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A model of cooperation between a vocational school and an industry's organization

EAA

AUTOKLASTR

SUPERIOR INDUSTRIES

TATRA

VOSKOP

ZST w Leżajsku

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1. Introduction

1.1 General overwiev

The automotive industry is currently undergoing a huge technological, qualitative and digital transformation. Vehicles can communicate with each other and they become highly autonomous being equipped with devices using software components and electronic car control units. In addition, alternative fuels are emerging to power vehicles - electric cars, hydrogen-powered cars. All this requires a certain demand for specialized knowledge and the adaptation of curricula to the requirements and needs of workplaces and the market for new products. Creating a high level of education that takes into account the needs of the labour market is not possible without the participation of workplaces, which must work closely with schools to provide the necessary information and knowledge about current trends, new technologies, technical and digital advances in industry and various areas of economic activity.

This project aims to create a model of cooperation between the school and the workplace to continuously improve teaching quality and adapt it to the industry's current requirements. We have included in its description the current achievements of our partners in this area, as well as the experience we have gained by implementing other projects, also aimed at improving cooperation and teaching quality.

Full implementation of the developed model of cooperation and its application by schools and workplaces will make it possible to conduct systematic assessment and verification of students' knowledge and skills, as well as to create ongoing comments on the substantive and social quality of students.

1.2 Project partners

Tadeusz Kosciuszko Technical School Complex in Lezajsk	Superior Industries Production Poland Sp. z o.o. Stalowa Wola
Střední škola a Vyšší odborná škola, Kopřivnice, příspěvková organizace	TATRA TRUCKS a.s. Kopřivnice
East Automotive Alliance Cluster	Moravskoslezský automobilový klastr, z.s.

The East Automotive Alliance cluster was established in 2015. Currently, the cluster has 32 members. The WSM aims to create conditions conducive to the development of the automotive industry, to create and support innovation and research and development in the automotive industry, to promote the industry, to support the industrial and economic activities of its members, and to cooperate with schools and universities for the development, improvement of the quality of education and its adaptation to market requirements.

AUTOKLASTR was founded in 2006 to increase competitiveness and promote innovation and export capacity of associated companies, entrepreneurs and institutions in the region. Currently, the Autocluster has 94 members. Its goal is to build a common identity among the companies in the cluster and to build trust and positive attitudes toward the automotive industry and the region as a whole. Autoklastr has its headquarter in Ostrava, Czech Republic.

Tadeusz Kosciuszko Technical School Complex in Lezajsk educates students in the following professions: electronics, computer science, programming, automation, CNC, robotics, mechatronics, welding, hospitality, trade, nutrition and catering industry, agriculture and agronomy, RES systems, car mechanics and machine tool operators, carpenters, electricians, bricklayers, locksmiths, machine and agricultural vehicle operators, salesmen, hairdressers, confectioners, bakers, cooks, finishers and drywall installers. The school's mission is to prepare competent workers needed in the competitive labour market. ZST has a long-standing partnership with Superior Industries Production Poland Sp. z o.o. in Stalowa Wola.

VOSKOP is a state secondary school providing technical education that prepares students for future work in the automotive industry. The school specializes in majors such as painter, locksmith, bodywork engineer, auto electrician or auto mechanic, but also focuses on economic subjects. Students of the VOSKOP school undergo vocational training at the school's specialised workshops, and students of all specializations also work in more than 40 companies that have become social partners of the school. The general partner of the school is Tatra Trucks a.s.

SUPERIOR INDUSTRIES Production Poland Sp. z o.o. is one of the world's leading manufacturers of aluminium wheels for passenger cars. Superior Industries is also a member of the East Automotive Alliance cluster, where it is actively involved in educational initiatives. The company continuously invests in its development in the area of new technologies. Superior has been cooperating with ZST in Lezajsk for many years.

TATRA TRUCKS a.s. is a manufacturer of trucks. TATRA brand trucks are based primarily on a design concept that has so far not been successfully imitated by anyone. Trucks from Koprivnice are famous for their ability to move in the most difficult terrain and weather conditions, their high reliability and excellent performance. The current product range is tailored to meet customer requirements.

To the best of our knowledge, all partners of the aforementioned project, from both the Czech Republic and Poland, are among the best organizations that exist in the market today. The results of their work have a very good reputation and they have a lot of in-house experience in school-plant cooperation.

The starting point for this project was an analysis of the existing cooperation of ZST in Leżajsk with Superior Industries Production Poland Sp. z o.o. and VOSKOP Koprivnice with the TATRA a.s. company. In the course of many years of cooperation, these entities have developed a set of good practices regarding relations between the school and the workplace.

Accordingly, achieving further improvements in the processes of mutual cooperation between those schools and workplaces was a major challenge for us.

Taking into account this long-standing cooperation between the project partners, this brochure was created as a summary of the project, which also includes suggestions for improving this mutual cooperation.

The activities of schools and workplaces and the functions these entities perform are generally known and need no further introduction. But what are cluster organizations operating around the world and what role do they play in the process?

As a rule, these organizations bring together a group of enterprises operating in the same or related industry. Cluster members also include organizations and institutions supporting business, as well as scientific centres (including, among others, universities, as well as secondary technical schools). Moreover, regional clusters can be and often are members of similar organizations at the national and international levels. The powerful cluster organizations thus formed have far-reaching horizontal goals, while also being important partners in the implementation of policies by supranational organizations such as the European Union. A good example of such an international metacluster is the European Automotive Cluster Network (EACN), of which the two clusters from this project are members.

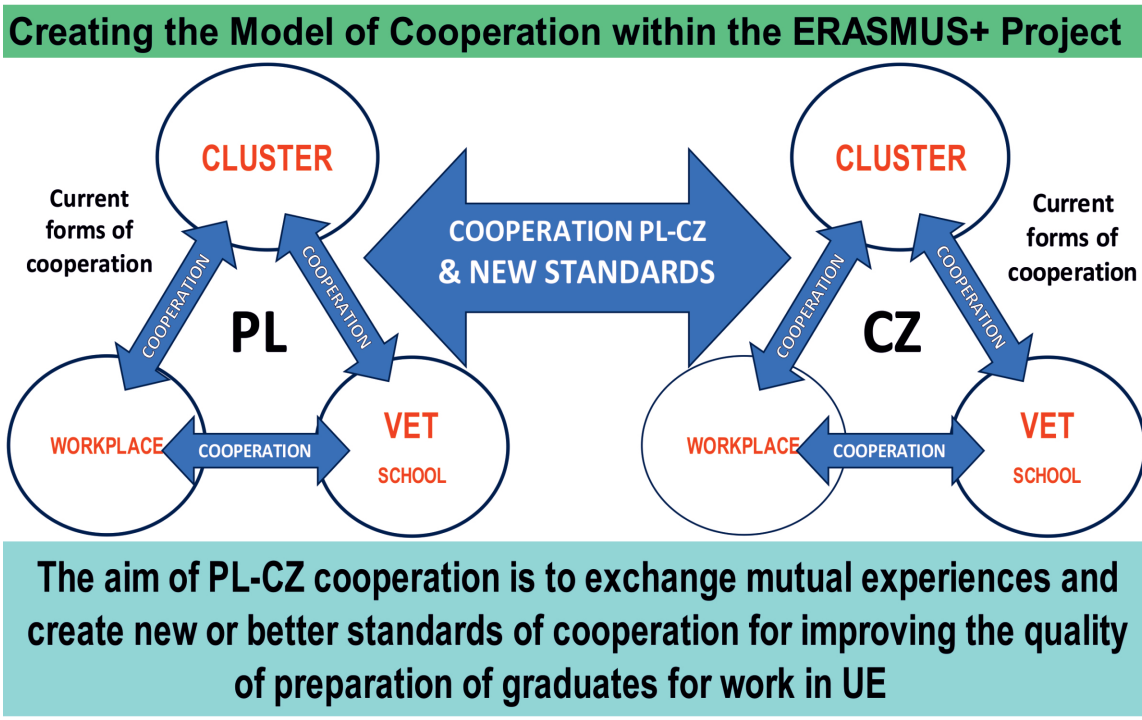
Clusters play many roles in the regional, national, as well as transnational economy. The main tasks of clusters include: representing the interests of associated companies, strengthening the competitiveness of cluster members, increasing the level of innovation through access to external sources of knowledge, and building a network of links between businesses, the R&D sector and educational institutions.

The cluster as an organization is too small an entity to become a social partner and have a real impact on modifying regulations. Nevertheless, cluster organizations can have a role to play in this process. As the example of the two partner clusters involved in this project shows, by working with other clusters and educational institutions at the national and international level, a joint proposal submitted to the relevant authorities can be developed, which is the best way to achieve the desired legislative changes.

1.3 Abbreviations used

SZ - Vocational School
OpM - Content Supervisor
PL - Poland
HR - Human Resources Department
ZP - Workplace
OpL - Line Supervisor
CZ - Czech Republic
Ub.r. - Last year
NZ - Vocational Teacher
U - Students
PDCA - Plan, Do, Check, Act
B.r. - Current year

2. The role of the project partners in the school–workplace cooperation



Slide Nr. 1

2.1 The role of the workplace in the school–workplace cooperation

The company's involvement in the process of cooperation with the school is the key to the systematic modification of curricula and thus to the continuous adaptation of the quality of teaching to the needs and requirements of the Plant, which leads to an increase in the quality of manufactured products and thus to the further development of the company.

School–workplace cooperation may include, but is not limited to, the following forms:

- ✓ patronage classes,
- ✓ preparation of curricula for the profession, taking into account additional competencies or qualifications required by the employer,
- ✓ implementation of vocational education, especially practical vocational training,
- ✓ retrofitting workshops and school studios,
- ✓ organization of the professional exam,

- ✓ improving skills of teachers of theoretical vocational subjects and teachers of practical vocational training, including organisation of industry training,
- ✓ implementation of career counselling and school promotion.

In addition, good school–workplace cooperation can bring various benefits. These are primarily:

- ✓ better recognition of the principles of school operation and the quality of education in the fields relevant to the company and building good relations with students at an early stage,
- ✓ increasing the effectiveness of recruitment and employment opportunities for selected students,
- ✓ creating a positive employer image in the local labour market.

Involvement in practical education is the most significant form of assistance to the school provided by employers. Support in the area of practical vocational training remains very important, both in the implementation of such education in vocational schools, as well as traineeships and apprenticeships for technical school students.

Our project has developed a model for implementing vocational training for students at workplaces, which modifies and improves the quality and efficiency of the current training process.

We intend to promulgate this model of partner cooperation and training implementation.

2.2 The role of the school in the school–workplace cooperation

The school's responsibility is to prepare properly their students for work at workplaces, which means preparing graduates in such a way that practically, once they are hired they do not need additional training to work independently at workstations in the plant.

For this to happen, schools need to cooperate with the workplaces to know exactly what their requirements are for the curriculum that is being taught at the school, so it can be modified systematically.

This results in additional involvement of the entire teaching staff in the process, which brings many **benefits to the school:**

- ✓ better alignment of curricula with the needs of businesses,
- ✓ access to new machinery and equipment, as well as to knowledge related to modern manufacturing processes,
- ✓ creating an image of a school that provides opportunities for students or pupils to get work experience with employers.

Benefits to the students:

- ✓ development of practical skills, as a result of combining theory and practice in the workplace

- ✓ familiarization with the latest technologies, not always available at school,
- ✓ increased job opportunities with expected salary.

Schools must become the first and most important cooperating partners for the workplace, as they determine the quality of the workforce at the plant and thus the pace of the company's development.

2.3 The role of cluster organizations in the school–workplace cooperation

The involvement in vocational education through associated plants may be an important role of the cluster. Such activity has a practical dimension since improving the quality of education is in the interest of member companies constantly in need of access to qualified workers who have the skills and competence level reflecting the dynamics of industrial change and can adapt quickly to new roles in manufacturing companies. In addition, clusters can apply for funding for this purpose at the national as well as EU level.

The activity of the cluster in the area of improving vocational education, to a large extent, is based on the potential that all affiliated entities have together. It is, so to speak, the role of an intermediary, but also an organizer of activities, which primarily boils down to the creation of links between workplaces and schools, taking into account the needs of both sides.

The involvement of clusters, and automotive clusters in particular, in improving vocational training should become one of their areas of activity. This is largely dependent on the industry in which the cluster operates, as well as on the specifics of the associated companies and, consequently, their particular needs. Nevertheless, clusters related to the automotive industry should be very active in this field due to rapidly changing technologies and environmental constraints, which require appropriately qualified personnel. It means that graduates who meet the technical and social requirements of the plants and, at the same time, are prepared and ready to work throughout the European Union.

According to the experience of the participating clusters, building mutual ties and deepening cooperation in vocational education can be done through:

- ✓ organization of apprenticeship and training for students and teachers in associated workplaces,
- ✓ assistance in modification of curricula for specific professions to meet the needs of a particular industry or entire companies,
- ✓ retrofitting of school workshops based on regional funds available to clusters and funded by member companies,
- ✓ creation of patronage classes for specific professions by associated companies,
- ✓ organizing study visits to selected manufacturing companies (even without partnership agreements) to show students "live" the current state of technology.

Currently, one of the most important elements in improving SZ-ZP cooperation is the cluster's assistance in organizing and implementing students' vocational training and study visits of students and their teachers to the workplace.

In order for these processes to be significantly improved, the role of the cluster as an intermediary between the associated members and vocational schools is already proving inadequate and should evolve not only into a permanent organizer of SZ-ZP cooperation but mainly into an initiator of new solutions and ideas to modify this cooperation, so that on this basis it would be possible to create new and modify existing curricula for schools cooperating with the clusters.

An interesting initiative currently being developed by the Autocluster is the involvement of retiring workers from the industry in vocational education. These are people with expert knowledge and many years of practical experience in the profession. With an increasingly apparent insufficient number of vocational teachers, such employees can provide excellent substantive support for teaching staff. Depending on the legal conditions in a particular country, such a solution is difficult to implement in a formalized way. There is a need for legislative changes addressing the problem of additional funding necessary for such teacher-practitioners' salaries.

Schools, just like all educational organizations, are in deep need of such substantive leadership to best meet the expectations of employers, teachers and their students.

3. Legal basis and purpose of school–workplace cooperation

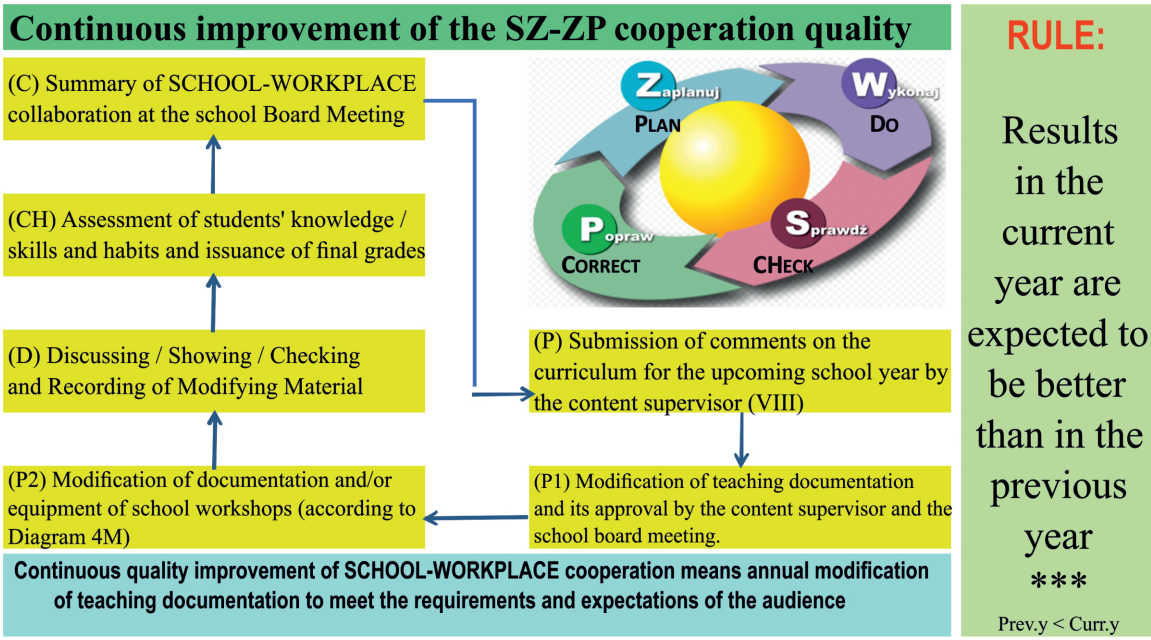
The legal basis for school-plant cooperation should be partnership agreements specifying the scope and forms of cooperation between the two parties to the agreement. In Appendix 5 we present a sample of such an agreement for possible use.

Partnership agreements should be of a long-term nature. All the plant's employees and all the teachers involved in the cooperation should be familiar with its provisions.

The goal of cooperation between the school and the workplace should be mutual assistance for the best realization of their particular tasks. In the case of the school - there should be a systematic improvement of the teaching quality in order to better prepare its graduates for work, while in the case of the plant, increasingly better adaptation of young employees to the reality of the workplace.

The Model Cooperation between SZ-ZP is implemented through the following objectives:

- ✓ creation of new profiles of vocational courses to meet the needs of workplaces,
- ✓ systematic modification of curricula to suit plant needs (PDCA),
- ✓ an increase in the skills and competencies of teachers and students through training at ZP,
- ✓ organizing competitions to find and attract talented students, etc.



Slide Nr. 2

In return for the aforementioned assistance, workplaces will receive increasingly better-qualified and prepared graduates. It will lead to a significant reduction of the time needed for their adaptation and their ability to perform work independently in a given profession and the early creation of Kaizen repair projects.

4. Forms of school–workplace cooperation

Due to the very rapid changes that are taking place in workplaces: technical, technological or organizational, schools can't wait for ministries to update curricula. Necessary changes must come directly from workplaces and be submitted to vocational schools.

Therefore, it is very important that plants, understanding their importance and priority, feel a shared responsibility for the quality and effectiveness of vocational training of students.

The schools that have been invited to participate in this project are leaders in their regions and conduct extensive forms of cooperation with their industry partners, which makes the immediate flow of knowledge from the plant to the school.

Forms of cooperation:

4.1 Vocational training for students
4.2 Study visits of students to workplaces
4.3 Lessons for students at school taught by industry employees
4.4 Training for teachers by industry experts
4.5 Assistance in retrofitting the school with equipment and devices used in industry
4.6 Acquisition of young talents through professional competitions for Students

4.7 Participation of industry representatives in the School's Open Days

4.8 Vocational training for industry employees organized by the School

4.9 Meeting between experts from the workplace and teachers to discuss remarks regarding modification of the curriculum

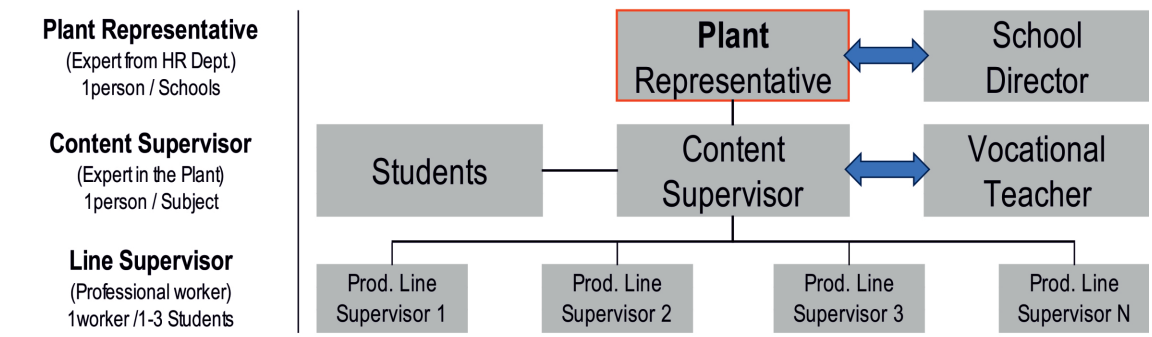
4.1 Vocational training for students

Vocational training for students is one of the primary forms of cooperation between the school and the workplace. Vocational training must take place as it is required by the curriculum. Therefore, in a sense, it forces both sides of the arrangement to work together, i.e. the school and the plant and to think together about how to make the required training for students as effective and safe as possible. Below, based on the experience of this project and other previous ones, we present a model way of carrying out vocational training so that students can benefit as much as possible during their mandatory stay at the plant.

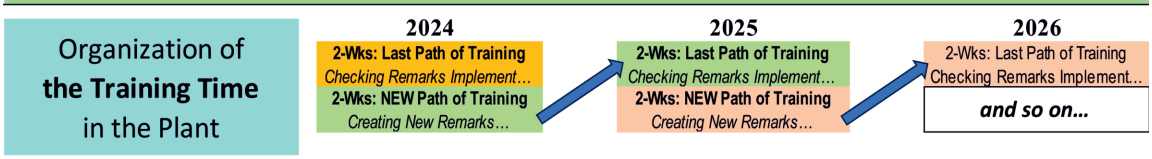
Step 1: Preparation of students for professional practice begins at the workplace with the appointment of the students' content supervisor (expert) and line supervisor (professional). See slide 3. These individuals will be responsible for guiding and supervising the students substantively and they will evaluate them continuously during the implementation of the vocational training program.

It is particularly important that people who are delegated to work with students are open to discussion and ready to answer any questions put to them. Working together on an ongoing basis, HR+OpM+NZ representatives determine the number of students that can be taken on for the training in the plant, the workstations and the profession that the students will practice.

Diagram of School-Plant cooperation during students' training



System of working during training in the Plant



Appointment of two supervisors to the arriving group of students for professional practice is a crucial condition to realise in a right way their programme of practice. The content and line supervisors must work together to prepare right assessment of students knowledge and skills to present it on the school's teachers council.

Slide Nr. 3

Step 2: The next step is to develop a thorough program for the students' vocational training. It is developed by the vocational teacher together with the supervisor and the HR specialist at Form. 01A. See slide 4.

4 weeks (or 2 weeks in the case of students from the Czech Republic) is enough time for the plant to thoroughly check the knowledge and skills learnt by the students at school, as well as to define some possible deficiencies in students' competency, which is needed for the profession.

Form 01A

Student Training Program - Mechanical Technician			
Week I > Employee in the Construction Department			
Nr.	Process	Details	Position
1	2	3	4
Day 1	Familiarization with health and safety regulations, discussion of the training program and the schedule	1. familiarization with health and safety regulations (initial occupational EHS instruction) 2. familiarization with the Work Regulations in force at the plant and regulations concerning trainees (5S, TPM) 3. familiarization with the specifics of the workplace 4. discussion of the program and training schedule 5. discussion of the principles of assessment and completion of the training	HEALTH AND SAFETY Dept.
Day 2	Preparation of the products' construction documentation	1. familiarization with the plant's Construction Department 2. familiarization with the construction documentation used at the plant 3. presentation of CAD systems used at the plant 4. importance of standardization and certification of technical drawings 5. introduction to quality assurance systems - 5S/TPM	Construction Department
Day 5	The process of grinding and cleaning rims	1. familiarization with the types of rims produced at the plant 2. familiarization with production parameters: temperature, pressure, cycle time, etc. 3. participation in the shift change at the workstation 4. 5S and health and safety at the workstations	Production Department

Andrzej Ulok:
The training program for the students is developed by the vocational teacher + content supervisor + HR
>Occupation trained: we enter the name of the Occupation pursued by the Student at the training e.g. Treatment Line Operator, Maintenance Worker, Worker in the Construction Department, etc. > vocational teacher + content supervisor + HR
>column1: enter the number of the training day at the workplace > vocational teacher
>column2: enter the name of the production process (process fragment) in general, as a task to be learned by the Student. Preferably a different task for each day of the Training > vocational teacher + content supervisor
>column3: enter the parameters of the implementation of the process as mentioned above, as well as elements that should be presented, explained and physically practiced by the Student, for full understanding of the given production process > vocational teacher + line supervisor
>column4: enter the names of the Departments/Stations at which a given topic is best presented, discussed and explained to Students > vocational teacher + content superv.

Slide Nr. 4

The process and details of the process that the line supervisor is supposed to perform on a given day must be well defined. Here, in column 2, we describe a fragment of the production process or, as in this example, a fragment of the preparation of the construction documentation for a given product. In this case, the components of the process will be created by the safety and performance characteristics, the parameters of the production process or the deadlines for the preparation of the production documentation.

Step 3: Full implementation of the organization model for each training day. Each working day for students consists of 7.5 hours at the Workplace. Good organization of this time is a key to improving students' knowledge and skills. Below, on slide no. 5, we present the 4 steps of implementation of the training by students and the involvement of supervisors (OpL and OpM) and students during this process. We indicate the types of meetings that should take place during each day of practice, their purpose, the person in charge and how the whole process is monitored.

Step 4: In order to understand the course of each day of the students' stay at the workplace, the students should be familiarized with the above-mentioned model of the training in advance, the documents used, and all the other events that will take place, such as the daily evaluation of their work by supervisors, etc.

It is especially important that before the vocational training begins, teachers provide students with detailed information regarding the practice program to be implemented, especially the column with particulars of the process, the training logbooks to be filled out and the workplace evaluation survey at the end of the training. Students understanding of all the documents and ability to fill them out and use them properly is necessary. See slides 6 and 7 below and Forms. 02, 04.

Model of the implementation of the student's training day:

TIME	ACTION	IN CHARGE	PRESENCE
8:00 –9:00 (~1-hour)	Morning meeting (***Discussion*** of the practice topic for a particular day, Q & A)	Content Supervisor	Students and Line Supervisor
9:00 –13:00 (~4-hours)	**Learning at the workstation** *(**Showing**, Q & A)*	Line Supervisor	Students
13:00 –14:00 (~1-hour)	**Verification meeting** *(**Checking**, Q & A)*	Content Supervisor	Students
14:00 –15:00 (~1-hour)	**End of the practice day** *(**Writing down,** Q & A)*	Content Supervisor	Students

150 hrs/student = 20 days x 7.5 hrs = 150 hrs

Slide Nr. 5

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Student's training assesement:
(on a scale of 1-10, i.e. from bad 1 to exemplary 10)

Student:

Company:

a. completion stage of the process learned during the practice:
b. the quality of carrying out activities and instructions:
c. quality of keeping the training logbook:
d. independence and diligence:
e. interest in the work performed:
f. observance of discipline:
g. ability to work in a team:
h. observance of health and safety regulations:

Certificate no:

Attendance:
Number of days present:
Number of days missed:

Reasons of absence:

CSS's legible signature

Seal of the Workplace

Slide Nr. 6

PLANT EVALUATION QUESTIONNAIRE

Workplace:_____ Training duration:_____

School and field of study:_____ Class:_____

Dear student, please answear following questions: Average rate:

1) How do you rate the morning discuccion of tasks for the upcoming period by the expert supervisor:
1 2 3 4 5 6 7 8 9 10
1) insufficient 10) very good

2) How do you rate the demostration and explanation of tasks by the expert supervisor:
1 2 3 4 5 6 7 8 9 10
1) insufficient 10) very good

3) How do you evaluate the process of checking the acquired skills by the expert supervisor:
1 2 3 4 5 6 7 8 9 10
1) insufficient 10) very good

4) How do you evaluate the training program, was it useful for you:
1 2 3 4 5 6 7 8 9 10
1) insufficient 10) very good

5) How do you evaluate the implementation of the training program by the plant:
1 2 3 4 5 6 7 8 9 10
1) insufficient 10) very good

6) How do you assess the attitude of employees towards you
1 2 3 4 5 6 7 8 9 10
1) unfavorable 10) very helpful

7) How do you rate the organizationof the training day at the plant:
1 2 3 4 5 6 7 8 9 10
1) inappropriate 10) very educatory

8) How do you rate the time spent at the plant in terms of knowledge acquisition:
1 2 3 4 5 6 7 8 9 10
1) too short 10) too long

8) Other comments and suggestions for better implementation of the training in the future:

Slide Nr. 7

Form 03B

Automation Technician - REMARKS (Content Supervisor)

Content supervisor:
Workplace/Training duration:
od students in parctice:

No.	Comments on the performance of the given competencies by the students:	Proposed improvement ranges to students' knowledge or skills:
1.	Students were unable to select tools for assembly of industrial automation systems	
2.	Students were unable to measure parameters of industrial automation systems	
3.	Students were unable to read technical documentation of machinery / equipment	
4.		
5.		

Slide Nr. 8

Automation Technician - REMARKS (Line Supervisor)

Line Supervisor:
Workplace/Training duration:
od students in training:

No.	Comments on the knowledge / skills of students after completion of the path of a given competence	Justification of the evaluation with the job description, type of activities performed, etc.
1.	The student was unable to select tools for the assembly of industrial automation systems	
2.	The student was unable to perform measurements of parameters of industrial automation systems	
3.	The student was unable to read the technical documentation of the machine / equipment	

Slide Nr. 9

Step 5: Summary of the training and preparation of remarks (recommendations) on the noted deficiencies in students' knowledge and/or skills to be reported at the school's board of education meeting. Supervisors evaluate the students on the last page of the training logbooks, see slide 6, Form. 02 and make notes for the school, see Slide 8 and 9, Form. 03A and 03B.
On the other hand, students fill out the workplace evaluation survey, see Slide 7, Form. 04.

The summary of the training should take place in the presence of vocational teachers. The supervisors should justify their evaluations written in the logbooks and discuss the comments to be presented at the school's board of education meeting.

the role of the school:

1) development of a practice program for students together with OpM,
2) discussion of the practice program and how to fill out training logbooks at the school,
3) visitation of students by the teacher during the practice, min. 1x per week,
4) continuous cooperation of the teacher with the supervisors of the students in the plant.

the role of the plant:

1) establishing a comprehensive practice path for each profession to be trained,
2) appointment of appropriate supervisors (OpM, OpL) to take care of the students,
3) continuous cooperation between supervisors and teachers for increasingly better implementation of the practice program.

the role of the cluster:

1) organising vocational training for students at affiliated workplaces. Schools should not be left on their own with the problem of finding factories and enough places to send their students to have vocational training. The cluster's help is much needed.
2) creating remarks, common to the entire cluster, regarding the educational quality of students after their practice, for each field of study, to be presented at the school board of education.

4.2 Study visits of students to workplaces

Study visits, like vocational training at workplaces, are significant elements in supporting vocational education. They constitute an important aspect of diversifying the practical way of transferring knowledge to students. The implementation of the study visit follows the model for the implementation of training described in Slide 3, but with one difference; it is a one-day vocational training. The study visit program is prepared by the vocational teacher in consultation with the workplace, see Form. No. 01A, and it usually covers a part of the process that is currently being discussed at school and that can only be seen at the workplace.

Study visits of students to workplaces prove the existence of real and deep cooperation between these entities and are an ideal way to introduce students to new equipment or technologies that have recently appeared at workplaces.
Such visits should be organized especially for students leaving the school as they will no longer have the opportunity to learn about these innovations during vocational training.

the role of the school:

1) Development, together with OpM, of a detailed program for 1 day of the students' visit to the plant,
2) Ensuring that the organization of the visit as on slide 5 is applied,
3) Ensuring that students evaluate the quality of the visit according to the survey as on slide 7,

the role of the plant:

1) Providing the right supervisors (OpM, OpL) to take care of the students,
2) Continuous cooperation between supervisors and teachers for increasingly better implementation of study visit programs,

the role of the cluster:

1) Supporting the organization of study visits of students to affiliated plants. Cluster assistance is vital as schools have less understanding in the area of technological change.

4.3 Lessons for students at school conducted by industry employees

An interesting form of cooperation between business and vocational education is classes for students conducted by industry representatives. They can be held both at school and at the plant, as long as the premises allow it. The topics of the classes may include both substantive issues, closely related to the profession taught, as well as soft skills, usually conducted by the HR Department employees. For such meetings, plants should prepare training presentations which, after the class, are given to the teachers for their further use.

ZST > More than 20 such meetings with representatives of various companies and institutions were held during the school year of 2022/23.

the role of the school:

to determine the topic and organization of the training,

the role of the plant:

to delegate the best specialists to such training, in order to thoroughly discuss the topics,

the role of the cluster:

to coordinate the involvement of experts from cluster organizations in educational processes in schools to discuss and explain new technologies or processes implemented by the plants.

4.4 Training for teachers conducted by industry experts

In this case, we mean short training courses see Attachment 2, Form. 01B, which consists of updating the knowledge concerning the previous year. As a rule, the training agenda for teachers is the same but should refer to current technological solutions and processes. Such training sessions take place during follow-up visits of students during their vocational training. They are conducted in the form of discussions with teachers and the duration of one training session is about 2-3 hours.

Training courses for teachers in this form should be implemented during vocational training.

the role of the school:

to discuss the feasibility of such training with the workplace,

the role of the plant:

to delegate the best specialists to such training, to thoroughly discuss the topics,

the role of the cluster:

to gather information from teachers about the content quality of such training courses and to modify them if necessary

4.5 Assistance in retrofitting the school with equipment and devices used in industry

The priority of vocational education is to prepare students as well as possible to enter the labour market. The students who benefit the most are those who have acquired practical skills in a real work environment and have had the opportunity to learn about new solutions and technologies used in a given industry on an ongoing basis. As part of the cooperation between companies and vocational schools, school workshops can be retrofitted with modern machinery and equipment used in industry, which at the same time meet the conditions indicated in the core curriculum for education in the given profession.

Employers' assistance can take the in-kind form through donations of machinery and equipment, which is later incorporated into the teaching process. The school can also benefit from financial support by co-financing the purchase of necessary equipment and accessories by industry institutions.

the role of the school:

requesting retrofitting of workshops, with the most needed equipment,

the role of the cluster:

retrofitting school workshops with used raw materials and supplies, used tools and instruments, and new equipment based on regional funds available to the clusters and partial financing of such purchases by associated plants.

4.6 Acquisition of young talents through professional competitions for Students

Another form of cooperation between the school and the plant is the organization and participation of students in professional competitions. This is an important form of work with students who are talented and interested in expanding their knowledge and skills. This form fosters the development and activity of students and inspires them to solve untypical issues and problems.

Its additional advantage is the formation of soft competencies desirable in the labour market such as the use of information, the application of knowledge in practice and creative problem-solving. When going through untypical tasks and competition problems, the student looks for different ways of sorting them. In addition, professional competitions provide a valuable opportunity for creative competition and teach how to function in difficult situations that require concentration within a certain time.

Vocational competitions organized by the school in cooperation with employers are an opportunity to attract the best young talents, who will join the middle management of companies in the future.

Contests also have a number of other purposes, namely:

- increasing motivation to improve students' knowledge and professional skills,
- strengthening the cooperation between the vocational school and companies,
- as a public relations element, building a positive image of the school and the company in the local environment.

ZST> During the last school year, 55 students of the mechanical engineering school participated in the competition "Master in the profession - machine tool operator", which constitutes 30% of the students studying the profession. There were also 20 students of the vocational branch division of the school who took part in the competition, which is 25% of all students studying in the profession of cutting machine tool operator.

the role of the school:

to organize such competitions and notify all the plants cooperating with the school,
to organize such competitions and notify all the plants cooperating with the school,

the role of the cluster:

to support such competitions by, among other things, sponsoring prizes for winners.

4.7 Participation of industry representatives in the school's open days

School open days, which are organized every year, are an important event in the school's calendar. They are part of the vocational orientation system designed to help elementary school pupils choose their educational path after leaving school and plan their career development according to their predispositions. Companies which cooperate with the school should be active participants in the open days. Such an event brings the school's educational offer closer and increases the effectiveness of recruitment while creating a positive image of the school and cooperating companies in the local community.

ZST> 8 manufacturing companies participated in the School Open Days last school year. In addition, representatives of universities, including the Rzeszow University of Technology, participated in meetings with young people. Promotion of the fields of study took place in the workshops and laboratories of ZST Leżajsk, where presentations and demonstrations prepared by students and vocational teachers were presented. In addition, each participant of the event could talk to representatives of the industry and learn about their job offer after graduation. Appropriate advertising brochures were also prepared and various technical knowledge contests were organized.

the role of the school:

organizing such open days and notifying all the plants cooperating with the school,

the role of the plant:

presenting, in the most interesting way, their production, so that young pupils from elementary schools are encouraged to study the professions needed by a particular workplace,

the role of the cluster:

supporting open days by taking part in them and preparing an interesting booth for visiting pupils from elementary schools. This is often the first contact with industry for young people, and the choice of their future career path may depend on our approach to them.

4.8 Vocational training for industry employees organized by the school

An important form of cooperation on the line between business and vocational education is training organized by the school and dedicated to industry employees. These trainings bring tangible benefits to both stakeholders. Employers acquire qualified employees, while the school makes better use of its teaching base and human and intellectual potential. An example of good practice in this area is the training courses organized for operators and setters of CNC machine tools of Superior Industries Production Poland Ltd. They were aimed at reminding and familiarizing the company's employees with the most important technical issues in the production sphere related to CNC machining. The training topics were agreed upon with the company's management and included the following modules: Technical drawing, Fundamentals of machining, Measuring tools and measurements, CNC programming basics.

the role of the school:

to establish with the Plant the dates and topics of training and how to implement them,

the role of the plant:

to establish with the school the dates, subject matter and the way the training is implemented, as well as to appoint trainers,

the role of the cluster:

in this case, the cluster is not involved in the organization of these trainings.

4.9 Meeting between experts from the workplace and teachers to discuss remarks regarding modification of the curriculum

The meeting of workplace experts (OpM) with all the school's teachers is a key factor in the process of improving the quality of teaching. Such a meeting takes place when the workplaces have their comments on the curriculum ready, i.e. after all forms of cooperation covered in sections 4.1 - 4.9 have been implemented, and they are ready to define specific remarks for modifying the profession-oriented curriculum.

Curriculum modification involves the implementation of remarks regarding the students' knowledge and/or skills noted by the workplace mainly during the course of students' vocational training and study visits. See Slides 8 and 9. During the students' training at the workplace, OpL and OpM practice supervisors, have the time and opportunity to look closely at the students' skills during the implementation of the various points of the practice program. The line supervisor has the opportunity to accurately assess the students' skills while they are working on the production line, while the content supervisor has the opportunity to thoroughly check the students' level of knowledge of a particular process during verification meetings and evaluation of their entries in the training logbooks. All collected comments on the educational quality and involvement of students should be reflected in the student's training logbook - see Slide 6, Form. 02, and should be reported and discussed at the school's board of education meeting - see Slide 9, Form. 03B.

The number of comments made by the plant on the quality of the curricula and their later utilization by the school is a very good measure of cooperation between the school and the workplace. As a rule, the implementation of such comments does not require changes to the curriculum, but only adjustments to the lesson and time to refine them. Repeating such a process annually will ensure that the quality of teaching is systematically improved and the school keeps up with the constant changes in the workplace. See Slide 2 (Deming Wheel).

the role of the school:

to work with the cluster to get as many experts as possible from all fields of study to meet with teachers and present their comments on the quality of vocational teaching at the school,

the role of the plant:

to assist in the modification of curricula through the participation of plant's experts in the working groups implementing the previously submitted comments,

the role of the cluster:

to assist in the modification of curricula through the participation of experts from the plants in the working groups implementing the previously submitted comments.

5. Summary

5.1 General comments

The primary goal of the presented model is to establish full cooperation between the school and the workplace and to support teachers in the process of teaching vocational subjects. Such cooperation will allow the formation of an entrepreneurial attitude of the student by making the student aware of the need to plan both educational and professional paths, taking into account their predispositions, values and competencies.

This model is intended, on the one hand, to support the implementation of educational tasks in the teaching of vocational subjects, and on the other hand, to encourage the formation of relations between the school and the workplace. Students acquire the necessary theoretical knowledge at school which is later confronted with practice at the workplace. Such integration of the school system with the business environment helps to reduce existing discrepancies between education and the labour market. The experience gained in this way allows young people to choose the direction of education in an informed manner and later enter the labour market with confidence.

The presented model of cooperation between school and workplace can be applied flexibly, regardless of the conditions under which it is used. The actual cooperation between the school and the workplace varies from one school and workplace to another. It depends on the degree of development of the school and the level of technology in the workplace.

Good cooperation between schools and workplaces not only brings educational benefits, but it also has a positive impact on the local community. Through such partnerships, local companies become more involved in the community and education, which in turn affects the development of the local economy increasing the availability of quality education.

5.2 Conclusions

The goal of this project was to develop the model of cooperation between the vocational school and the workplace. Such well-arranged and consistently implemented cooperation should lead to a systematic deepening of the process and, in the long run, to a continuous improvement in the quality of the teaching process. The ultimate result is reached when the school educates the students according to the needs of workplace, i.e. the school meets the expectations of the workplace. The workplace then, with its increasingly better-qualified staff, is well prepared to adapt its production to the market demands.

The following conditions seem to be necessary to guarantee well-arranged cooperation:

1) the management of the workplace must be interested in having the best-educated personnel possible, as it translates positively on the quality of production, reduction of losses, etc.,

2) the school's management must be aware that the plants will be interested in recruiting only graduates who have such knowledge and skills that without additional and lengthy training they are able to work well and independently,

3) school-plant cooperation must be established formally through the signing of relevant contracts and agreements regarding cooperation and the mutual relations of the partners must be defined in such a way as to enable long-term planning,

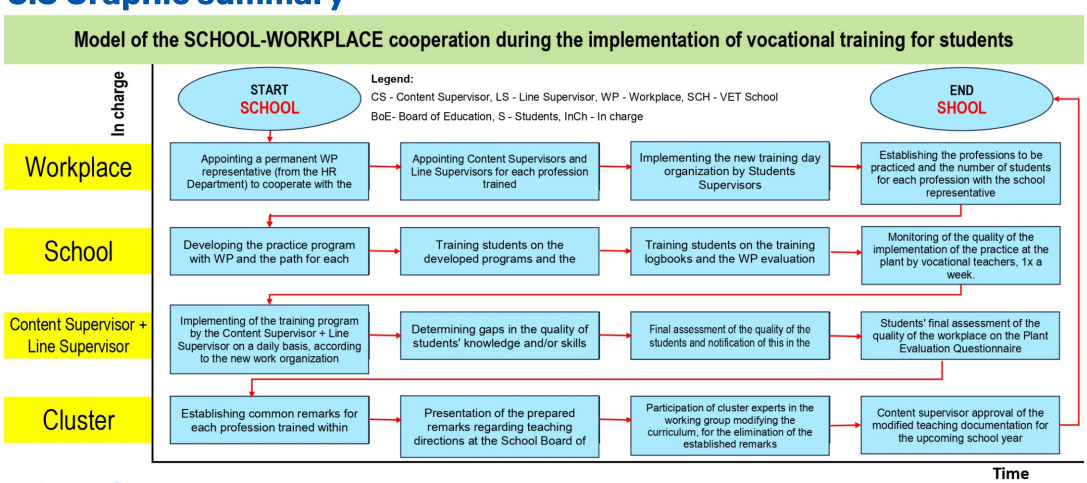
4) the workplace should create a position (in the HR Department) responsible for cooperation with the school or schools, depending on the size of the plant and the need to deepen this cooperation,

5) the school that cooperates with a company must become the most important partner for the company, as it influences the quality of the workforce at the company.

Many of the above conditions have already been implemented by the schools and workplaces partnering in this project, thanks to which both schools in the Czech Republic and Poland educate well-prepared graduates.

Implementation of the remarks shown in this paper, especially the new organization of vocational training and study visits, will raise the already high quality of all the students to an even higher level, and will further improve the quality of teaching at the school, increasing the quality of manufactured products by the workplace.

5.3 Graphic summary



6. List of attachments

1.Form 01A Student Practice Program
2.Form 01B Teacher Training Program
3.Form 02 Practice Logbook
4.Form 03 Comments of the Workplace
5.Form 04 Evaluation Survey
6.Partnership Agreement
7.Cooperation Agreement

The attachments are available on the website: **www.eaa-wsm.pl** in the section Projects/ Model for Cooperation between Vocational School and Industry.

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