



Co-funded by the
Erasmus+ Programme
of the European Union



Handbook for practical teaching coordinators and instructors for the implementation of learning through work (Computer scientist)

- Dual education -



Introductory speech of the project manager

The manual in front of you is part of the project "Creation of a diary of competences for students and a manual for teachers - mentors in VET schools", which is carried out by the Secondary Vocational School Kragujevac-Serbia, Sule Muzaffer Buyuk Mesleki ve Teknik Anadolu Lisesi Manavgat - Turkey and Agrupamento de Escolas de Barcelos Barcelos - Portugal, within the Erasmus+ program for which the Tempus Foundation office in Belgrade is responsible.

The goal of the project is to improve the organization practical classes in schools and with social partners by creating a manual for mentors in social companies and the diary of students' competencies in the system of dual education.

The project has been implemented since 2019 . years. From then until today, in the territory of the cities of Kragujevac, Manavgat and Barcelos, the working version of the Competence Diary for students and the Handbook for teachers has been successfully implemented, in cooperation with successful companies, local governments and Chambers of Commerce.

Competence Diary for students and Handbook for teachers was prepared by an expert team made up of team coordinators, expert associates and learning through work coordinators of all schools participating in the project.

We sincerely hope and believe that the manual will be a useful tool for learning-by-doing coordinators and instructors in companies, who train young people in a real business environment and prepare them for future independent work.

EXERCISE ONLY ACHIEVES CONSTANT!

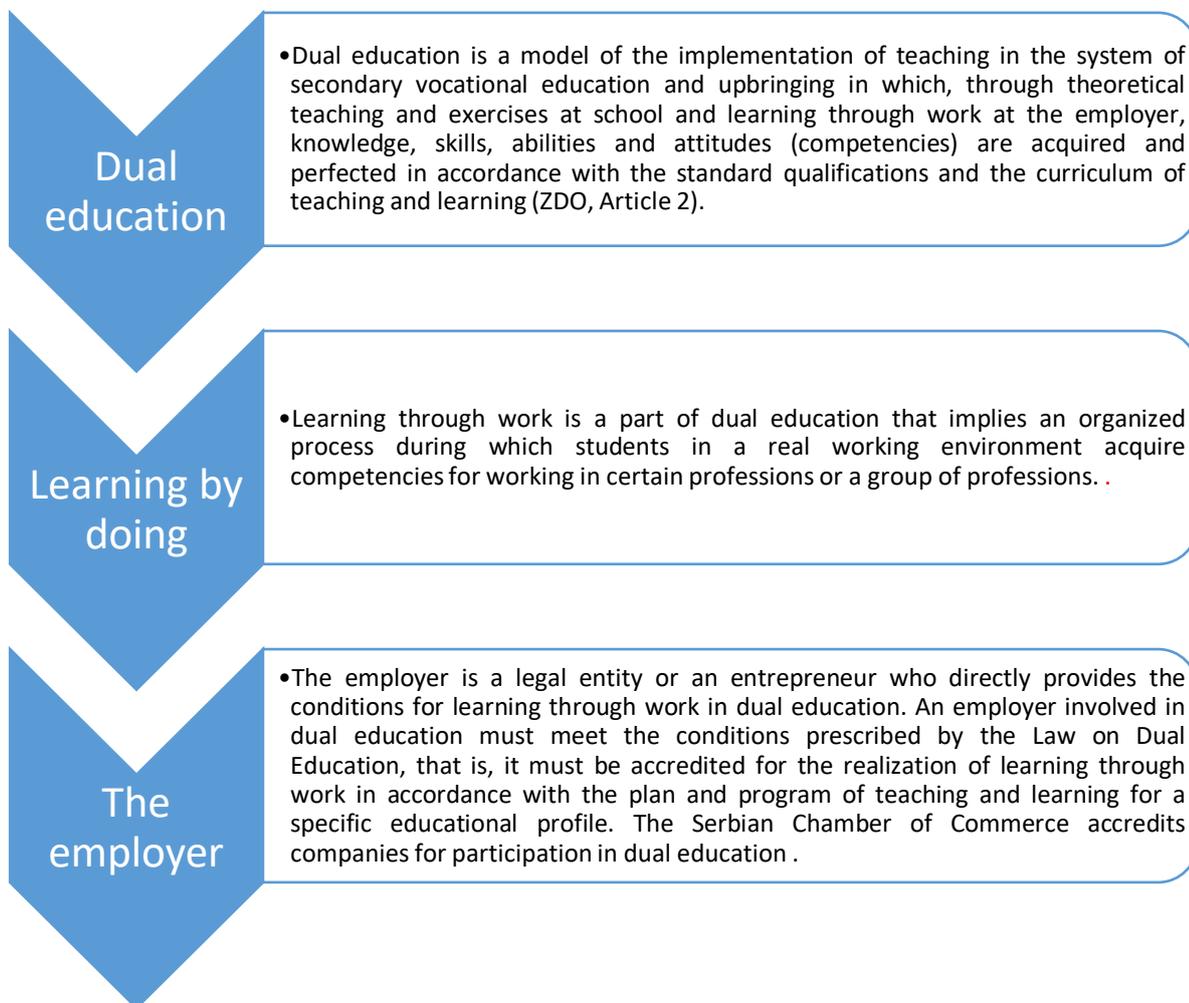
SUPERVISED EXERCISE GIVES PERFECTION!

THE CONTENT

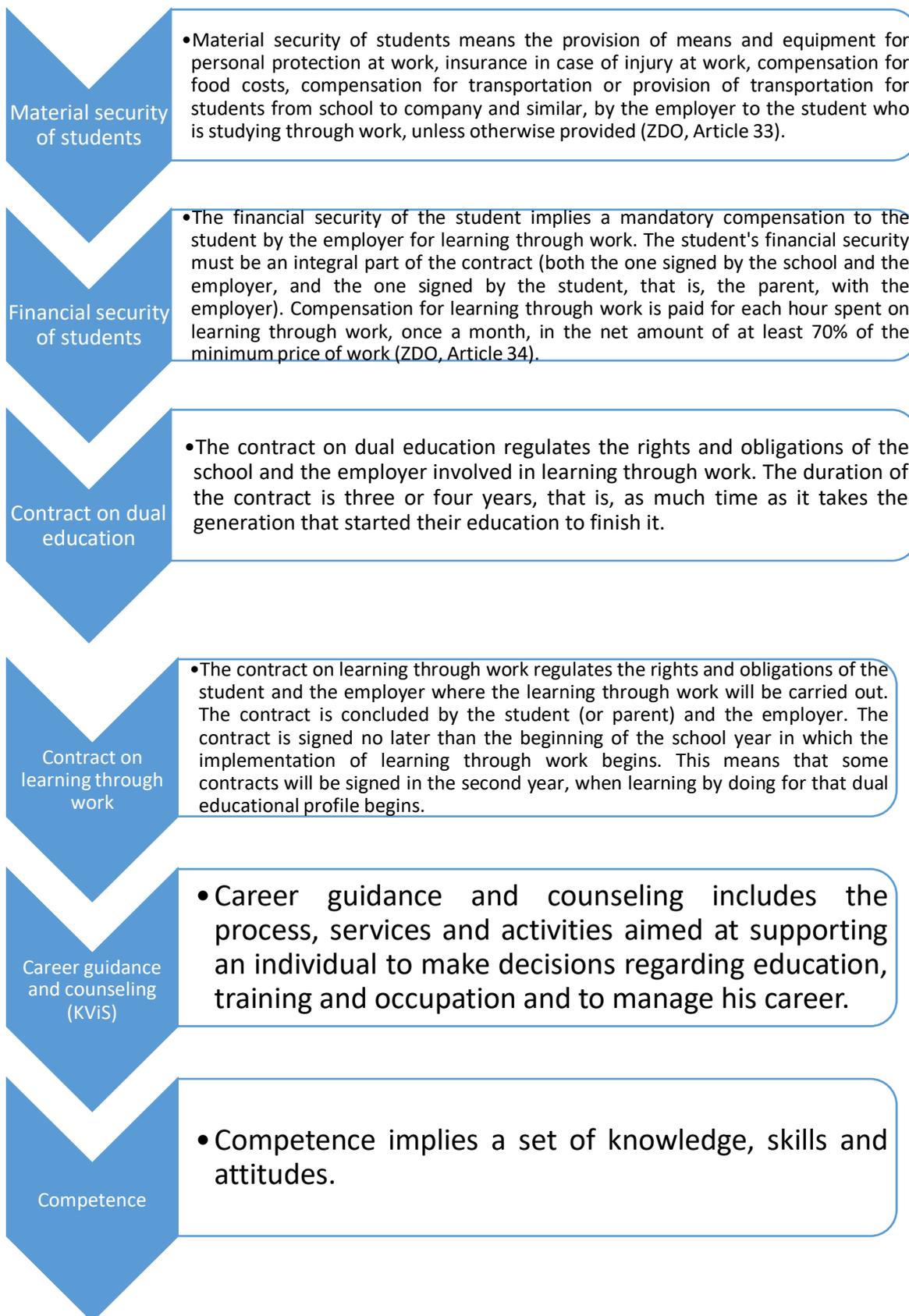
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1 Specifics of dual education

You can see the specificity of dual education through the following key terms that are directly related to its realization. Important, key terms related to dual education are:







Qualification standard

- The qualification standard is a document established at the national level that contains a set of qualification data with a detailed description of learning goals and outcomes, as well as qualification data on the basis of which the level is determined, its classification and evaluation (ZNOKS, Article 2)

Higher education institutions

- Higher education institutions that independently perform higher education activities are universities (faculties and art academies within them), colleges, academies of vocational studies and colleges of vocational studies. All but the university (and its institutions) are non-university institutions.

Qualification

- Qualification is a formal recognition of acquired competencies. An individual acquires a qualification when the competent body determines that he has achieved the learning outcomes within a certain level and according to the set qualification standard, which is confirmed by a public document (diploma or certificate) (ZNOKS, Article 2).

Occupation

- A set of jobs whose main tasks and duties are characterized by a high degree of similarity.

Occupational standard

- A document that contains a description of duties and tasks, as well as the competencies required by an individual for the efficient performance of work in a certain occupation, established in accordance with the regulations governing employment (ZNOKS, Article 2).

2 Key principles in the implementation of dual education

In the dual education contract itself and the implementation plan for learning through work, it should a **clear division of duties and responsibilities** between the school and the company will be established . The dual education process itself should be sufficiently **open and inclusive all interested representatives of** different groups from the local community. **The dignity and personality** of the student must be respected at all times, as well as the school and the company they must be **fully committed** to increasing the student's chances of employment after completing high school education and to help him develop as much as possible skills to manage his career and make decisions that are in his best interest.

Dual education is based on the obligation of all participants to be guided by the best interest of the student, in accordance with the following principles:

- 1) partnership between the school and the employer - cooperation and clear division of duties and responsibilities in ensuring a quality process of learning through work;
- 2) establishment of social partnership at the local level - involvement of all interested parties in the process of planning, realization and monitoring of the effects of dual education through the established institutional framework;
- 3) professionalism - establishing a formal-legal relationship between the student, the employer and the school in the education process;
- 4) ethics - respect for the personality and dignity of students and the achievement of educational goals;
- 5) quality assurance - coordination and establishment of standards at all levels and monitoring the effectiveness of dual education;
- 6) career guidance and employability - development of career management skills and provision of greater chances for employment;
- 7) availability - equal conditions for everyone for quality access to dual education;
- 8) relevance - compliance with the needs of employers and the labor market;
- 9) accessibility - access to different areas of work within the same level of education and to higher levels of education;
- 10) lifelong learning - enabling education and development throughout life in all areas of life and work;
- 11) the right to choose - the freedom to choose an occupation and educational profile within the established criteria;
- 12) equal opportunities - providing equal conditions for acquiring education, without any discrimination with regard to gender, racial, national, cultural, ethnic and religious affiliation, language, sexual orientation, place of residence, financial condition, disability and other personal characteristics. Institutional partnership and cooperation between the ministry responsible for education affairs (hereinafter: the Ministry), the Chamber of Commerce of Serbia and the Institute for the Improvement of Education and Training is established for the purpose of implementing dual education at the national level.

3 Objectives of dual education

The goals of dual education are:

- 1) provision of conditions for acquisition, improvement and development of competences in accordance with the needs of the labor market;
- 2) contribution to strengthening the competitiveness of the economy of the Republic of Serbia;
- 3) provision of conditions for employment upon completion of education;
- 4) providing conditions for further education and lifelong learning;
- 5) development of entrepreneurship, innovation and creativity of each individual for his professional and career development;
- 6) providing conditions for personal, economic and general social development;
- 7) developing the ability for teamwork and a sense of personal responsibility in work;
- 8) developing awareness of the importance of health and safety, including occupational safety and health;
- 9) developing the ability to self-evaluate and express one's own opinion as well as independent decision-making;
- 10) respect for mutual rights and obligations of students and employers.

4 Teaching and learning plans and programs

The basis for adoption of teaching and learning plans and programs is the qualification standard established by the sector council for a specific sector of work, in accordance with the law governing the national qualifications framework.

The teaching and learning plan and program contains standard qualifications, compulsory general education, compulsory professional and optional subjects.

Within the framework of compulsory professional subjects, there are also subjects that are implemented as learning through work.

The learning outcomes determined for subjects that are implemented within the framework of learning through work are the basis for the development of a plan for the implementation of learning through work and are part of the school program.

5 Learning by doing

Given that the employer is responsible for the systematic and high-quality performance of learning through work in accordance with the teaching and learning plan and program, and that the school is responsible for the implementation of the teaching and learning plan and program as a whole, cooperation with the school and the coordinator for learning through work is necessary and crucial for the successful realization of this process. The instructor and coordinator of work-based learning have important roles in the implementation of work-based learning. They are in direct contact with students, and the successful implementation of many aspects of dual education depends on their mutual cooperation. It is necessary that the coordinator of learning by doing visits the students while they are in the company on learning by doing. The coordinator will thus check whether the student is present in the company and whether he implements learning through work in accordance with the Implementation Plan for learning through work.

Learning through work is realized in accordance with the school calendar during the school year, no longer than six hours a day, or 30 hours a week, in accordance with the plan and program of teaching and learning.

Learning through work is realized in its entirety at one or several employers in accordance with the teaching and learning plan and program.

As an exception to paragraph 4 of this article, part of the learning through work can be realized at school in accordance with the plan and program of teaching and learning, that is, if it is not possible to realize it in its entirety at the employer.

In the school, a maximum of 25% of the hours of learning through work provided for in the plan and program of teaching and learning are realized.

6 Monitoring and evaluation of learning through student work

The instructor is responsible for the implementation of part of the teaching and learning plan and program and in his responsibility is to continuously monitor the progress of each student in learning through work in cooperation with the coordinator of learning through work. The instructor and coordinator of learning through work should deal with:

- by improving the work with each student and adapting the work to the individual needs of the student,
- by taking appropriate support measures if the student does not achieve the expected results,
- by monitoring the progress and evaluating the competencies that the student has acquired during learning through work etc.

The instructor in cooperation with the coordinator of learning through work based on the analysis of the student's in progress, he gives a proposal for the student's grade for the part that is implemented in the company. In the Appendix of this guide are some examples of forms that instructors can give used to monitor the student, giving feedback to the student regarding his progress in the development of professional competencies prescribed by the curriculum - goals and outcomes of professional education operationalized through knowledge, skills, abilities and values that the student needs to develop as well as for the exchange of information with the learning coordinator through work. It is very important that instructors document the monitoring and evaluation process. Forms contained in the attachment refer to:

- Attachment 1 - Implementation plan for learning through work
- Attachment 2 - Elaboration of a topic for teaching students
- Attachment 3 - Form for evaluating the candidate's performance after each topic
- Annex 4 - Evaluation list
- Attachment 5 - Final evaluation form
- Attachment 6 - Evaluation sheet filled in by the student

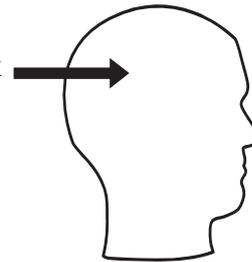
7 Areas of study

Learning can be divided into 3 learning areas, namely:

- COGNITIVE FIELD OF LEARNING
- PSYCHOMOTOR AREA OF LEARNING
- AFFECTIVE AREA OF LEARNING

The cognitive area of learning covers the area of general and professional knowledge that is necessary for the later acquisition of skills. These include for example:

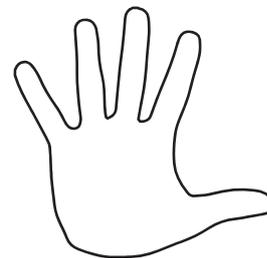
- Knowledge of material characteristics
- Knowledge of regulations for healthy and safe work
- Types of material processing
- Knowledge of labor law
- Rules of conduct at the workplace
- Knowledge of ingredients for cooking



Psychomotor area of learning

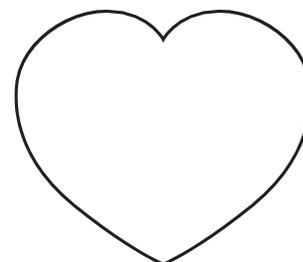
The psychomotor area of learning includes the acquisition of various skills. For example:

- Craft skills
- Operating a device or machine
- Drawing
- Working with tools
- Dexterity in general, etc.



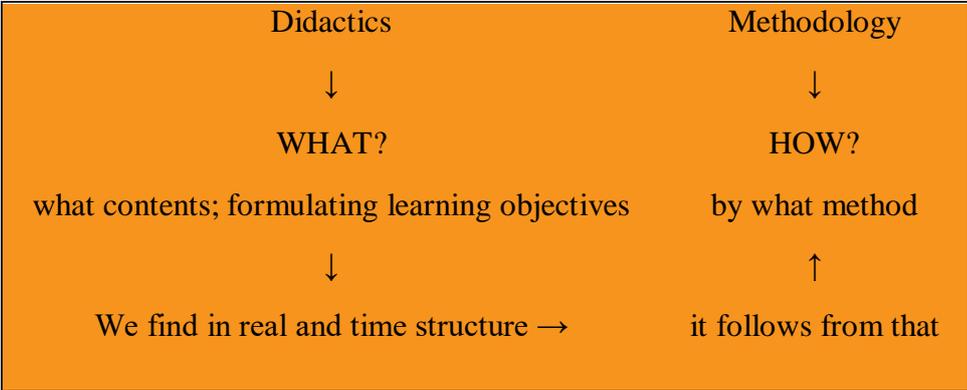
The affective field of study is about internal attitudes or ways of behaving. For example:

- Readiness to work
- Attitude towards work
- Confidence
- Willingness to help
- Behavior towards clients
- Relationship to means of work
- Relationship to the company's assets, etc.



8 Didactics and methodology

It is very important to know the role of didactics and methodology in learning. We will show this through a block diagram, so that future mentors can easily distinguish between these terms.



Thus, didactics gives an answer to the question of what we do, and methodology how we reach the goal and which method we will use to achieve the goal. Therefore, methodology follows didactics. Only when we define the appropriate training objectives (WHAT) can we determine the procedure (HOW).

9 Division of methods for training

Methods with low participant activity	Methods with high participant activity
<ul style="list-style-type: none"> ▶ lecture ▶ short lecture ▶ demonstration 	<ul style="list-style-type: none"> ▶ Four-phase method ▶ Conversations in class ▶ Moderation ▶ Case method ▶ Role play ▶ Text-instruction method ▶ Project teaching ▶ Task-work learning ▶ Expert groups ▶ Insert technique ▶ ZŽN ▶ Bunch ▶ Pomodoro ▶ Simulation ▶ Discovery learning through inquiry
→ Participants are not actively involved	→ Participants activate themselves

When conducting training with practitioners, the choice of method for knowledge transfer is very important. Since it is about production or service occupations, it is necessary that the trainees be involved in the training to the greatest extent possible and be active participants. We certainly cannot achieve this exclusively through a lecture, a short lecture or a demonstration. We also need access from the right side of the table. In this way, the practitioners are activated. The four-phase method, which we will study and try to apply, proved to be a good method.

10 Four-phase method

The four-phase method is the most frequently applied method in the phase of teaching or knowledge transfer. The stages go in the following order:

The first stage - preparation and explanation

The second stage – showing and explaining

The third stage – repeat and explain

The fourth stage – independent practice

In the first phase , the workplace is prepared by the mentor or instructor, the mentor's greeting and motivational speech to establish a positive atmosphere for the conversation. In the further course, the necessary cognitive knowledge is checked through the conversation, and even if certain knowledge is not present to the required extent, the duty of the mentor and instructor is to help the practitioner make up for what he did not master before. Of course, this has its limits and that a practitioner who does not satisfy most of the required knowledge during a longer period of training may be removed from practice.

In the second phase , the mentor explains what is done, how it is done, why it is done that way and gives notes on safety and hygiene regulations. Poto performs procedures, operations and the like.

In the third phase , the practitioner repeats and explains the operation or procedure, the mentor helps and corrects any mistakes. The mentor asks control questions, encourages and praises the practitioner. This phase lasts until the mentor is satisfied that the trainee can perform the operation independently.

In the fourth phase , independent practice and application of what has been learned is carried out. The mentor intervenes only when necessary, confirms and acknowledges success, encourages independent deepening of knowledge. It is also good that at this stage the mentor specifies the task in terms of the deadline, the duration of the operation, and the like. The mentor should measure the deadlines and the time of the creation correctly so that the operation is not too easy due to the long deadline, but also not too difficult.

11 difficulties in training

Students in dual education are mostly between the ages of 15 and 19, i.e. teenagers. This developmental age has specific characteristics and is extremely sensitive for each person. For these reasons, as well as a number of others (e.g. secondary school enrollment policy, due to which students often enroll in a school that was not ranked high on their wish list), it is possible that in the implementation of learning through work, problems arise in terms of poor communication with the student or student indiscipline. Some of the problems that may arise during the learning-by-doing process are as follows:

- The student does not come or comes irregularly to the company,
- The student is late for "learning by doing" or leaves it early
- The student does not act in accordance with the rules on safety and health protection at work
- The student causes material damage to the employer (alienates the employer's property)
- The student refuses to cooperate, does not want to complete the assigned tasks, etc.

In solving each of these, as well as all other situations with students, it is necessary first of all to cooperate and exchange information with the coordinator of learning through work, and if there is a specific need, with the relevant services.

The instructor, as someone in the company who is in the most direct communication with the student, should always try to talk about the "problematic" situation with the student and point out to him the importance of acting in a certain way. For the sake of illustration, when a student does not come to the company on time, the importance of being on time should be pointed out to him immediately. Most students do not yet have developed work habits, so a well-intentioned suggestion from their instructor is very important. However, if the situation does not improve even after the conversation, then it is necessary to inform the coordinator of learning through work and take appropriate measures.

Also, if the student wants to go out or go home during the work-based learning, the instructor must inform his teacher, i.e. the work-based learning coordinator, who will further inform the parent.

If the student does not want to implement the given tasks, it should be discussed with him. Boredom can be a problem if the student does not have enough tasks to complete. That is why he should be given tasks that will be challenging, interesting and meaningful.

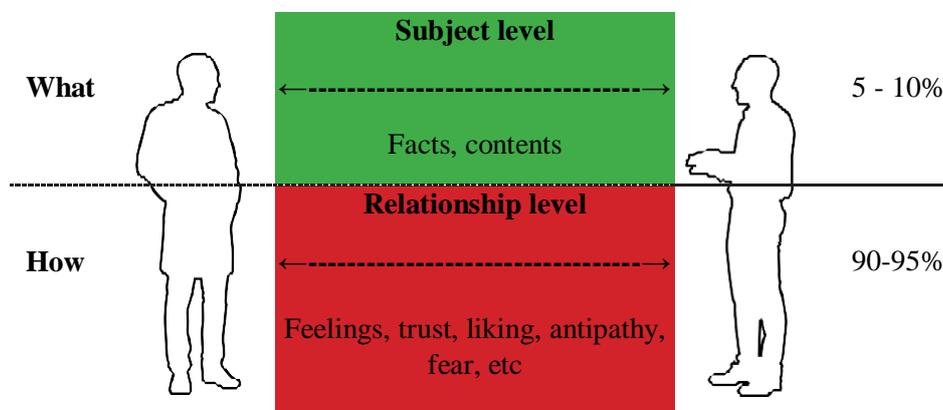
The student should be talked to even when there is no problem, when constructive attention to the problem is applied with a recommendation to overcome it. Pupils' praise can be considered particularly important. The student should be praised every time a job is well done and whenever he shows progress. In this way, you will help them build faith in themselves and in what they do.

If a student suddenly withdraws into himself, it may be a sign that something in his life is not going well or that he cannot cope with some challenge. Maybe that's the right time to ask him a question and encourage him to talk. Take the student seriously, treat him as your equal and accept him as an adult. The very feeling of being accepted will cause him to think before he speaks, without immediately expressing displeasure or criticism. Be there for the students when they need you, but whenever there are conditions for that, give them space so they can try their own work.

You should entrust something to the student to do on his own and over time give him more responsibility in completing the tasks - always as much as you judge that he is ready to do. Use your strengths and continue to work on strengthening and developing them. Offer support, where you see that the student is not doing well.

12 Communication (instructor - coordinator of learning through work - student)

Communication between mentor and practitioner always takes place on two levels. The first level is the subject level that concerns facts and content, and the second level is the level of relationships, which includes feelings, trust, sympathy, antipathy, fear, etc. the necessary distance in relation to practitioners. Communication should always be affirmative and without using negative observations. For example, you should not say "you are doing this operation badly", but "you still have a lot of room for improvement here". This should be accepted as a rule and always applied in work. The results will be visible.



13 Discussion of criticism

Critical conversation is a technique used by the mentor in communication with the practitioner that goes beyond the system requirements. It can be non-observance of house rules in the company, non-fulfilment of set tasks and the like. Once he has identified a potential problem, the mentor chooses an opportune moment to schedule a meeting with the practitioner and sets a convenient time for the conversation.

Each critique conversation has certain stages that the mentor imposes during the conversation. The mentor first clearly and accurately informs the practitioner what the problem is. In the next step, the type of problem and the possible causes of the problem are clarified. In the further discussion, possible measures are clarified and defined. If possible, a selection is made and the implementation of the measures is agreed upon. This is followed by the confirmation of the agreement and the implementation of the measures.

14 Evaluation interview

An evaluation interview is also conducted between the mentor and the trainee. At the invitation of the mentor, the instructor or other relevant persons can also attend this conversation.

The evaluation conversation is renewed periodically. It can be weekly, ten-day, bi-weekly, tri-weekly, monthly. This assessment of the period is determined by the mentor himself if it has not already been systematically resolved. The most frequently applied evaluation period is for two weeks.

During the evaluation discussion, the mentor uses the evaluation sheet he previously filled out and communicates the results to the practitioner and again uses the methods of affirmative addressing in communication. During the conversation, a discussion can develop, especially if the practitioner has a different view of the assessment of his progress. In some cases, there may be subsequent reconciliation. At the end of the conversation, new goals are set for the upcoming period and an agreement is made. All present sign the evaluation sheet. The practitioner does not have to sign the sheet if he does not agree with the assessment.

15 List of documents

- Plan implementation of learning through work (attachment No. 1)
- Elaboration topics For teaching students (attachment no 2)
- The form For assessment success candidate after every one topics (attachment no 3)
- Evaluation list (attachment no 4)
- Form For final evaluation (attachment no 5)
- Evaluation of the sheet filled in by the student (attachment no 6)

Implementation plan for learning through work

This one document se forms on the the beginning before rather the table it starts practice. He is significant because se in it they find all topics who is will se to process on the learning through work . Except list the theme he sees se and time who is will se spend on the implementation of learning through work by to each topics. Too is given and sequence the theme and the desired goal achieve.

Elaboration topics For teaching students

Document which one emerges from plan learning through work is elaboration topics For teaching students in dual education (attachment 2 manual).

The persons who fill out this document can be: coordinator of practical classes and instructor .

The form For assessment success candidate after every one processed topics

This one document (attachment no 3 manual) us allows Yes on the basis placed objectives in developing a topic for teaching students we evaluate different elements of student success . Important is Yes all students follows and evaluates on the basis the same elements estimates and Yes all of students they know precisely goals and expectations, How would be could Yes they correct own Work.

Form For assessment success we can filling up and everyday, without regardless on the that Yes is it the theme in flow or is completely ended.

From this document comes the evaluation list, which is used in the evaluation discussion.

Evaluation list(The form Forevaluation)

Evaluation list (attachment no 4 manual) se mandatory uses at conversation evaluation , but is a mentor fills in before conversations on the basis elements monitoring advancement student . Since and fields which se they fill in flow or after conversations. That are usually sign participants conversations or changes and remarks.

At the end of learning by doing or after evaluation periods, it is good to perform evaluation learning by doing using evaluation sheet which is completed by the student (attachment no 6)

CONTRIBUTIONS:

- Attachment 1 - Implementation plan for learning through work
- Attachment 2 - Elaboration of the topic for teaching practitioners
- Attachment 3 - Evaluation form
- Attachment 4 - Evaluation list
- Attachment 5 - Form for final evaluation
- Attachment 6 - Evaluation sheet filled in by the student

Attachment No. 1

IMPLEMENTATION PLAN OF LEARNING THROUGH WORK		
Company in which learning through work is implemented:	Estimated duration of learning by doing:	
Work method where learning through work is realized:		
Sequence of modules/topics for learning through work:	Realization of vision:	Estimated time for the realization of the outcome:
Instructor/Coordinator of learning through work, responsible for the development and implementation of the plan:	Instructor's signature:	Student Signature:

Attachment No. 2

DEVELOPMENT OF TEACHING TOPICS/UNITS FOR TEACHING STUDENTS		
Topic/unit name:		
Name and surname of the instructor / coordinator of learning through work		Place and date
Workplace (place of study)		
Workplace for the realization of results		
Precise outcome		
The method of realization of the outcome		
Description of teaching flow		

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Prologue No. 3

FORM FOR STUDENT PERFORMANCE ASSESSMENT BY MODULES/TOPICS			
	Assessment level		
Conducted activities	Acquired	In the acquisition process	Not acquired
Instructor:	Date and place:	Overall assessment and comment:	

Prologue No. 4

EVALUATION FORM			Period from _____ to _____		
Work place:			Name and surname of the student:		
Level of achievement	5	4	3	2	1
Competence for lifelong learning					
Communication					
Working with data and information					
Digital competence					
Troubleshooting					
Cooperation					
Responsible participation in a democratic society					
Responsible attitude towards health					
Responsible attitude towards the environment					
Aesthetic competence					
Entrepreneurship and orientation towards entrepreneurship					
Evaluator, I give and sign:	Evaluation participants:	Conducted interview with the student (signature of the student)	Total points:		
			Average:		

Prologue No. 5

FORM FOR FINAL EVALUATION					
Assessment given by the instructor	Very successful	Successful	Less successful	Not successful	Additional comments
A conversation about student strengths					
A conversation about the integration of students in the company and the work team					
Discussion about the student's personal initiative					
Talk about how much a student fulfills the work plan					
A discussion of student effectiveness in performing assigned tasks					
Talk about student responsibility					
Talk about dedication and enthusiasm of students					
The instructor gives advice on the student's work, which the student can use in the following period of learning through work.					
The instructor indicates if there is possibility of employment of students in to the company. What is it that the student needs? to do to maintain or improve you possibilities?					

Prologue No. 6

EVALUATION SHEET COMPLETED BY THE STUDENT			
Aspect for evaluation	Qualitative assessment		
Training in the company	Below expectations	Within expectations	Beyond expectations
Mentor support	Insufficiently expressed	Good	Very good
Presentation of topics	Insufficiently clear and precise	Sufficiently clear and precise	Completely clear and precise
Defining goals, tasks and deadlines	Insufficiently clear and precise	Sufficiently clear and precise	Completely clear and precise
The attitude of other employees towards you	Indifferent and uninterested	With occasional inclusion	Supportive and friendly
What did you especially like/use a lot during the internship?			
What would you change/improve?			

Other comments suggestions?

16 Literature

[1] Guide to dual education for companies,

website: <https://www.mpn.gov.rs/wp-content/uploads/2021/06/Vodic-za-kompanije-DUALNO-OBRAZOVANJE.pdf>

accessed: 12.10.2021.

[2] Law on Dual Education of the Republic of Serbia,

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[3] Rulebook on the method of assigning students for learning through work;

website: <https://www.pravno-informacioni-sistem.rs/SlGlasnikPortal/eli/rep/sgrs/ministarstva/pravilnik/2018/102/8/reg>

accessed: 22.03.2022.

[4] Branko Perović; Manual for mentors in production; Kragujevac 2017