

Name of the project:

STEP IN to the online world/virtual learning, Facilitation of access to Vocational practice through online teaching at secondary technical schools



Needs analysis related to online teaching and practical training in the field of Machining, Hydraulics and Pneumatics and Logistics

INTRODUCTION

You hold a NEEDS ANALYSIS in your hands related to online teaching and practical training in the fields of Machining, Hydraulics and pneumatics, and Logistics. The aim of this analysis targeting group of teachers and students of vocational and technical schools in the relevant field of study was to set up the priorities, content, methods and proven tools related to online teaching of above mentioned vocational subjects while providing professional/vocational training, vocational practice, laboratory exercises, inspections and measurements, technical measurements within the topics of machining, hydraulics and pneumatics, and logistics.

The analysis resulted in selected topics for which 38 online modules with videos and 72 input and output tests were created as part of the project to evaluate the shift in knowledge and skills for 3 fields: machining, hydraulics and pneumatics, and logistics.

The needs analysis was carried out on an international level, in 4 European countries - the Czech Republic, Finland, Italy and Slovakia. Analysis was performed among 87 teachers of relevant vocational subjects and 265 students of relevant fields of study in secondary vocational and technical schools. The needs analysis was carried out within the international project STEP IN to the online world/virtual learning, Facilitation of access to Vocational practice through online teaching at secondary technical schools, under ERASMUS+ Programme.

In terms of content, the analysis was divided into a part for teachers and a part for students.



TEACHERS

At the beginning of the questionnaire, we asked respondents for basic information about themselves.

The first question concerned their place of residence. The most of responders were from Italy (31 respondents) and Slovakia (30 respondents), less from the Czech Republic (17 respondents) and Finland (9 respondents).

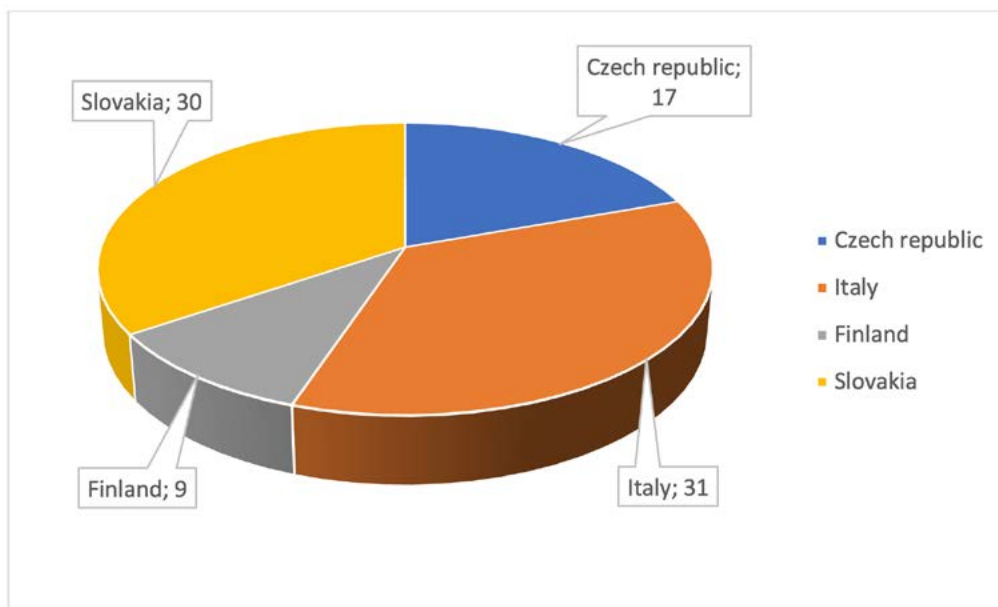


Chart 1: Where are you from?

Another question was about the frequency of online teaching. Approx. half of the respondents carry out (or have implemented) online teaching every day, and only 7 respondents stated that they had not yet implemented online teaching.

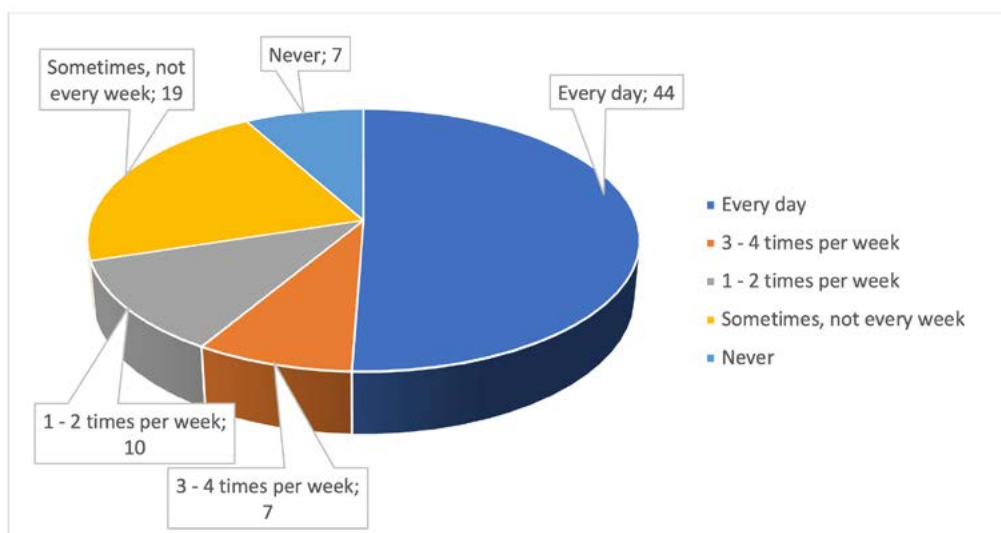


Chart 2: How often do you carry out (or have implemented) online teaching?

PART 1: ONLINE TEACHING

In the part of NEEDS ANALYSIS dedicated to online teaching, we asked the respondents all together 28 questions.

The first question concerned the length of their teaching experience during which they implement online teaching. Most of them (76%) implement online teaching for 1 - 2 years, and only 4% confirmed online teaching for more than 5 years of their teaching practice. As for the countries involved in the survey, teachers from Finland have the longest use of online teaching (all of them more than 3 years), while teachers from Slovakia and the Czech Republic have the least use (all of them less than 2 years).

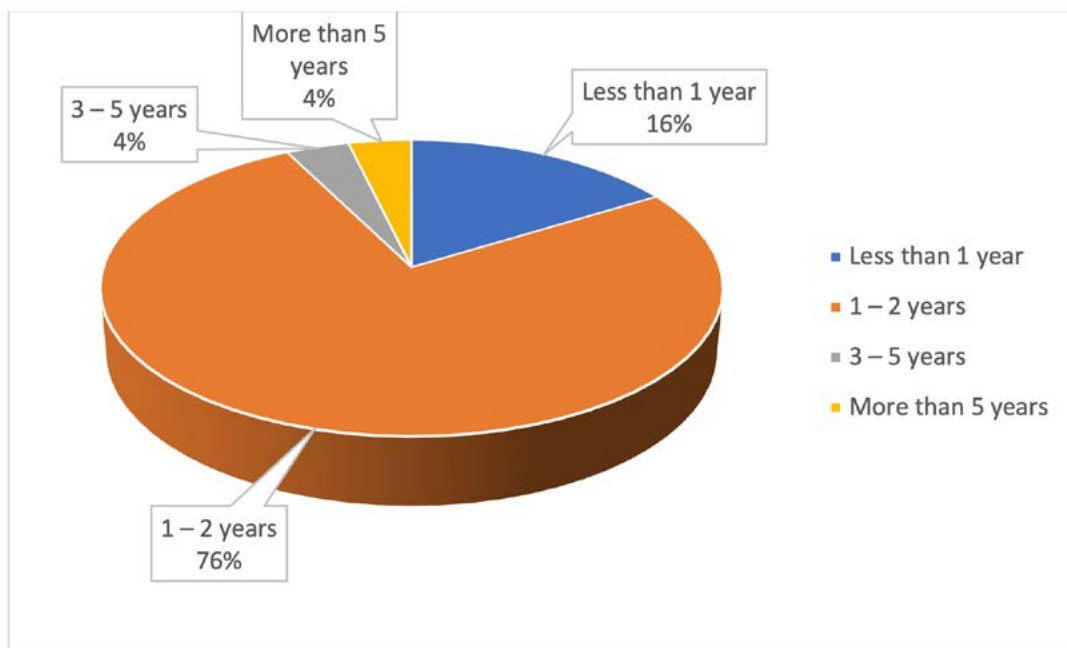


Chart 3: How many years do you implement online teaching in your practice?

The next question asked **whether online teaching meets their expectations**. Only 19% of respondents confirmed meeting their expectations, and 81% of teachers considered their expectations of online teaching unfulfilled or partially filled only. They cited it most often as a reason:

- practice cannot be taught online
- passive participation of students
- lack of direct interaction between teacher and students
- the missing confrontation between students



But, at the same time, many respondents agreed that online teaching is better than none as an emergency solution (for example during the COVID 19 pandemic when schools were closed).

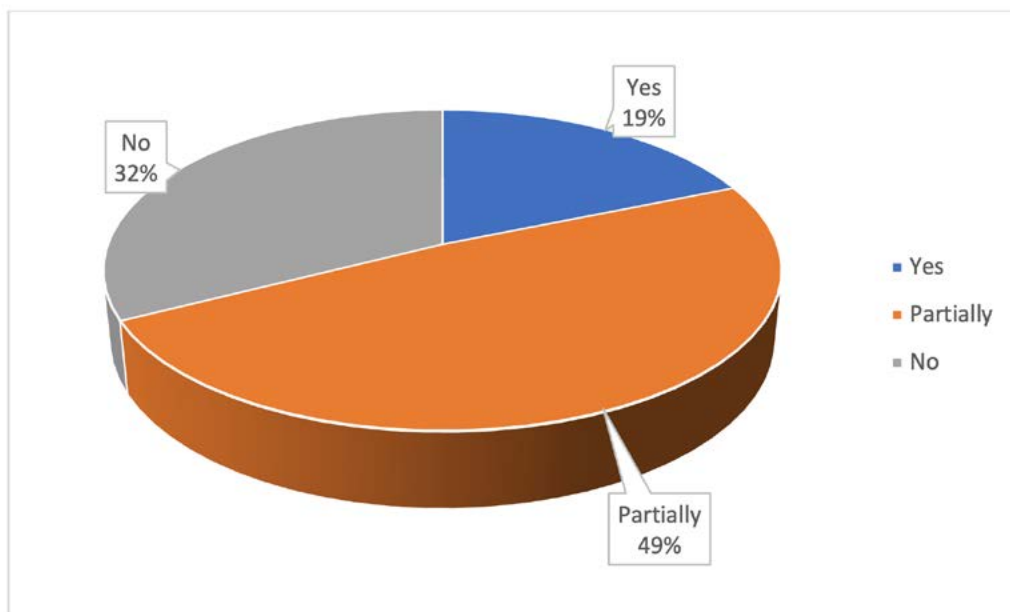


Chart 4: Does online teaching meet your expectations?

Another question focused on the **online learning tools they use during online teaching**. 94% of respondents confirmed online learning via webinars/video conferencing (TEAMS, ZOOM, Google Meet, Webex, etc.). Almost half of the respondents also use tutorial videos, quizzes or tests to support online teaching and motivate students.

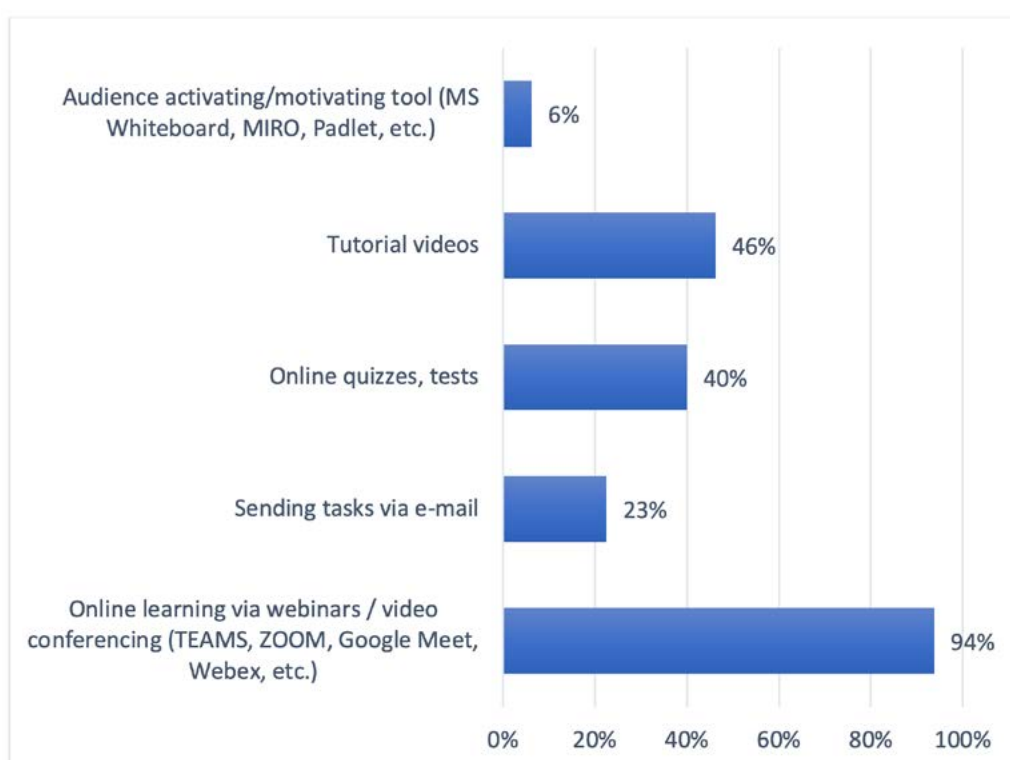


Chart 5: Which online learning tool do you prefer?

In the next question, we asked about **the benefits of online teaching**. As mentioned previously, most of the respondents (93%) considered online teaching in a lock-down situation as an opportunity to teach and learn. Another benefit selected by half of the respondents was the introduction of new teaching methods.

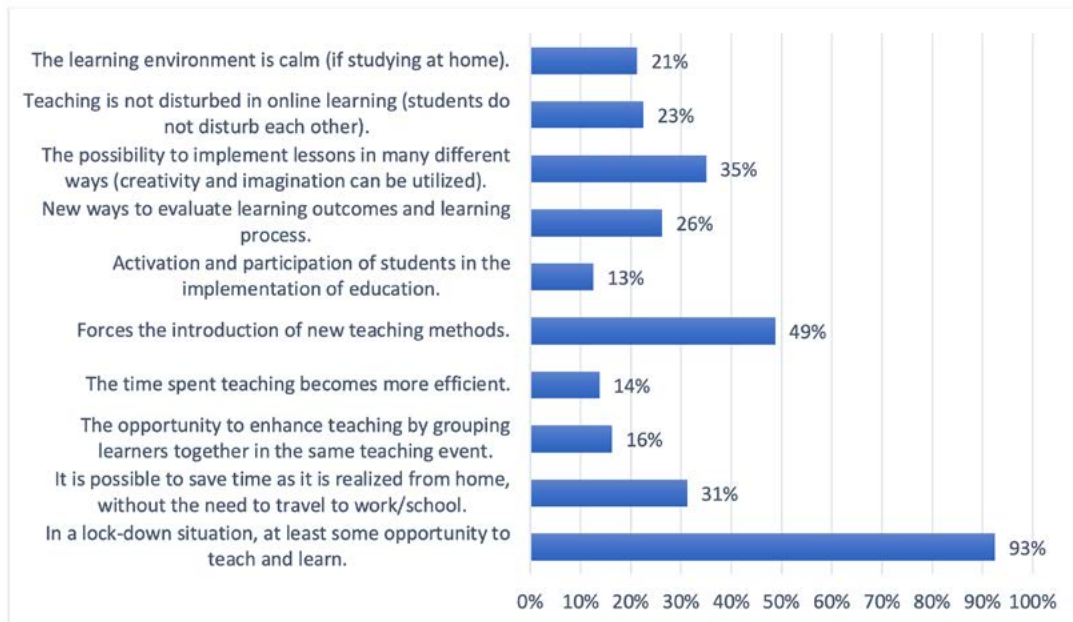


Chart 6: Based on your opinion, what are the advantages of online teaching when compared with classroom teaching?

In the next question, we asked about the **disadvantages of online teaching compared to classroom teaching**. They considered the absence of face-to-face interaction between the student and the teacher to be the biggest problem (91% of respondents). Other disadvantages of online teaching when compared to classroom teaching:

- Practical exercises/workshops, where students acquire the skills necessary for their future profession, cannot be carried out. (78%)
- There is a lack of cooperation/contact between classmates. (68%)
- Sometimes they are unable to learn due to internet connection problems / slow connection. (51%)
- Students often cheat. (50%)
- Students are missing practical examples provided by the teacher. (50%)

It is worth noting that only teachers in Slovakia and the Czech Republic consider the risk of students cheating.

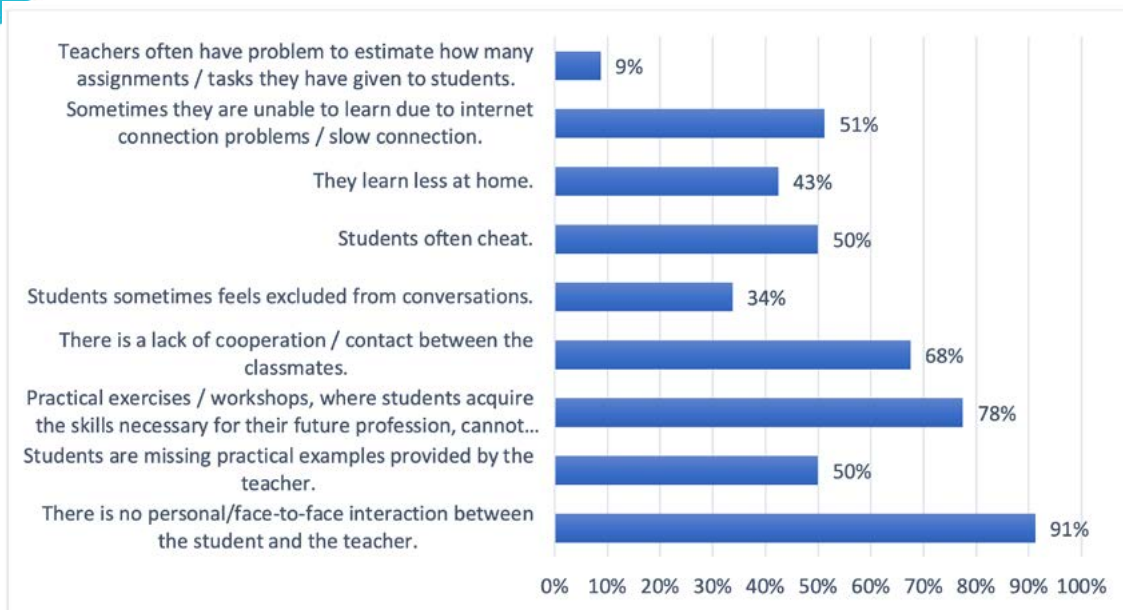


Chart 7: Based on your opinion, what are the disadvantages of online teaching when compared with classroom teaching?

The next question focused on the use of online communication platforms. Most of the teachers (61%) use MS Teams due to its free limited licence. Other recommended platforms used by teachers to communicate with students are Moodle, Zoom, Google Meet or Webex.

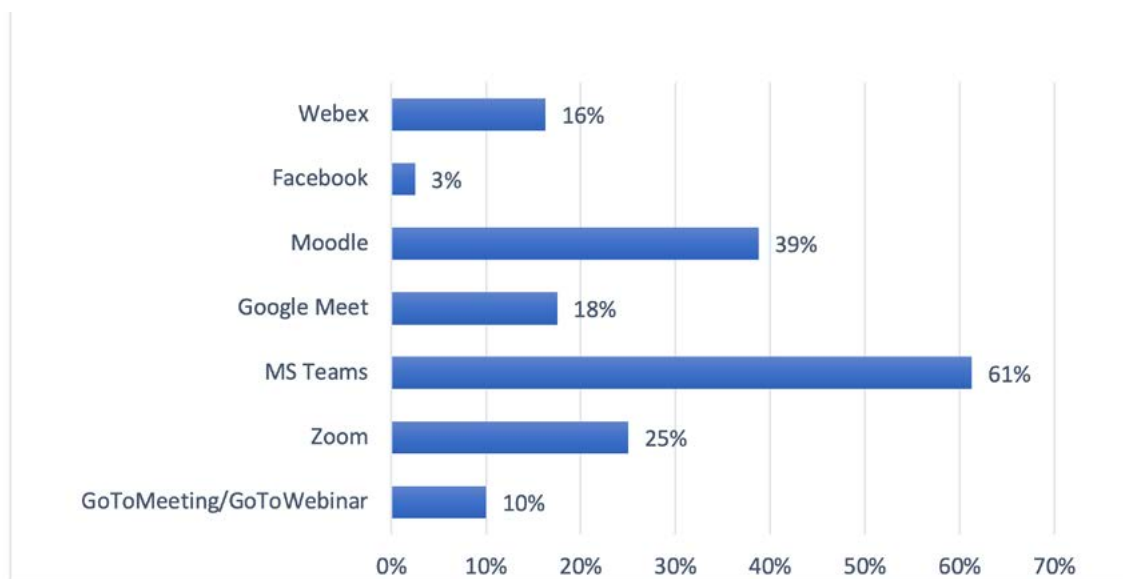


Chart 8: Which online platforms do you use to communicate with students?

In the next question, we were interested **whether they had a problem teaching online from the beginning.**

53% of respondents had no problems at the beginning, but 47% stated they had problems. The most common reasons they had problems in the beginning were:

- starting completely unprepared, with no clue about e-learning
- lack of digital teaching material
- no time to get acquainted with the different ways of teaching, we went in the style of “learning by doing”
- slow internet connection and hardware limitations

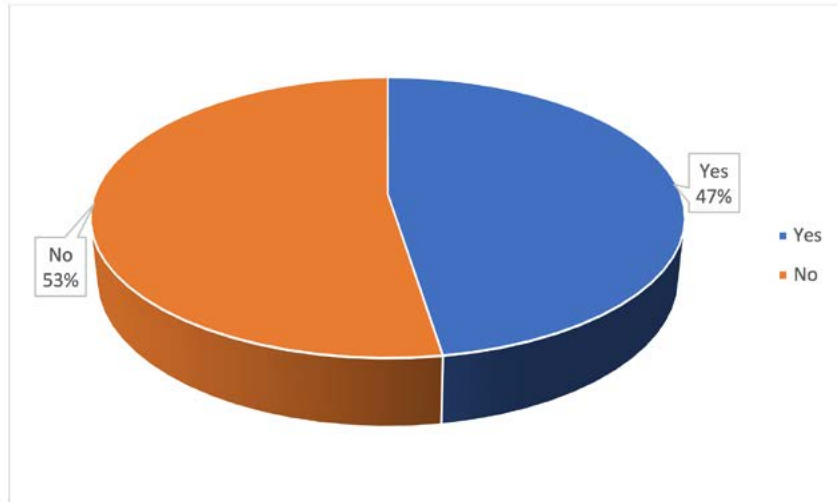


Chart 9: When you started to teach online (e.g. when you started to be a teacher, during the current lock-downs etc.), did you have some problems teaching online from the beginning?

The next question was similar to the previous one, asking **whether teachers had sufficient skills at the beginning** (e.g. working with a computer, with webinars, etc.) **to be able to fully implement online teaching**. 73% of responders expressed positively. They considered the following problems as the biggest:

- lack of internet/slow connection, wifi not steadily working
- unable to understand all the functionalities of online tools
- the correct evaluation of students
- not having time to prepare everything on the PC to share with the students
- students activation, new methods of teaching

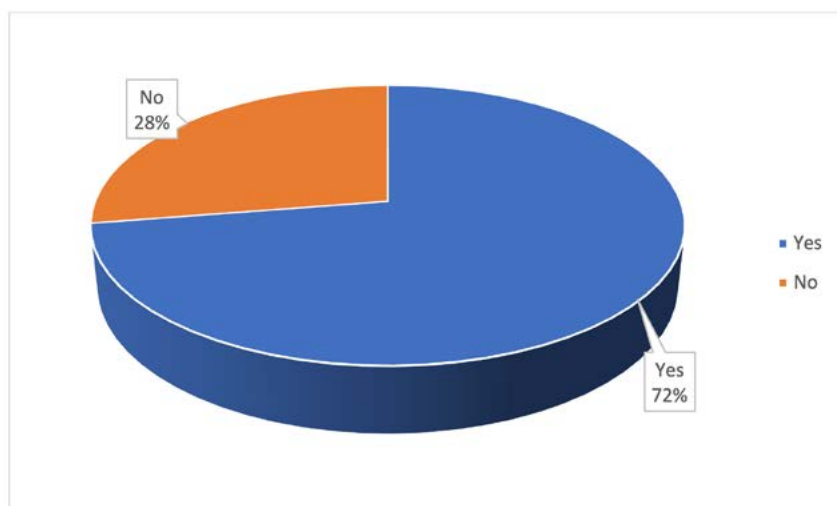


Chart 10: Did you have sufficient skills at the beginning (e.g. working with a computer, with webinars, etc.) to be able to fully implement online teaching?

Another question was about the content of teaching, or **what they wanted to pass to their students during online lessons compared to classroom teaching**. Almost half of the respondents (46%) wanted to pass everything that is learned during

the full-time form - theoretical knowledge and practical skills. 43% of teachers said they wanted to pass all the theoretical knowledge students need to know. They generally assessed that:

- it's possible only pass on simple concepts
- practical skills are difficult to teach online
- in online lessons it is easier to deal with theory and insights, and vice versa the practice is more effective during classroom teaching

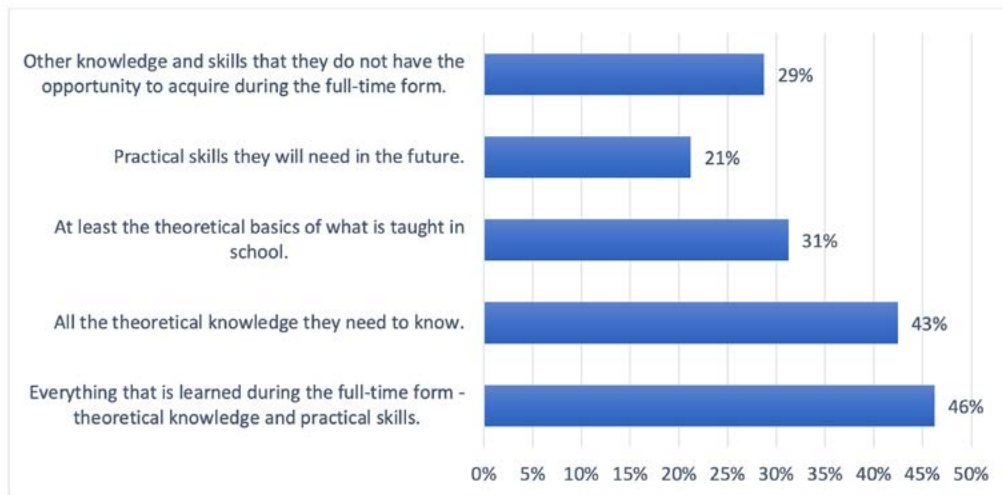


Chart 11: What would you like to pass on to your students during online lessons compared to classroom teaching?

The next question focused on the students **whether online teaching suits their students and whether it is possible to teach their topic/subject online**. 60% of respondents expressed positively, since they can use some specific software to simulate some practical work (e.g. technical drawing). 40% of respondents think that it is difficult, because:

- most students do not work independently and they should be encouraged the practical part requires a lot of interaction and cooperation with the teacher and classmates
- students do not have the possibility of practical teaching at home, they lack relevant tools
- practical teaching is generally irreplaceable

However, they all more or less agreed that online teaching is better than none at all.

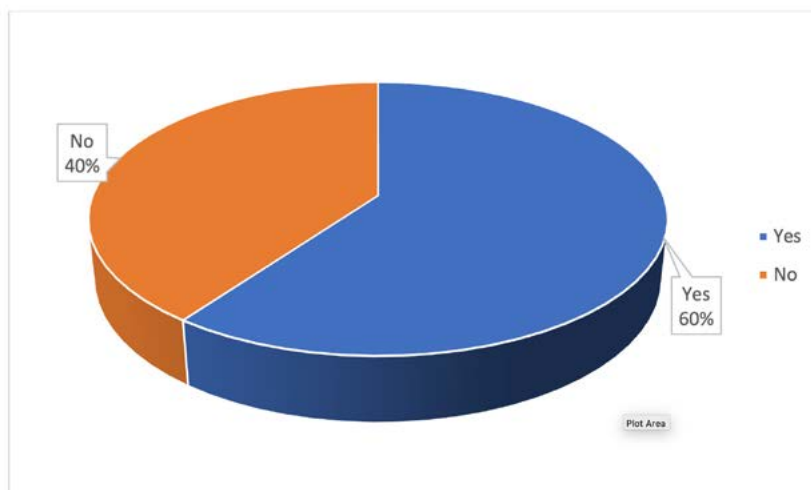


Chart 12: Does online teaching suit your students? Is it possible to teach the topic or (your) subject online?

In the next question, we asked teachers **what students were missing the most during the online teaching**. 69% of respondents think that the students miss mainly direct interaction with the teacher and also individual practical exercises or workshops.

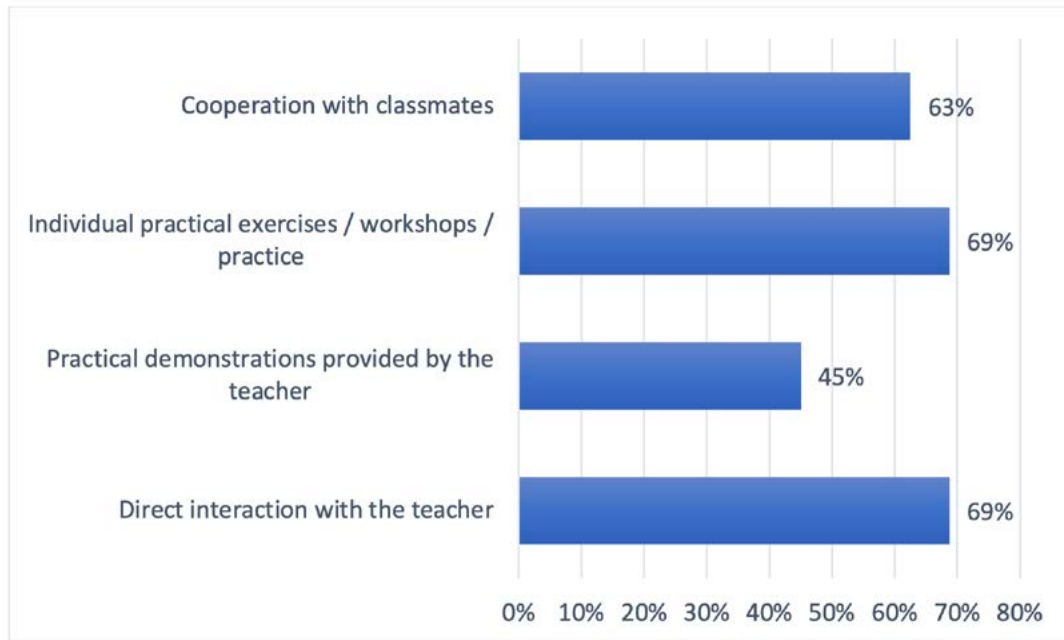


Chart 13: What are the students missing the most during online teaching?

The same question was about **teachers or trainers - what they were missing the most during online teaching**. Most of them expressed missing direct interaction with the students (84%) and individual practical exercises or workshops (63%).

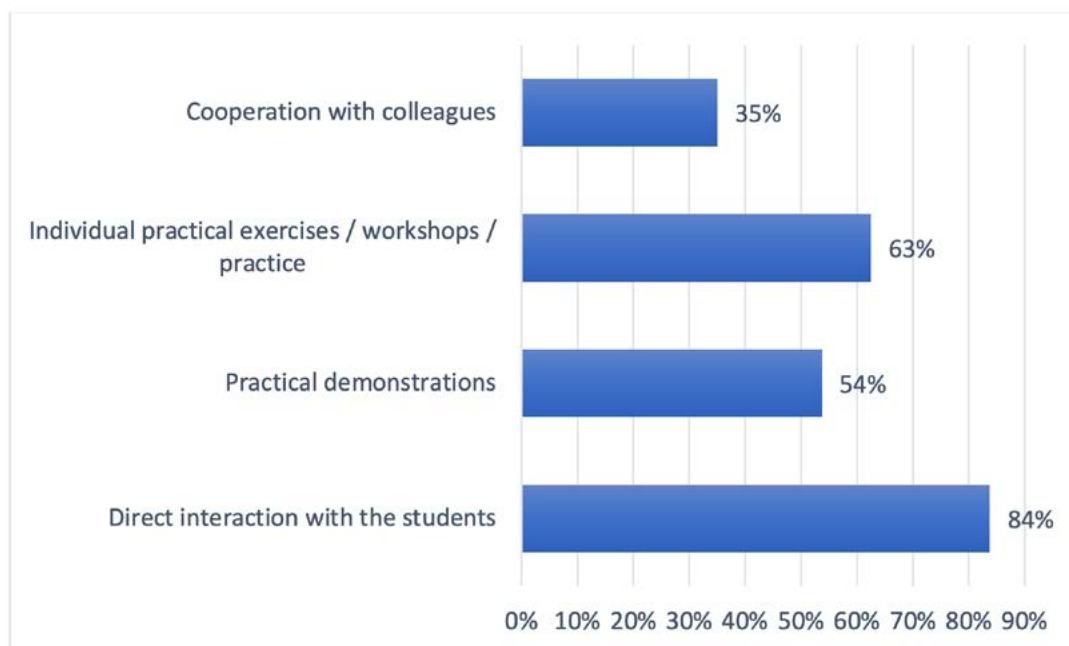


Chart 14: What are the teachers/trainers missing the most during online teaching?

The next question focused **on teachers' experience with online teaching and its advantages for students**. Most of them think that students are happy not to travel/go to school (75%).

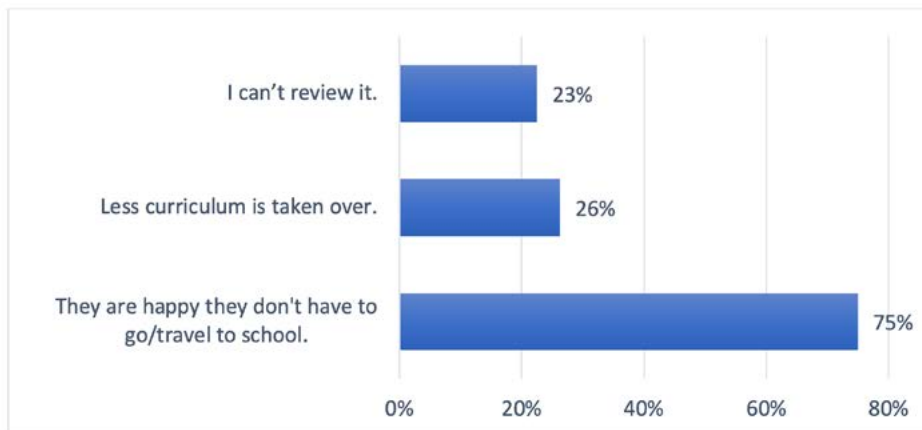


Chart 15: Based on your opinion and experiences, what do your students see as the advantage of online learning?

Another question was about the way how students learn and **whether students themselves can manage to learn the curriculum from the materials provided online**. Most of the teachers think that they are not very good at it (39%). Almost half of the respondents think students have to try harder to learn (24%) and it requires a new kind of design and content for the teaching material (23%). It is worth mentioning that only 2% of teachers think that students can't do it at all.

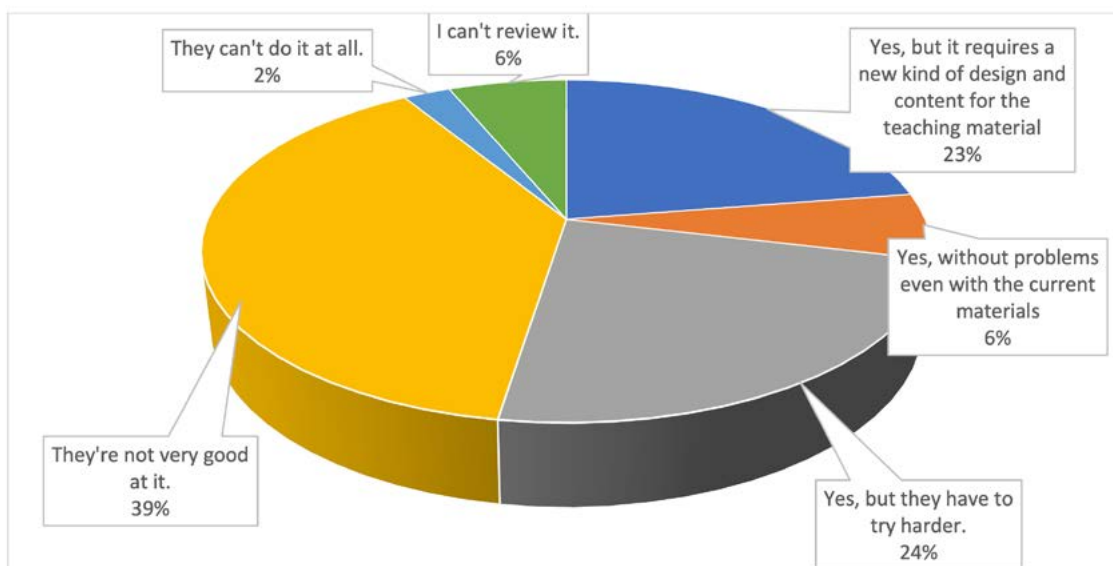


Chart 16: Do you think that the students themselves manage to learn the curriculum from the materials provided online?

The next question was about **favourite evaluation methods of theoretical knowledge while teaching online**. They most often mentioned methods such as an online oral exam, exercises with a short time to perform, online tests, group work, project realisation or an online conversation/interview.

Another question was about measuring methods for the practical improvement of students while teaching online. They most often mentioned ppt presentations, individual projects, practical tests, and descriptions of practical aspects. **All of them agreed that practical skills during online teaching stagnate**. When teaching online, it can only be implemented those parts of expertise that can be realized on a PC in simulators.

The next question was about **teaching online before COVID pandemic in 2020 and whether they personally taught online before it**. As many as 89% said that they had not used online teaching before, and only 11% said that they already had experience with online teaching before the pandemic.

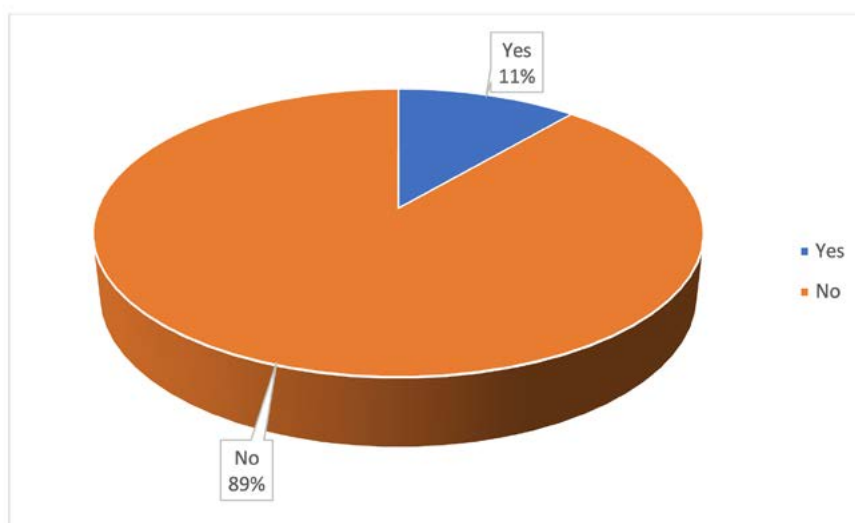


Chart 17: Online teaching became more widespread in several countries in Europe (and the world) during the Covid pandemic in 2020. Have you personally taught online before?

We also asked **for reasons to teach online before**. Some of them were teaching online during their teacher's studies as part of it, others tried to experiment with online teaching.

Those who had no previous experience with online teaching were asked about **their strongest impression of teaching online**. The vast majority took it as a new personal challenge, they also appreciated the possibility of quickly adapting to the current situation. They were happy to communicate and impart knowledge to students.

They report it as an excellent solution for dealing with emergency situations and ensuring communication. In the future, some teachers see the possibility of a combination of face-to-face and online teaching.

However, some teachers complained about the weak response of the students, who rather saw online teaching as an opportunity not to work. Some teachers who criticized online teaching justified their position mainly by the impossibility of imparting practical skills to students, which in their fields of machining, hydraulics and pneumatics and logistics are essential for their future professions.

In the next question, we asked teachers what would be their **choice if they should choose between full-time classroom teaching at school or online teaching at home**. Half of the respondents would definitely choose teaching at school (49%). But there was also a large group of teachers prefer a hybrid model with both methods of teaching (33%). Only 3% of teachers refer that they would prefer teaching from home.

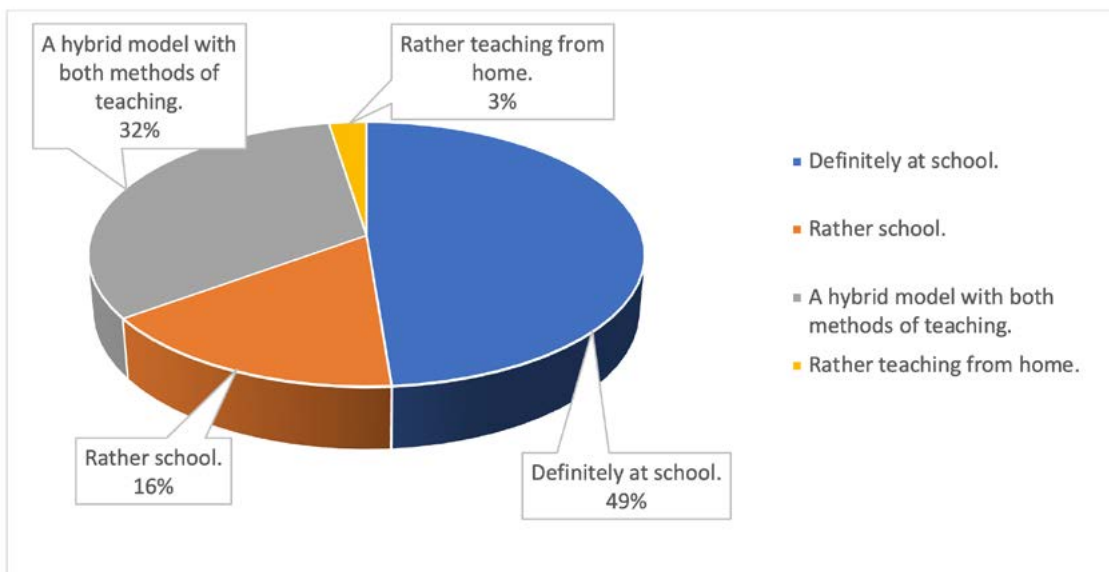


Chart 18: If you should choose full-time classroom teaching at school or online teaching at home, what would you choose?

The next question was about **the basic things that they would need if they continue to teach online**. The largest group of respondents would need video demonstrations for situations that they could face during the full-time form (65%), tailored educational materials (63%) and online tests (43%).

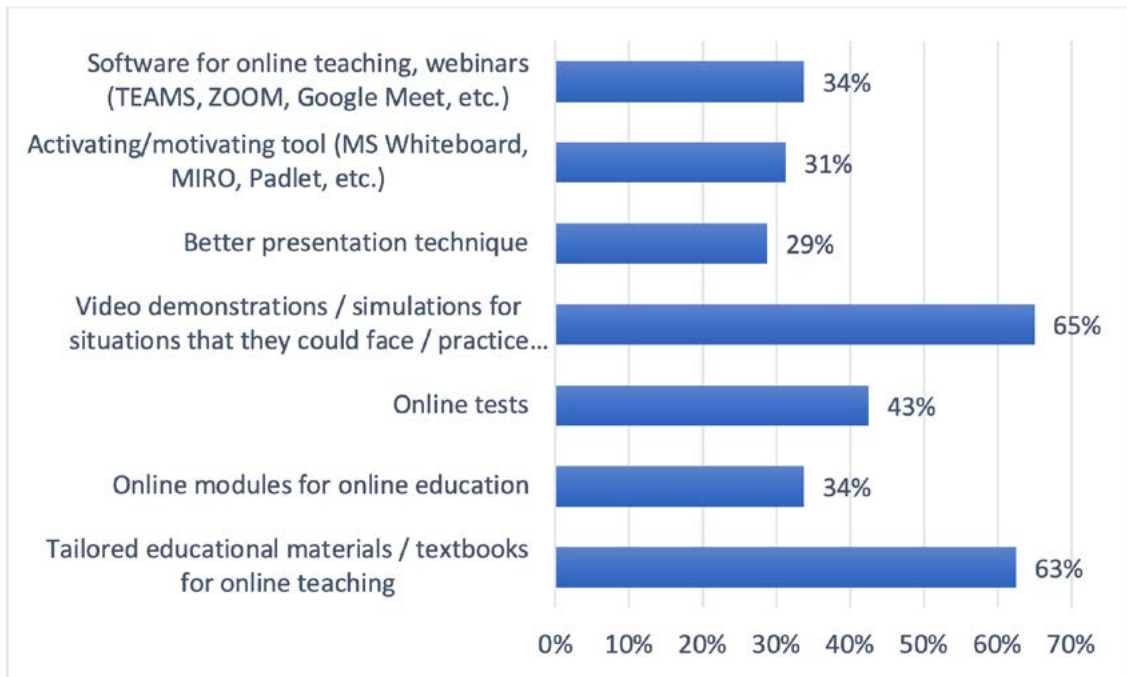


Chart 19: If you were to continue teaching online, what would you need?

The last question in this section was about using online simulations or videos in their practice. Up to 93% of respondents would definitely (80%) or maybe (13%) use videos or simulations in their practice that show practical situations from the workshop and from which students could learn at least the basics, which they will later master during practical training.

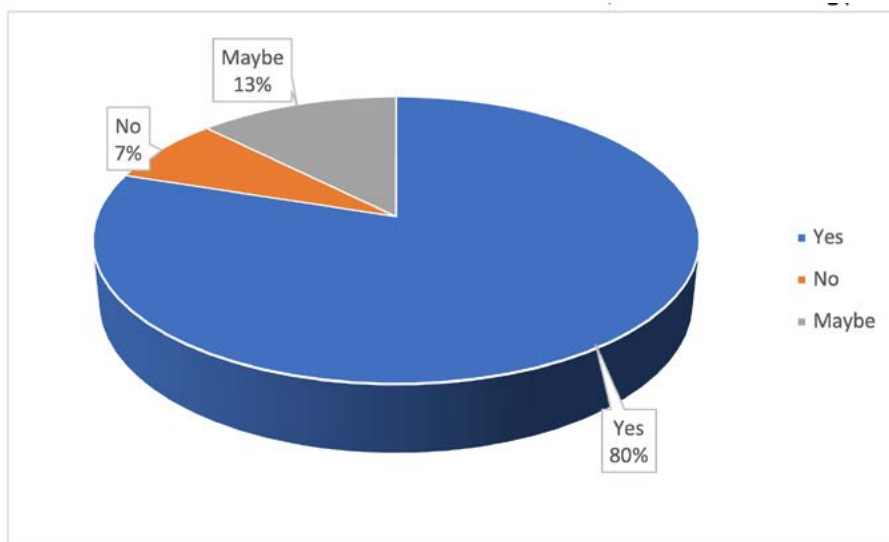


Chart 20: Would you use online simulations/videos in your practice that illustrate (though do not fully replace) the situation in practice in the workshop?

PART 2: MACHINING

In the part of NEEDS ANALYSIS dedicated to the topic of MACHINING, we asked the respondents all together 38 questions.

In the beginning, we asked how many respondents are concerned with the topic of MACHINING. Among all interviewed teachers, this area concerned 36% of respondents, which means 29 teachers. Therefore, in the following text, we refer exclusively to the opinions of this group of teachers.

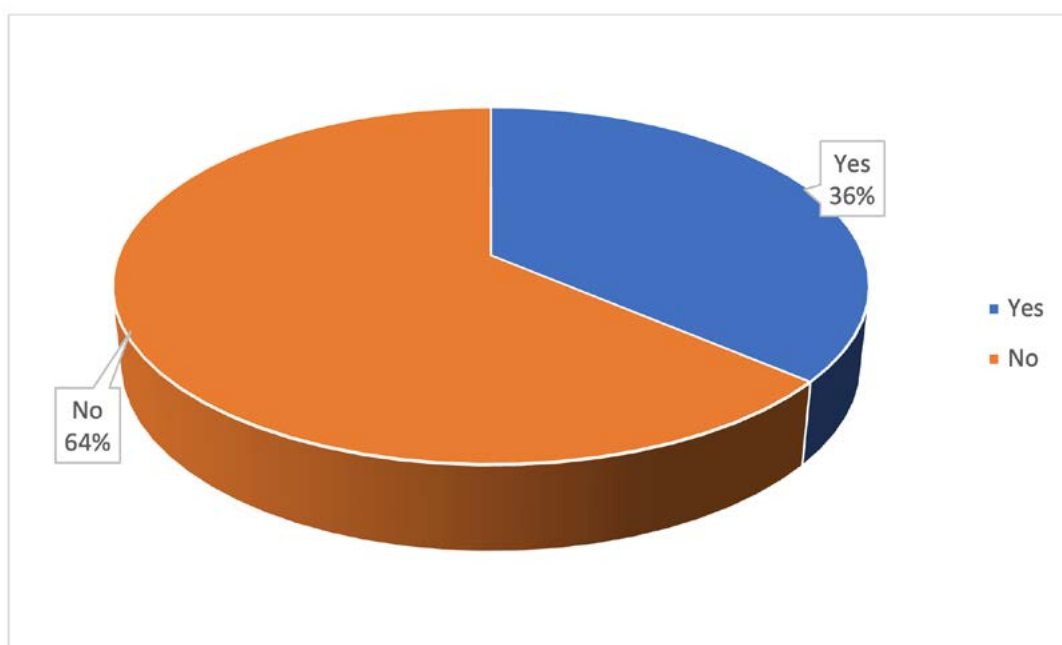


Chart 21: Is the subject MACHINING relevant to your field of work?

Within this section, we investigated what topics teachers would be interested in. These topics later became the basis for creating the outputs of the STEP IN project.

The first question was about the **topics we should give priority to when creating online educational materials on the topic of MACHINING**. Most teachers expressed an interest in turning (100%) and milling (93%). These topics were included as a priority in the content of the prepared educational materials within the project.

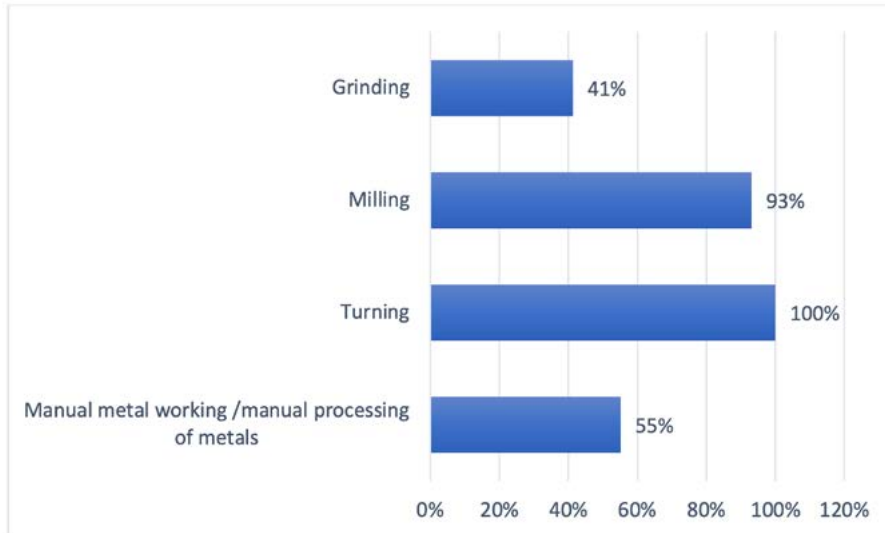


Chart 22: What topics should we give priority to when creating online educational materials on the topic of MACHINING?

MANUAL METAL WORKING

In the next several questions, we asked about **preferences regarding areas MANUAL METAL WORKING for which they would need a practical demonstration in the form of a video/simulation** so that the student can better imagine the situation during online learning. Most of them expressed the need for materials on the topic of Measurement and drawing (90%), Cutting (69%) and Sawing (55%). Again, these topics were included in the developed video materials.

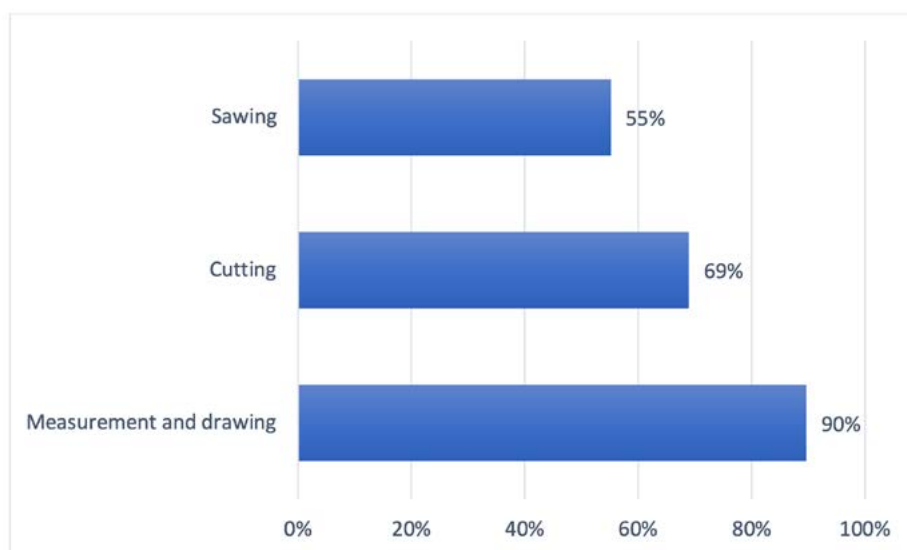


Chart 23: As part of "MANUAL METAL WORKING", select topics for which you would need a practical demonstration in the form of a video/simulation so that the student can better imagine the situation during online learning.

In the next questions, we asked what students should learn in practice through the video in the field of Measurement and drawing, Cutting and Sawing. It is worth mentioning that up to 83% of respondents expressed the need to acquaint students with the principles of safety at work. Please, see the following 3 graphs that show teachers' preferences for the content of the curriculum for the given topics.

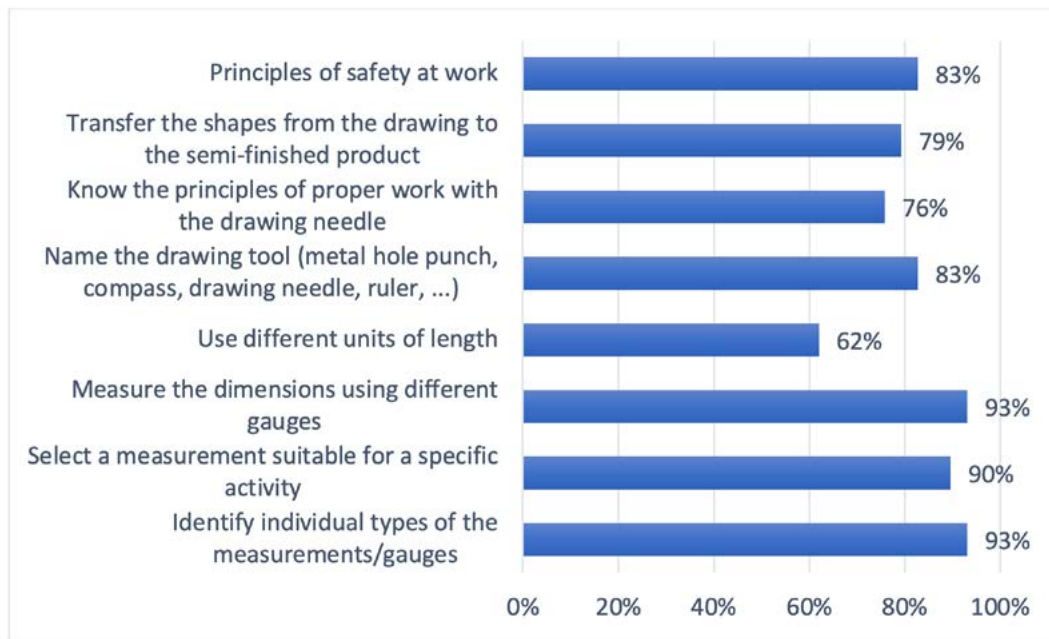


Chart 24: What should the student learn in practice on the topic of "Measurement and drawing"?

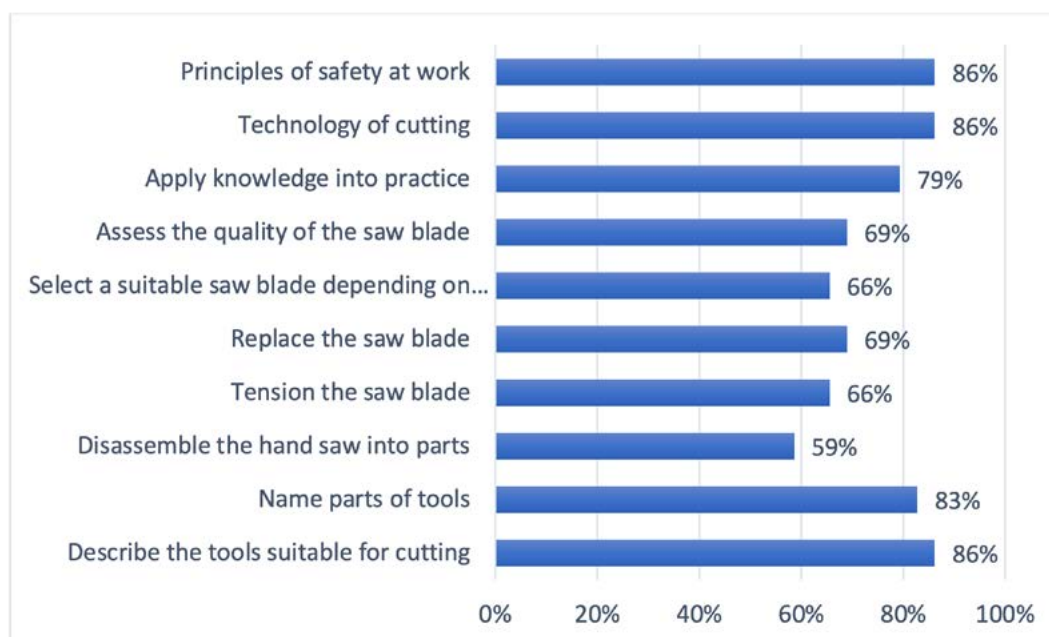


Chart 25: What should the student learn in practice on the topic of „Cutting“?

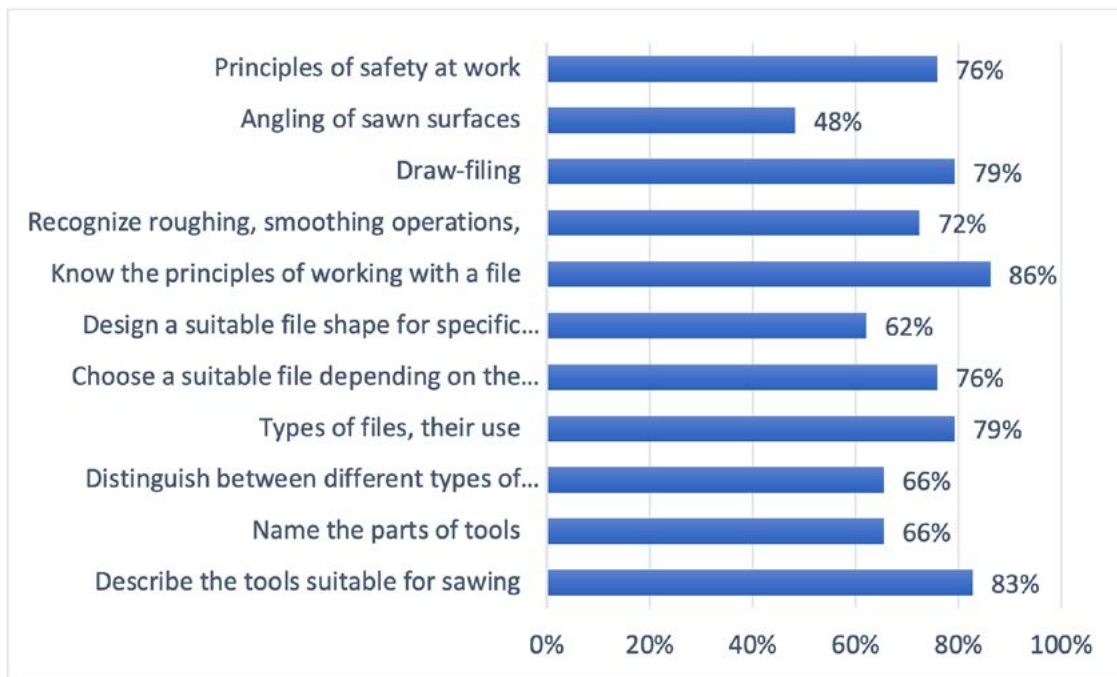


Chart 26: What should the student learn in practice on the topic of „Sawing“?

In the next question, we asked **what skills students lack most in online education on the topic MANUAL METAL WORKING**. The respondents said that what students miss the most is real work with tools, learning to stick with one activity or a sense of detail. They unanimously concluded that practical skills cannot be acquired through videos, but they can be at least partially prepared for practical work. Thus, videos can replace theoretical preparation before practical work in the workshop.

Another question was about **what students would like to learn the most about the topic MANUAL METAL WORKING**. Teachers think that students would like to learn how to make some specific part according to a drawing with the correct use of tools, learn to file, cut, bend, choose the right tool, and finally modify the part by hand.

In the next question, we were **wondering what is necessary for the practice for students to master the topic**. In addition to practical activity and the general acquisition of practical skills, teachers expressed that it is important for students to learn to measure with a calliper, to learn the rules of correct cutting, as well as to connect a drawing with a real product. It is therefore essential to generally acquire basic motor skills when working with hand tools.

Then, we asked what teachers think is certainly **not possible to learn on the topic with online teaching compared to classroom teaching**. In addition to the previously several times mentioned practical skills, the teachers also pointed out the impossibility of teaching students to persevere at work and overcome their laziness through online teaching.

In the next question we wanted to find out in **what form teachers try to replace practical exercises** (workshops) on the topic of MANUAL METAL WORKING during online teaching and **what tools they use**. Most often, teachers used demonstration videos that showed tools and correct work procedures, which they also commented on. Alternatively, they used the camera and performed the demonstration themselves during the online lesson. It follows from the above that teachers tried to use video materials during online teaching. Therefore, we think that the **prepared video materials and online tests to evaluate the acquired knowledge will be a great help for teachers of professional subjects in the future**.

TURNING

In the next several questions, we asked about **preferences regarding areas TURNING for which they would need a practical demonstration in the form of a video/simulation** so that the student can better imagine the situation during online learning. Most of them expressed the need for materials on the topic of Basic turning work (97%), Parts and controls of the lathe (93%) and Clamping of tools and workpieces on turning machines (90%). Again, these topics were included in the developed video materials.

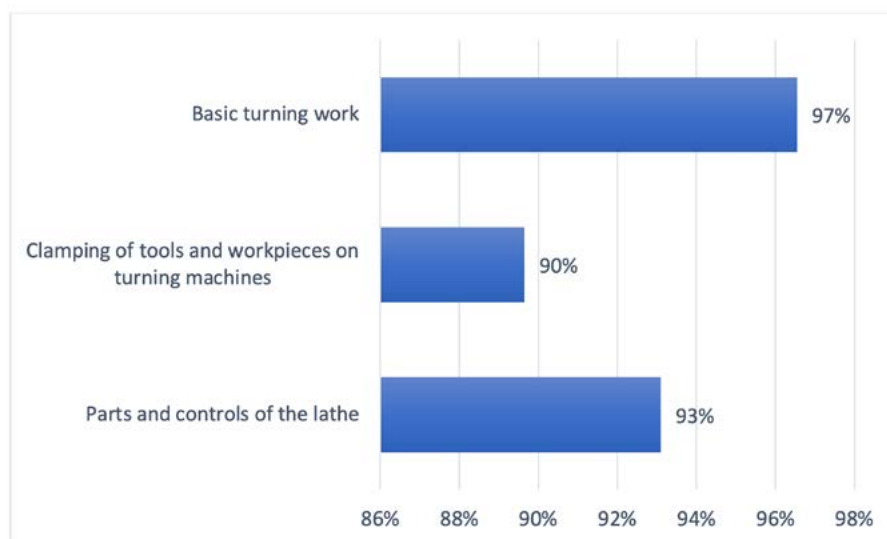


Chart 27: As part of "TURNING", select topics for which you would need a practical demonstration in the form of a video/simulation so that the student can better imagine the situation during online learning.

In the next questions, we asked **what students should learn in practice through the video** in the field of Parts and controls of the lathe, Clamping of tools and workpieces on turning machines and Basic turning work. It is worth mentioning that up to 93% of respondents expressed the need to acquaint students with the principles of safety at work. Please, see the following 3 graphs that show teachers' preferences for the content of the curriculum for the given topics.

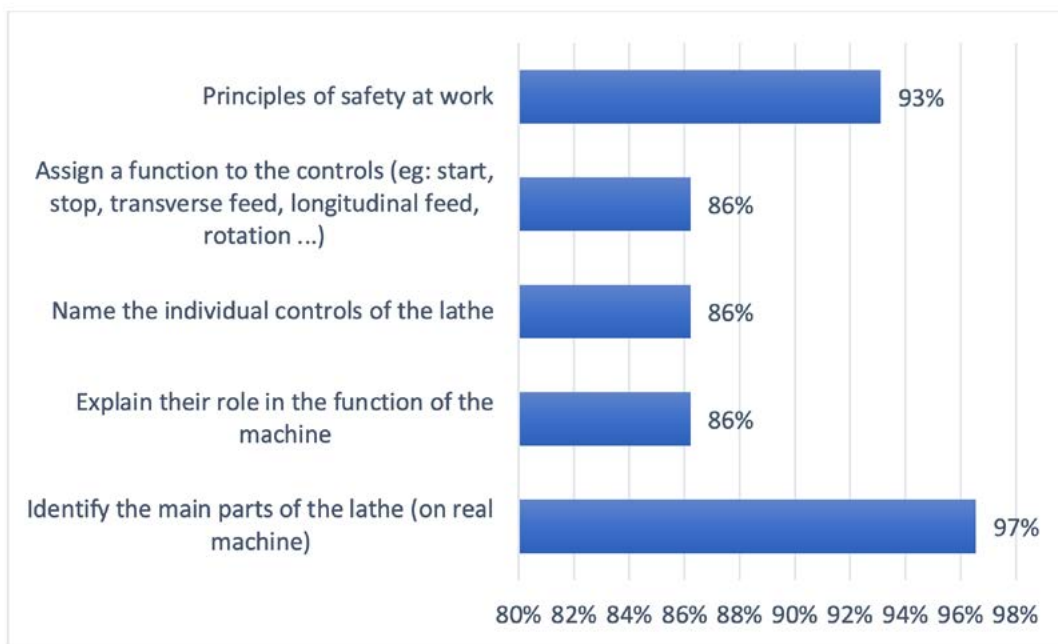


Chart 28: What should the student learn in practice on the topic of „Parts and controls of the lathe“?

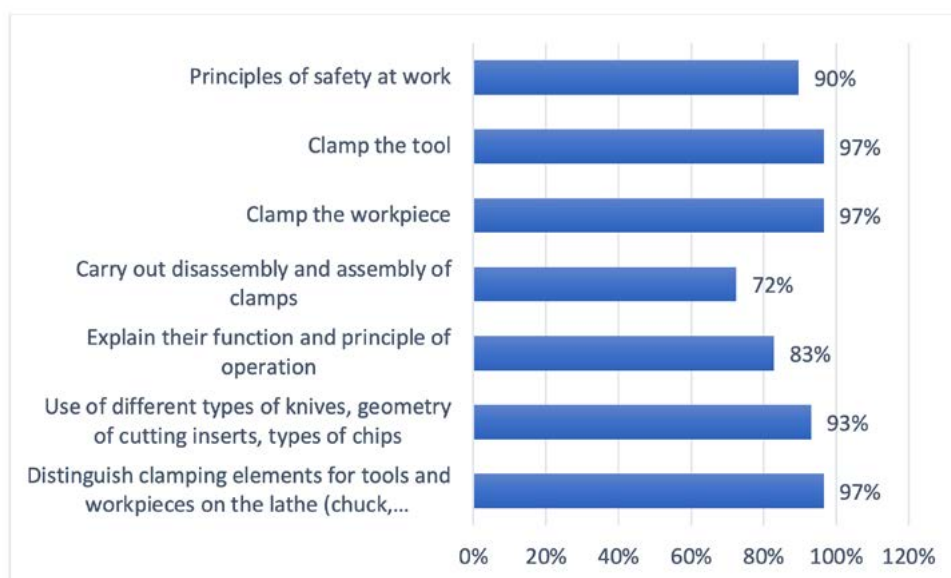


Chart 29: What should the student learn in practice on the topic of „Clamping of tools and workpieces on turning machines“?

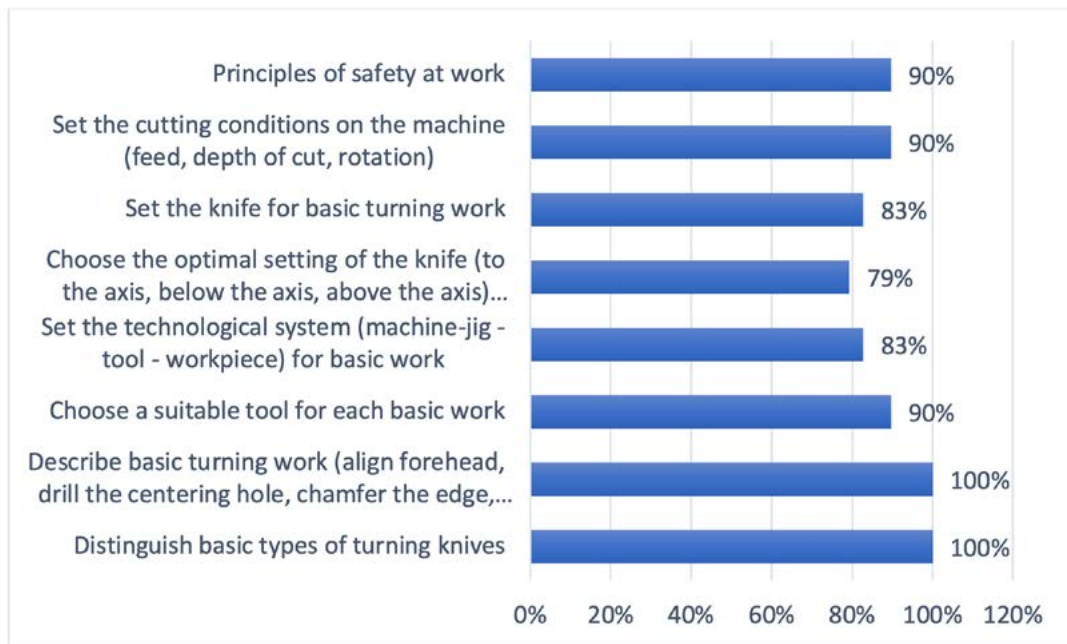


Chart 30: What should the student learn in practice on the topic of „Basic turning work“?

In the next question, we asked **what skills students lack most in online education on the topic of TURNING**. Most often, teachers mention the need for students to learn to work independently on a lathe, to operate it and overcome the initial fatigue from the machine itself and from chip machining.

Another question was about **what students would like to learn the most about the topic of TURNING**. The teachers think that the students would like to learn to approach the lathe without fear of failure, with sufficient skills to know how to operate it and to have an overview of the possibilities of production on lathes. Basically, they want to learn what they will need in practice in their profession.

In the next question, we were wondering **what is necessary for the practice for students to master the topic**. According to the respondents, it is essential that students learn the function of all the elements of the lathe, as well as the work procedure and safety rules at work. It is necessary for the student to be able to make the part according to the drawing without the help of the teacher.

Then, we asked **what teachers think is certainly not possible to learn on the topic with online teaching compared to classroom teaching**. During online teaching, students cannot learn to actually work with a lathe, operate it and develop the necessary skills. Online teaching can thus be limited to the presentation of individual parts of the lathe and a demonstration of how to work with the lathe. However, this will make it easier for them to work in the workshop itself later when working with the lathe.

In the next question, we wanted to find out in **what form teachers try to replace practical exercises** (workshops) on the topic of TURNING during online teaching and **what tools they use**. Most often, teachers used demonstration videos that showed tools and correct work procedures, which they also commented on. Alternatively, they used the camera and performed the demonstration themselves during the online lesson. It follows from the above that teachers tried to use mainly video materials during online teaching.

MILLING

In the next several questions, we asked about **preferences regarding areas of MILLING for which they would need a practical demonstration in the form of a video/simulation** so that the student can better imagine the situation during online learning. Most of them expressed the need for materials on the topic of Basic milling work (97%), Parts and controls of milling machines (97%) and Clamping of tools and workpieces on milling machines (93%). Again, these topics were included in the developed video materials.

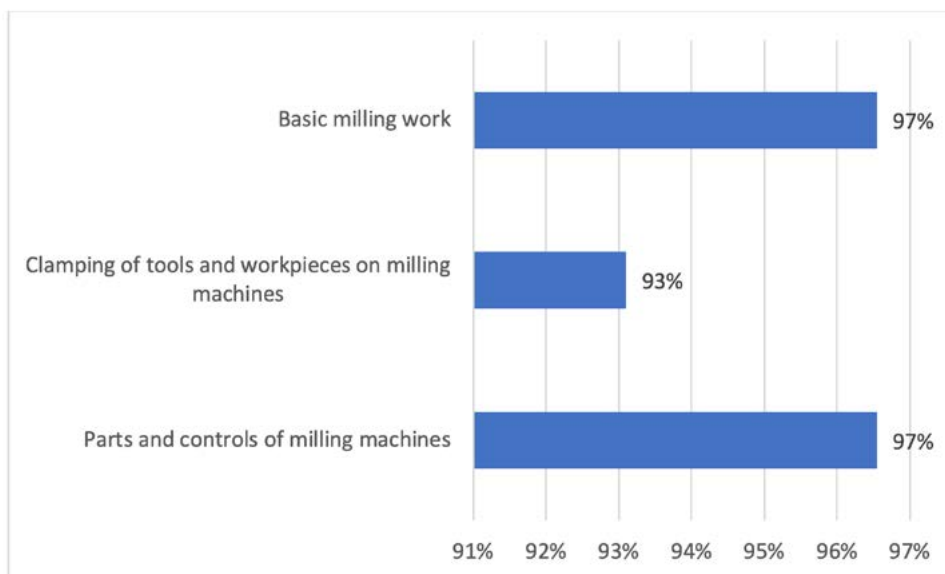


Chart 31: As part of "MILLING", select topics for which you would need a practical demonstration in the form of a video/simulation so that the student can better imagine the situation during online learning.

In the next questions, we asked **what students should learn in practice through the video** in the field of Parts and controls of milling machines, Clamping of tools and workpieces on milling machines and Basic milling work. It is worth mentioning that up to 90% of respondents expressed the need to acquaint students with the principles of safety at work. Please, see the following 3 graphs that show teachers' preferences for the content of the curriculum for the given topics.

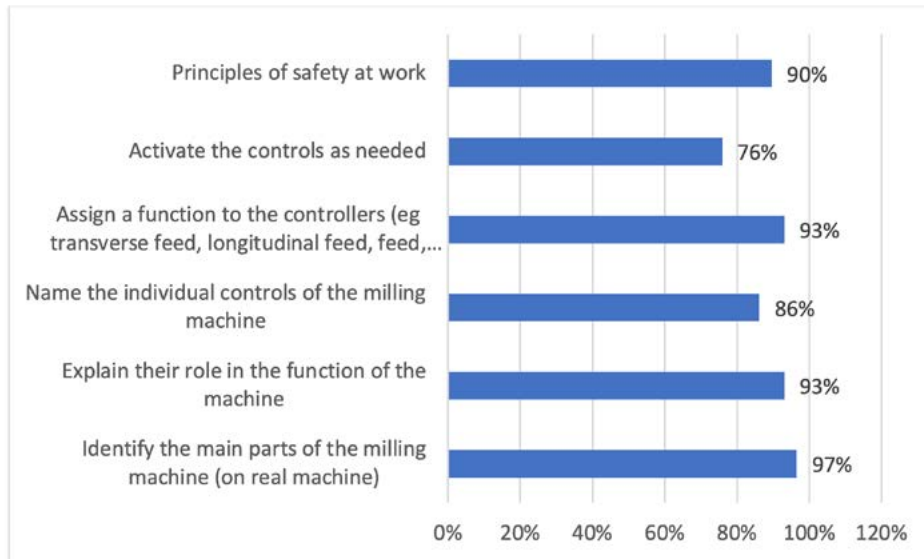



Chart 32: What should the student learn in practice on the topic of „Parts and controls of milling machines“?



Chart 33: What should the student learn in practice on the topic of „Clamping of tools and workpieces on milling machines“?



Chart 33: What should the student learn in practice on the topic of „Basic milling work“?




In the next question, we asked **what skills students lack most in online education on the topic of MILLING**. According to the teachers, the students miss the real work on the milling machine and its operation the most. They cannot learn how to control the machine and overcome the initial fear of handling the machine. Today's students often lack the connection between the virtual world and reality, and this will not change with online teaching. They can't even imagine the part drawn on the drawing.

Another question was about **what students would like to learn the most about the topic of MILLING**. According to the respondents, students would appreciate it the most if they got to know the milling machine in such a way that their real work would become easier later. One of the things that students often mention that they would like to be able to make is gear.

In the next question, we were wondering **what is necessary for the practice for students to master the topic**. It is essential for students to know the basic principles of how a milling machine works and to acquire the necessary skills. It is also important for them to know the construction of the cutter, its functionality and control elements. For their practice, it is important that every miller has a certain confidence in what he is doing, and this can only be achieved through practice.

Then, we asked **what teachers think is certainly not possible to learn on the topic with online teaching compared to classroom teaching**. Respondents again agreed that students cannot acquire practical skills when working on a milling machine during online classes.

In the next question, we wanted to find out in **what form teachers try to replace practical exercises** (workshops) on the topic of MILLING during online teaching and **what tools they use**. Again, teachers used demonstration videos that showed tools and correct work procedures, which they also commented on. Alternatively, they used the camera and performed the demonstration themselves during the online lesson. Generally, they tried to use mainly video materials during online teaching.



GRINDING

In the next several questions, we asked about **preferences regarding areas of GRINDING for which they would need a practical demonstration in the form of a video/simulation** so that the student can better imagine the situation during online learning. Most of them expressed the need for materials on the topic of Basic grinding work (97%), Parts and controls of grinding machines (90%) and Clamping of tools and workpieces on grinding machines (90%). Again, these topics were included in the developed video materials.

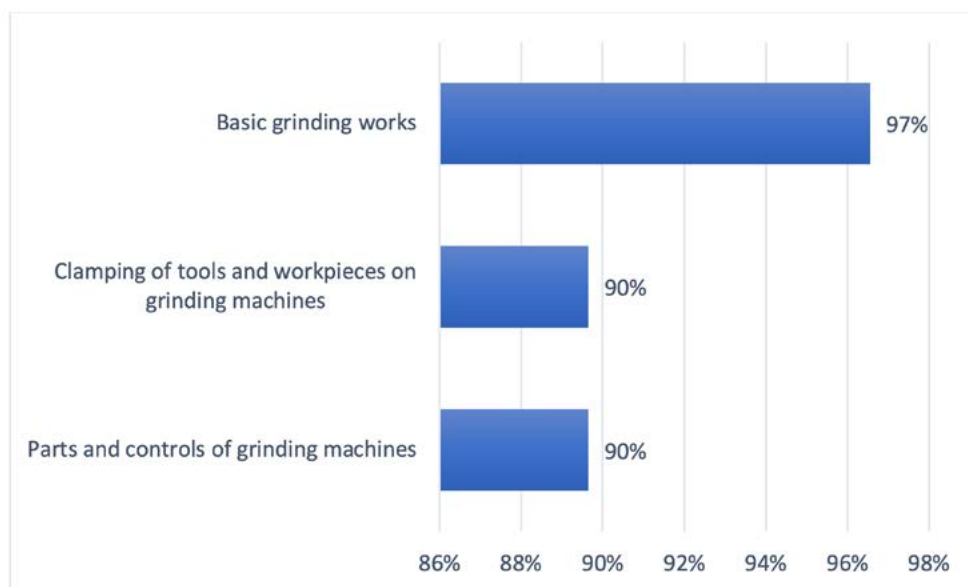


Chart 34: As part of "GRINDING", select topics for which you would need a practical demonstration in the form of a video/simulation so that the student can better imagine the situation during online learning.

In the next questions, we asked **what students should learn in practice through the video** in the field of Parts and controls of grinding machines, Clamping of tools and workpieces on grinding machines and Basic grinding work. It is worth mentioning that up to 93% of respondents expressed the need to acquaint students with the principles of safety at work. Please, see the following 3 graphs that show teachers' preferences for the content of the curriculum for the given topics.

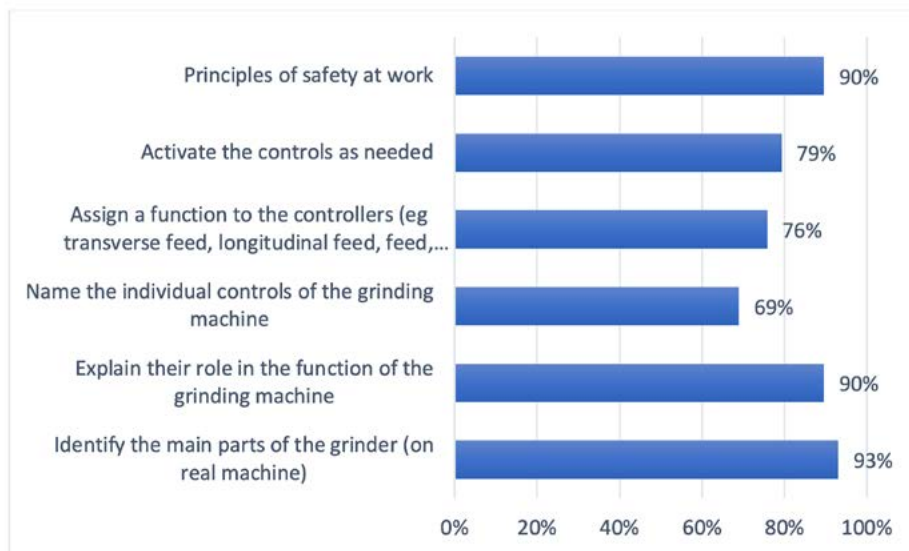


Chart 35: What should the student learn in practice on the topic of „Parts and controls of grinding machines“?



Chart 36: What should the student learn in practice on the topic of „Clamping of tools and workpieces on grinding machines“?

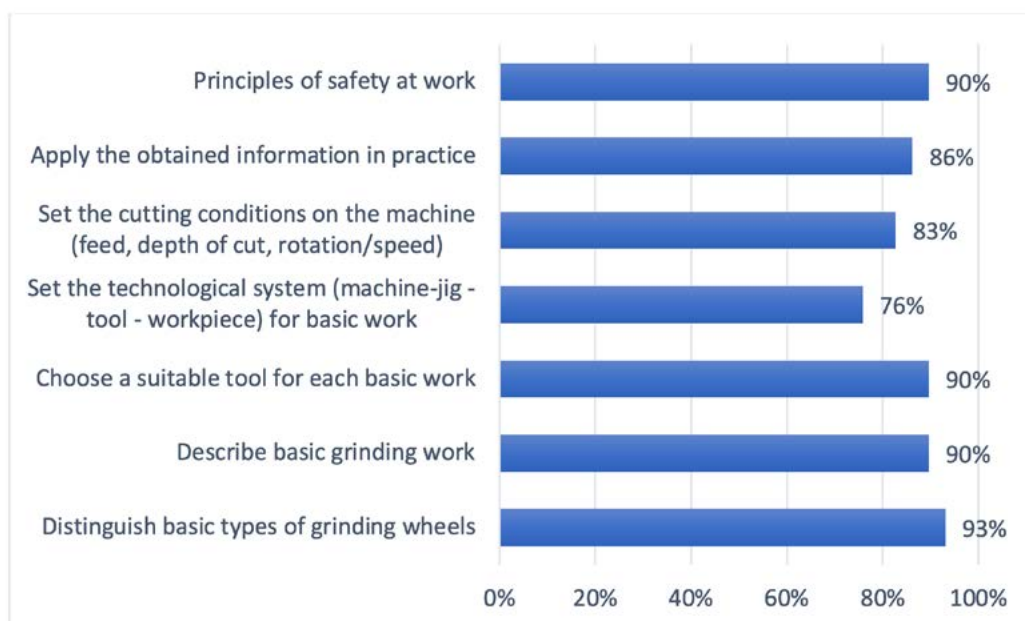



Chart 35: What should the student learn in practice on the topic of „Basic grinding works“?




In the next question, we asked **what skills students lack most in online education on the topic of GRINDING**. The respondents answered that the students miss working on a real machine the most, the skills they would acquire and the opportunity to overcome the initial fear of operating a grinding machine.

Another question was about **what students would like to learn the most about the topic of GRINDING**. According to teachers, students would like to learn how to operate a grinder, clamp workpieces and use tools, or measure with a micrometer.

In the next question, we were wondering **what is necessary for the practice for students to master the topic**. It is essential for students' practice that they learn all the practical skills they will need when handling a grinder. Furthermore, they need to know the construction of the machine and its control, the degree of accuracy and roughness of the surface, etc.

Then, we asked what teachers think is **certainly not possible to learn on the topic with online teaching compared to classroom teaching**. During online classes, students cannot practically learn how to grind flat, rotary and shaped surfaces, which they will later need in their profession. At most, they will learn the names of the individual parts of the machine, e.g. according to the video. However, this will make it easier and faster for them to work in the workshop later.

In the next question, we wanted to find out in **what form teachers try to replace practical exercises** (workshops) on the topic of GRINDING during online teaching and **what tools they use**. Again, teachers used demonstration videos that showed tools and correct work procedures, which they also commented on. Alternatively, they used the camera and performed the demonstration themselves during the online lesson. Generally, they tried to use mainly video materials during online teaching.



PART 3: PNEUMATICS AND HYDRAULICS

In the part of NEEDS ANALYSIS dedicated to the topic of PNEUMATICS AND HYDRAULICS, we asked the respondents all together 38 questions.

In the beginning, we asked how many respondents are concerned with the topic of PNEUMATICS AND HYDRAULICS. Among all interviewed teachers, this area concerned 10% of respondents, which means 8 teachers. Therefore, in the following text, we refer exclusively to the opinions of this group of teachers.

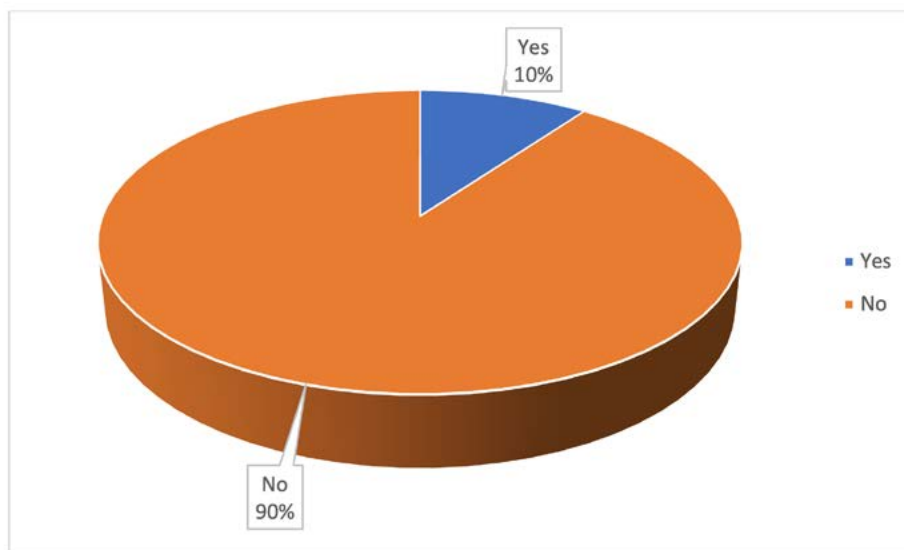


Chart 36: Is the subject PNEUMATICS & HYDRAULIC SCHEMATIC CIRCUITS DESIGN relevant for your field of work?

Within this section, we investigated what topics teachers would be interested in. These topics later became the basis for creating the outputs of the STEP IN project.

The first question was about the **topics we should give priority to when creating online educational materials on the topic of HYDRAULICS AND PNEUMATICS**. 88% of teachers expressed an interest in pneumatic and hydraulic schematic circuits design, typical pneumatic & hydraulic circuits and introduction to electropneumatics and electrohydraulics. These topics were included as a priority in the content of the prepared educational materials within the project.

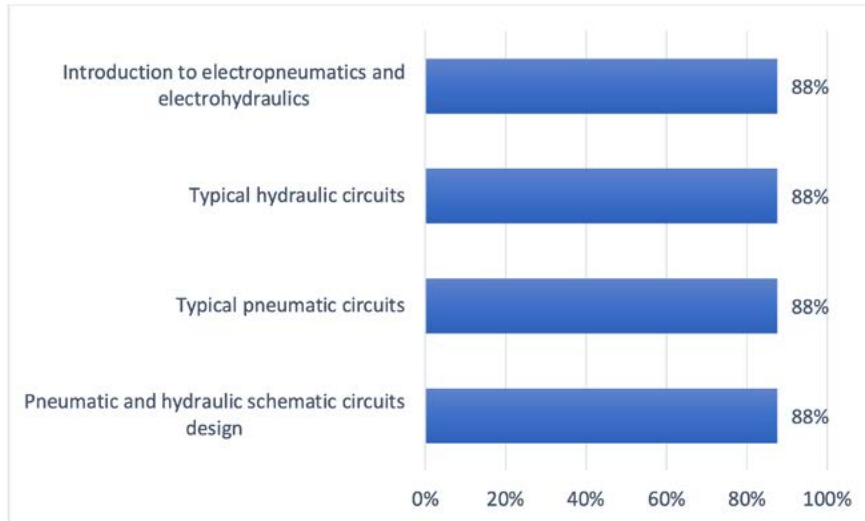


Chart 37: What topics should we give priority to when creating online educational materials on the topic of PNEUMATICS and HYDRAULICS?

PNEUMATIC AND HYDRAULIC SCHEMATIC CIRCUITS DESIGN

In the next several questions, we asked about **preferences regarding areas PNEUMATIC AND HYDRAULIC SCHEMATIC CIRCUITS DESIGN for which they would need a practical demonstration in the form of a video/simulation** so that the student can better imagine the situation during online learning. Most of them expressed the need for materials on the topic of Pneumatic and hydraulic valves (88%), Schematic symbols involved in a compressed air distribution and typical for pneumatics (75%) and Schematic symbols typical for hydraulic systems (75%). Again, these topics were included in the developed video materials.

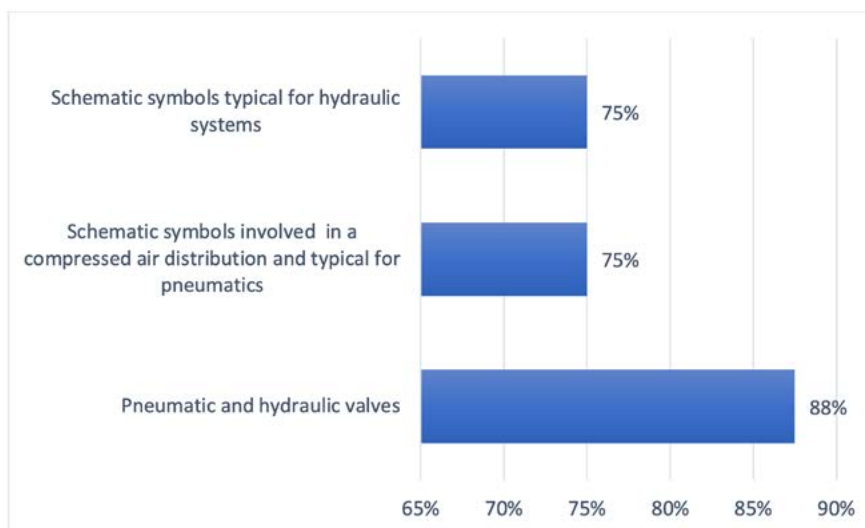


Chart 38: As part of "PNEUMATIC AND HYDRAULIC SCHEMATIC CIRCUITS DESIGN", select topics for which you would need a practical demonstration in the form of a video /simulation so that the student can better imagine the situation during online learning.

In the next questions, we asked **what students should learn in practice through the video** in the field of Pneumatic and hydraulic valves, Schematic symbols involved in a compressed air distribution and typical for pneumatics and Schematic symbols typical for hydraulic systems. Please, see the following 3 graphs that show teachers' preferences for the content of the curriculum for the given topics.

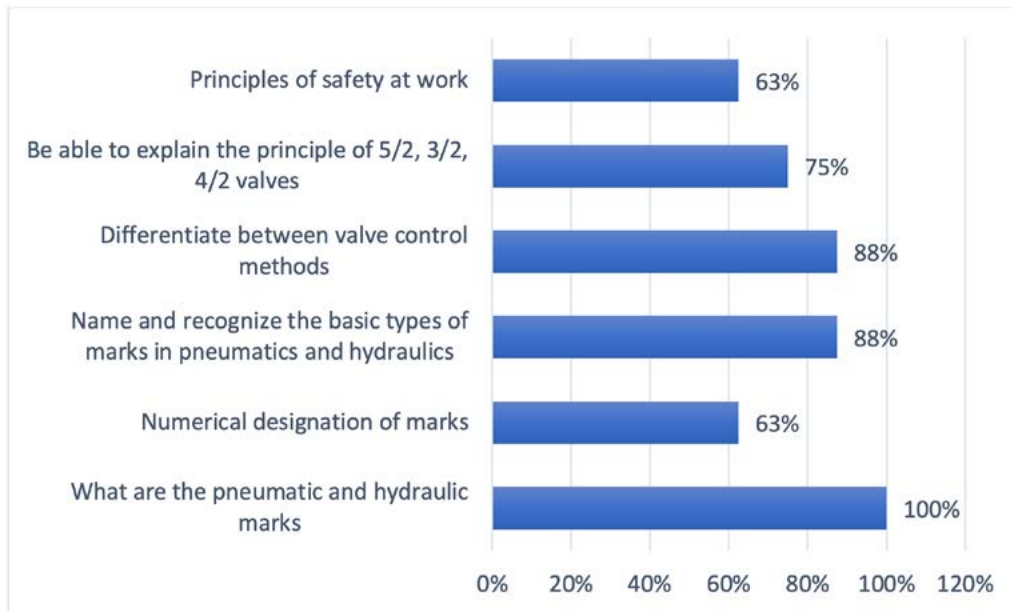


Chart 39: What should the student learn in practice on the topic of "Pneumatic and hydraulic valves"?

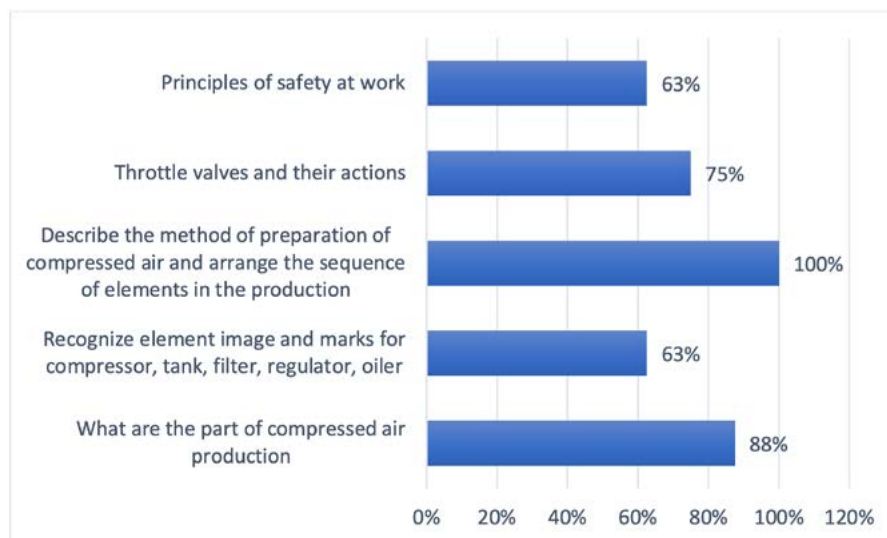


Chart 40: What should the student learn in practice on the topic of „ Schematic symbols involved in a compressed air distribution and typical for pneumatics“?



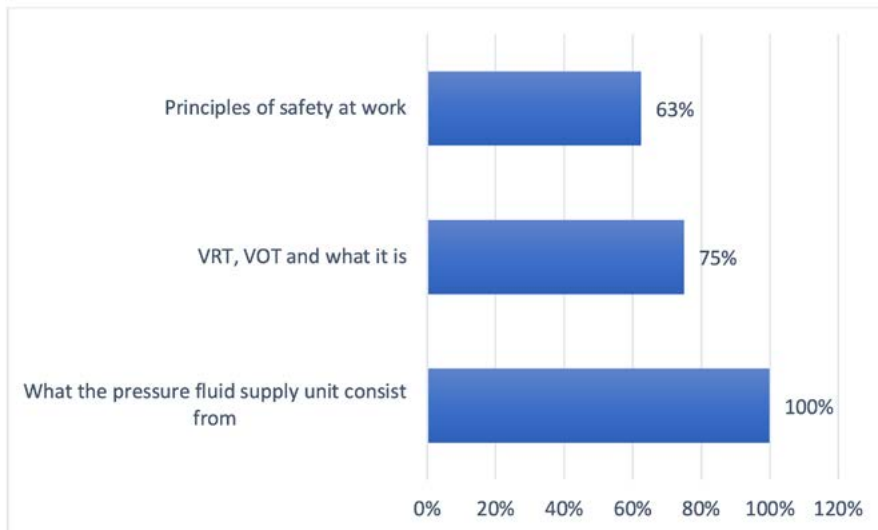


Chart 41: What should the student learn in practice on the topic of „Schematic symbols typical for hydraulic systems“?

In the next question, **we asked what skills students lack most in online education on the topic PNEUMATIC AND HYDRAULIC SCHEMATIC CIRCUITS DESIGN.** According to the respondents, what students miss the most is checking the functionality of the circuit in practice, or the possibility of simulating and verifying the functionality of the circuit. It follows that students cannot understand the functionality of the scheme.

Another question was about **what students would like to learn the most about the topic PNEUMATIC AND HYDRAULIC SCHEMATIC CIRCUITS DESIGN.** Students like to learn how to draw a given circuit and then simulate the operation of the circuit. They also enjoy drawing in the FluidSIM software.

In the next question, we were **wondering what is necessary for the practice for students to master the topic.** In addition to the practical skills necessary for connecting circuits, which are essential for students, it is important that they know all circuit components, pneumatic markings of elements and their function, or the principle of operation of individual circuit elements.

Then, we asked what teachers think is certainly **not possible to learn on the topic with online teaching compared to classroom teaching.** During online education, students will not learn how to practically wire circuits, they will not learn how to eliminate real malfunctions in equipment, how to remove dirt in a tube, or how to repair a broken valve. They don't try to build a circuit according to the schematic. However, they can learn circuit components or pneumatic element markings and their function, which will facilitate their later work in the workshop.

In the next question we wanted to find out in **what form teachers try to replace practical exercises** (workshops) on the topic of PNEUMATIC AND HYDRAULIC SCHEMATIC CIRCUITS DESIGN during online teaching and **what tools they use**. Most often, teachers used demonstration videos that showed circuits and schemes, which they also commented on. Alternatively, they used online modulators or the camera and performed the demonstration themselves during the online lesson. It follows from the above that teachers tried to use video materials during online teaching. Therefore, we think that the **prepared video materials and online tests to evaluate the acquired knowledge will be a great help for teachers of professional subjects in the future**.

TYPICAL PNEUMATIC CIRCUIT

In the next several questions, we asked about **preferences regarding areas of TYPICAL PNEUMATIC CIRCUITS for which they would need a practical demonstration in the form of a video/simulation** so that the student can better imagine the situation during online learning. Most of them expressed the need for materials on the topic of Pneumatic circuits with single acting cylinder (100%), Simple pneumatic circuits with double acting cylinder (88%) and Controlling speed of a piston (88%). Again, these topics were included in the developed video materials.

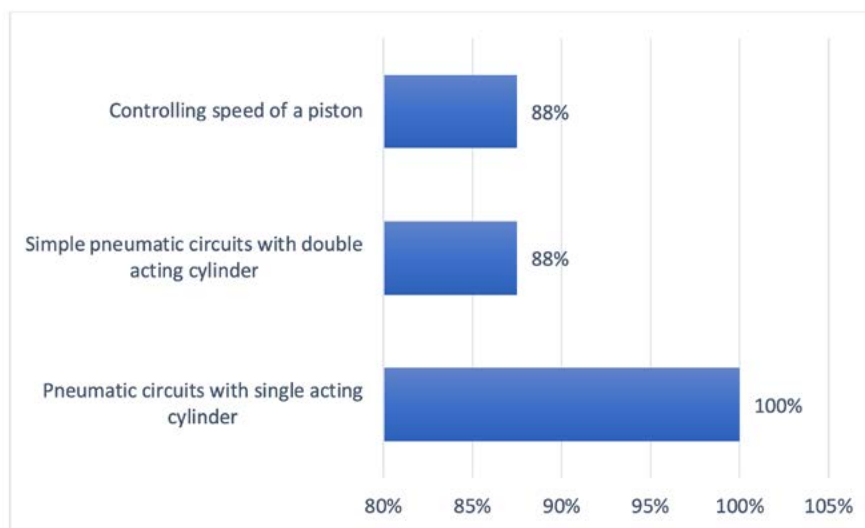


Chart 42: As part of "TYPICAL PNEUMATIC CIRCUITS", select topics for which you would need a practical demonstration in the form of a video / simulation so that the student can better imagine the situation during online learning.

In the next questions, we asked **what students should learn in practice through the video** in the field of Pneumatic circuits with single acting cylinder, Simple pneumatic circuits with double acting cylinder and Controlling speed of a piston. It is interesting that only half of the respondents consider safety at work to be important. Please, see the following 3 graphs that show teachers' preferences for the content of the curriculum for the given topics.

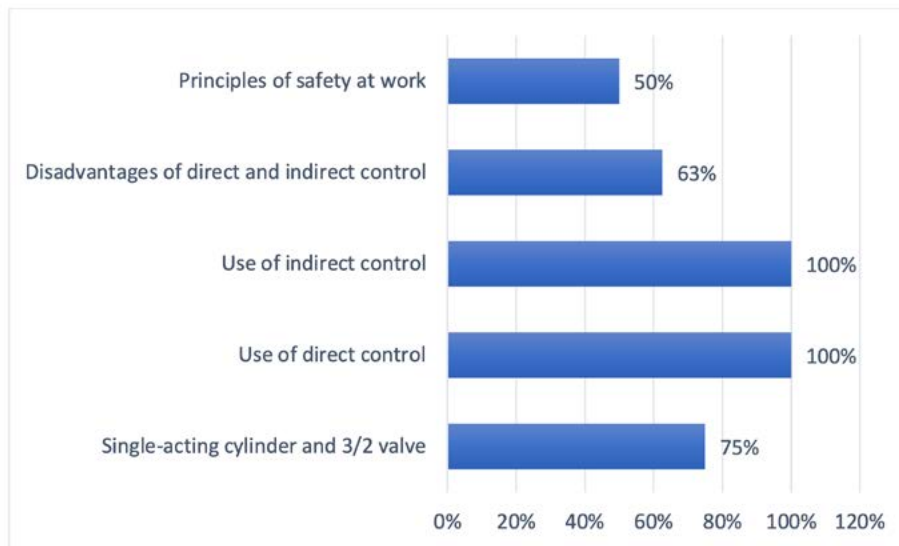


Chart 43: What should the student learn in practice on the topic of „Pneumatic circuits with single acting cylinder“?

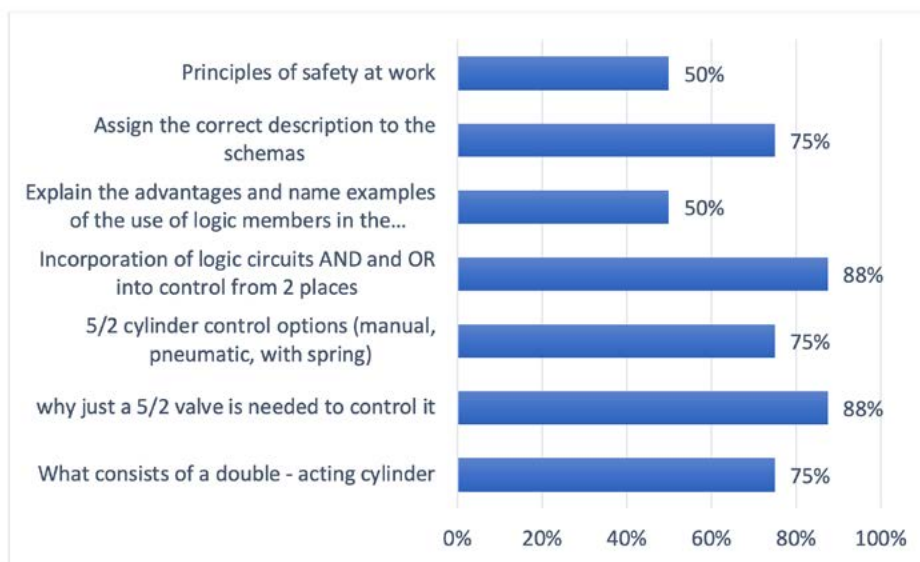


Chart 44: What should the student learn in practice on the topic of „Simple pneumatic circuits with double acting cylinder“?

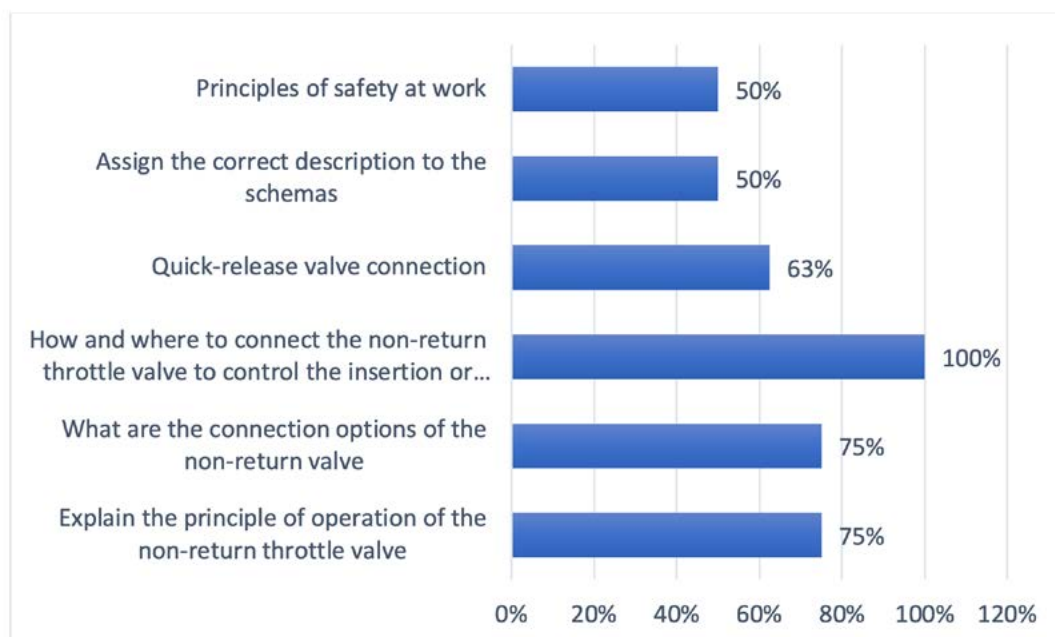



Chart 45: What should the student learn in practice on the topic of „Controlling speed of a piston“?



In the next question, we asked **what skills students lack most in online education on the topic of TYPICAL PNEUMATIC CIRCUITS**. According to the teachers, the students miss working with real components the most, so that, for example, they can try to connect the circuit and then look for errors, why the circuit does not work.

Another question was about **what students would like to learn the most about the topic of TYPICAL PNEUMATIC CIRCUITS**. For this topic, students would like to learn to recognize individual components and be able to connect them to a functional circuit.


In the next question, we were wondering **what is necessary for the practice for students to master the topic**. It is important for students to learn how to read schematics, connect circuits, and look for possible problems. At the same time, it is important that they know the marks of the elements, or the marking of inputs and outputs.

Then, we asked **what teachers think is certainly not possible to learn on the topic with online teaching compared to classroom teaching**. During online classes, students will not learn how to connect circuits practically, nor how to look for possible connection errors and other problems. Therefore, they will not find out how the circuit assembled according to the scheme works, or does not work.

In the next question, we wanted to find out in **what form teachers try to replace practical exercises** (workshops) on the topic of TYPICAL PNEUMATIC CIRCUITS during online teaching and **what tools they use**. Most often, teachers used demonstration videos that showed circuits and correct work procedures, which they also commented on. Alternatively, they used the camera and performed the demonstration themselves during the online lesson. Generally, teachers tried to use mainly video materials during online teaching.

TYPICAL HYDRAULIC CIRCUITS

In the next several questions, we asked about preferences **regarding areas of TYPICAL HYDRAULIC CIRCUITS for which they would need a practical demonstration in the form of a video/simulation** so that the student can better imagine the situation during online learning. Most of them expressed the need for materials on the topic of Simple hydraulic circuit (100%), Application of a pressure control valves (75%) and Flow control valves (75%). Again, these topics were included in the developed video materials.



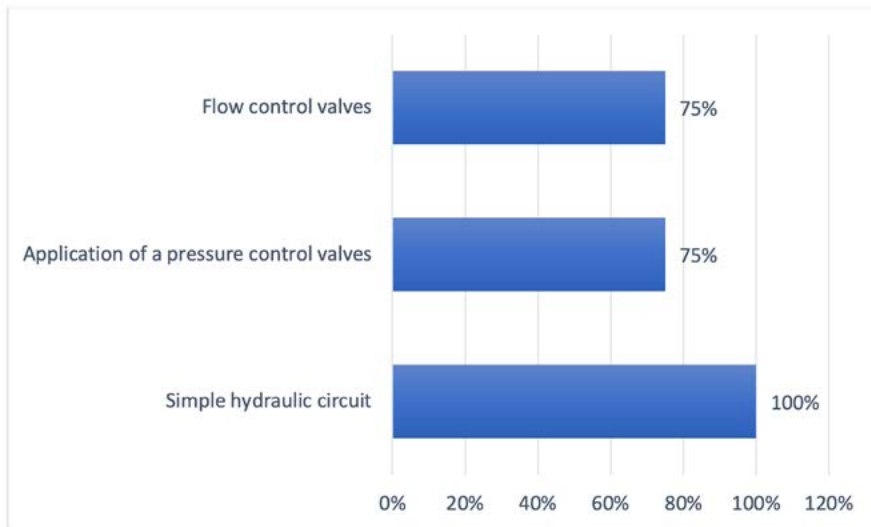


Chart 46: As part of "TYPICAL HYDRAULIC CIRCUITS", select topics for which you would need a practical demonstration in the form of a video/simulation so that the student can better imagine the situation during online learning.

In the next questions, we asked **what students should learn in practice through the video** in the field of Simple hydraulic circuit, Application of a pressure control valves and Flow control valves. Please, see the following 3 graphs that show teachers' preferences for the content of the curriculum for the given topics.

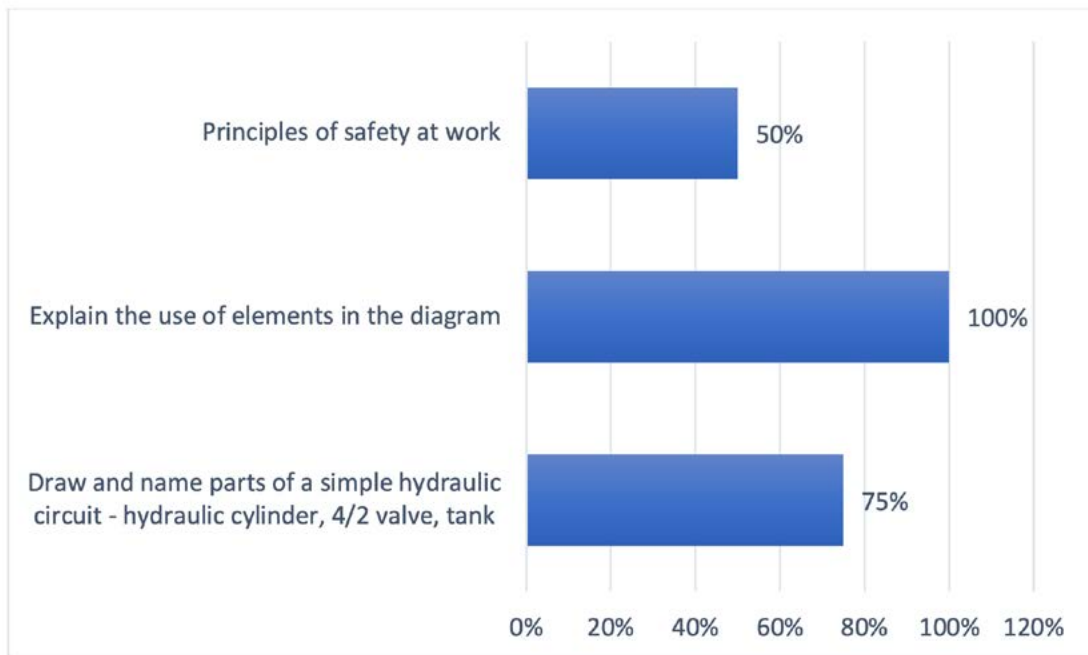


Chart 47: What should the student learn in practice on the topic of „Simple hydraulic circuit“?

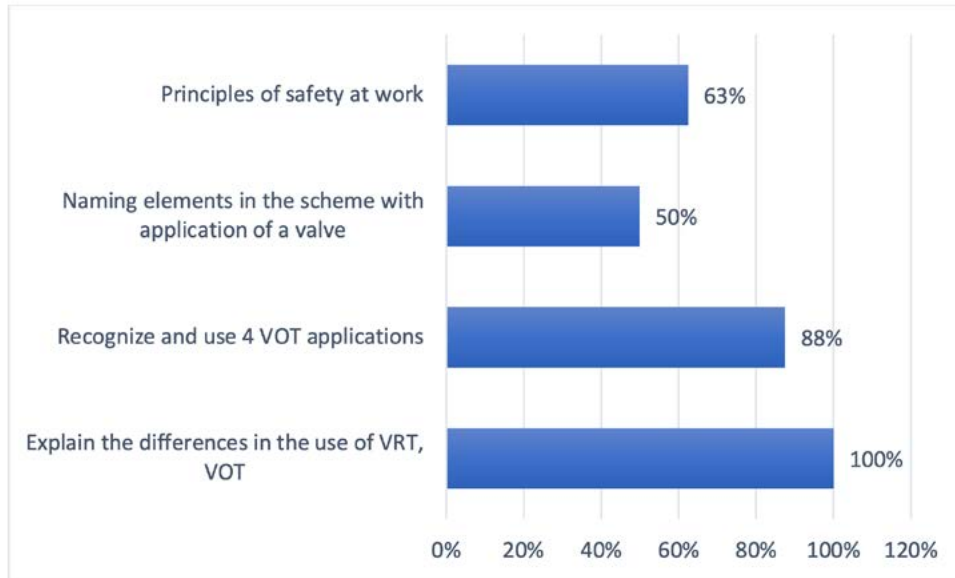


Chart 48: What should the student learn in practice on the topic of „Application of a pressure control valves“?

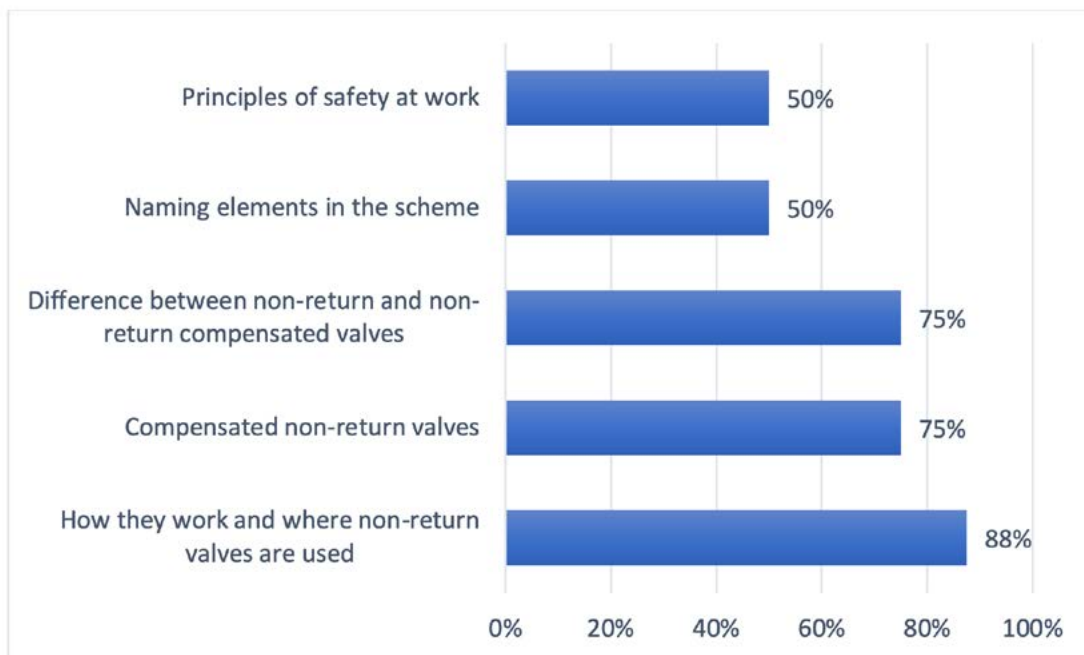



Chart 49: What should the student learn in practice on the topic of „Flow control valves“?

In the next question, we asked **what skills students lack most in online education on the topic of TYPICAL HYDRAULIC CIRCUITS**. According to the teachers, the students miss the most manual work when connecting circuits and knowledge of real hydraulic elements.

Another question was about **what students would like to learn the most about the topic of TYPICAL HYDRAULIC CIRCUITS**. According to the respondents, students would like to learn how hydraulic circuits work and how to wire them up according to a schematic to make them work.




In the next question, we were wondering **what is necessary for the practice for students to master the topic**. For students and their further professional development, it is necessary to know in detail the components of the hydraulic circuit, the brands, or the principle of operation of the individual elements of the circuit. However, what they lack most is the practical skill involved in engaging them.

Then, we asked **what teachers think is certainly not possible to learn on the topic with online teaching compared to classroom teaching**. As we have already mentioned, students will not learn to practically connect the circuit during the online course, they will not try out the principle of operation of the individual elements of the circuit.

In the next question, we wanted to find out in **what form teachers try to replace practical exercises** (workshops) on the topic of TYPICAL HYDRAULIC CIRCUITS during online teaching and **what tools they use**. Again, teachers used demonstration videos that showed tools and correct work procedures, which they also commented on. Alternatively, they used the camera and performed the demonstration themselves during the online lesson. Generally, they tried to use mainly video materials during online teaching.

INTRODUCTION TO ELECTROPNEUMATICS AND ELECTROHYDRAULICS

In the next several questions, we asked about **preferences regarding areas of INTRODUCTION TO ELECTROPNEUMATICS AND ELECTROHYDRAULICS for which they would need a practical demonstration in the form of a video/simulation** so that the student can better imagine the situation during online learning. Most of them expressed the need for materials on the topic of Electric control of a electropneumatic and electrohydraulic valves (88%), Relay control of electrically actuated valves (75%) and Relay latching circuit (90%). Again, these topics were included in the developed video materials.



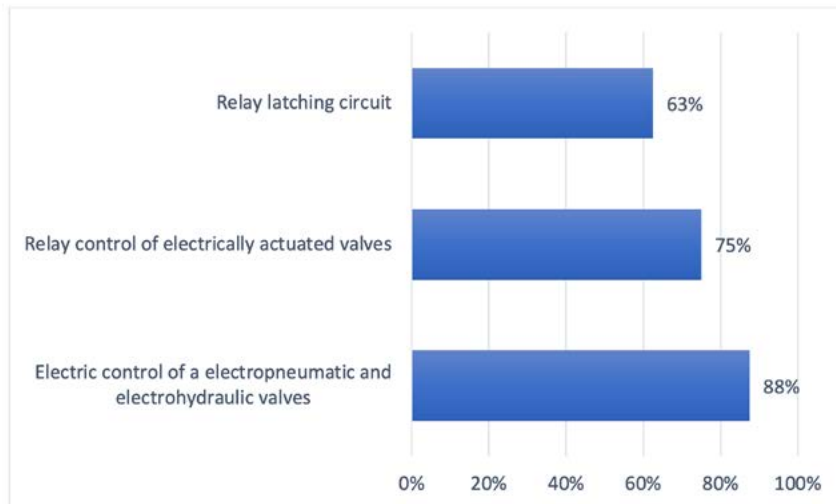


Chart 50: As part of "INTRODUCTION TO ELECTROPNEUMATICS AND ELECTROHYDRAULICS", select topics for which you would need a practical demonstration in the form of a video / simulation so that the student can better imagine the situation during online learning.

In the next questions, we asked **what students should learn in practice through the video** in the field of Electric control of a electropneumatic and electrohydraulic valves, Relay control of electrically actuated valves and Relay latching circuit. Unlike machining, hydraulics teachers do not consider safety at work very important and only 63% of respondents expressed the need to acquaint students with the principles of safety at work. Please, see the following 3 graphs that show teachers' preferences for the content of the curriculum for the given topics.

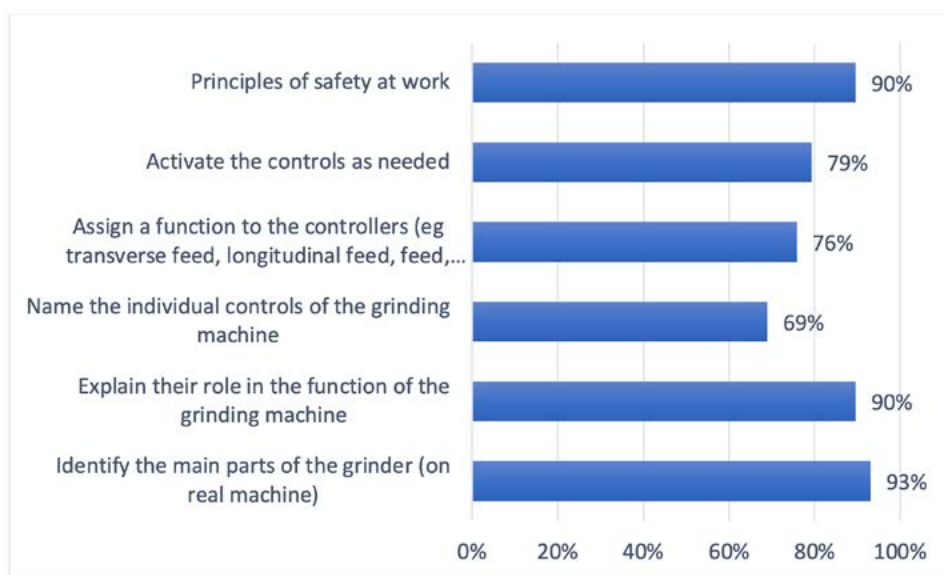


Chart 51: What should the student learn in practice on the topic of „Electric control of a electropneumatic and electrohydraulic valves“?



Chart 52: What should the student learn in practice on the topic of „Relay control of electrically actuated valves“?

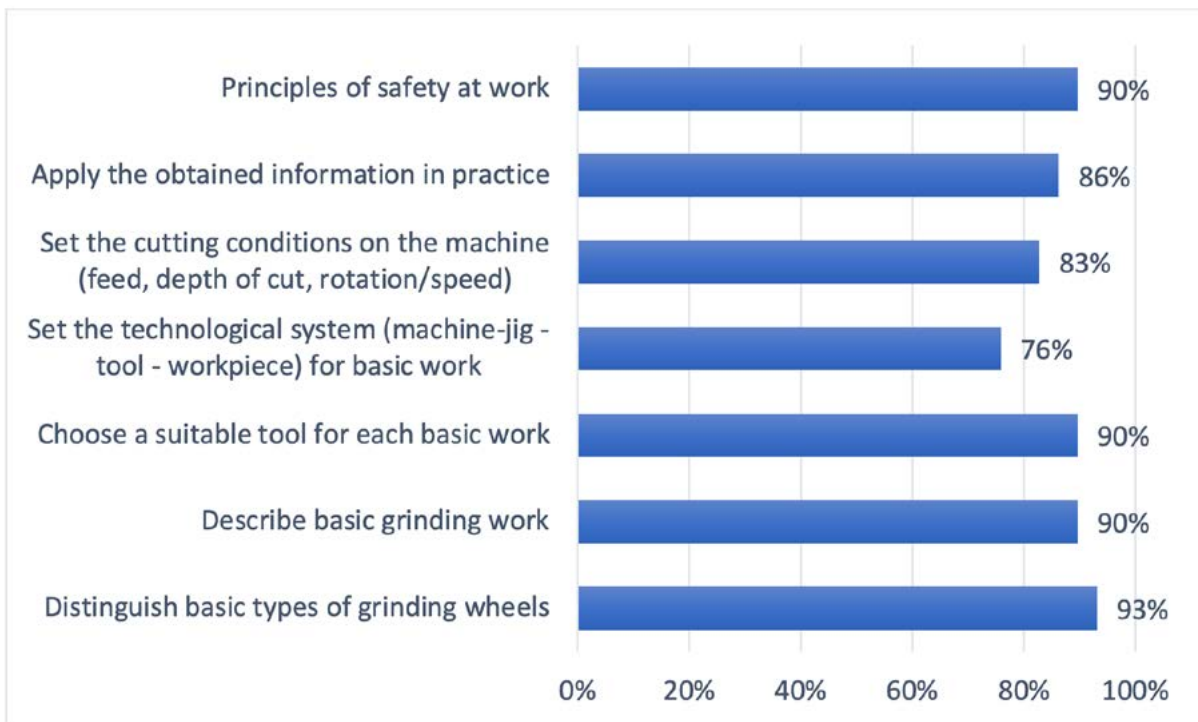



Chart 53: What should the student learn in practice on the topic of „Relay latching circuit“?



In the next question, we asked **what skills students lack most in online education on the topic of INTRODUCTION TO ELECTROPNEUMATICS AND ELECTROHYDRAULICS**. The respondents answered that the students miss the most the opportunity to practically connect the circuits and to know the real elements of the circuits.

Another question was about **what students would like to learn the most about the topic of INTRODUCTION TO ELECTROPNEUMATICS AND ELECTROHYDRAULICS**. According to the teachers, students would like to learn the principles of creating circuits in practice and their practical use in industry.

In the next question, we were wondering **what is necessary for the practice for students to master the topic**. It is essential to control safety at work and to know components and wiring rules, or to read diagrams and look for components in a circuit.

Then, we asked what teachers think is **certainly not possible to learn on the topic with online teaching compared to classroom teaching**. During online classes, students do not learn how to practically wire circuits and look for wiring errors. They will not acquire the necessary skills at work. However, they will at least find out what the schemes look like, which will help them later in practice.

In the next question, we wanted to find out in **what form teachers try to replace practical exercises** (workshops) on the topic of INTRODUCTION TO ELECTROPNEUMATICS AND ELECTROHYDRAULICS during online teaching and **what tools they use**. Even though the teachers expressed that there is no equivalent substitute for practical exercises, they appreciated the help of online videos and direct demonstration by the teacher during online teaching. Generally, they tried to use mainly video materials during online teaching.

Therefore, we believe that video materials with links to tests verifying students' input and output knowledge, which are created as part of the STEP IN project, will facilitate their education and provide adequate study materials during online teaching in the future.



PART 4: LOGISTICS

In the part of NEEDS ANALYSIS dedicated to the topic of LOGISTICS, we asked the respondents all together 38 questions.

In the beginning, we asked how many respondents were concerned with the topic of LOGISTICS. Among all interviewed teachers, this area concerned 11% of respondents, which means 9 teachers. Therefore, in the following text, we refer exclusively to the opinions of this group of teachers.

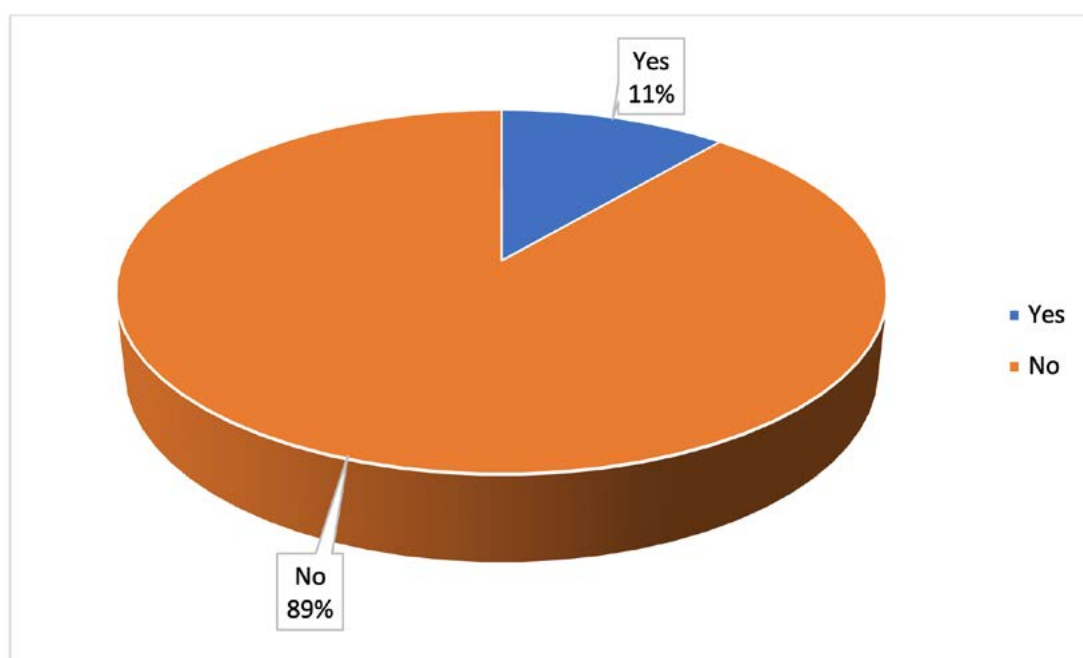


Chart 54: Is the subject LOGISTICS relevant for your field of work?

Within this section, we investigated what topics teachers would be interested in. These topics later became the basis for creating the outputs of the STEP IN project.

The first question was about the **topics we should give priority to when creating online educational materials on the topic of LOGISTICS**. 100% of teachers expressed an interest in the topic of ensuring the load, other topics suggested for educational materials were coupling and uncoupling of trailers (67%), and approximately half of responders recommended also a counterbalance forklift and a swap body. These topics were included as a priority in the content of the prepared educational materials within the project.

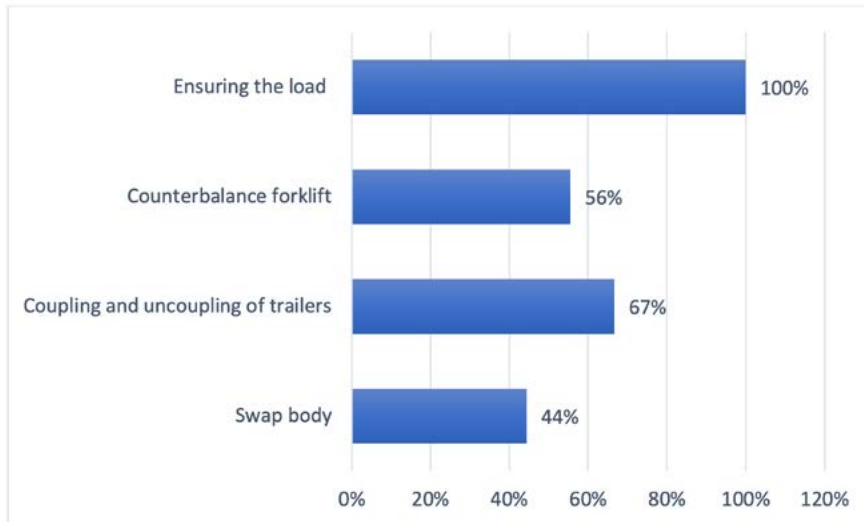


Chart 55: What topics should we give priority to when creating online educational materials on the topic of LOGISTICS?

SWAP BODY

In the next several questions, we asked about **preferences regarding areas SWAP BODY for which they would need a practical demonstration in the form of a video/simulation** so that the student can better imagine the situation during online learning. Most of them expressed the need for materials on the topic of Operation equipment and preparation of swap body (89%), Taking a swap body container into a vehicle (67%) and Removing the swap body container from the vehicle (56%). Again, these topics were included in the developed video materials.

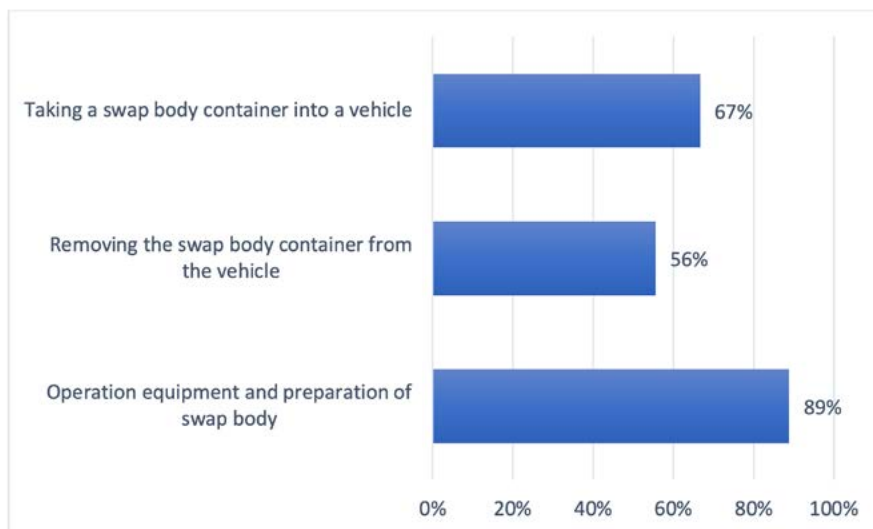


Chart 56: As part of "SWAP BODY", select topics for which you would need a practical demonstration in the form of a video / simulation so that the student can better imagine the situation during online learning.

In the next questions, we asked **what students should learn in practice through the video** in the field of Operation equipment and preparation of swap body, Taking a swap body container into a vehicle, and Removing the swap body container from the vehicle. Please, see the following 3 graphs that show teachers' preferences for the content of the curriculum for the given topics.

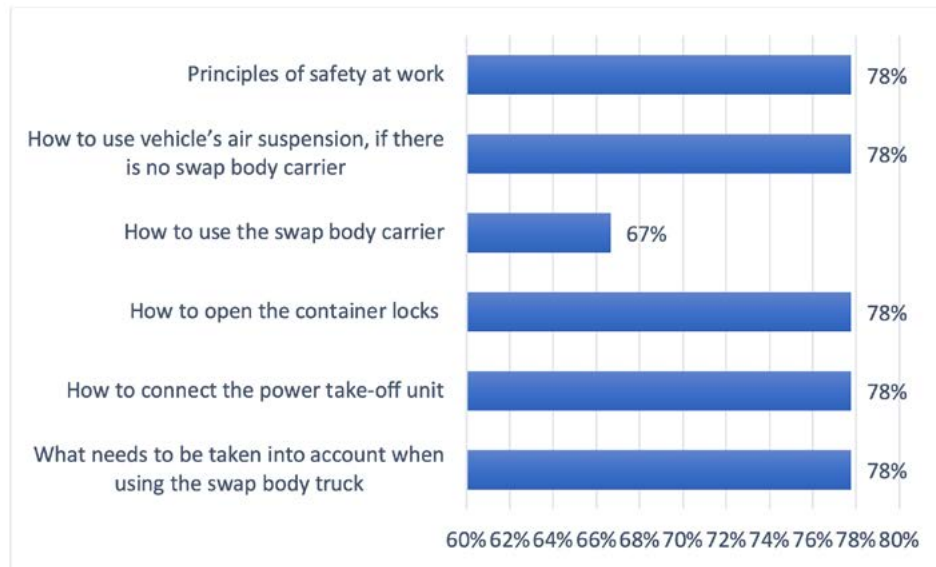


Chart 57: What should the student learn in practice on the topic of "Operation equipment and preparation of swap body"?

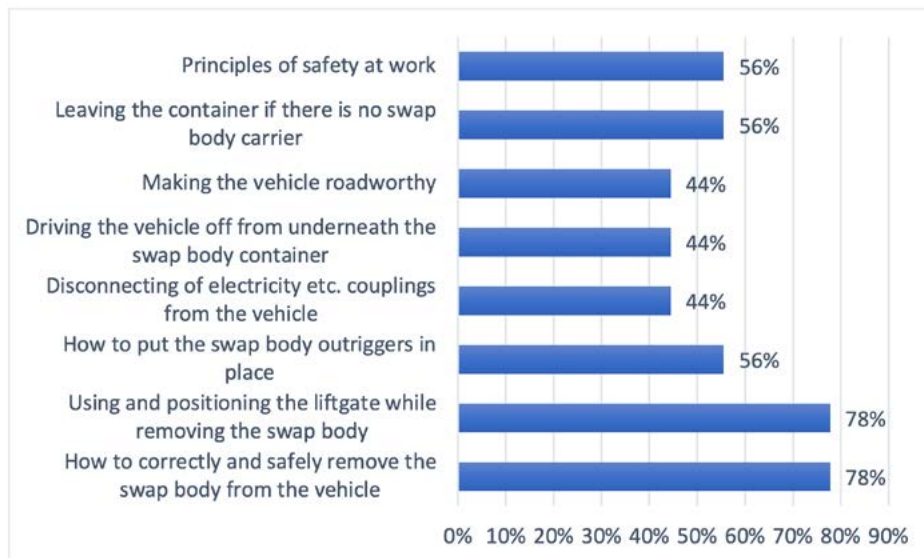


Chart 58: What should the student learn in practice on the topic of "Removing the swap body container from the vehicle"?



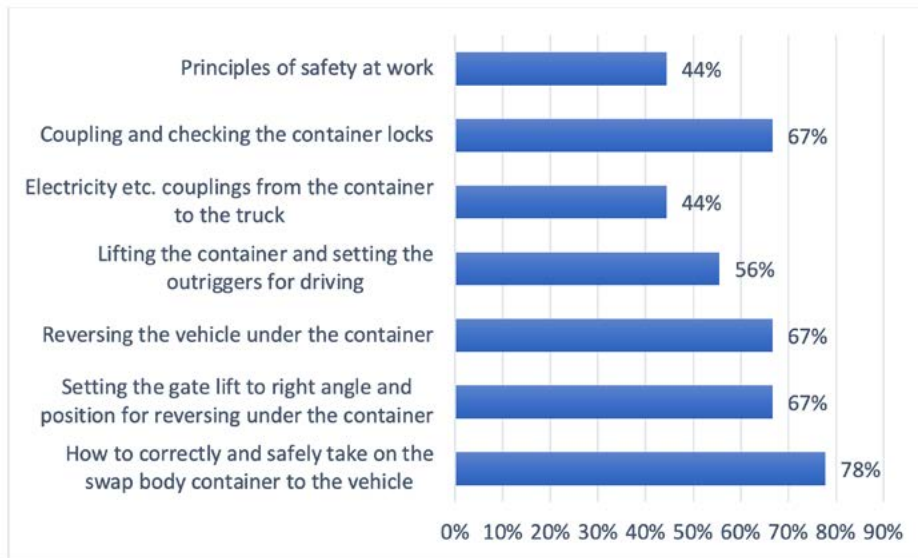


Chart 59: What should the student learn in practice on the topic of „Taking a swap body container into a vehicle“?

In the next question, we asked **what skills students lack most in online education on the topic SWAP BODY**. According to the respondents, the students did not even know that they had seen such a thing. They do not understand whether the container is removed from the vehicle correctly and safely, or how to take the container into the vehicle correctly.

Another question was about **what students would like to learn the most about the topic SWAP BODY**. Students would most like to learn how to handle the swap body, and how to attach or detach it from the vehicle. They would also enjoy driving a vehicle with the swap body.

In the next question, we were **wondering what is necessary for the practice for students to master the topic**. In addition to the practical skills necessary for handling the swap body, which is essential for students, it is important that they know safe operating methods and basic principles to prevent equipment or personal damage, or container lifting and fixing.

Then, we asked what teachers think is certainly **not possible to learn on the topic with online teaching compared to classroom teaching**. During online education, students practically do not learn how reversing under a container, it's similar to driving school - you can learn the rules, but only during the practice drives will you learn how to handle the vehicle.

In the next question we wanted to find out in **what form teachers try to replace practical exercises** on the topic of SWAP BODY during online teaching and **what tools they use**. Most often, teachers used demonstration videos and driving simulations. It follows from the above that teachers tried to use video materials during online teaching. Therefore, we think that the **prepared video materials and online tests to evaluate the acquired knowledge will be a great help for teachers of professional subjects in the future**.

COUPLING AND UNCOUPLING OF TRAILERS

In the next several questions, we asked about **preferences regarding areas of COUPLING AND UNCOUPLING OF TRAILERS for which they would need a practical demonstration in the form of a video/simulation** so that the student can better imagine the situation during online learning. Most of them expressed the need for materials on the topic of Full trailer (89%), Semi-trailer (78%) and Dolly (67%). Again, these topics were included in the developed video materials.

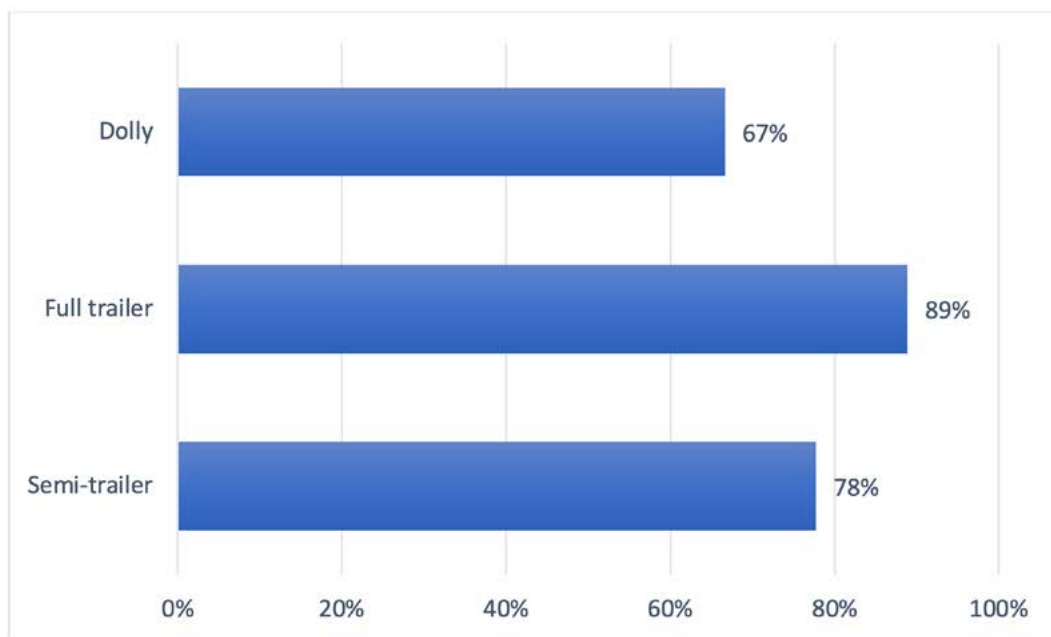


Chart 60: As part of "COUPLING AND UNCOUPLING OF TRAILERS", select topics for which you would need a practical demonstration in the form of a video / simulation so that the student can better imagine the situation during online learning.

In the next questions, we asked **what students should learn in practice through the video** in the field of Full trailer, Semi-trailer and Dolly. It is interesting that only half of the respondents consider safety at work to be important. Please, see the following 3 graphs that show teachers' preferences for the content of the curriculum for the given topics.

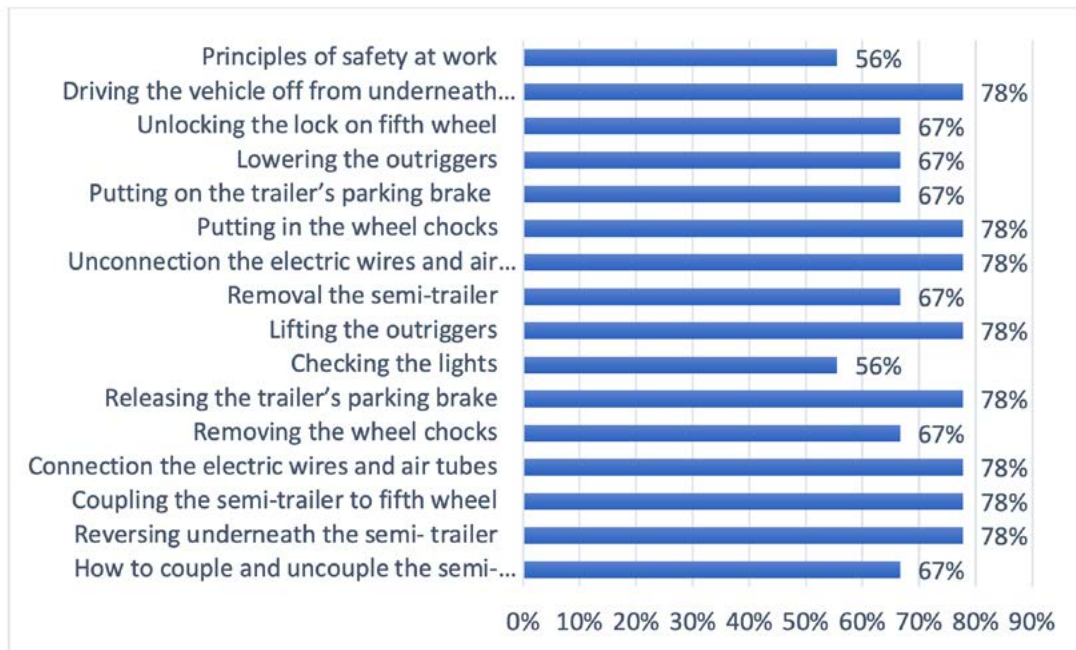


Chart 61: What should the student learn in practice on the topic of „ Semi-trailer“?

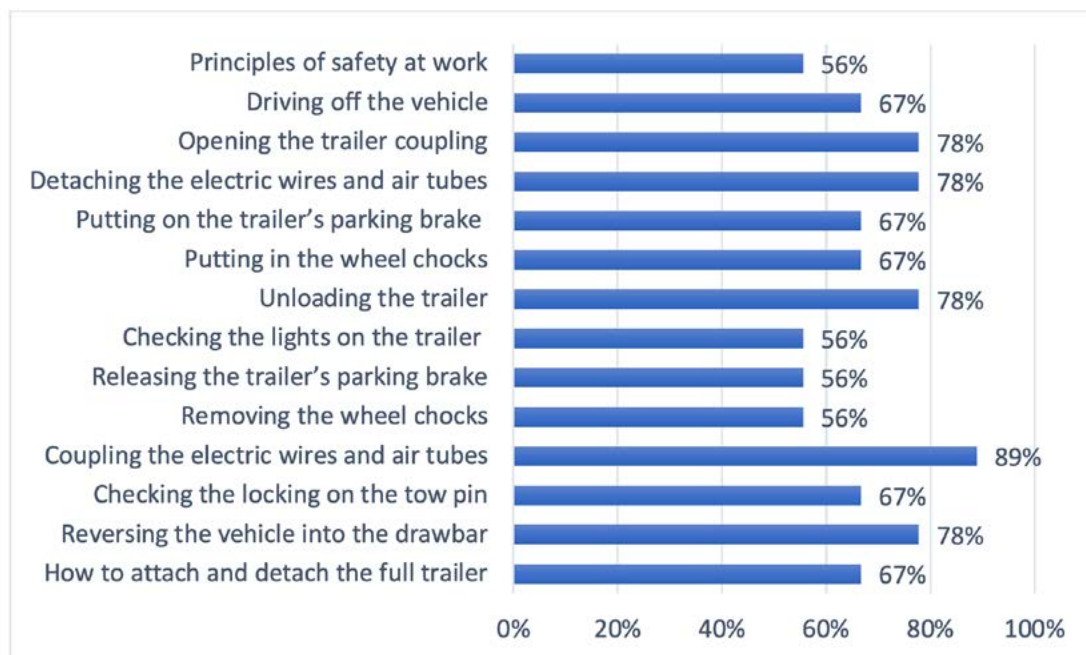


Chart 62: What should the student learn in practice on the topic of „ Full trailer“?

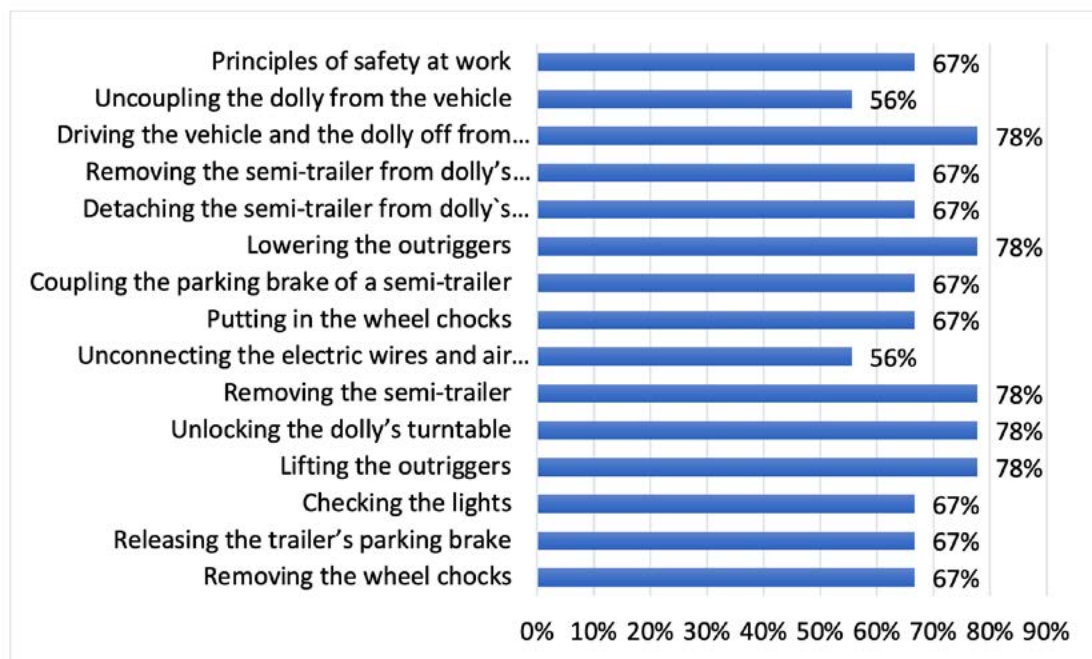


Chart 63: What should the student learn in practice on the topic of „ Dolly“?

In the next question, we asked **what skills students lack most in online education on the topic of COUPLING AND UNCOUPLING OF TRAILERS**. According to the teachers, the students miss logical sequences of operation. They don't have the opportunity to try out what to do first and if I happen to skip something, what are the consequences.

Another question was about **what students would like to learn the most about the topic of COUPLING AND UNCOUPLING OF TRAILERS**. For this topic, students would like to learn how to race with trailers and how to properly use the advantages of trailers.

In the next question, we were wondering **what is necessary for the practice for students to master the topic**. It is important for students to learn safe operating procedures and ensure attachment and safe removal.

Then, we asked **what teachers think is certainly not possible to learn on the topic with online teaching compared to classroom teaching**. During online classes, students will not learn how to ensure the load and they will not be able to acquire the necessary driving skills for handling trailers.

In the next question, we wanted to find out in **what form teachers try to replace practical exercises** (workshops) on the topic of COUPLING AND UNCOUPLING OF TRAILERS during online teaching and **what tools they use**. Most often, teachers used demonstration videos that showed necessary work procedures, which they also commented on. Alternatively, they used the camera and performed the demonstration themselves during the online lesson. Generally, teachers tried to use mainly video materials during online teaching.

COUNTERBALANCE FORKLIFT

In the next several questions, we asked about **preferences regarding areas of COUNTERBALANCE FORKLIFT for which they would need a practical demonstration in the form of a video/simulation** so that the student can better imagine the situation during online learning. Most of them expressed the need for materials on the topic of Driving start check (89%), and Driving or Loading and unloading the vehicle (both 78%). Again, these topics were included in the developed video materials.

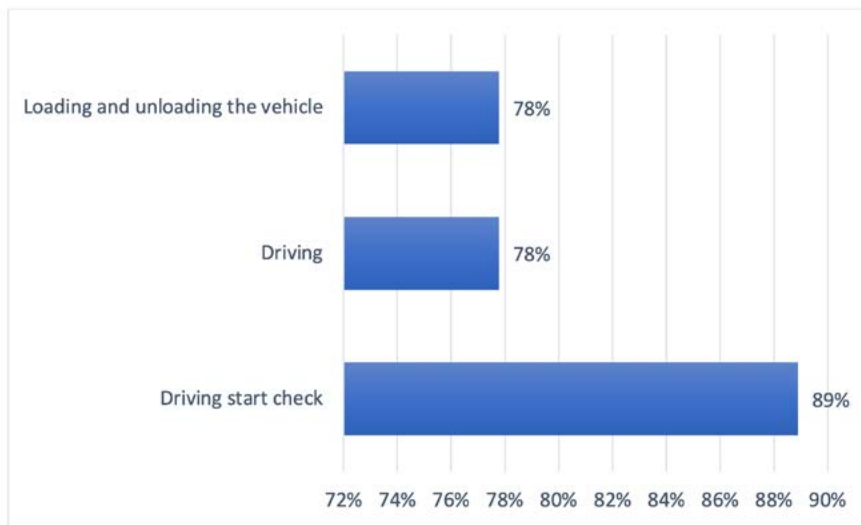


Chart 64: As part of "COUNTERBALANCE FORKLIFT", select topics for which you would need a practical demonstration in the form of a video / simulation so that the student can better imagine the situation during online learning.

In the next questions, we asked **what students should learn in practice through the video** in the field of Driving start check, Driving and Loading and unloading the vehicle. Please, see the following 3 graphs that show teachers' preferences for the content of the curriculum for the given topics.

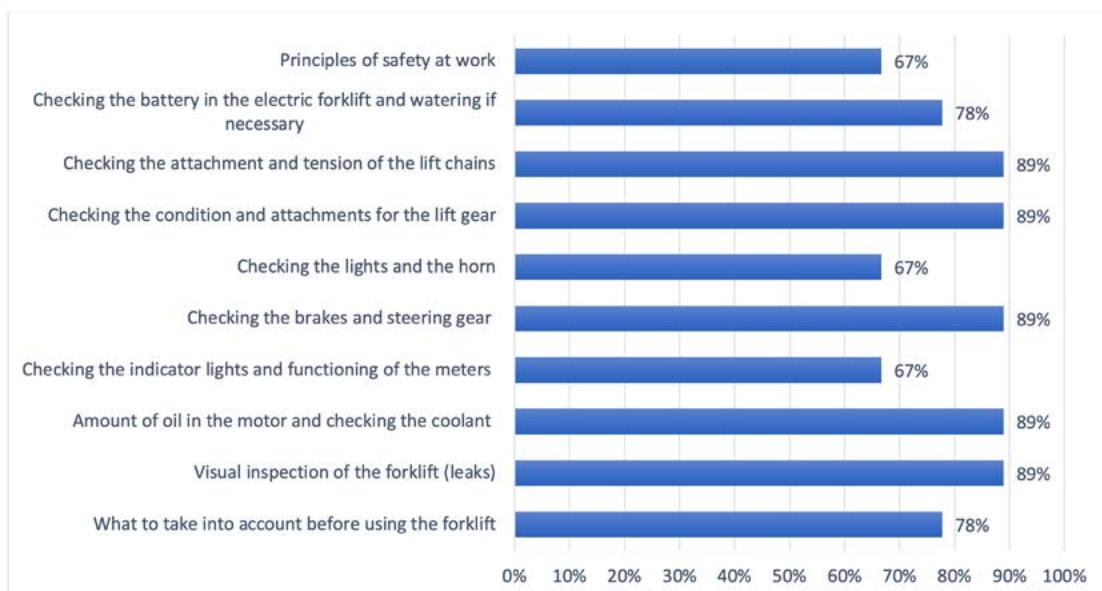


Chart 65: What should the student learn in practice on the topic of „ Driving start check “?

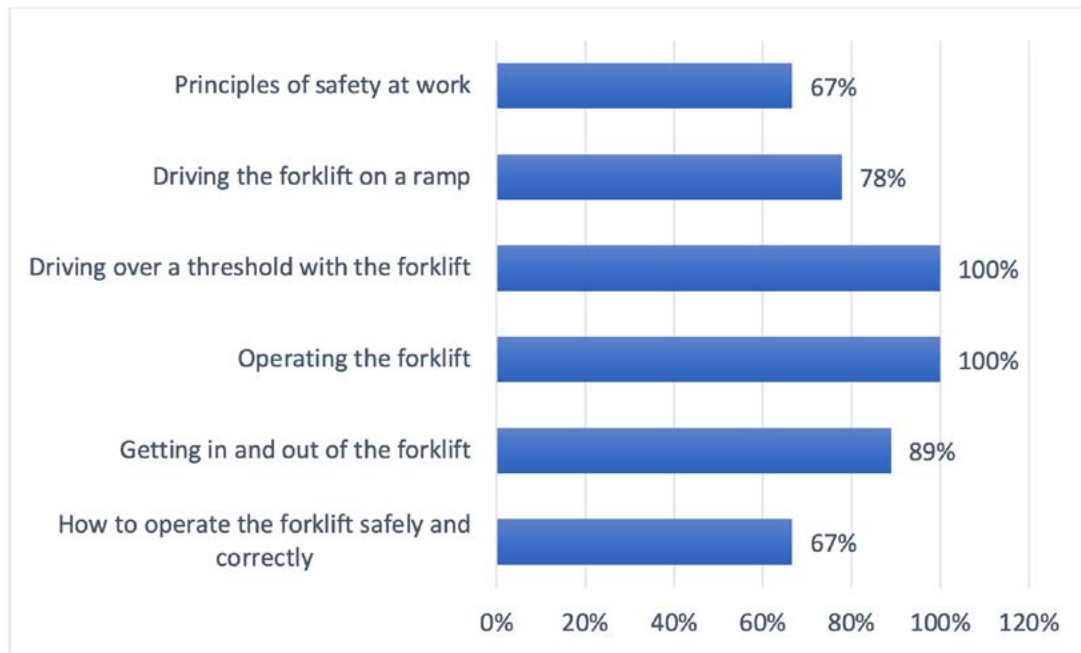


Chart 66: What should the student learn in practice on the topic of „Driving“?

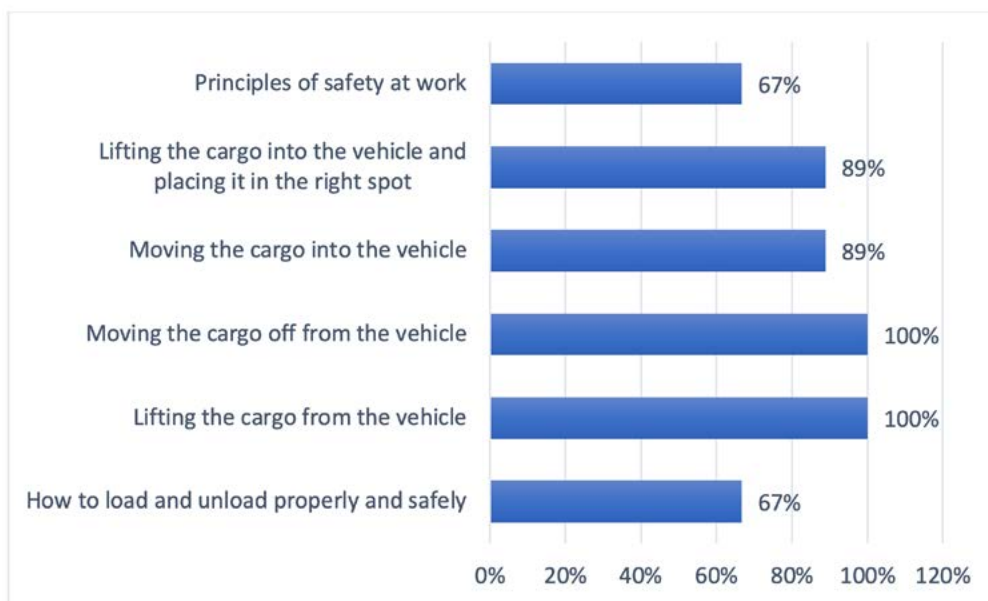


Chart 67: What should the student learn in practice on the topic of „Loading and unloading the vehicle“?

In the next question, we asked **what skills students lack most in online education on the topic of COUNTERBALANCE FORKLIFT**. According to the teachers, the students miss the most practical exercises, basics of forklift driving, or interpretation of the load plate. They also cannot learn the centre of gravity distance and proper balancing while driving with the forklift.



Another question was about **what students would like to learn the most about the topic of COUNTERBALANCE FORKLIFT**. According to the respondents, students would like to learn how to drive the forklift and carry the load.


In the next question, we were wondering **what is necessary for the practice for students to master the topic**. For students and their further professional development, it is necessary to know safe operating procedures, commissioning and inspections of the device and have enough practice time in a safe place.

Then, we asked **what teachers think is certainly not possible to learn on the topic with online teaching compared to classroom teaching**. As we have already mentioned, students will not learn practical driving, because we all learn to drive by driving. Students can partially prepare for driving on a simulator, but they can experience all the reality later on in a real forklift only.

In the next question, we wanted to find out in **what form teachers try to replace practical exercises** (workshops) on the topic of COUNTERBALANCE FORKLIFT during online teaching and **what tools they use**. Again, teachers used demonstration videos that showed driving skills and loading or unloading procedures, which they also commented on. Alternatively, they used the camera and performed the demonstration themselves during the online lesson. Generally, they tried to use mainly video materials during online teaching.

ENSURING THE LOAD

In the next several questions, we asked about **preferences regarding areas of ENSURING THE LOAD for which they would need a practical demonstration in the form of a video/simulation** so that the student can better imagine the situation during online learning. 100% of them expressed the need for materials on the topic Preparation of ratchet tie down and Preparation of ratchet load binders, another topic Supporting and covering the load has been chosen by 89% of responders. Again, these topics were included in the developed video materials.



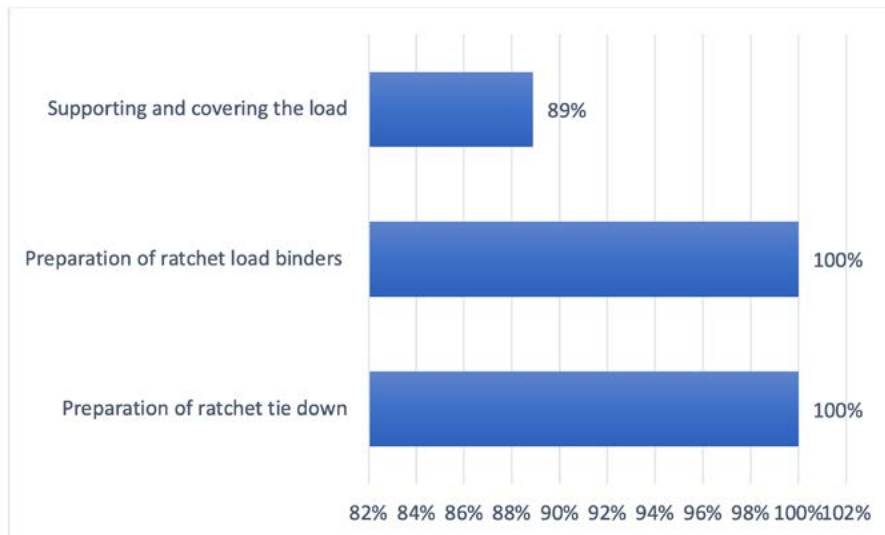


Chart 68: As part of "ENSURING THE LOAD", select topics for which you would need a practical demonstration in the form of a video / simulation so that the student can better imagine the situation during online learning.

In the next questions, we asked **what students should learn in practice through the video** in the field of Preparation of ratchet tie down, Preparation of ratchet load binders and Supporting and covering the load. It is good to mention, that logistics teachers consider safety at work very important and up to 90% of respondents expressed the need to acquaint students with the principles of safety at work. Please, see the following 3 graphs that show teachers' preferences for the content of the curriculum for the given topics.

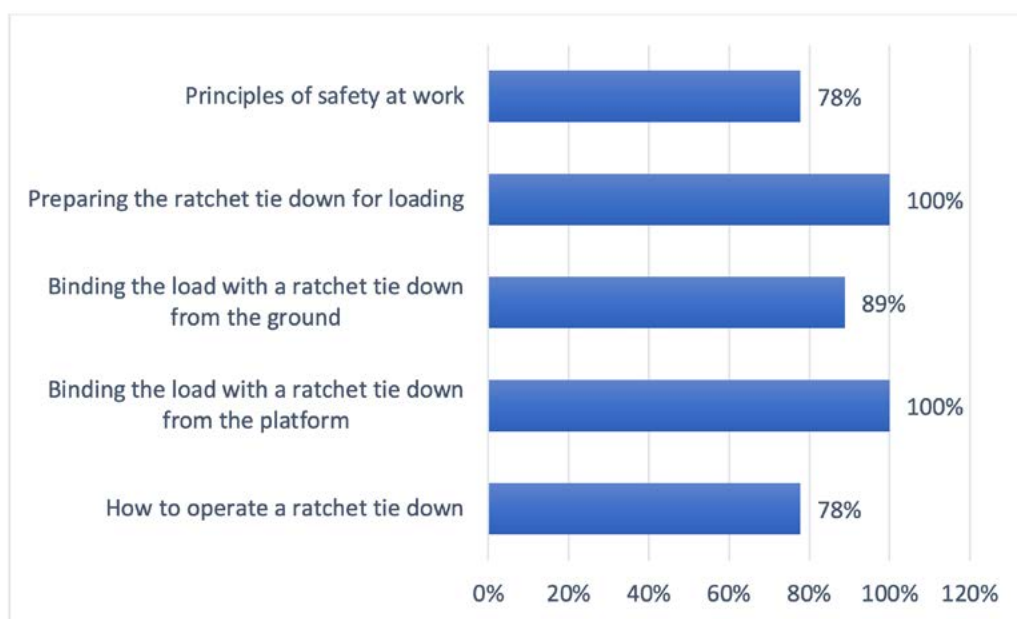


Chart 69: What should the student learn in practice on the topic of „ Preparation of ratchet tie down“?

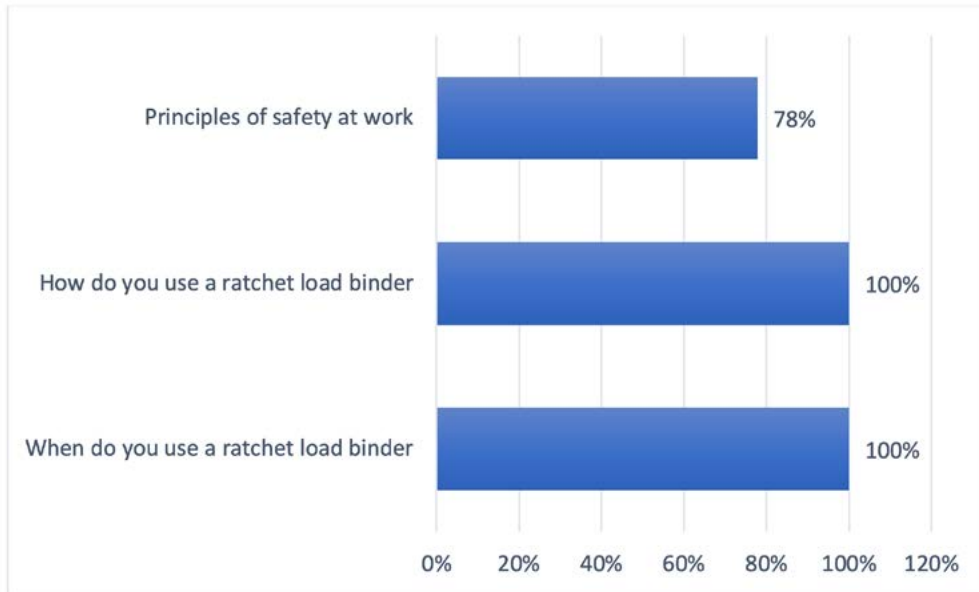


Chart 70: What should the student learn in practice on the topic of „ Preparation of ratchet load binders“?

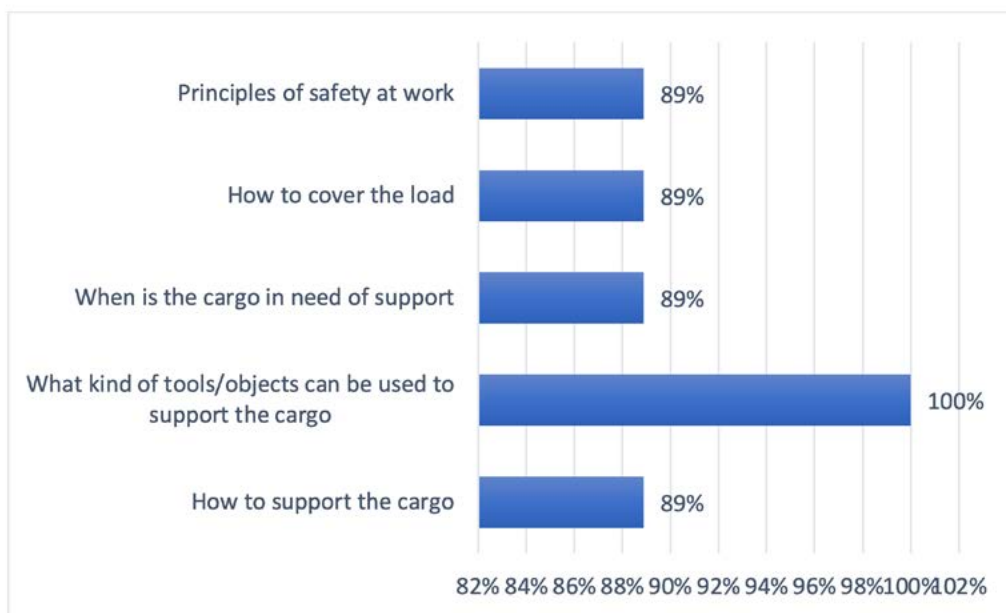



Chart 71: What should the student learn in practice on the topic of „ Supporting and covering the load“?

In the next question, we asked **what skills students lack most in online education on the topic of ENSURING THE LOAD**. The respondents answered that the students miss the most the opportunity to practically choose a cargo line and its correct use, to secure the load and other practical skills to handle the load.

Another question was about **what students would like to learn the most about the topic of ENSURING THE LOAD**. According to the teachers, students would like to learn practical binding or the use of load-securing tools. None of these students can learn completely remotely.



In the next question, we were wondering **what is necessary for the practice for students to master the topic**. It is essential to choose the right cloth, to tighten the load and choose the right attachment points. It is also necessary to learn binding and load positioning properly.

Then, we asked what teachers think is **certainly not possible to learn on the topic with online teaching compared to classroom teaching**. During online classes, students do not learn how to tighten the load and choose the right attachment points. It is also necessary to learn binding and load positioning properly.

In the next question, we wanted to find out in **what form teachers try to replace practical exercises** (workshops) on the topic of ENSURING THE LOAD during online teaching and **what tools they use**. Even though the teachers expressed that there is no equivalent substitute for practical exercises, they appreciated the help of online videos and direct demonstration by the teacher during online teaching. Generally, they tried to use mainly video materials during online teaching.

Therefore, we believe that video materials with links to tests verifying students' input and output knowledge, which are created as part of the STEP IN project, will facilitate their education and provide adequate educational materials during online teaching in the future.



STUDENTS

At the beginning of the questionnaire for students, we asked respondents for basic information about themselves.

The first question concerned **their place of residence**. A total of 253 students participated in the survey. The most of responders were from the Czech Republic (89 respondents) and Slovakia (84 respondents), less from Italy (42 respondents) and Finland (38 respondents).

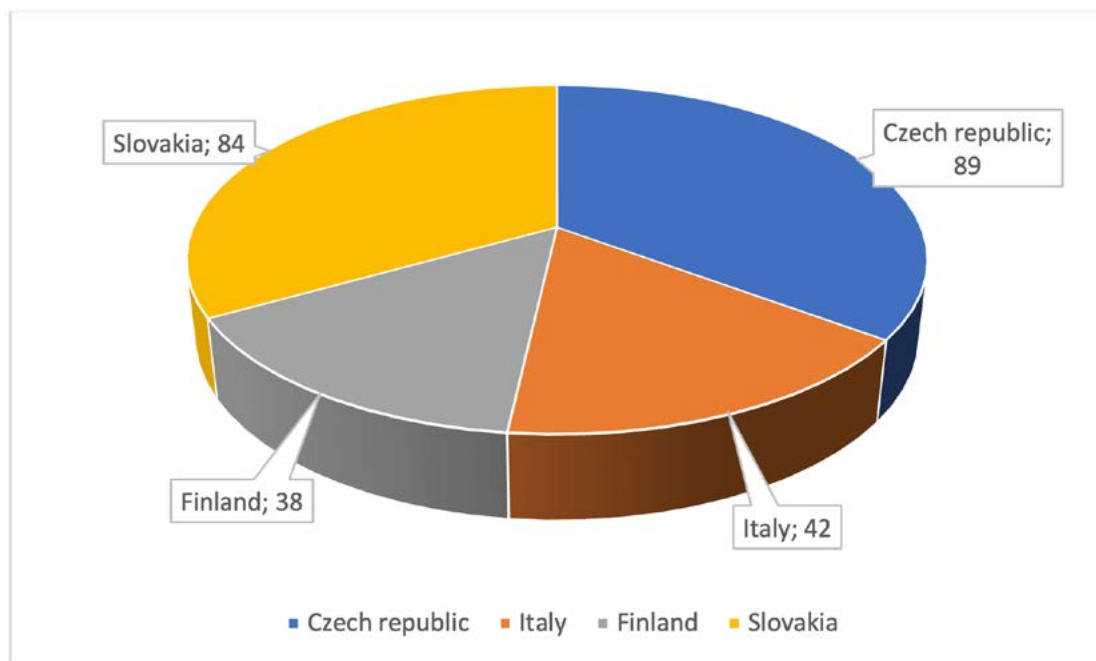


Chart 72: Where are you from?

Another question was about **the school year is the student in**. Most respondents visited the second or third year (55%), and only 4% of students were in the first year of study.

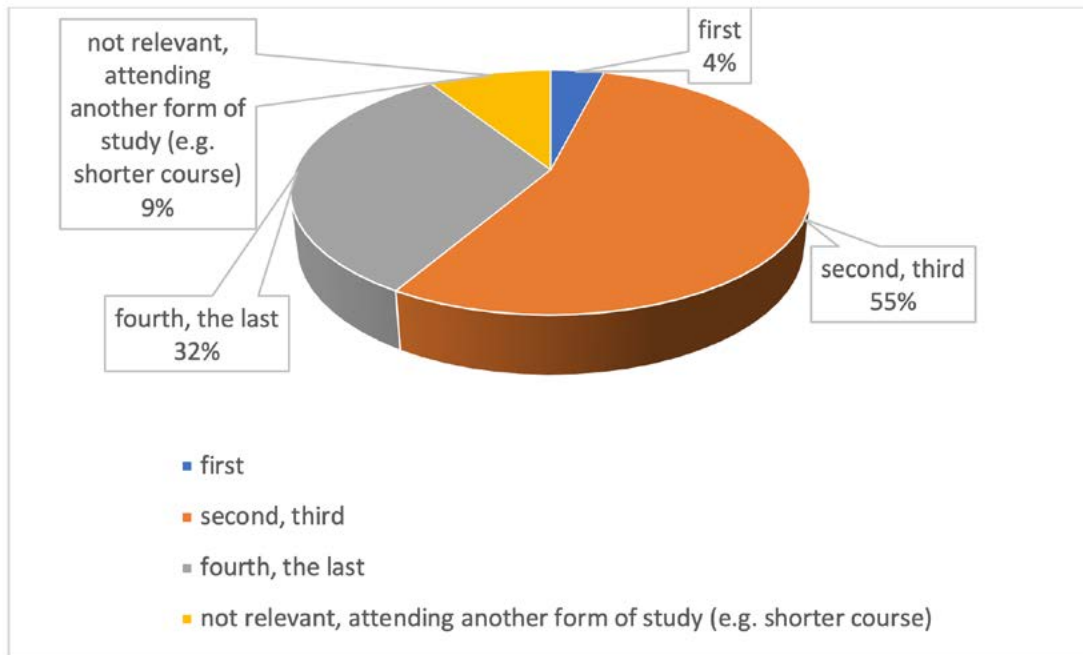


Chart 73: What school year are you in?

Another question was about **the frequency of online teaching**. More than half of the respondents (65%) carry out (or have implemented) online teaching every day, and another 10% implemented online teaching 3-4 times per week.

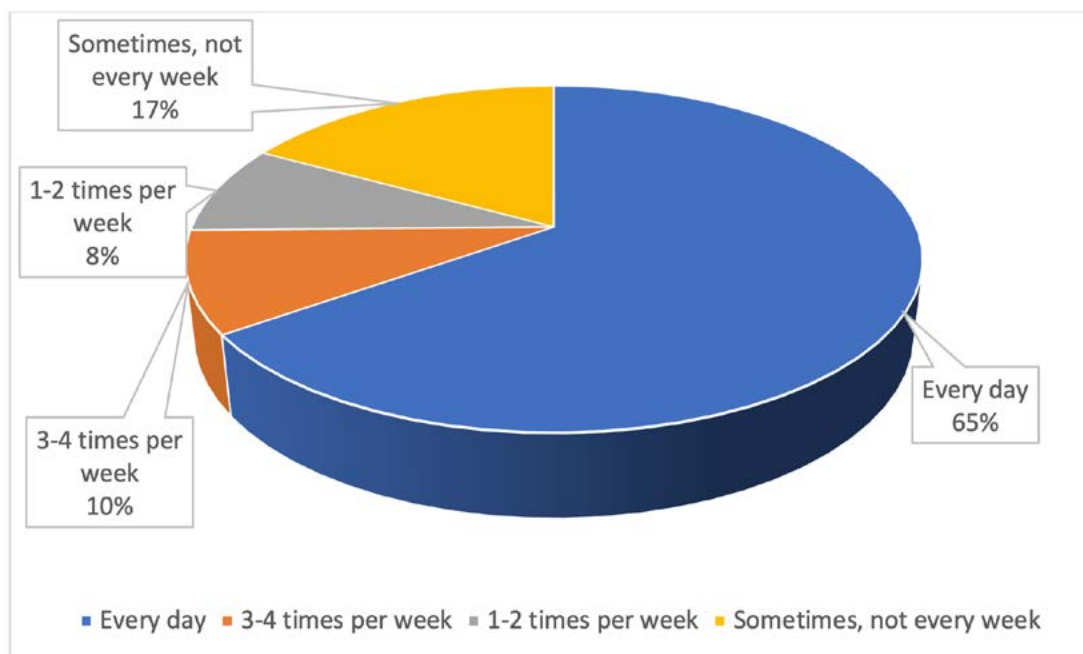


Chart 74: How often do you attend (or did you attend) online education/online learning?

In the next couple of questions, we asked students **how they assess the tasks that the teachers send for elaboration**. First, we asked how they assess the number of tasks. App. half of them think that they were just right (54%) and 31% of students think that there were a lot of them.

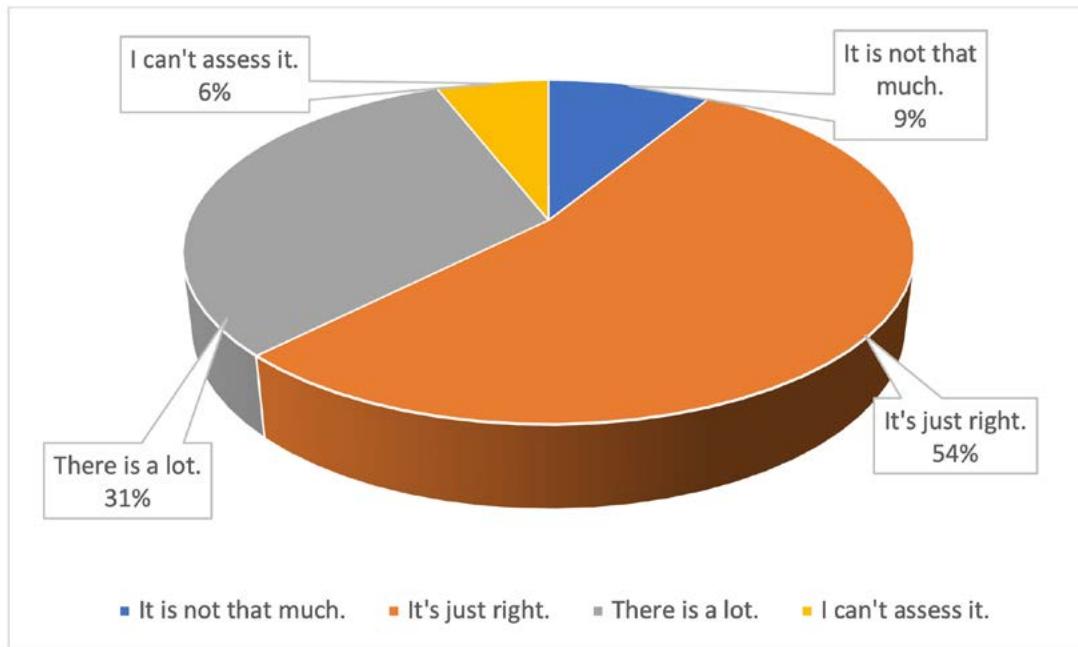


Chart 75: How do you assess the number of tasks that your teachers send for elaboration?

Then, we wondered **how they assess the complexity of the tasks**. More than half of them, 67% think that the tasks were just right, 16% evaluated tasks as very difficult, and only 5% of students think that the tasks could be even more difficult.

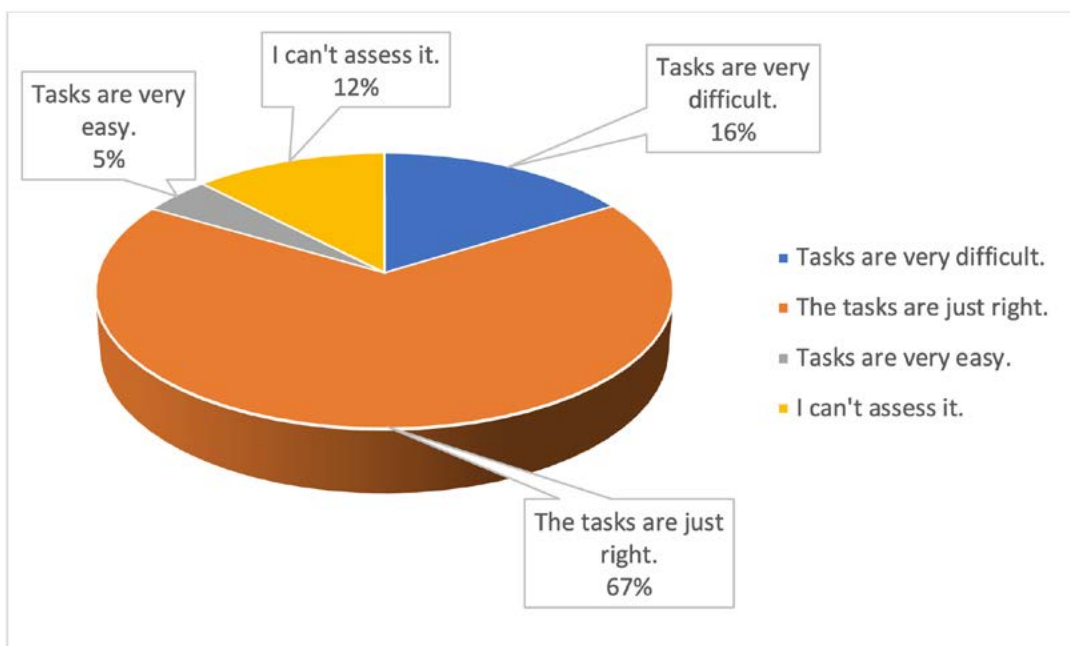


Chart 76: How do you assess the complexity of the tasks that your teachers send for elaboration?

Another question aimed **at the fairness of the task evaluation**. Students think that the evaluation of the tasks during online education was rather or completely fair (68%), and only 4% of respondents think that the evaluation was completely unfair.

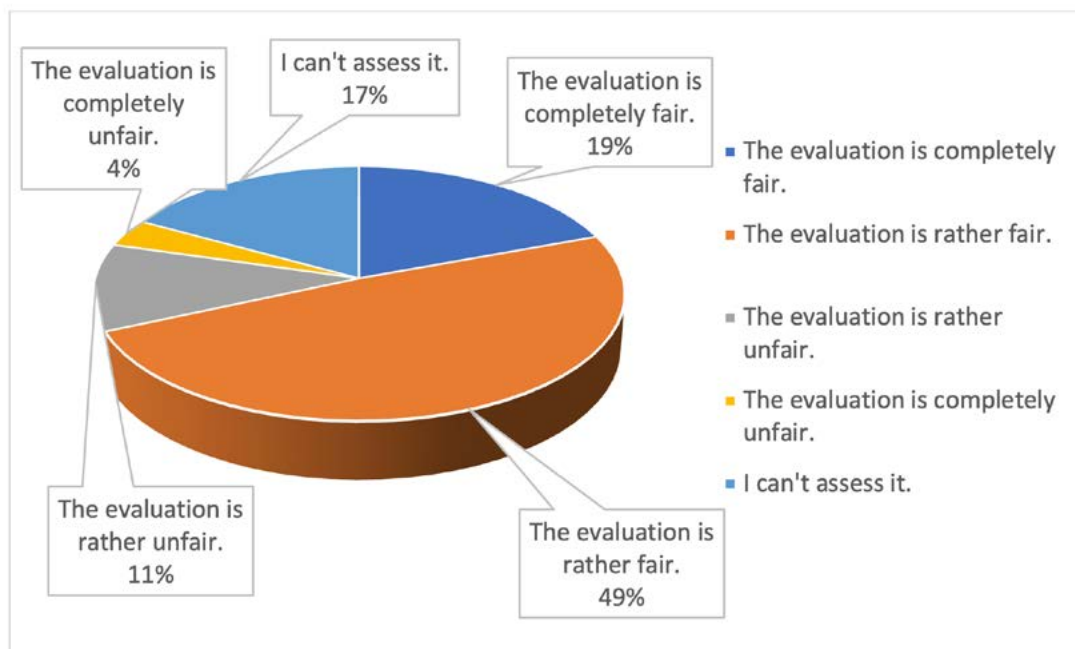


Chart 77: How do you assess the complexity of the tasks that your teachers send for elaboration?

Since not only teachers but also students had to deal with various obstacles during online classes (slow internet, insufficient technical equipment, lack of knowledge of technology, etc.), we were interested in **whether online classes met their expectations**. Almost half of the students are convinced that online teaching met their expectations, and only 16% think that it did not meet them. In reasoning, many leaned towards **the possibility of at least learning something during online classes**, rather than having schools closed completely and then catching up on missed lessons. On the other hand, it bothered them that **they don't have direct contact with the teacher and classmates and the teaching is not as interesting as in the real classroom**, so they don't pay as much attention when explaining the new subject and therefore learn less.

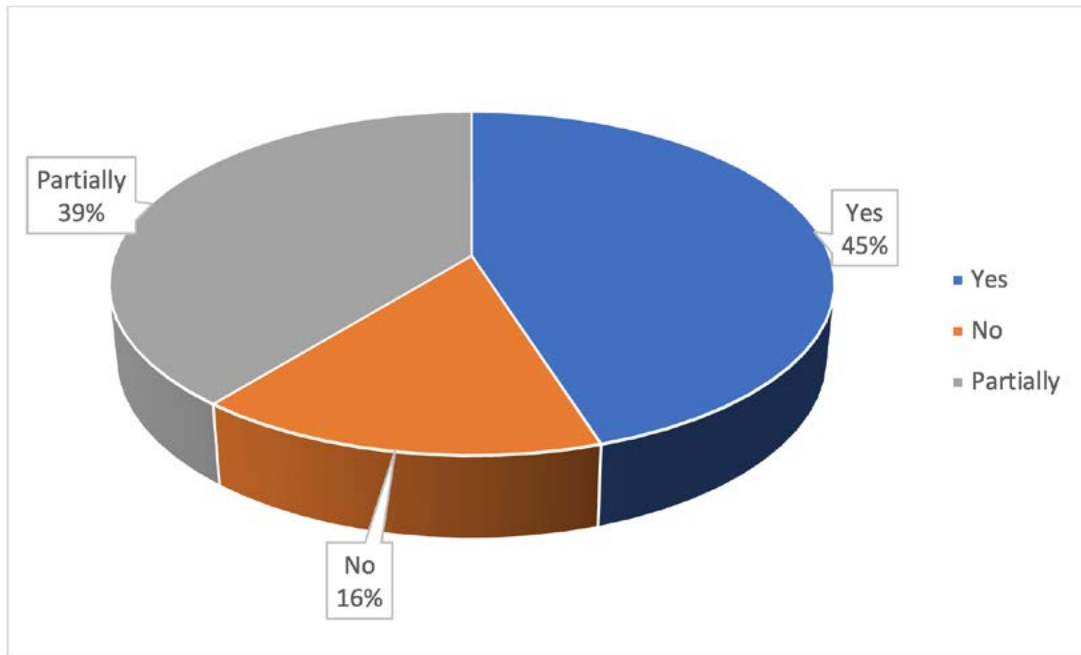


Chart 78: Does online teaching meet your expectations?

Another question focused on the **online learning tools they prefer during online teaching**. 74% of respondents confirmed online learning via webinars/video conferencing (TEAMS, ZOOM, Google Meet, Webex, etc.) and tutorial videos (74%). It is worth noting that only 11% of students said that they are comfortable communicating through applications such as Padlet, Miro, etc., compared to about half of teachers who prefer this method of teaching.

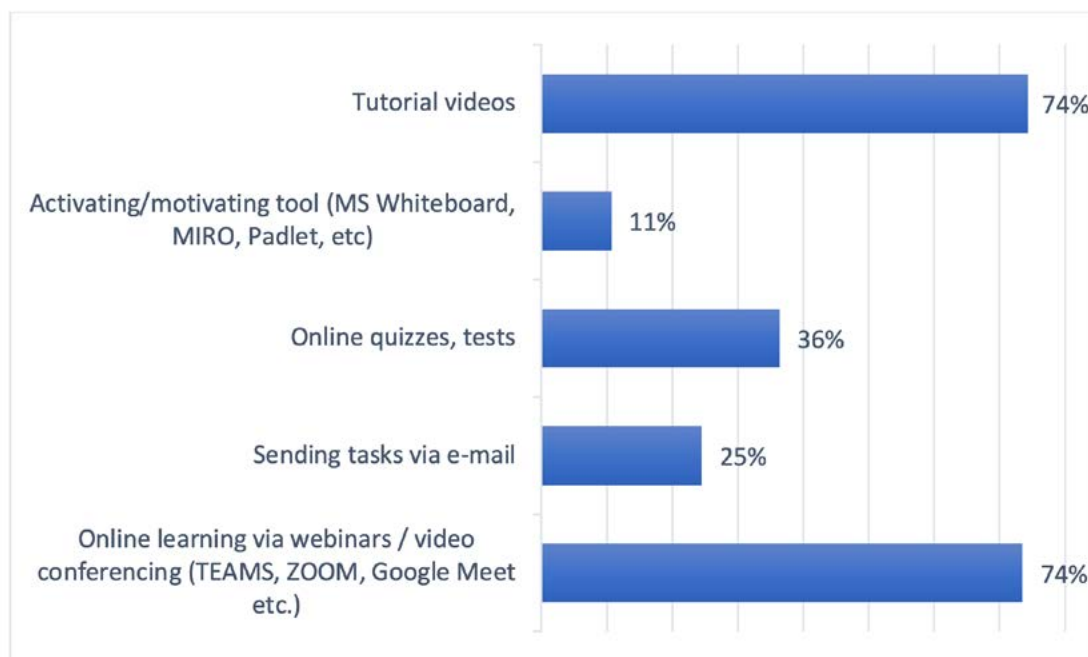


Chart 79: Which online learning tool do you prefer?

In the next question, we asked **whether students managed by themselves to learn the curriculum from the materials provided online** (e.g. independent study of materials provided by the teacher). 73% of respondents confirmed that they didn't have any problems and just needed to try a bit harder.

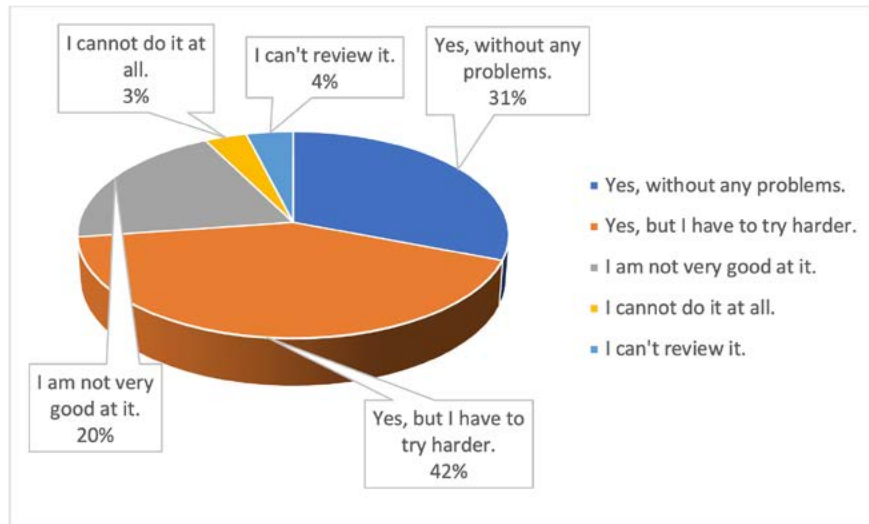


Chart 79: Do you manage by yourself to learn the curriculum from the materials provided online (e.g. independent study of materials provided by the teacher)?

In the next question, we asked about **the advantages of online learning**. Most of the respondents (75%) considered online learning in a lock-down situation as an opportunity to save time as it is realized from home, without the need to travel to school. The next advantage they mentioned was at least some opportunity to learn or attend school education.

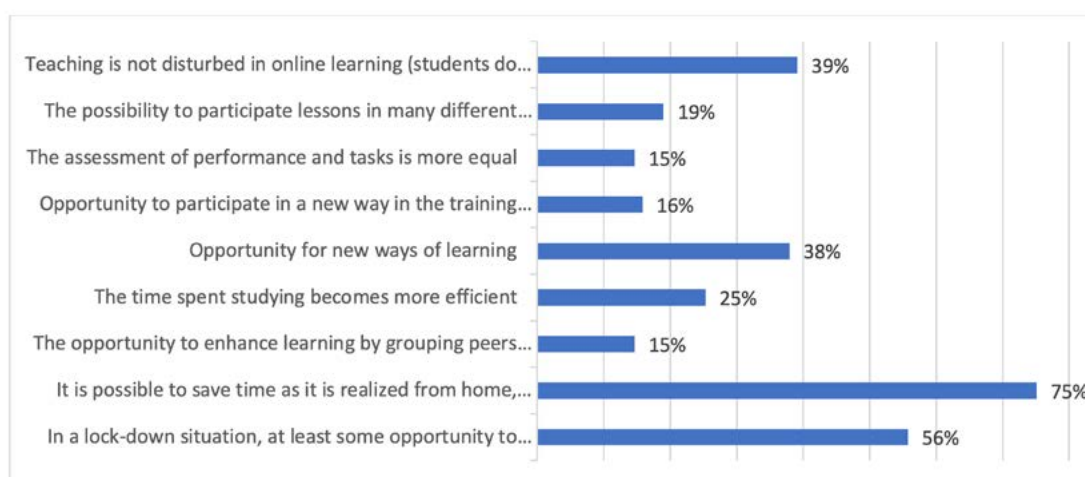


Chart 80: What are the advantages of online learning when compared with classroom learning?

In the next question, we asked about the **disadvantages of online learning compared to classroom learning**. They considered the absence of practical exercises /workshops to acquire the skills necessary for their future profession to be the biggest problem (59% of respondents).

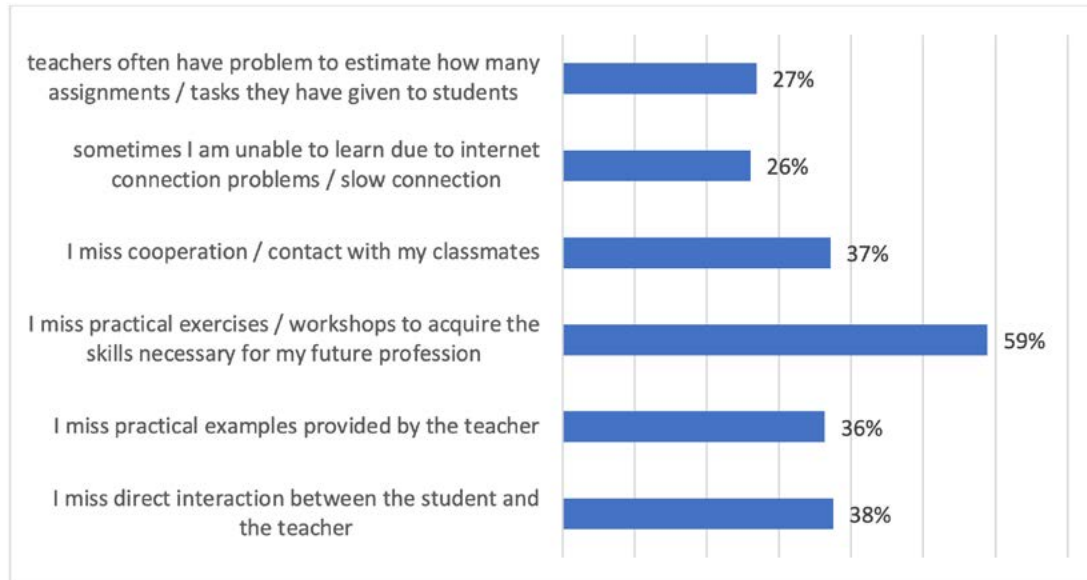


Chart 81: What are the disadvantages of online learning when compared with classroom learning?

Since online teaching was often implemented for the first time during their studies due to lockdowns, we were interested in how students themselves coped with the situation. We therefore asked **if they had problems with online teaching from the beginning**. Almost a third of the respondents said that they initially had problems with online teaching. In addition to connecting to the Internet, students most often expressed that they had the biggest problem with learning motivation and concentration when they were alone at home and with the new system of self-study, also isolation did not suit them. It was also disturbing for them that each teacher had his own teaching system and each of them was actually new for the students.

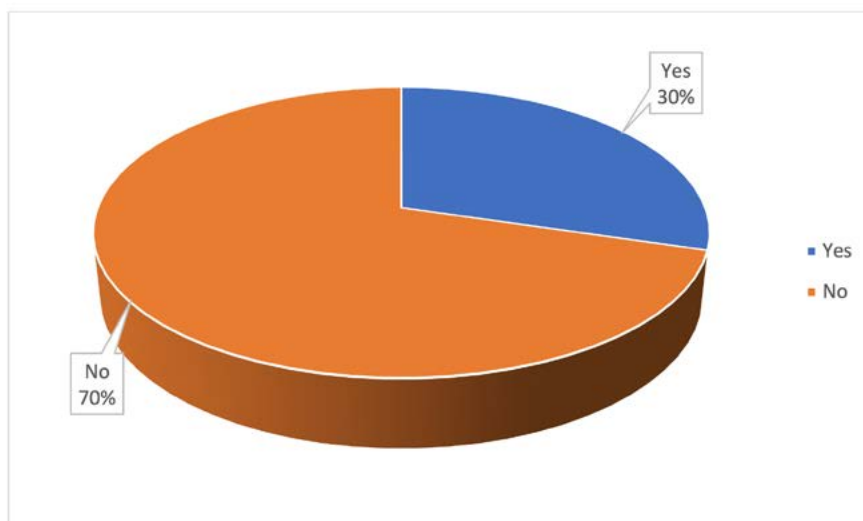


Chart 82: When you started to learn online (e.g. when you started your study, or during the current lockdowns, etc.), did you have some problems learning online from the beginning?

Regarding **their ICT skills at the beginning with online teaching**, up to 87% stated that they had no problems technically managing and controlling the computers and applications that were used for teaching. Their biggest problem was getting up for classes, as they were in bed at home until the last possible moment before the online classes. Technically, they sometimes had trouble responding to the teacher's instructions, properly controlling the camera, microphone, and sharing.

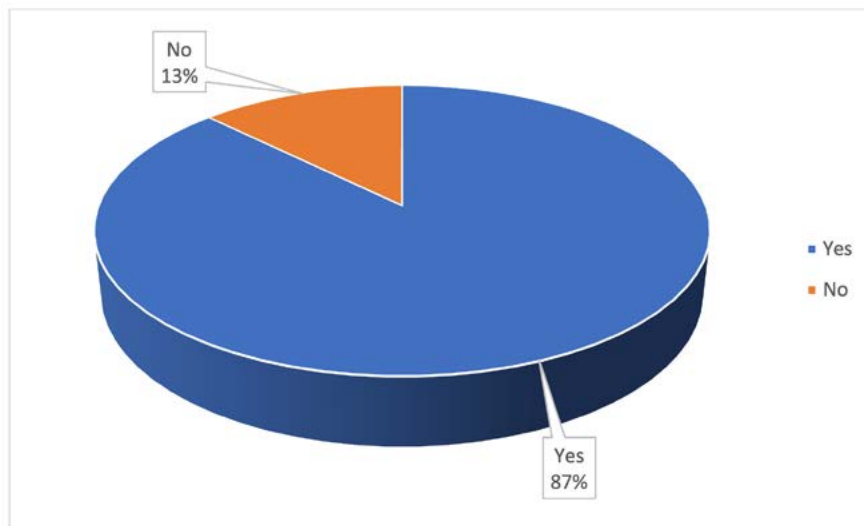


Chart 83: Did you have sufficient skills at the beginning (e.g. working with a computer, with webinars, etc.) to be able to fully participate in online education?

The next question focused on the use of online communication platforms. Most of the students (75%) use MS Teams. Other platforms used to communicate with teachers were Moodle or Webex.

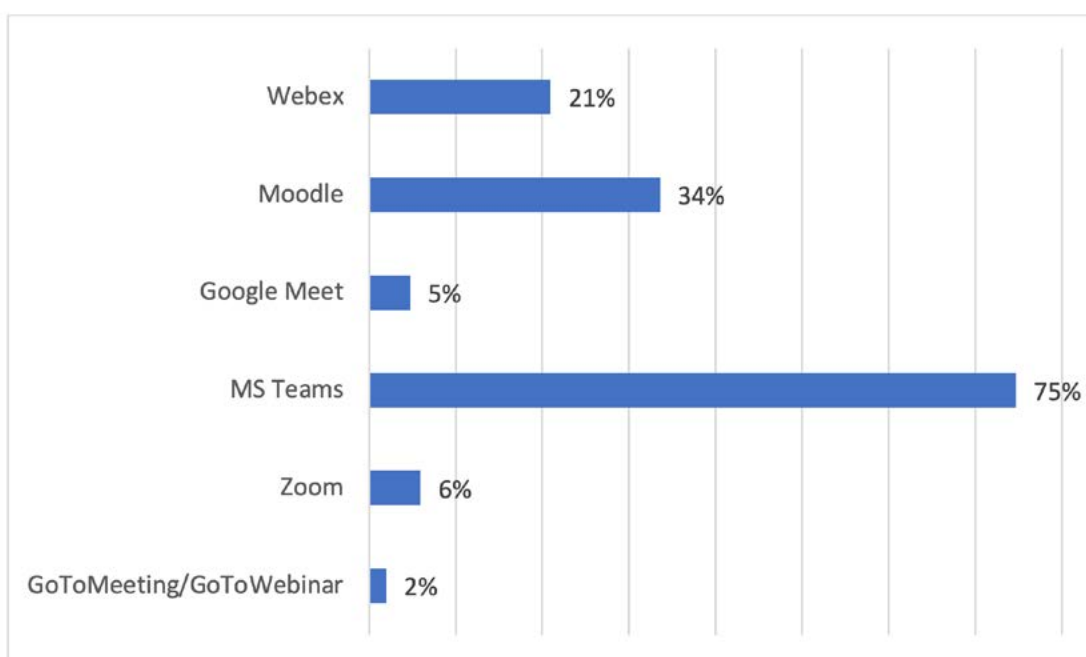


Chart 84: Which online platform do you use to communicate with teachers?

In the next few questions, we asked the students to **evaluate the skills and effort of their teachers during online teaching**. First, we were interested in evaluating the teacher's skills with online teaching. About half of respondents assessed that it was sometimes better, sometimes worse, and that they could improve, but in principle, about 83% were satisfied with their performance.

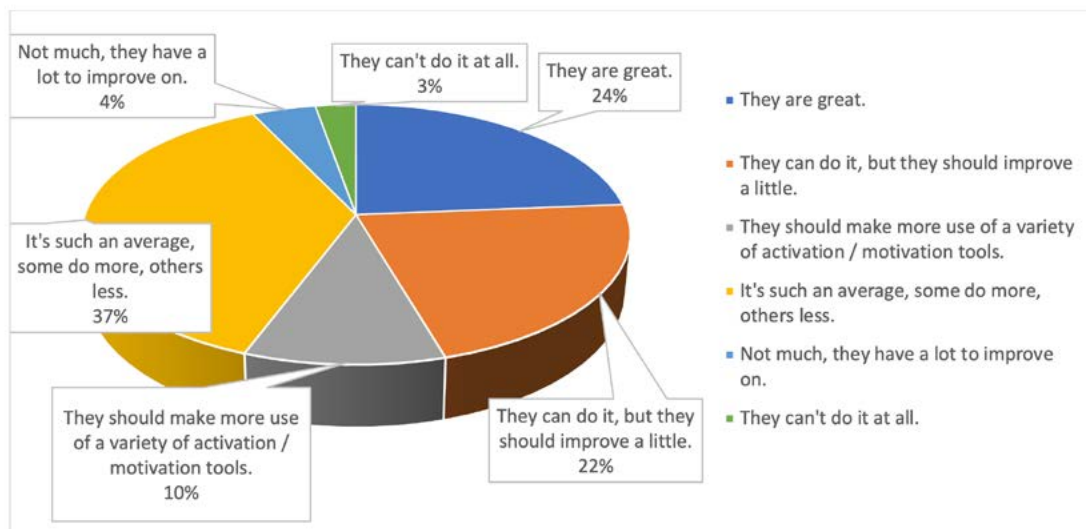


Chart 85: How would you rate your teachers for online teaching skills?

Another question was about the content of teaching, or **what teachers pass to the students during online lessons compared to classroom teaching**. 72% of the respondents thought that the teachers pass all the theoretical knowledge students need to know, that is learned during the full-time form - theoretical knowledge and practical skills. Students often expressed that, in their opinion, online teaching is completely sufficient for theory, but practice cannot be carried out remotely.

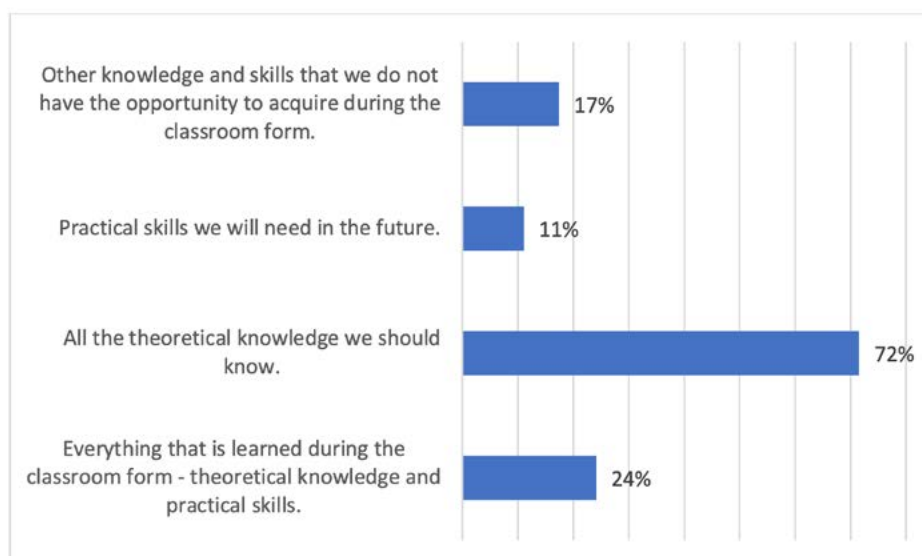


Chart 86: What do you think the teachers passed on to you / students during the online teaching compared to the classroom method?

In the end, we were interested in **whether they would choose the option of online teaching in the future** and if they chose online teaching, what would they need as an aid in their education. It is interesting **that only 4% of the respondents would choose traditional school education. Surprisingly, up to 19% would prefer exclusively online education. Up to 34% of respondents would prefer a hybrid learning model** - part at school, part at home in the form of online teaching.

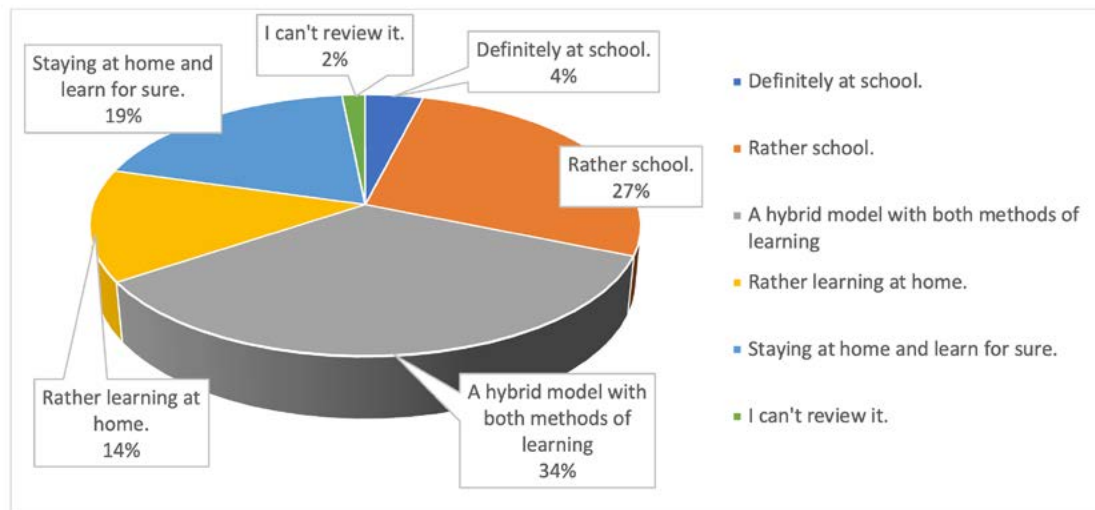


Chart 87: If you should choose full-time classroom teaching at school or online teaching at home, what would you choose?

When asked **what they would need most if they were to continue learning online**, they suggested **video demonstrations/simulations that they could face in practice in the future as the most helpful** (46%), tailored educational materials (43%) and online tests (29%). In the end, 158 students confirmed that they would be happy to use video materials in their future studies and self-learning.

Therefore, we hope that the materials (video demonstrations, tests, etc.) created as part of the STEP IN project will make online teaching, its hybrid model, or self-study easier in the future.

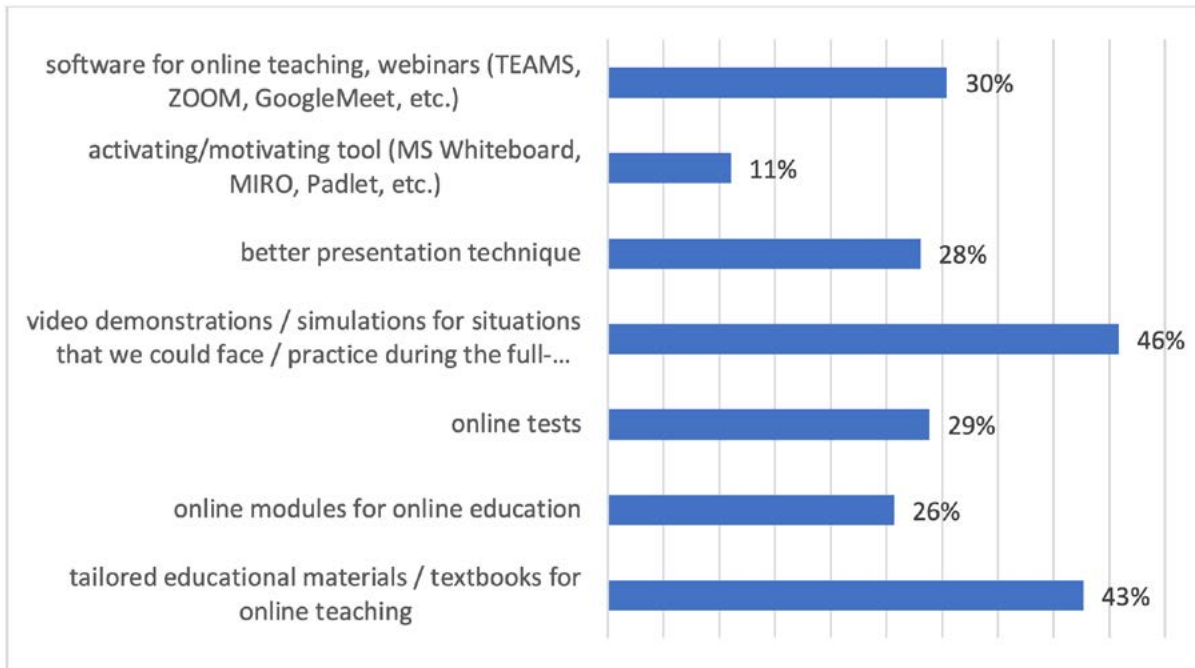


Chart 88: If you were to continue learning online, what would you need the most?

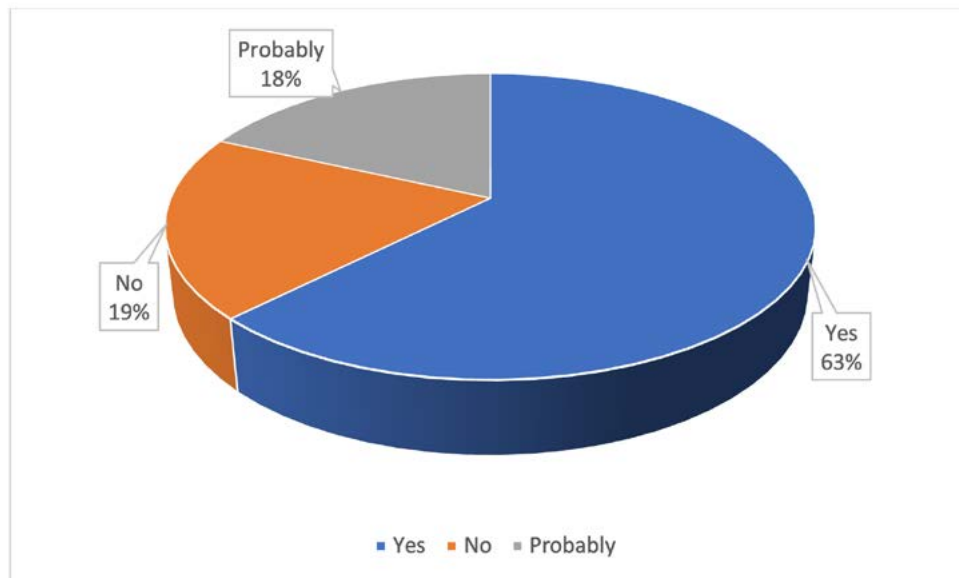


Chart 89: Would you use online simulations/videos in your own learning that illustrate (though do not fully replace) the situation in practice in the workshop?



CONCLUSION

Online teaching has become the main form of teaching in many schools around the world during the pandemic. As part of the survey, we therefore asked teachers about their opinions on this form of teaching. Approximately half of the respondents implement (or implemented in 2021, at the time of the COVID-19 pandemic) online teaching every day, and only 7 respondents said that they have not yet implemented online teaching. 76% of the respondents started to implement online teaching only during the pandemic, and only 4% confirmed that they have more than 5 years of experience with online teaching. Regarding the countries involved in the survey, teachers from Finland use online teaching the longest (more than 3 years), while teachers from Slovakia and the Czech Republic use it the least (less than 2 years).


Those who had no previous experience with online teaching were asked about their strongest impression of online teaching. The vast majority took it as a new personal challenge, they also appreciated the possibility of quickly adapting to the current situation. They liked to communicate and pass on knowledge to students. They took it as an excellent solution to an emergency situation and ensured communication. Some teachers are planning to implement more a combination of face-to-face and online teaching/blended learning in the future.

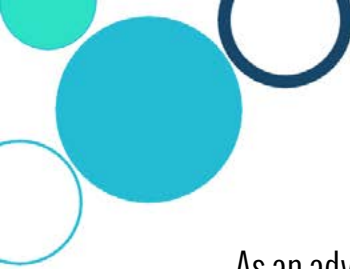
However, some teachers complained about the poor response of students, who rather understood online teaching as an opportunity not to work. Those who criticized online teaching justified their position mainly on the impossibility of imparting practical skills to students, which are essential for their future profession in their fields of study - machining, hydraulics and pneumatics, and logistics.

And what about students?

The students thought that the scope of the curriculum and tasks for online teaching were appropriate for the given form, and they also rated the difficulty of the tasks as correctly set. 68% of the respondents thought that the assessment of their knowledge was objective, and only 4% said that it seemed unfair to them.

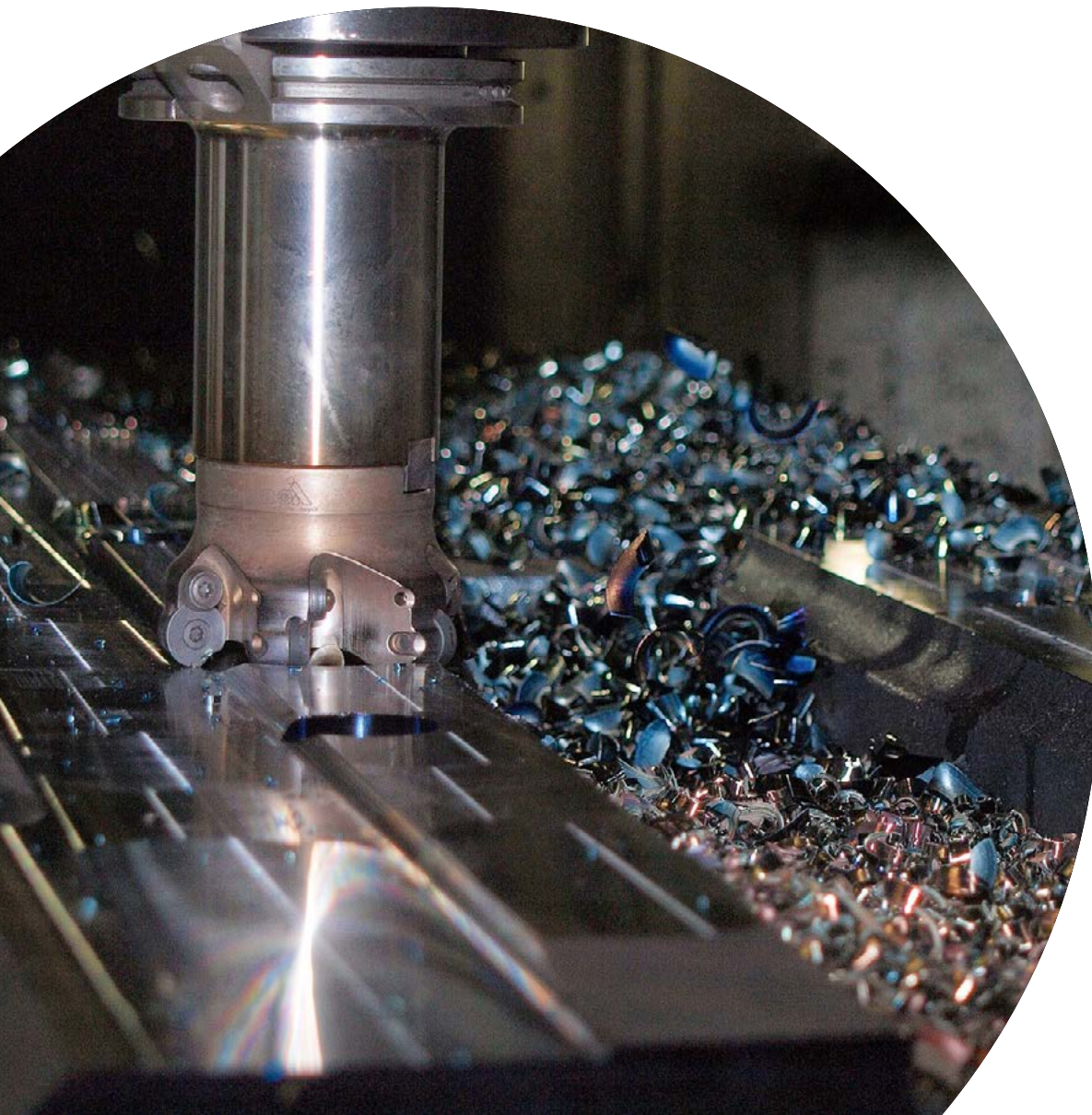
They did not have significant problems with online teaching as such, as they themselves assessed their ICT skills as sufficient (up to 87% of students). Up to 74% of respondents consider online webinars and video conferences to be the best method of online teaching, and they also appreciate vocationally focused video material. According to 75% of respondents, teaching took place via the MS Teams platform, the others named were Moodle and Webex.





As an advantage of online teaching, students saw the opportunity to save time travelling to school, up to 75% of respondents. Up to 85% of respondents consider the absence of practical teaching and interaction with classmates to be the biggest disadvantage. They mentioned that the student is not forced to pay as much attention as in regular teaching and therefore does not learn as much from the lessons as in the classical form of teaching. They also consider the environment at home to be unstimulating, which disturbs them more since there are many other things to do.

Despite all the shortcomings of online teaching, up to 75% would welcome a hybrid learning model, online teaching from the comfort of home and practical activities at school. At the same time, up to 81% of students expressed that they would welcome professionally oriented video materials.



FINALLY, ...

From the mentioned survey of needs within the project “STEP IN to the online world/virtual learning, Facilitation of access to Vocational practice through online teaching at secondary technical schools” it is clear that **both teachers and students are aware of the advantages and disadvantages of online teaching and learning.** In the future, however, they **would appreciate appropriate materials that would facilitate their online learning, especially professionally focused video materials and educational materials such as tests and examples.**

You can learn more details about the individual topics and the advantages of online teaching from the perspective of both the teacher and the student from the documents and materials located on the project website <https://stepintolearning.eu>

Finally, on behalf of the STEP IN project partnership, we would like to thank all respondents from Slovakia, Finland, Italy, and the Czech Republic for participating in the survey, and we hope that our analysis will serve others as an answer to their possible questions, or will be an inspiration for them in their own professional pedagogical practice..

On behalf of the STEP IN partnership:
Adriana Kováčová, INAK Slovakia, project coordinator
www.stepintolearning.eu

STEP IN to the online world/virtual learning, Facilitation of access to Vocational practice through online teaching at secondary technical schools

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