materials	SOŠST	Radovan Lazarčík	February-June 2017	22	10	10
Machine Vision	SOŠ IT Bratislava	Peter Rybár	April-May 2017	25	11	11
Machine Vision	SOŠST	Ján Koštial	February-June 2017	22	9	9
CAD/CAM	SOŠST	Radovan Lazarčík	February-June 2017	22	10	10
Reading Technical Documentation	SOŠ IT Bratislava	František Cedula	March-April 2017	25	8	8

Table 3: Pilot trainings for students in Slovakia



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Skills in Metal and Electro Industry

Pilot training	School	ichool Trainer Date of piloting Date of piloting hours sector**		Number of particip ants	Number of issued certifica tes		
Composite Materials	SOŠST	Zmeková Palúchová	January- March 2017	20	Chirana,a.s. (L/E) VLATO (S/M) EX METAL (S/M)	27	27
Machine Vision	SOŠ IT Bratislava	Peter Rybár	April-May 2017	25	Sylex a.s. (L/E) Tecton a.s. (S/E) Nemocnica sv. Michala a.s. (M/E) Kaliant s.r.o. (S/E) Ricoh Slovakia s.r.o. (S/E)	9	9
CAD/CAM	SOŠST	Zmeková Palúchová	February 2017	20	Chirana Medical (L/M) Manomer (S/M)	18	18
Reading Technical Document ation – Electro	SOŠST	Zmeková	March 2017	20	MOKI (S/E)	13	13
Reading Technical Document ation	SOŠ IT Bratislava	František Cedula	April-May 2017	25	Nemocnica sv. Michala a.s. (M/E) Kaliant s.r.o. (S/E) Sylex a.s. (L/E) Ricoh Slovakia s.r.o. (S/E) Tecton a.s. (S/E)	9	9

* Type: S: mikro or small company; M: medium-sized company; L: large company

** Sector: M: metal sector; E: electro sector; M+E: metal and electro sector; O: other

Table 4: Pilot trainings for workers in Slovakia



Photo 2: skillME pilot trainings with students and workers in Slovakia



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3. PILOT TRAININGS IN CROATIA



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In Croatia, the pilot trainings have been implemented by the skillME partner school **Technical School Faust Vrančić** and the attracted school **Electrotechnical School Zagreb.** The schools implemented **4 trainings for students** and **4 trainings for workers**, one for each identified skill gap, in the period from February to May 2017.

Implemented trainings:

- Technical School Faust Vrančić: Composite materials and CAD/CAM for students and workers, Reading Technical Documentation for workers
- Electrotechnical School Zagreb: Machine Vision for students and workers, Reading Technical Documentation for students

Both schools trained **106 participants: 59 students and 47 workers from 10 companies** (6 metal, 3 electro, 1 metal and electro, of which 7 were SMEs and 3 were large companies). The **success rate** of the trainings based on the number of issued certificates was **100%**.

Pilot training	School	Trainer	Date of piloting	Total no. of hours	Number of participants	Number of issued certificates
Composite materials	Technical School Faust Vrančić	lnes Ivanović	March-May 2017	25	11	11
Machine Vision	Electrotechn ical School Zagreb	Mario Tretinjak	May 2017	25	17	17
CAD/CAM	Technical School Faust Vrančić	Snježana Korčij	March-April 2017	25	13	13
Reading Technical Documentation	Electrotechn ical School Zagreb	Mario Tretinjak	March-April 2017	25	18	18

Table 5: Pilot trainings for students in Croatia



Skills-in Metal and Electro Industry

Pilot training	School	Trainer	Date of piloting	Total no. of hours	Name of participating companies, type* and sector**	Numb er of partici pants	Number of issued certifica tes
Composite materials	Technical School Faust Vrančić	Ines Ivanović	May 2017	25	ALTPRO d.o.o. (SME/E) MGK Pack (SME/M)	10	10
Machine vision	Electrotec hnical School Zagreb	Mario Tretinjak	April 2017	25	Solvis (SME/E) FERRO-PREIS (L/M) Metalska industrija Varaždin d.d. (L/M)	10	10
CAD/CAM	Technical School Faust Vrančić	Snježana Korčij	April- May 2017	25	Metalska industrija Varaždin d.d. (L/M) ALTPRO d.o.o. (SME/E) Kostwein - proizvodnja strojeva d.o.o. (SME/M) MGK Pack (SME/M)	13	13
Reading Technical Document ation	Technical School Faust Vrančić	Tanja Frketić	February -March 2017	25	Metus d.o.o. (SME/M+E)	14	14

* Type: SMEs: small or medium-sized company; L: large company

** Sector: M: metal sector; E: electro sector; M+E: metal and electro sector; O: other

Table 6: Pilot trainings for workers in Croatia



Photo 3: skillME pilot trainings with students and workers in Croatia





4. PILOT TRAININGS IN LATVIA



In Latvia, the pilot trainings have been implemented by the skillME partner school **Riga Technical College** (RTC) and the attracted school **Liepaja Technical School** (LTS). The schools implemented **4 trainings for students** and **4 trainings for workers**, one for each identified skill gap, in the period from October 2016 to September 2017.

Implemented trainings:

- **Riga Technical College: Composite Materials** and **Machine Vision** for students and workers
- Liepaja Technical School: CAD/CAM and Reading Technical Documentation for students and workers

Both schools trained **129 participants: 61 students and 68 workers from 24 companies** (9 metal, 7 electro, 2 metal and electro and 6 other, of which 16 were SMEs and 8 were large companies). The **success rate** of the trainings based on the number of issued certificates was **100%**.

Pilot training	School	Trainer	Date of piloting	Total no. of hours	Number of participants	Number of issued certificates
Composite Materials	RTC	J. Krizbergs	October- December 2016	25	18	18
Machine Vision	RTC	K. Veide M. Stepanovs	May-June 2017	25	16	16
CAD/CAM	LVT	N. Janite	May- September 2017	25	12	12
Reading Technical Documentation	LVT	V. Gutakovskis	March-April 2017	25	15	15

Table 7: Pilot trainings for students in Latvia



Skills in Metal and Electro Industry

Pilot training	School	Trainer	Date of piloting	Total no. of hours	Name of participating companies, type* and sector**	Number of particip ants	Number of issued certifica tes
Composite Materials	RTC	J. Krizbergs	November 2016- January 2017	25	SIA »INSPECTA« (L/M+E) SIA »Polymold« (M/O) SIA »TUV nord Baltic« (M/O) SIA »Torgy Baltic« (M/M) SIA»RER« (L/M) RTK (M/O) O.R. Laser Technology Baltic (M/M)	11	11
Machine Vision	RTC	M. Stepanovs K. Veide	November- January 2016	25	P/A »Ogres Namu Parvaldnieks« (M/O) SIA »Lexel Fabrika« (M/E) SIA »Energo Remont Rigas TEC2« (M/E) Sia«Caverion Latvija« (M/E) SIA »Light Guide Optics« (M/E) SIA »Valpro« (L/O) SIA«Ciedra Pro« (M/M) Sia«Divi Simti Divi« (M/E) SIA »RRR« (L/M)	9	9
CAD/CAM	LVT	N. Janite	April-May 2017	25	SIA »Expedit Baltic« (L/E) KVV »Liepājas metalurgs« (L/M) SIA »JENSEN« (M/M) Trelleborg Wheel Systems, LSEZ SIA (L/M+E)	18	18
Reading Technical Document ation	LVT	V. Gutakovski s	March- April 2017	25	Trelleborg Wheel Systems Liepaja (M/M+E) KVV Liepajas metalurgs (L/M) PECC LVT (M/O) LSEZ »Jensen Metals« SIA (M/M)	30	30

* Type: S: mikro or small company; M: medium-sized company; L: large company

** Sector: M: metal sector; E: electro sector; M+E: metal and electro sector; O: other

Table 8: Pilot trainings for workers in Latvia



Photo 4: skillME pilot trainings with students and workers in Latvia



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5. OVERVIEW OF IMPLEMENTED TRAININGS IN NUMBERS

5.1 Overview of piloting per training

Machine vision

The Machine Vision trainings were attended by **107 participants: 69 students and 38 employees from 23 companies** in all four participating countries. Overall, 4 trainings for workers and 5 for students were organized.

Composite materials

The Composite Materials trainings were attended by **112 participants: 55 students and 57 employees from 18 companies** in all four participating countries. Overall, 4 trainings for students and 4 for workers were organized.

CAD/CAM

The CAD/CAM trainings were attended by **108 participants: 47 students and 61 employees from 16 companies** in all four participating countries. Overall, 4 trainings for students and 4 for workers were organized.

Reading Technical Documentation (Electro + Metal)

The Reading Technical Documentation trainings were attended by **135 participants: 59 students and 76 employees from 16 companies** in all four participating countries. Overall, 4 trainings for students and 5 for workers were organized.

As can be seen from the graph below, the number of participants is quite evenly distributed among the four developed trainings:



Graph 1: Number of implemented trainings per country and school (N = 462)



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5.2 Number of implemented trainings

In each country, trainings were implemented by project participating and attracted VET providers. The trainings took place in either classrooms and workshops of the participating VET providers or in the training facilities of the participating companies, with organizational aspects determined by each school individually. The school that implemented a certain training for students mostly implemented it also for workers.

The aim was to implement 4 pilot trainings for students and 4 for workers in each country (one for each defined skill gap), jointly <u>32 trainings</u>. In Slovenia, Latvia and Croatia, this aim was achieved, with Slovenia and Latvia distributing the implemented trainings equally among both schools and the Croatian project school implementing one training more for employees than the attracted school. In Slovakia, project participating school SOŠST implemented **an additional** Machine Vision training for students and **an additional** Reading Technical Documentation training for workers.

As a result, 2 additional pilot trainings have been implemented, totalling in <u>34 pilot trainings</u> by 8 participating schools in the school year 2016/17 in the period from October 2016 to September 2017. Overall, 23 teachers were involved in implementing jointly 824 hours of trainings, each training ranging from 20 to 25 hours.



Graph 2: Number of implemented trainings per country and school





5.3 Number of participating students and workers

In the period preceding the pilot training phase, partners contacted attracted schools and began promoting the trainings – the VET providers among their students and the representative partners and VET providers among companies and workers.

The goal was to attract at least 8 participants per training or 32 students and 32 workers per country, or <u>128 students and 128 workers</u>, totalling in <u>256 participants</u>.

The pilot trainings generated much interest, so much so that not all interested students or workers could be included in the first round of piloting. In the end, **each national team trained over 100 people.** In some countries, there was more interest among students, whereas in others, there were more participants among workers: Slovenia and Croatia trained more students, whereas Slovakia and Latvia more workers. The share of participants per country ranged from 22% to 28%; the most participants attended the trainings in Latvia.

Overall, the trainings were attended by 80% more students and 81% more workers than planned, totalling in <u>230 students and 232 workers</u> or <u>462 participants</u> overall.



Graph 3: Number of participating students and workers per country





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5.4 Participating companies by size and sector

The target sectors of the developed pilot trainings were the **metal and electro industries**. However, as many training contents are relevant also for other sectors, especially Composite materials, and as the partnership wanted to reach the widest possible audience, companies from **other sectors** were also invited to attend the trainings.

The goal was to attract at least <u>32 companies</u> overall.

Due to the high interest in trainings expressed by companies, the goal was surpassed by 119%, totalling in <u>70 participating companies</u> in all four countries.

The companies from the metal and electro sector were quite evenly included, with companies from other sector also representing an important share. Overall, **27 metal** companies, **29 electro companies**, **3 metal and electro companies**, and **11 companies from other sectors**, such as the chemical industry, the utility sector, engineering, and others, were included in the piloting phase.



Graph 4: Share of participating companies per sector (N = 70)





As SMEs often face greater difficulties with training their staff in missing competences than large companies with their own training facilities, an important focus was put on attracting SMEs.

The aim was to include at least 3 SMEs and 1 large company per sector in each country, totalling in 12 metal SMEs, 4 large metal companies, 12 electro SMEs and 4 large electro companies.

Pilot trainings attracted many more companies than anticipated. They were attended by 18 metal SMEs (+50%), 10 large metal companies (+150%), 20 electro SMEs (+66%) and 7 large electro companies (+75%).

The individual national goal was **met by all countries**, except for Croatia, who instead of 1 large electro company attracted two additional large metal processing companies. The most companies participated in Latvia (35%).



Graph 5: Number of participating companies per size per sector per country





5.5 Number of awarded certificates

At the end of the training, all participants took an **assessment test**, comprised out of theoretical and practical examination. If the participants proved the acquired competences by passing the test, they were awarded a **certificate of attendance**. The success rate is a good indicator of the quality of the designed training process, as a low share would indicate a poor design quality; on the other hand, a high share is an indicator of the usability and clearness of the developed learning content.

The success rate of the trainings reached 100% in Slovakia, Croatia, and Latvia, and 98% in Slovenia, meaning that <u>only 2 out of 462 participants or less than 1%</u> <u>of participants failed to achieve the certificate</u>.



Graph 6: Success rate (no. of participants : no. of awarded certificates) of pilot trainings



6. OVERALL EVALUATION OF PROJECT RESULTS

For many partners, this was their first experience in developing several curricula that should be adopted to the special needs of each of the four partner country standards: Latvia, Croatia, Slovakia and Slovenia. All of them were facing the same challenges during the curricula program development period and pilot training period, which were resolved successfully due to great collaboration among partners during partner meetings and respective phases.

The trainings were more or less divided into the theoretical part and the practical part, where the participants worked practically to get experience in this area. The participants were given printed study materials that they also used to make notes during the courses. Courses have passed successfully, teachers prepared interesting presentations with practical demonstrations. Groups of participants were generally not too big, so the trainers reported that there was a pleasant atmosphere and that they had enough time to attend to all participants. In general, participants were very satisfied with courses provided and they appreciated that they could attend these courses. Overall, participants praised the chance to learn new things, technologies as well as processes that are being used in the most important metal and electrotechnical companies. Most of them found the practice during the courses to be the most beneficial. The trainings were also successful and useful for all the trainers and it provided a great experience for the teaching staff.

Mostly, the trainers were of various profiles, including students and employees who were ranging from workers to directors of companies. In total, the result of the trainings is very good and the trainings were evaluated as very successful, despite the fact that it was a problem to find a perfect time and coordinate the execution of pilots among different companies. The slight problem was that the workers came to the classes after their working hours so at times the education was demanding for them. Despite that, at the end of the classes, they expressed their satisfaction with the curricula and the implemented pilots.

An additional positive aspect of the trainings for workers that was often mentioned was the exchange of information among the participants. Due to mixed groups consisting of workers from various companies, they had the opportunity to learn many examples of good practice and gained new knowledge for their production optimisation also through informal networking.

Due to great interest of students, additional training for students are already set to be provided by schools outside the scope of the project, which is already a great start of exploitation of project results.





Evaluation of individual trainings as reported by trainers:

1. Machine Vision:

All trainers implementing Machine Vision agreed that the curriculum was well designed, that relevant topics were covered, that the competence gaps were smartly determined, and reported that there was a lot of interest from participants in all countries. Work in smaller groups (than usually in class) proved to be more efficient, which holds true also for students, who are in this way more motivated for education. It was very interesting for one Latvian group of participants to see modern manufacture sample on the exhibition in this topic. It was also agreed that the Slovak team would present the training results on a practical demonstration at the Final skillME Conference as an example of good practice.

2. Composites:

The training was divided into a theoretical and a practical part, where the participants were familiarized with composite materials and how they are produced.

Overall, both students as well as workers were very pleased with the trainings. They gained much useful knowledge and supported the general idea of organizing such trainings, which enable them to gain competences that are directly applicable in their workplace. In addition, the employees also liked the fact that they get a chance to meet employees from other companies and thus gain a chance to discuss concrete challenges, which they face in the production, and exchange examples of good practice directly from the real-life situations. The content of the trainings was also very interesting for all trainers, as this is the popular technology in our days and has even more perspectives in the future compared to classic metals.

The companies' structure showed that the designed trainings are suitable also for other manufacturing sectors outside the metal and electro industry.

3. CAD/CAM:

This training equipped students and employees with comprehensive knowledge and set of skills in the area of CAD/CAM. The majority of training focused on practical work and all students and employees were very satisfied with the trainings and proved the acquired knowledge by passing the test in all organized pilot trainings. Perhaps the statement of one of the students from the Slovene Machine Vision pilot says it all: "Very useful competence for present and the future digitalisation plus it was a lot of fun!"





4. Reading Technical Documentation:

The trainers reported that the training partially covered the content that the students already acquired in their respective study years, which gave the students a chance to renew and expand the knowledge in the form of practical work (drawing electrotechnical diagrams using the "SEE Electrical" software). In the second part, students learned how to connect electrical elements based on the drawn diagrams. In the final part, students performed diagnostics and measurements of electrical installations.

In all countries, students were very interested in the training content and assessed it as useful. They appreciated the fact that they learned something so practical, and would wish to use even more instruments and perform even more independent work. Employees were also very satisfied with the execution of the trainings as they gained much useful knowledge, and expressed the desire for more similar trainings.







7. RECOMMENDATIONS FOR FUTURE TRAININGS

One of the main recommendations that was generally offered by trainers for all pilot trainings concerns the theoretical material. According to their experience, there was too much theoretical information in the first phase of the trainings. They recommended spreading the theory throughout the whole training and concentrate more on practical implementation of the gained knowledge, or combining some parts of curricula with practical work.

In addition, they established that some parts of the training content have proven to be somewhat difficult for both students and employees; they recommended simplifying or modifying them directly for the needs of the participants.

They also agreed it would be better for the participants to have some more study materials provided so they do not need to spend time writing their own notes and can spend more time on improving their practical skills.

There were some recommendations made for specific trainings:

Composite Materials:

- Composite materials curricula was too complex and difficult for secondary-school students, practically all partners recommend simplifying it.
- Some of the employees would like to see more examples in engineering technology. Most popular question was about additional study material via workbook or something like that.
- Some partners suggested that there could be more practical training in Composite materials.
- A recommendation for future trainings would be to add the chemistry explanation of composites (chemistry structure, chemical reaction with materials, chemical mechanism) in the literature, and to expand the classes to have more time available for a comprehensive explanation of the composites. Participants also expressed a desire for even more practical work.

Overall, the training was useful and well received and appreciated by all participants.





Reading Technical Documentation:

- Based on the participants' feedback, even more practical work with the use of instruments is recommended in the future.
- An important part of the process is an adequate presentation of the training content in companies, so that homogenous groups of a suitable size (8–10 participants) can be formed that attract participants with similar levels of prior knowledge.
- The teachers also learned that they could introduce more independent work in the student classrooms.

For **Machine Vision and CAD/CAM**, most of the trainers find the practice during the trainings implementation to be the most beneficial.







8. CONCLUSION

The report results show that the **implemented skillME trainings were highly successful.** The project partners achieved all set goals and managed to attract a high number of participating students and workers from companies specializing in different areas of metal and electrotechnical industry, generating much interest also among other sectors outside the metal and electro industry.

The **number of skillME training participants was quite evenly distributed among the four training areas** (ranging from 23% to 29%) **as well as among countries** (ranging from 22% to 28%), with the metal and electro industry being included in an equal share (participating companies: 39% metal, 41% electro). Both the organization as well as the implementation of the trainings were very successful, **which is reflected in a number of overachievements**:

- 2 additional pilot trainings have been implemented, totalling in <u>34 pilot</u> <u>trainings</u> by 8 participating schools in the school year 2016/17 in the period from October 2016 to September 2017. Overall, **23 teachers were involved in** implementing jointly 824 hours of trainings, each training ranging from 20 to 25 hours.
- Each country trained over 100 participants. The trainings were attended by 80% more students and 81% more workers than planned, totalling in 230 students and 232 workers or 462 participants overall.
- Due to the high interest in trainings expressed by companies, many more companies participated then planned: the goal was surpassed by 119%, totalling in 70 participating companies in all four countries. Overall, 27 metal companies, 29 electro companies, 3 metal and electro companies, and 11 companies from other sectors, such as the chemical industry, the utility sector, engineering, and others, were included in the piloting phase.
- Pilot trainings attracted many more companies than anticipated. They were attended by 18 metal SMEs (+50% than planned), 10 large metal companies (+150%), 20 electro SMEs (+66%) and 7 large electro companies (+75%).
- The success rate of the trainings reached 100% in Slovakia, Croatia, and Latvia, and 98% in Slovenia, meaning that only 2 out of 462 participants or less than 1% of participants failed to pass the final assessment.

All of this shows that the trainings had a **strong impact on the industry** in terms of developing skills of students and workers of the electro and metal industries and demonstrating a successful model of filling skill gaps.



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With the implemented trainings, partners have managed to:

- Improve the skills of students and workers;
- Link education and workers;
- Transmit information among workers as well as educators and workers;
- Faster information exchange among regulatory partners, employers representatives and VET providers on labour market trends, teaching and learning, and new accomplishment in the field of the technologies and production
- Knowledge improvement in accordance with the future employers' demands;
- Accomplish teaching on a higher level resulting in a better knowledge of students who are better prepared for the labour market;
- Achieve practical expertise with the workers;
- Improve international cooperation in vocational education and training;
- Improve the quality of VET systems of participating countries.

The results are a good starting point for ensuring the sustainability of project results after the project end. All of the findings and recommendations of this report will be considered in the further implementation of the trainings in the framework of the Alliance for the Advancement of VET in the Metal and Electro Industry.



Skills in Metal and Electro Industry





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