InCompEdu
Innovative Competence in Online Higher Education

Technical platform booklet

Software or tools used for online teaching activities and Delphi analysis on identified challenges and problems in online teaching

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INTRODUCTION PART I

Software or tools used for online teaching activities

The rapid shift from classrooms to virtual environments has forced educators to quickly search for and test technologies and tools that best meet their needs.

The pandemic has fundamentally shaken established patterns of teaching in higher education. The rapid shift from classrooms to virtual environments has forced educators to quickly search for and test technologies and tools that best meet their needs in terms of availability, ease, and efficiency of tools to support online instructions while being attractive and engaging to students.

Online learning tools establish a virtual connection between teachers and students and aim to provide technological support for teaching. These tools refer to software or any program, app, virtual classroom, or technology that can be accessed through an Internet connection and that enhances a teacher's ability to present information and a student's ability to access that information. Some basic online tools are Zoom, MS Teams, Google meet, Moodle, etc. There are many other programmes that can help the teacher communicate with students, engage students, or test student knowledge, such as Kahoot, Canava. For more details, see our Technical Platform Booklet, "Revision on available IT solutions for online education".

During this period, teachers at every level tested tools and software until they found the technology that best fits their needs and supports them in online teaching. We invited teachers from Croatia (n = 102), Finland (n = 75), Poland (n =144), Romania (n = 67), Slovenia (n = 78), and Italy (n = 52) to participate in a survey, whose questions aimed to understand the challenges and obstacles that they faced in finding the appropriate software and tools for online teaching. The results include the analysis of responses into a Webropol-questionnaire. The answers were collected during the period 25 May 2021 till 25 October 2021. In the following, we present the tools, software and applications which have been used during and before the pandemic in different aspects of online teaching. We are also presenting the future plans of the teachers.

1. REPORT ON SOFTWARE OR TOOLS USED FOR ONLINE TEACHING ACTIVITIES IN CROATIA (University of Rijeka)

The analysis showed that teachers used a relatively limited number of software or tools for online teaching activities before the pandemic. The most common used were Skype (49%), followed by Adobe Connect and Zoom (16%), and Google Meet and MS Teams (13%) (Fig. 1.1). Even during the pandemic, the number of tools remained largely limited to the 5 already mentioned, but their percentages changed - Zoom comes first with 77%, and the largest number of respondents (45%) intend to use it even after the pandemic. It is followed by MS Teams with 59% and 26% of users intending to use it even after the pandemic; Google Meet with 45% and 23%, respectively. In the group of other tools not mentioned above, 16% of respondents mentioned the Big Blue Button.

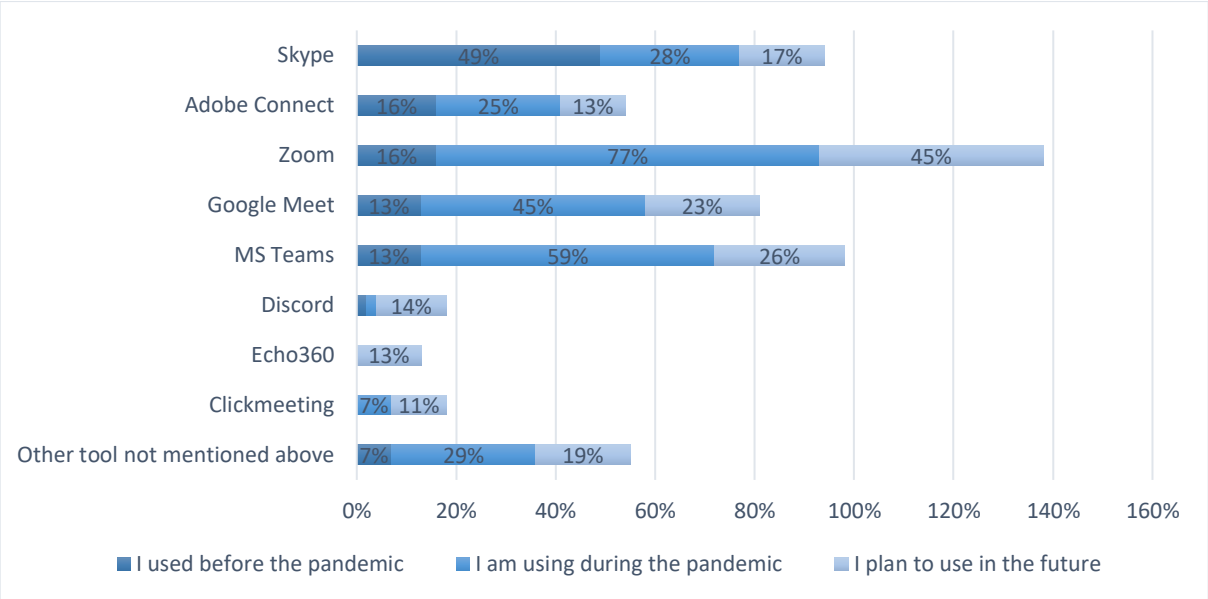

Figure 1.1. Software or tools for online teaching activities

An analysis of the use of different platforms for communication with students showed that teachers used a very limited number of platforms. Moodle topped the list of popularity at 50%, followed by Google Workspace (11%), MS Teams (10%), and Breakout Rooms in Zoom (6%) and Adobe Presenter (5%). The most commonly used platforms during the pandemic were Moodle (68%), MS Teams (58%), and Breakout Rooms in Zoom (43%). While users reported use of Moodle at pre-pandemic levels, we found reported decreased interest in most platforms for future use, but it is still significantly higher than pre-pandemic times (Fig. 1.2).

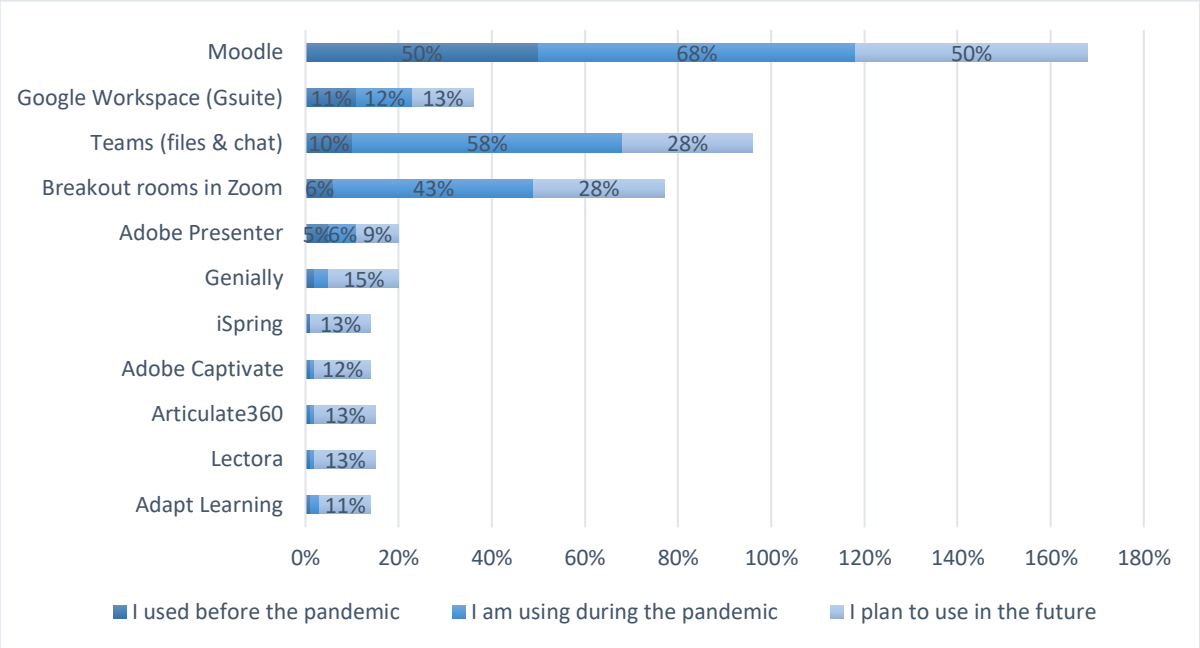

Figure 1.2. Platforms for online teaching activities

About half (51%) of respondents used software to create entire presentations and/or elements related to their online teaching activities (40% of respondents do not used this kind of software). The most commonly used software for online teaching before, during, and after a pandemic was Power Point (90%, 79%, and 67%, respectively). Prezi (27%) and Google Slides (25%) follow in frequency of use before the pandemic. Google Slides was used relatively frequently during the pandemic (23%), and in post-pandemic use, Canvas appears after Power Point, which maintains its leading role, with a 67% share (Fig. 1.3).

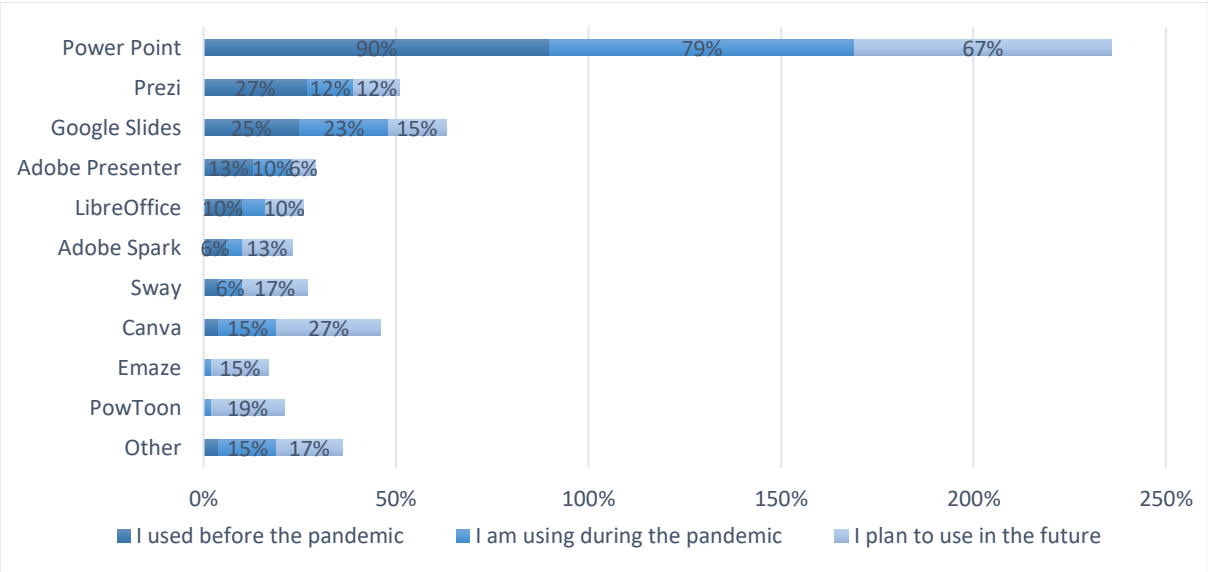

Figure 1.3. Software for creating entire presentations or their elements, connected to your teaching activities

The biggest challenge in teaching during the pandemic was maintaining attention and keeping students engaged during online lectures. Only 52% of respondents reported that they used online tools to activate students during class. Prior to the pandemic, the most common tools were Google Docs (42%) and Kahoot (38%), which maintained their "leading position" both during and after the pandemic. For the other tools, the trends is similar to what presented above, with a decreased intention to use them in time of pandemic, but a much higher interest than before COVID-19 (Fig. 1.4).

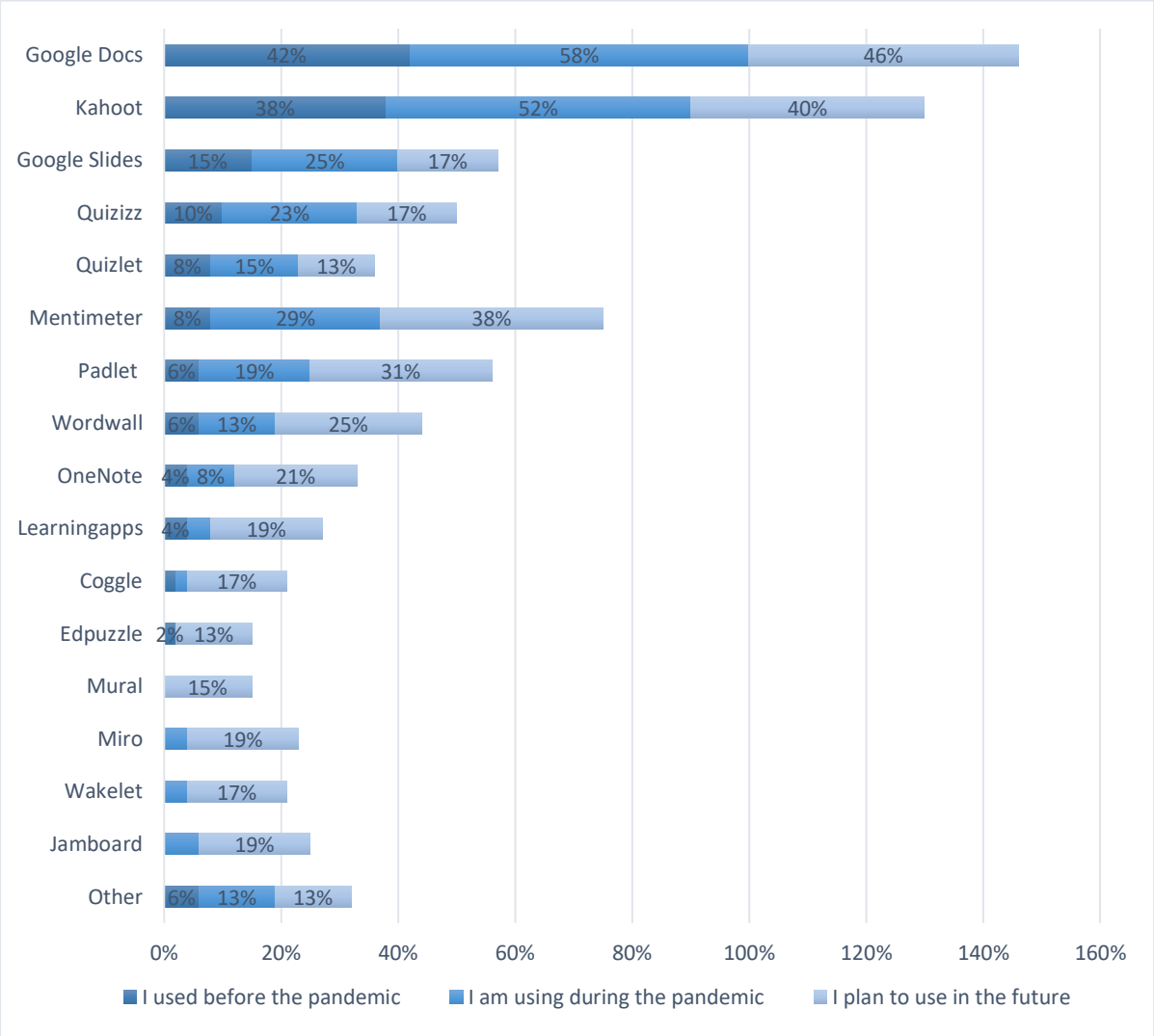

Figure 1.4. Online tools for students' activation during the lessons

Two thirds (65%) of respondents used online tools to verify students' knowledge. This already complex task is even more demanding in the virtual environment. Besides the problem of finding appropriate tools for assessing knowledge and adapting exams to these new online tools, additional security measures (e.g., Safe Exam Browser or Video Proctoring) have been used to avoid unwanted student behavior. It is worth mentioning that as many as 31% of the respondents did not use online tools for knowledge assessment.

The majority of respondents used Moodle as a tool to create exams prior to the pandemic (52%) and intend to do so in the future (55%). All other tools were marginally used (Fig. 1.5).

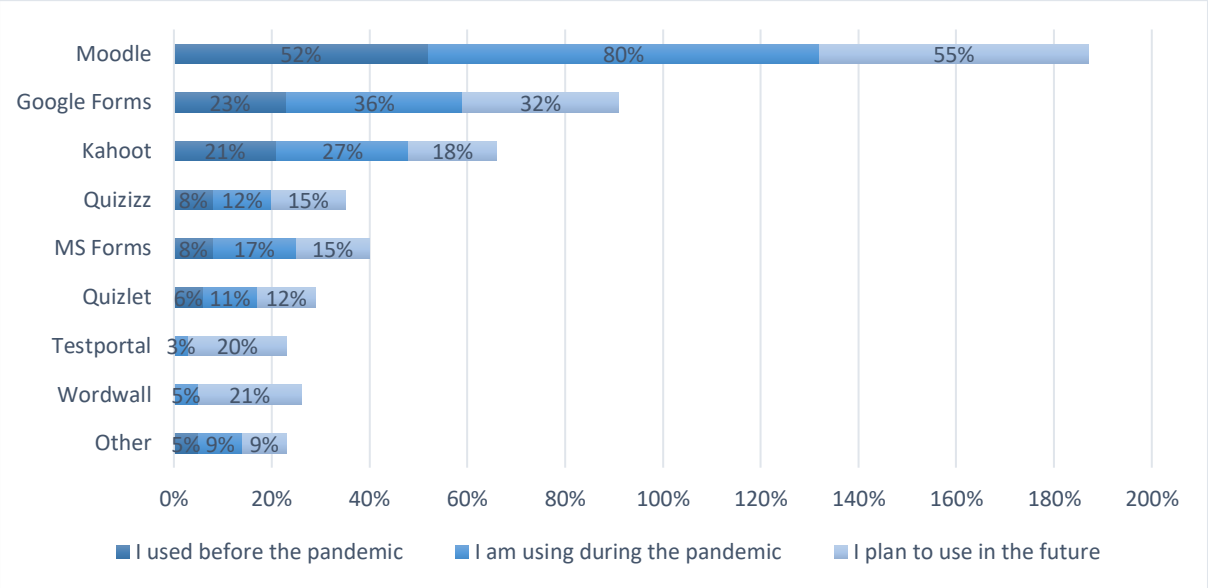

Figure 1.5. Digital tools for verification of knowledge

The licences for the use of various online software and tools were in most cases provided by the universities, but there is also a significant proportion of software and tools that are open access, i.e. free (Fig. 1.6). This is partly the result of the requirement to use certain software and tools being mandated by the university, but it certainly also reflects a concern on the part of universities provide appropriate tools to teachers. The highest percentage of freely available / free tools was recorded in the use of tools to activate students during lessons (36%), where teachers experienced more flexibility to meet each subject needs.

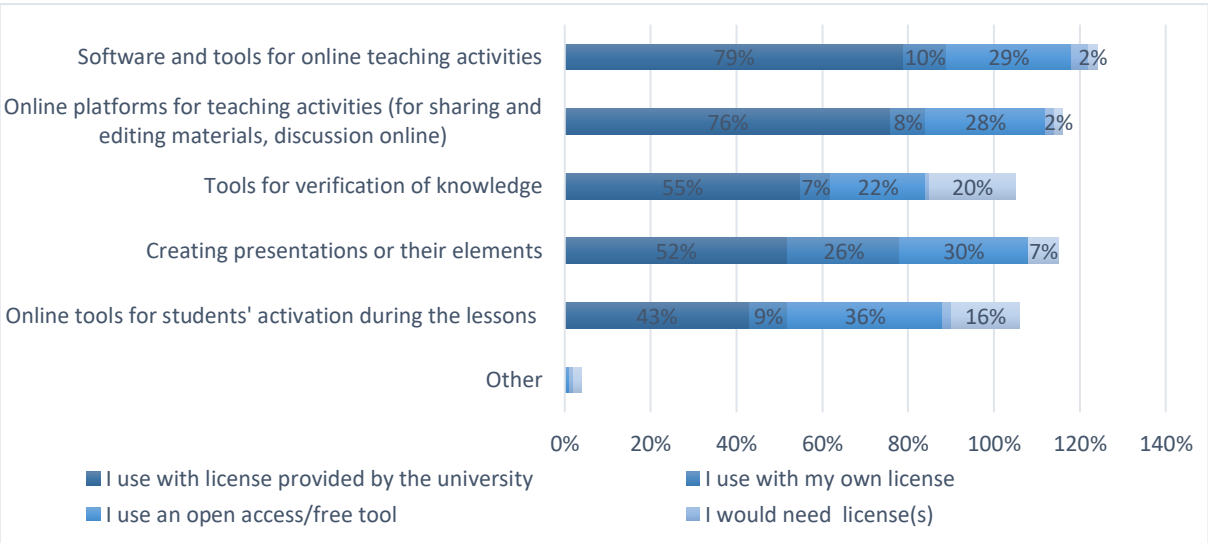

Figure 1.6. Licences for online software and tools

One of the concerns is that the relatively small proportion of online teaching resources i.e. equipment required were provided by the university, as shown by the data in Figure 1.7.

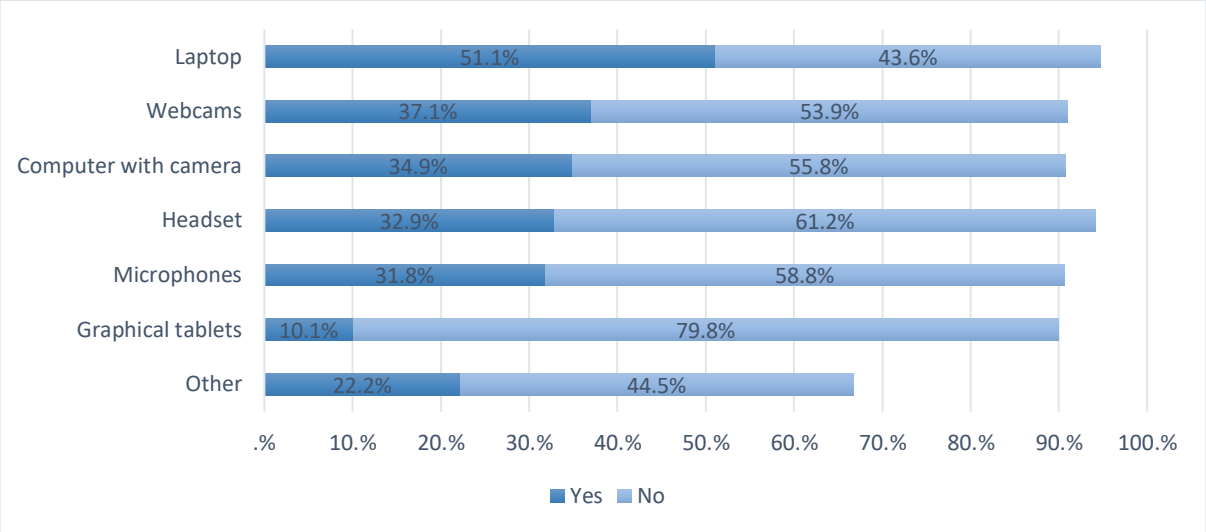

Figure 1.7. Did your University provide you with some dedicated equipment for carrying out teaching activities from remote?

Universities provided different levels of support to faculty in training and providing software and tools for online teaching. Most faculty received support in using software and tools for online instruction (both in real time and depending on students' obligations), followed by verification of knowledge and online teaching methods. Again, student activation is one of the problem areas, as only 24.2% of teachers received training on this topic (Fig. 1.8). The training was organized in the form of webinars (73%), online meetings (51%), via intranet (47%) and 38% as onsite/ in presence education.

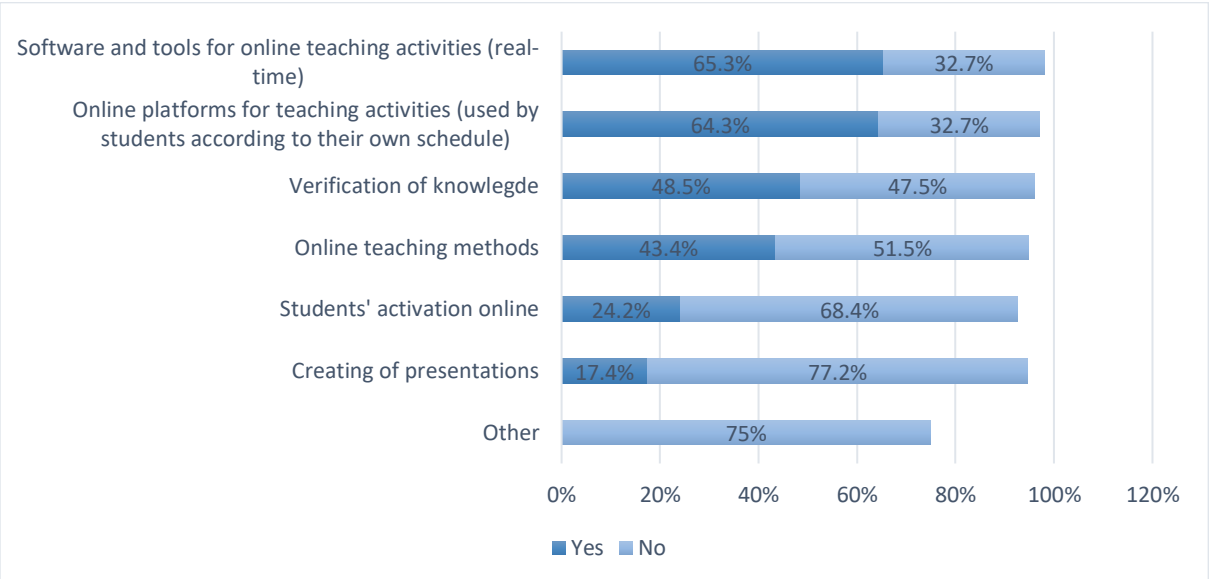

Figure 1.8. Have you received any training from your University for online teaching?

The number of teachers who were extremely satisfied or extremely dissatisfied with education provided were relatively small (Fig. 1.9). A significant number of teachers described their experience of training as 'neutral'. Verification of knowledge and students' activation are the types of learning where the percentages of very dissatisfied and dissatisfied are the highest (i.e., 34.1% and 32.1%, respectively).

The vast majority of teachers rate their progress in using online tools and platforms as positive: 31% believe they have significantly improved their skills, 50% have improved their skills (Fig. 1.10).

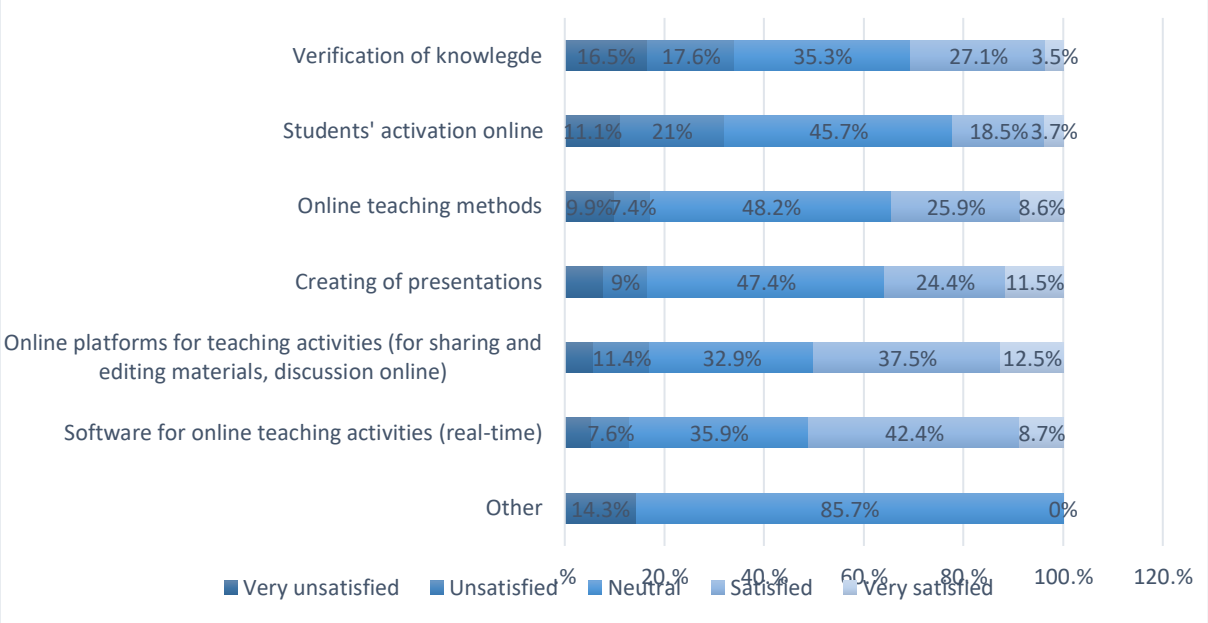

Figure 1.9. Please rate your experience about training and advice related to online teaching

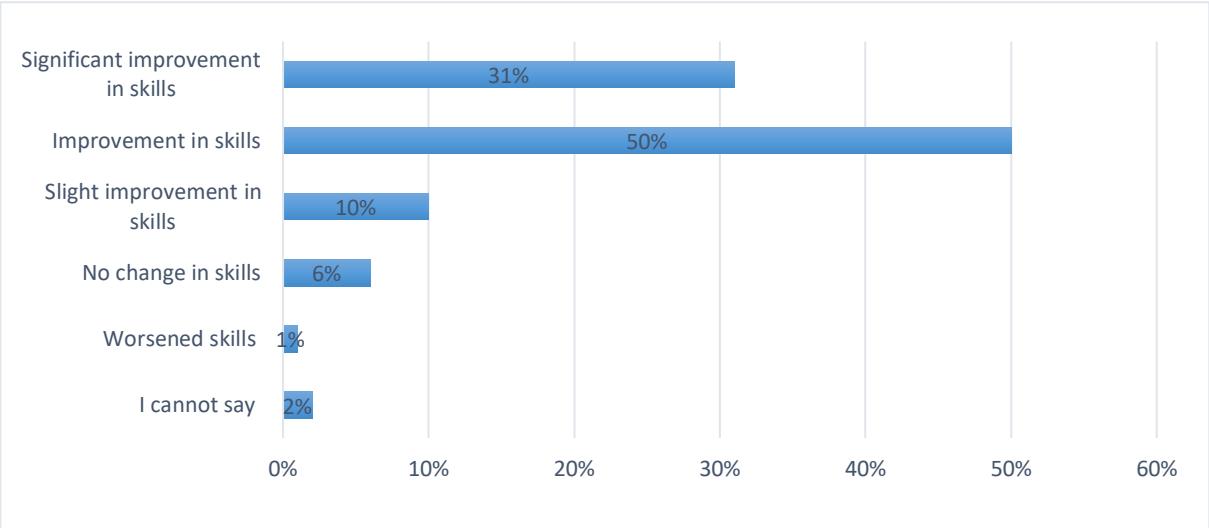

Figure 1.10. How would you consider your proficiency in using online tools and platforms?

2. REPORT ON SOFTWARE OR TOOLS USED FOR ONLINE TEACHING ACTIVITIES IN FINLAND (University of Turku)

Before the pandemic, the most often used tool was Skype, chosen by 63% of the respondents. Its use decreased rapidly during pandemic, and it was replaced by MS Teams and Zoom, which were used by one third of respondents before the pandemic. During pandemic, Zoom was used by nearly all of the respondents, and it is planned to be used even in the future. Second most used tool is MS Teams, chose by 73% of the respondents. These two systems dominate among the used online platforms. Other systems used are Google meet (23%), and Echo360 (20%) for video recording and streaming, video content management, audience engagement, and analytics. Other software or tools used by the respondents: Moodle (5 mentions), Lifesize (2 mentions), Panopto, OneNote, Jitsi, TIM, Digicampus and Eduflow (Fig. 2.1).

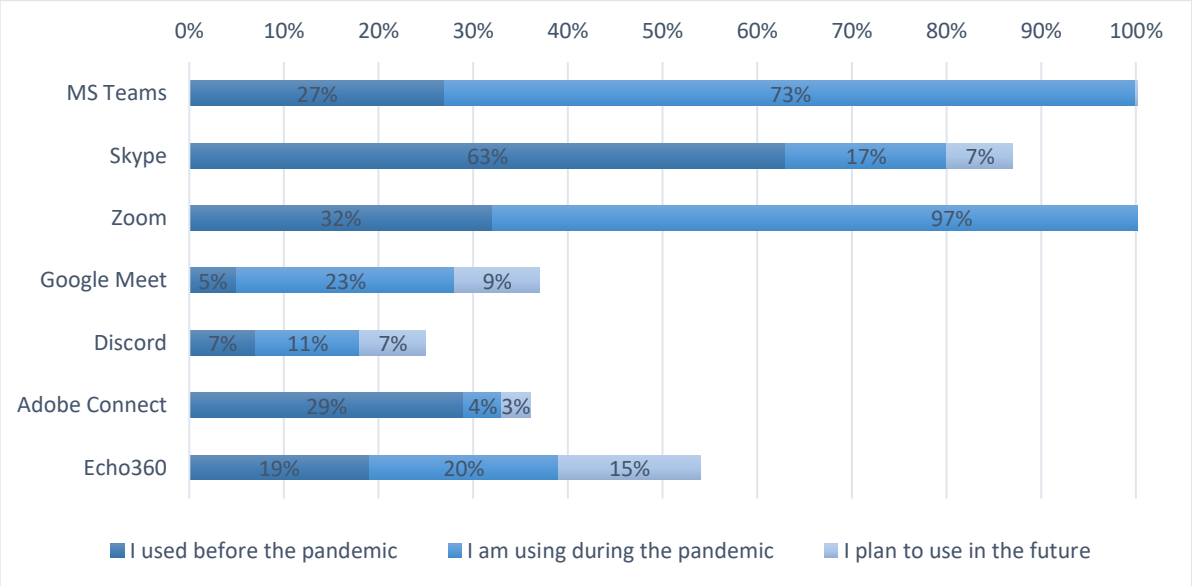

Figure 2.1. Software or tools for online teaching activities

Moodle is the most often chosen platform for online teaching activities, and it was used already before the pandemic by 84% of the respondents. MS Teams (files & chat) and Breakout rooms in Zoom were used during pandemic by ca. 70% of the respondents, and their use has clearly increased during the pandemic comparing to pre-covid time. For the future use, Moodle was chosen as most suitable platform, followed by Breakout rooms in Zoom and MS Teams.

Other software or tools mentioned by the Finnish respondents were: TIM (The Interactive Material), Mentimeter, Kahoot, Confluence Wiki, Quizzizz, Whatsu and Peda.net. TIM is a collaborative learning platform developed at the University of

Jyväskylä, Finland, ViLLE[1] by the Centre of Learning Analytics of the University of Turku (Fig. 2.2).

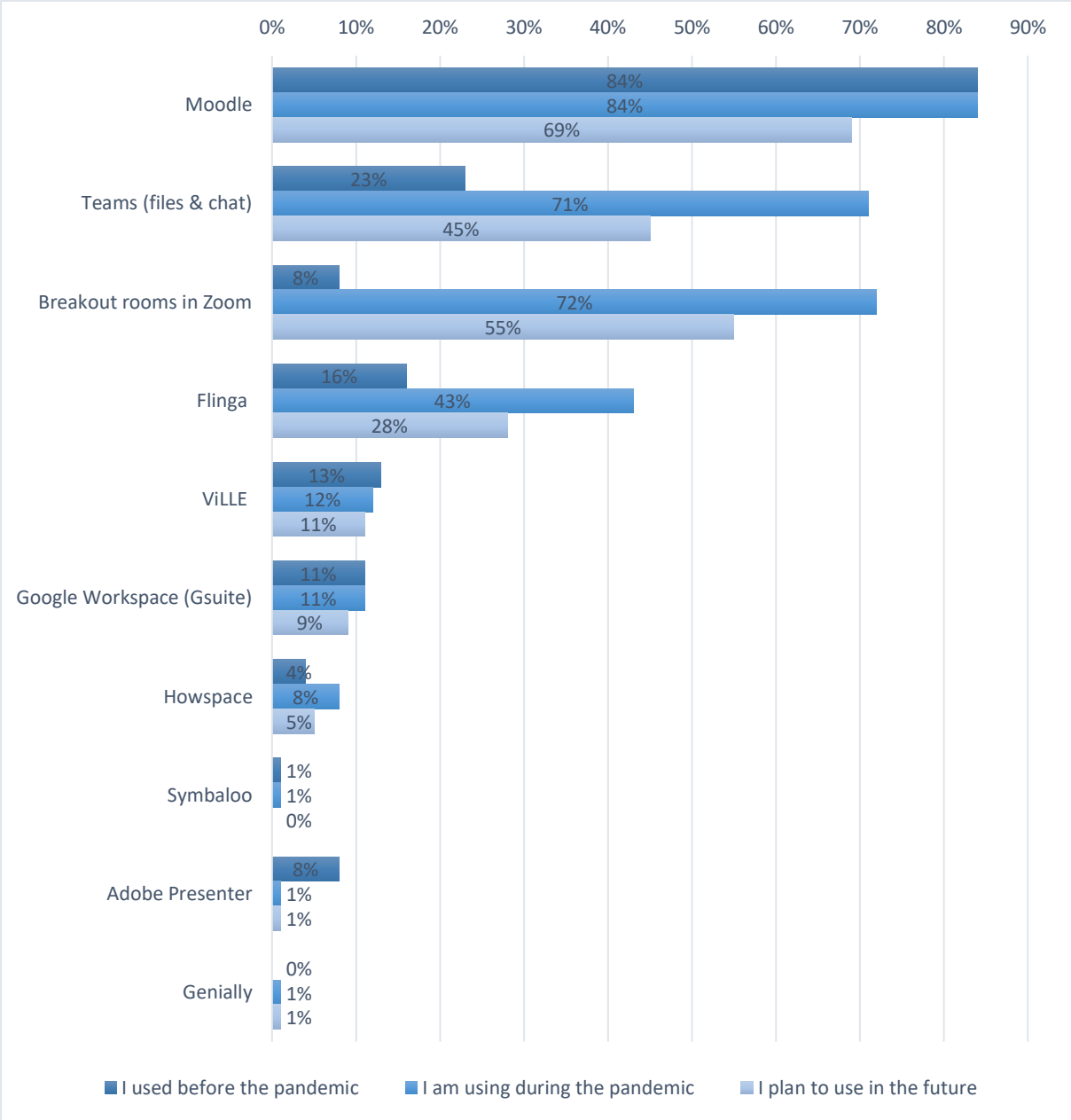

Figure 2.2. Platforms for online teaching activities.

The respondents were asked whether they adopt any software for creating entire presentations and/or their elements, connected to their online teaching activities. Of the respondents 63 % told that they use software, 20 % does not.

The most often used software was Power Point, followed by Google Slides, Prezi and Canva, in much lesser extent. Other software mentioned by the respondents were

[1] https://oppimisanalytiikka.fi/en/

Keynote, Panopto, Thinglink, Camtasia, LaTeX, Reveal.js, QGIS, Keynote, Emacs Org mode, TIM, Flinga, LaTeX, Mathematica, Google and Padlet (Fig. 2.3).

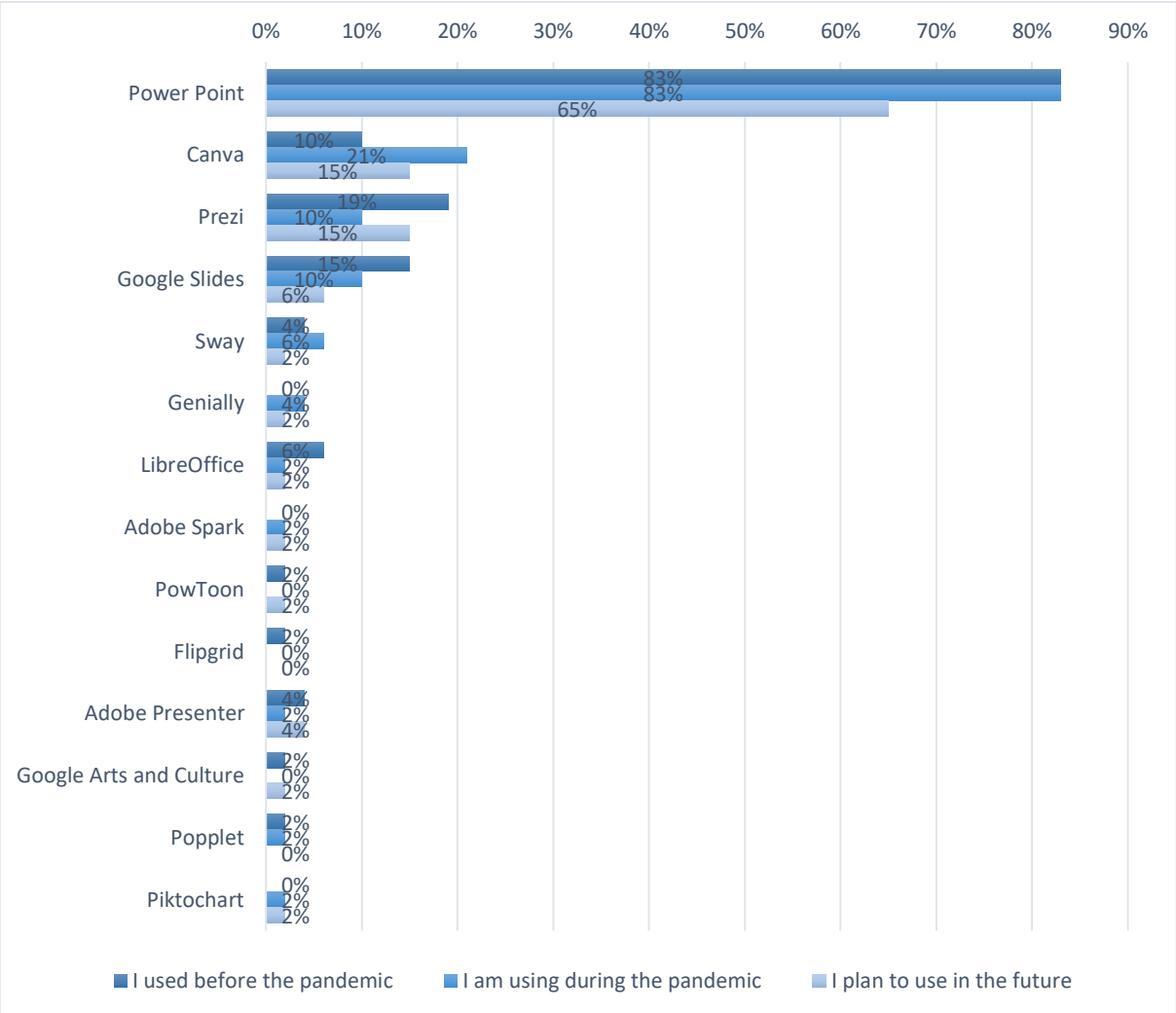

Figure 2.3. Software for creating entire presentations or their elements, connected to your teaching activities

Of the respondents, 64% told that they used online tools for students' activation during the lessons, and 27% did not use any. The most often used tools for students' activation during the lessons was Mentimeter (23%), and it was planned to be used in future even more (by 36% of respondents). All other tools selected by the respondents all remained below 10%, either for their use during the pandemic or in the future (Fig. 2.4). Some other tools were also mentioned, such as Zoom, Zoom polls, Zoom breakout rooms, Moodle, Moodle STACK, Flinga, Flinga board, MS Teams chat, TIM, GeoGebra, WhatsApp, Poll Everywhere, PowerPoint, video clips.

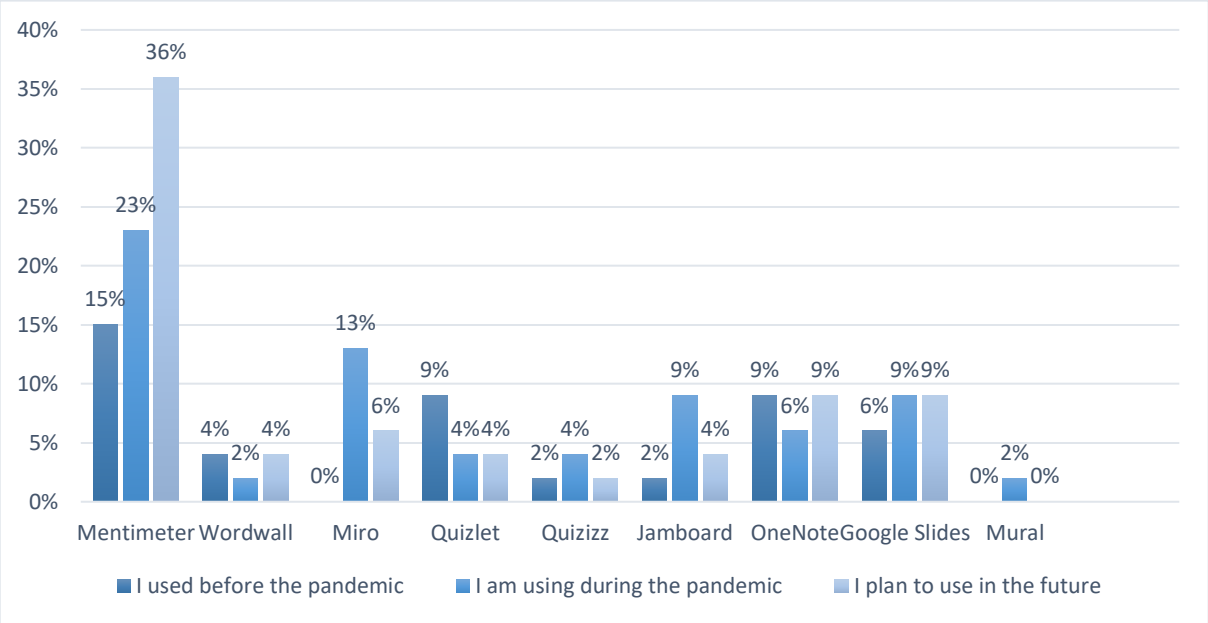

Figure 2.4. Online tools for students' activation during the lessons

56% of respondents reported that they use online tools for verification of knowledge, 31% does not. Moodle was used by the majority of respondents for verification of knowledge, and it was used even before the pandemic by 76% of respondents. Other tools had significantly less users among the respondents to this question. Kahoot was used by one fifth of the respondents, Google Forms and MS Forms were used during pandemic by less than 10% the respondents (Fig. 2.5). Other tools used by the respondents were Turnit, Webropol-survey, Thinglink, Exam, TIM, Genially, Exam, STACK, reflections and essays.

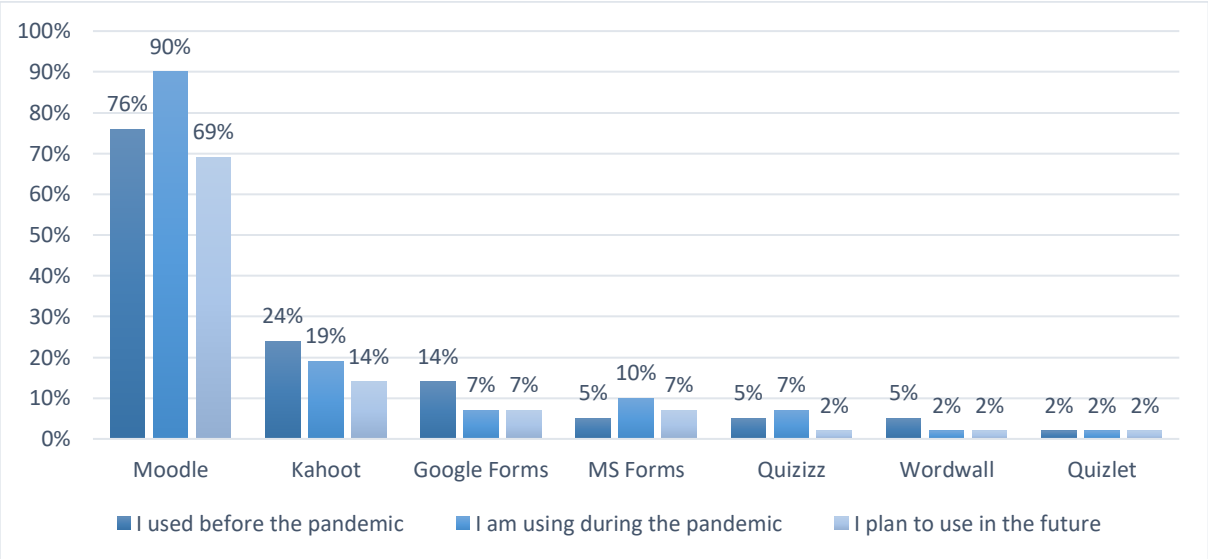

Figure 2.5. Online tools for verification of knowledge

The majority of the respondents used software and tools with license provided by the university. For example, for creating presentations or other elements, 73% of the respondents used the license provided by the university. However, there was more variability for students' activation during the lesson, with 59% of participants using tools with license provided by university, and 39% relying on open access or free tools. Tools for verification of knowledge were used by 51% with the license provided by the university (Fig. 2.6).

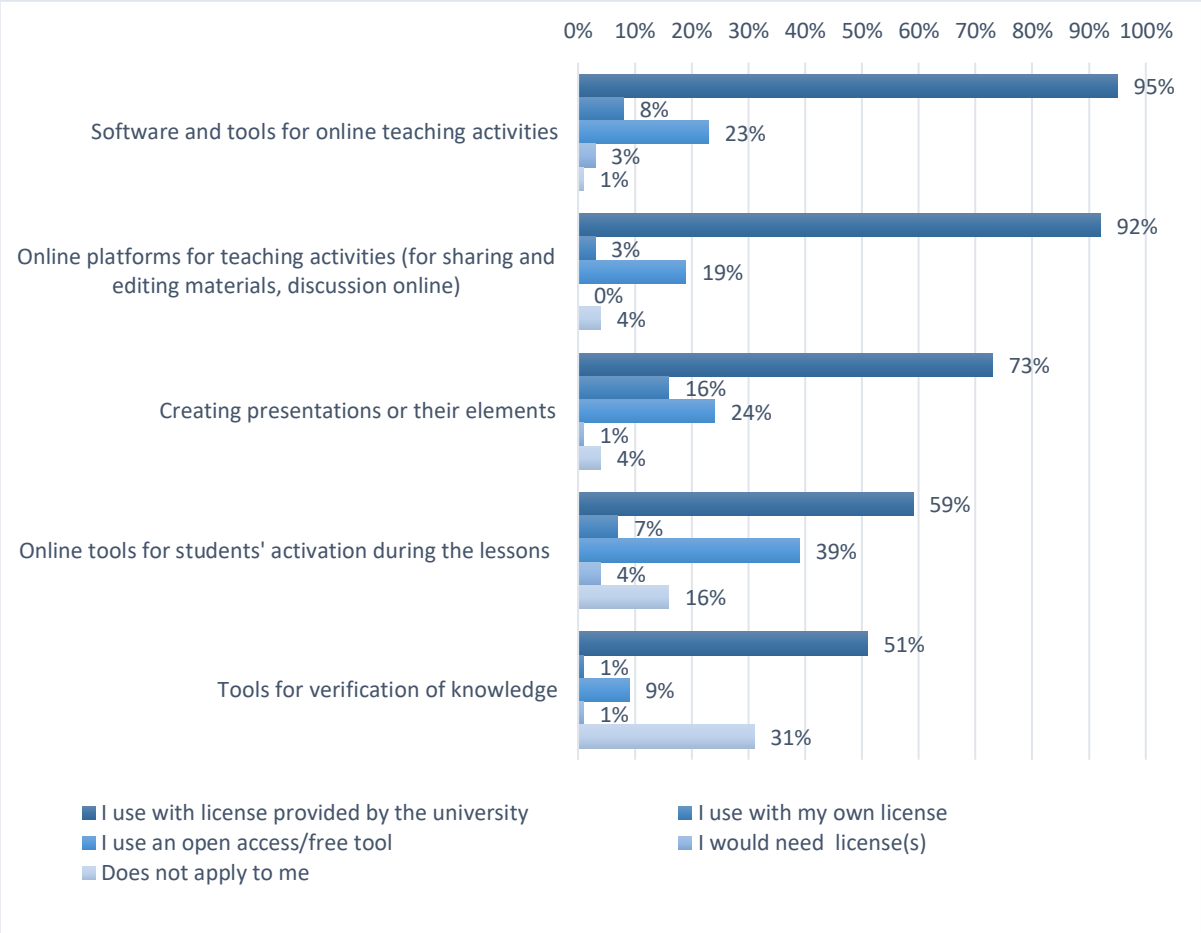

Figure 2.6. Licences for online software and tools

The respondents were asked for which software or tool they would like to have a licence from their university. The mentioned software or tools were the following:

- For communication: Bookable calendar for organizing 1:1 meeting with students, Moodle;
- For online learning: Zoom, Google Education / G Suite, Padlet, Kahoot, Prezi Pro, Camtasia, Mentimeter, and some e-learning platform;
- Video editing: Biorender, Adobe Premier, Vimeo, Adobe Photoshop.

Among dedicated equipment for carrying out teaching activities from remote, a laptop was most often provided by the university, for 77% of the respondents. Headset was provided for 59%, and computer with camera for 56%. Concerning webcams and microphone, the amount of those who had it provided by the university or not was around 40% in both cases. Other equipment mentioned were speaker and screen (Fig. 2.7).

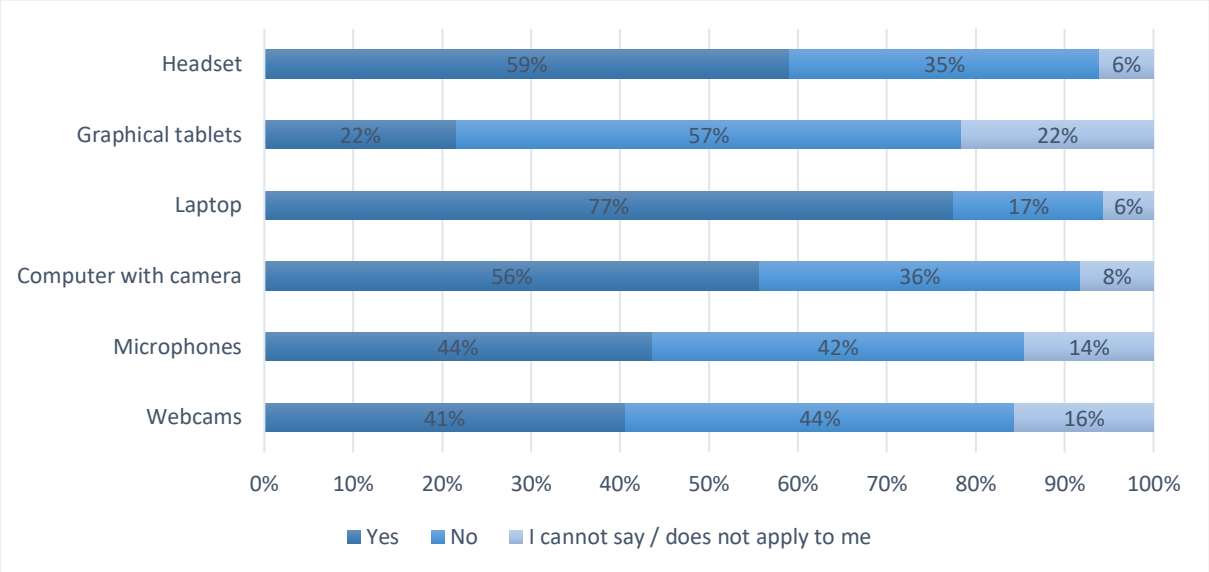

Figure 2.7. Did your university provide you with some dedicated equipment for carrying out teaching activities from remote?

Most of the respondents (70%) had received training for software and tools for online teaching activities (real-time). Trainings for online platforms for teaching activities was chosen by 61% and trainings for online teaching methods by 58% of respondents. Training on students' activation online was provided for 48%, whereas 39% did not have training for this. Training was provided on verification of knowledge for 41%, however the same amount of the respondents did not have any training on this (Fig. 2.8). Other examples mentioned were support for editing videos and for making teaching material accessible, facilitation of group discussions and discussion during meetings and with colleagues.

Training or advice for online teaching offered by the university was usually provided as information online, e.g. on the intranet (84%). Webinars were mentioned by 77% and online meetings by 69% of the respondents. In presence training was reported by 34%. Number of respondents to this question was 61. Other means mentioned were technical support via phone and email, and before pandemic it was provided in classroom. One of the respondents did not consider the training on the intranet very effective in this situation.

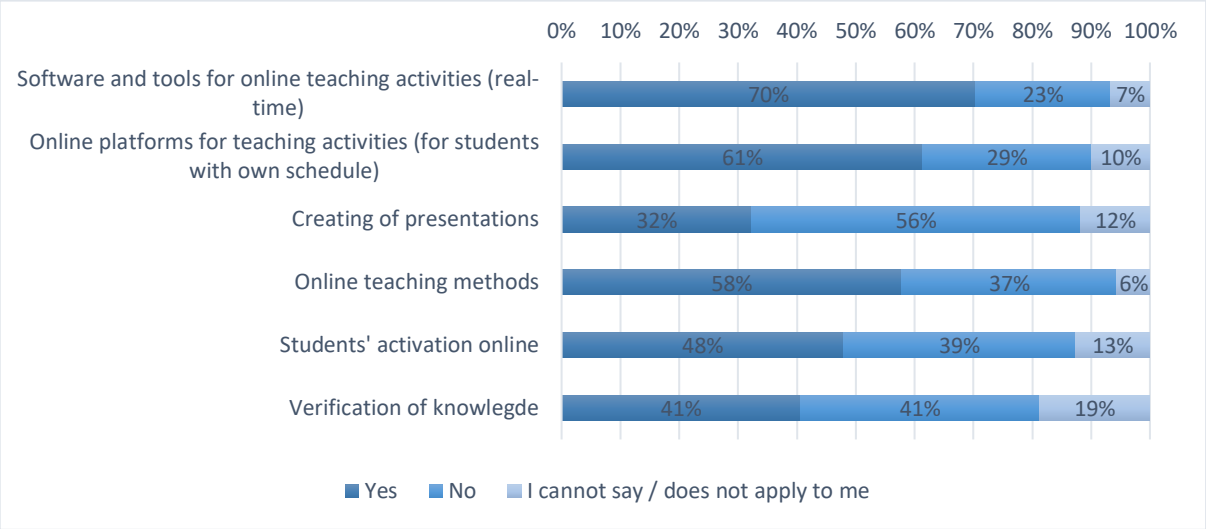

Figure 2.8. Have you received any training from your university for online teaching?

The respondents were asked to rate their experience related to online teaching (Fig. 2.9). For most of the considered aspects, the vast majority of respondents reported to feel either neutral or mildly satisfied. For example, 54% of respondents had a neutral view on their experience with verification of knowledge, 21% was satisfied, 10% unsatisfied 9% of them was very unsatisfied and 5% was very satisfied. The teachers were satisfied (44%) with their experience with software for online teaching activities (real-time) and with online platforms for teaching activities (42%). It is remarkable, that only few respondents considered themselves very satisfied with their experience in any of the themes.

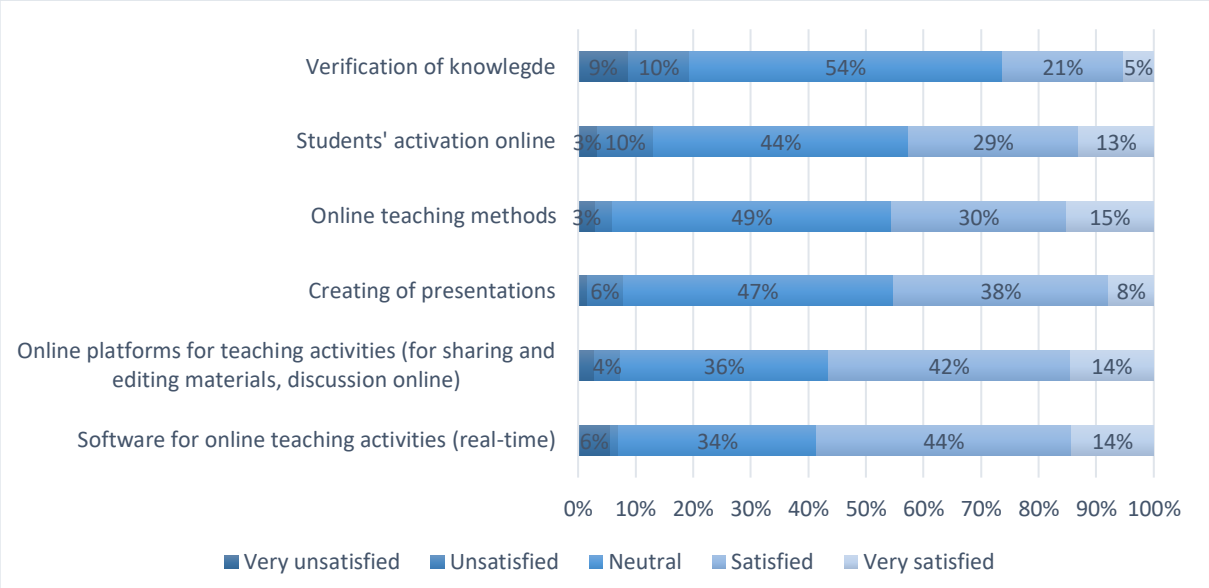

Figure 2.9. Please rate your experience about training and advice related to online teaching

The teachers were asked to assess their improvement in proficiency in using online tools and platforms during the online teaching period, compared with the time before the COVID-19 pandemic. Nearly half of them believe their skills have improved, and 30% consider that the improvement is significant (Fig 2.10).

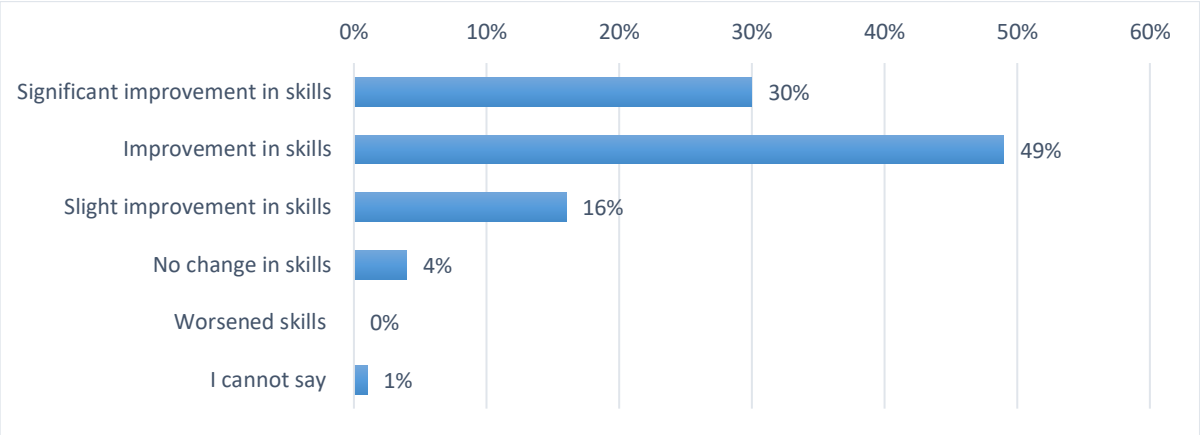

Figure 2.10. How would you consider your proficiency in using online tools and platforms?

3. REPORT ON SOFTWARE OR TOOLS USED FOR ONLINE TEACHING ACTIVITIES IN POLAND (University of Gdańsk)

The study shows that before the pandemic period, the use of both software and online platforms by academic teachers was low. Only Skype and Zoom were used extensively for meetings, by 49% and 15% of the respondents respectively. The use of other tools for organizing meetings did not exceed 9%. The transition to online learning forced all respondents to use these tools and it is significant that up to 90% of them used MS Teams, a tool that was previously used by only 8% of respondents. This may be due to recommendations or regulations at the University level, for example the University of Gdańsk required online classes to be implemented through MS Teams. During the pandemic period the most popular systems were Zoom (54%), Google Meet (26%), Skype (24%) and ClickMeeting (21%). Less common tools (<1%) mentioned by respondents were BigBlueButton, CiscoWebex, Moodle platforms, Mentimeter, Sannaco Connect, Jitsi Meet, and Nudau (Fig. 3.1)

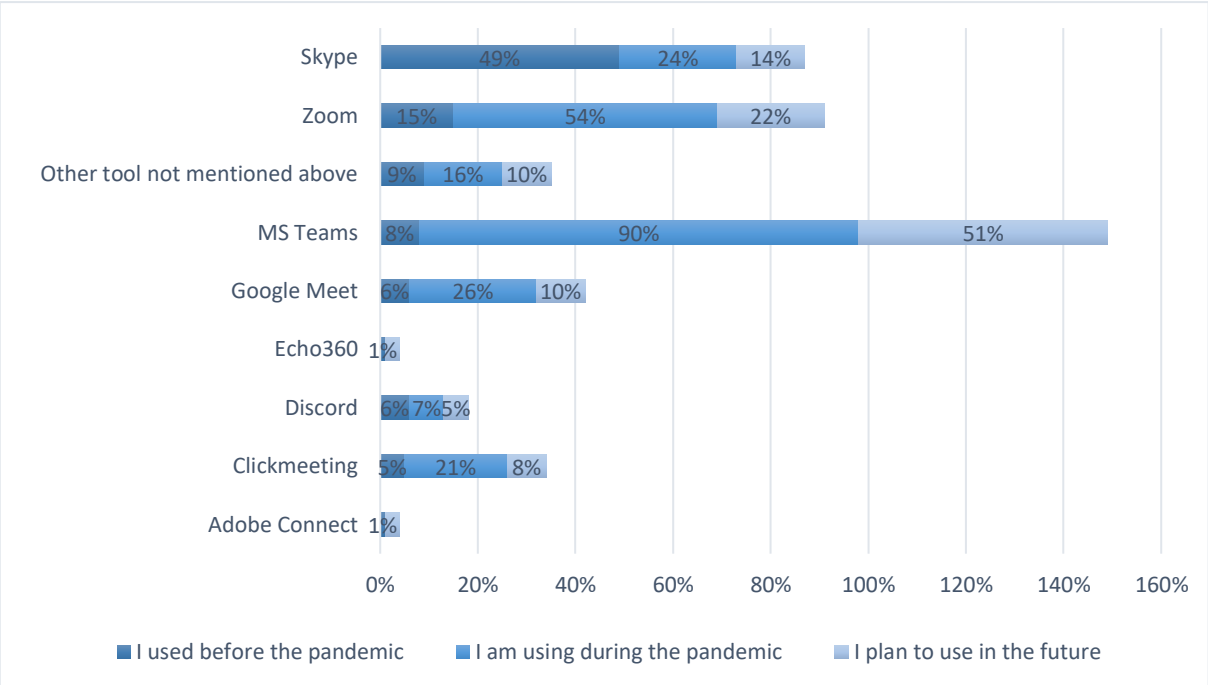

Figure 3.1. Software or tools for online teaching activities

The academic community appreciated the advantages of using some software in teaching and declared their willingness to continue using them after the pandemic period, especially appreciating the advantages of MS Teams, that is planned to be used in the future by 51% of respondents.

Also, the use of online platforms to work with students was very low before the pandemic period. Respondents listed only 5 platforms, but only Moodle was more widely used (36%), while the other four were marginally used, including Genially (1%), Breakout rooms in Zoom (2%), Google Workspace (4%) and files and chat in MS Teams (7%). In this area, the pandemic contributed to a huge increase in use of the MS Teams platform by as many as 82% of respondents. The Moodle platform has also become popular during pandemic (43%). What's more, more than half of the respondents also in this case declare that they want to use MS Teams in their further work with students. 33% of them also intend to continue using the Moodle platform, which is the same level of usage as before the pandemic. However, there was some information, yet not much more than 3%, about the intention to use other platforms such as Lectora, Elucidat, Easy Generator, Symbaloo and GOMO learning Suite (Fig 3.2).

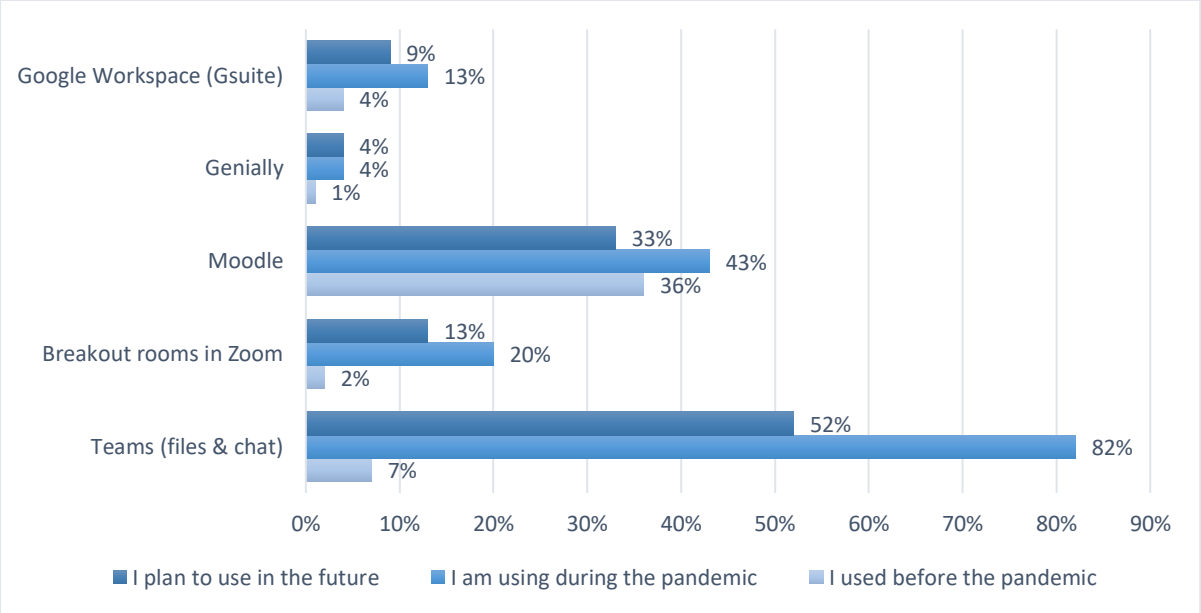

Figure 3.2. Platforms for online teaching activities

53% of respondents use different software to create entire presentations and/or their elements related to their online teaching activities (41% of respondents do not use software). The most popular tool for creating presentations is Power point, which was used both before (92%), during (76%) and after the pandemic (71%). Some of the respondents also used Prezi (22%), Canva (12%), Google Slides (12%) and Libre Office (11%) (Fig. 3.3). And while academics have not really used other presentation tools much or at all, there seems to have been an awareness of the possibility of using other tools, such as Sway, Emaze, Visme, Tableau, Coogle, Infogram, Piktochart, Popplet, etc.

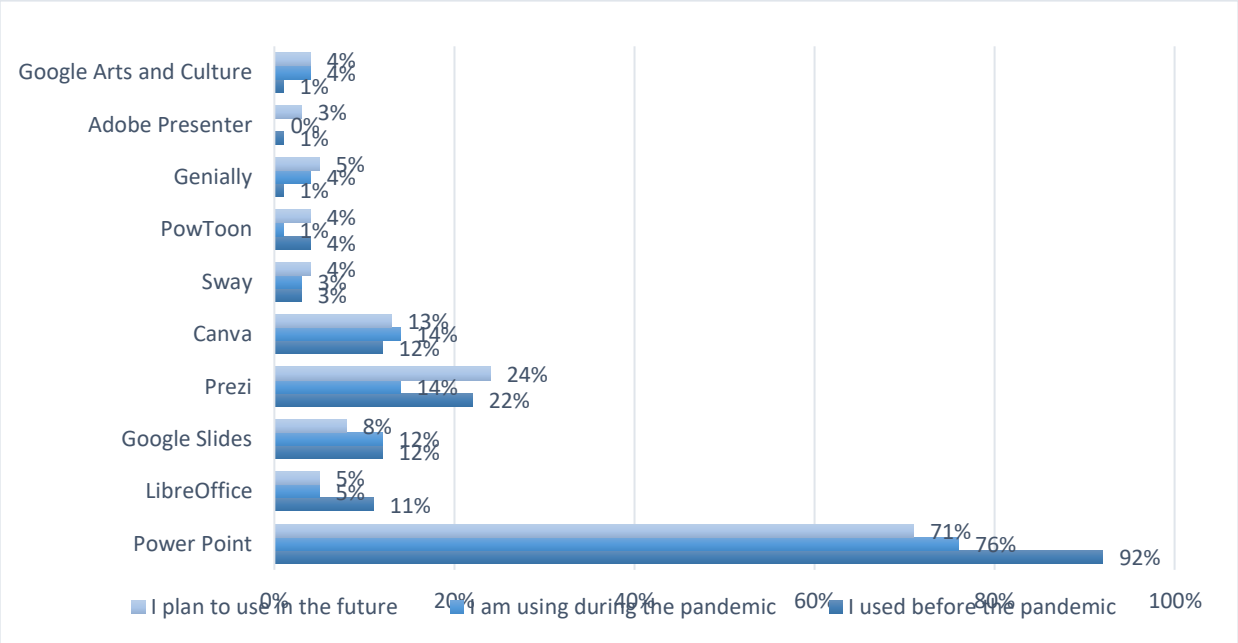

Figure 3.3. Software for creating entire presentations or their elements, connected to your teaching activities

Many teachers reported problems with students' activation during the pandemic, but few of them had used the IT support tools in that are before the pandemic. Among the programs used, and not at a high rate, were Google Docs (36%), Kahoot (26%), Mentimeter (16%) and Quizlet (14%). While these applications continued to be used during pandemic online classes, other applications such as Wordwall (15%), Quizizz (18%) Jambord (17%) Google Slides (14%) were also used. Several of them have been well received by teachers who still intend to use them after the end of the pandemic, including Google Docs (33%), Kahoot (28%), Mentimeter (25%), Quizlet (17%) and Jambord (14%) (Fig. 3.4).

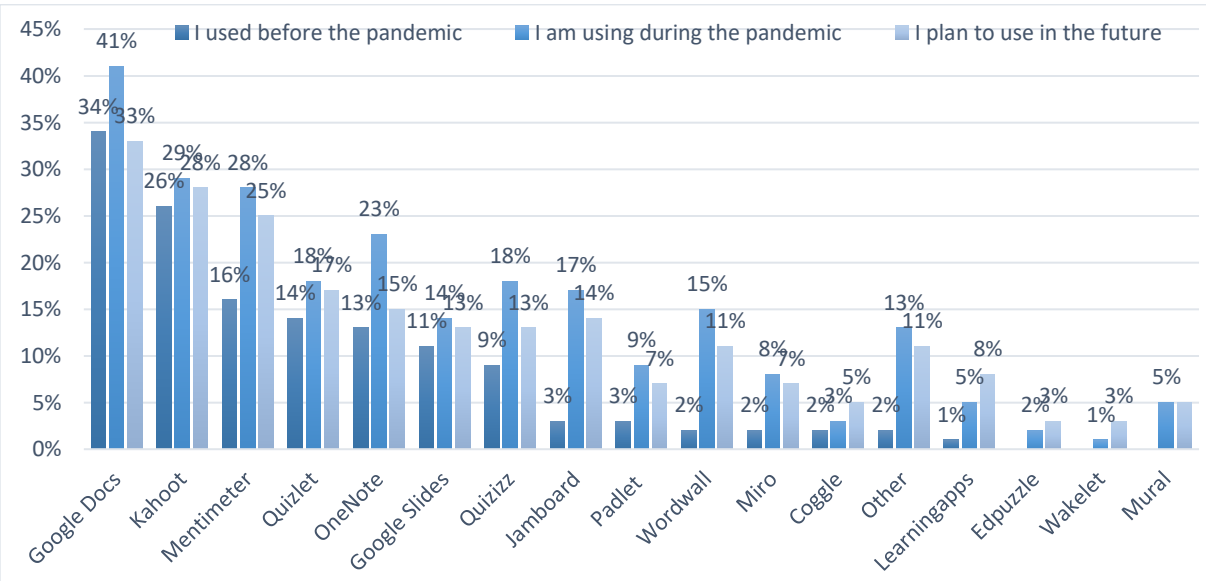

Figure 3.4. Online tools for students' activation during the lessons

The use of online tools in pre-pandemic period was most applicable to verifying student knowledge: as many as 88% of respondents used them for this purpose (Fig 5). The Moodle platform was used most often (27%). During pandemic, MS Forms (56%), Moodle (46%) and Google Forms (24%) became popular (Fig. 3.5).

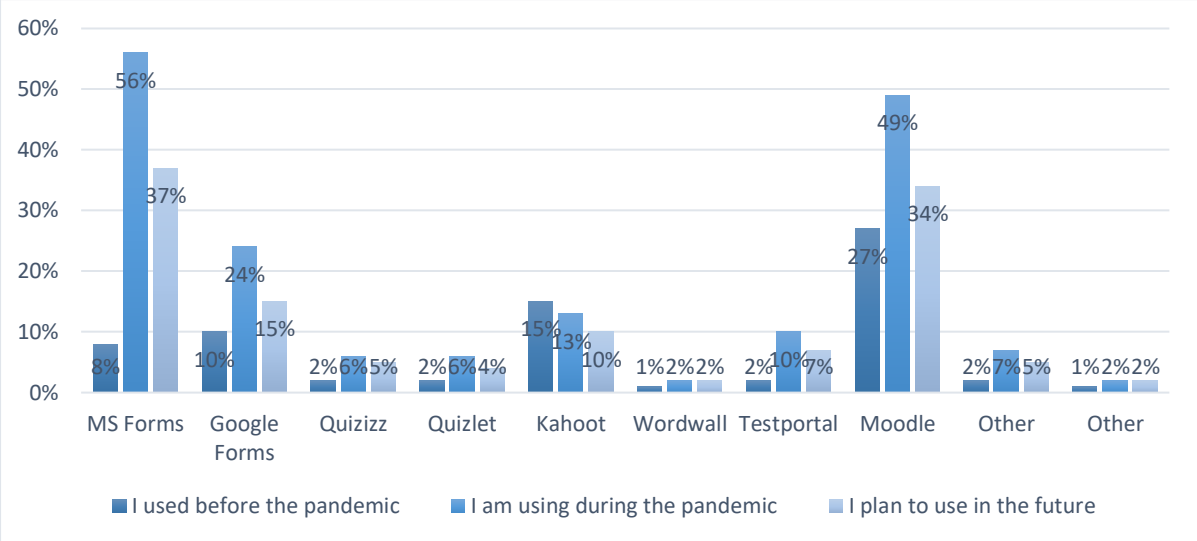

Figure 3.5. Digital tools for verification of knowledge

Most of the universities provided licenses for basic software necessary for the online courses. Teachers also used additional tools available on an open access basis or used private licences to create presentations (26% and 26% respectively) and for activating students during lessons (13% and 31%) (Fig. 3.6). In case of some open source programs, such as Miro, Canva, Wakelet or Mentimeter, the respondents also reported their willingness to use advanced premium options, which are only available in the license version.

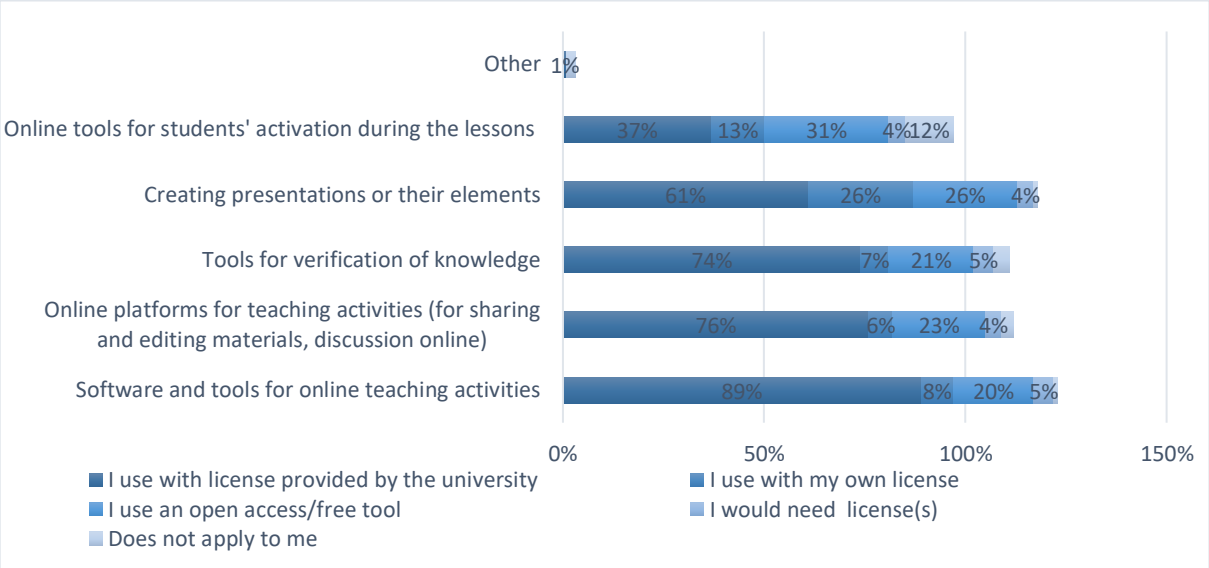

Figure 3.6. Licences for online software and tools

While the provision of licenses for online software and tools was quite good, the university's provision of technical equipment in the form of computers, cameras, headsets, webcams was inadequate (Fig 3.7).

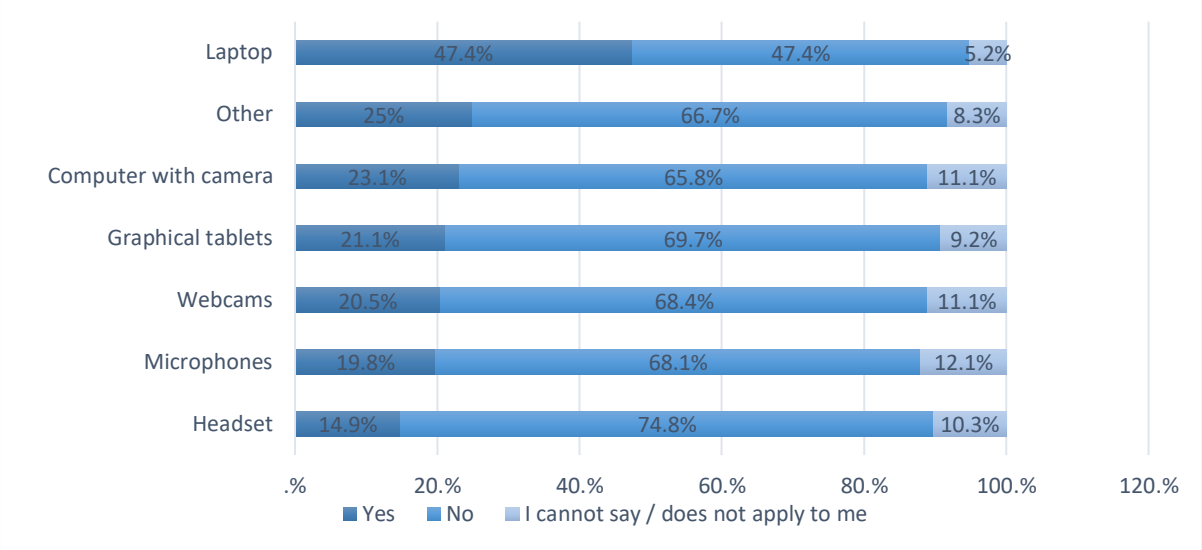

Figure 3.7. Did your university provide you with some dedicated equipment for carrying out teaching activities from remote?

The range of training offered by universities during the transition to online learning varied greatly, with the greatest support offered in the use of software and tools for real-time teaching activities (80,6%), followed by trainings on using the online platforms for teaching activities (72%). However, too little training was devoted to the problem of activating students (only 24%). The training was organized in the form of webinars (80,2%), online meetings (69%), via online information / intranet (63,5%) and 16,7% as onsite/in presence. The universities also sent training materials as pdf files, in the form of films and lessons recorded and available in the Intranet (Fig. 3.8).

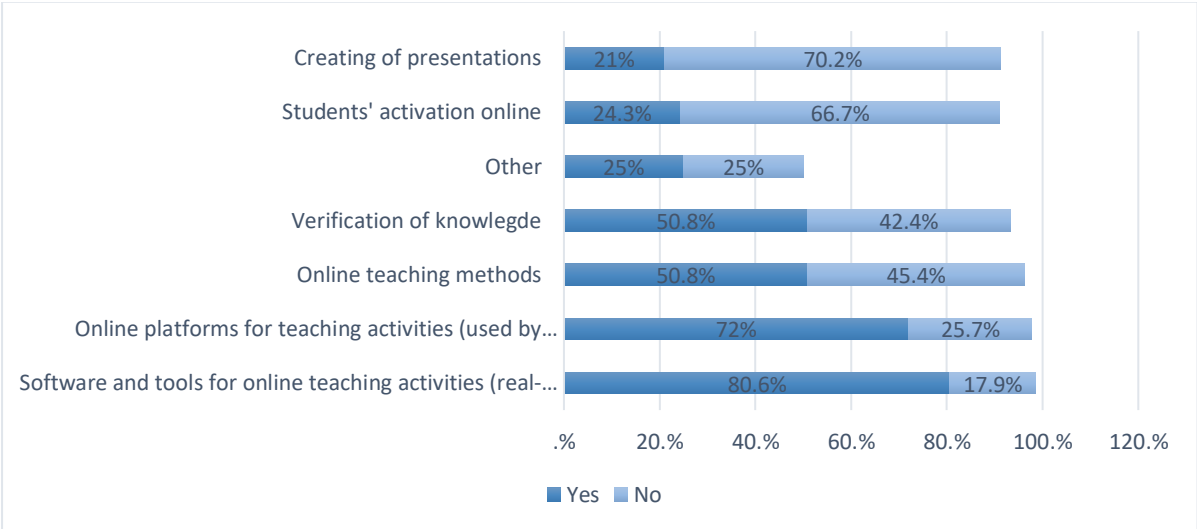

Figure 3.8. Have you received any training from your University for online teaching?

The academic staff positively evaluated also the training in remote teaching software and the use of online platforms. Again, the problem was training on methods of student activation. In the opinion of 37% of respondent's trainings dedicated to students' activation online were very unsatisfied or unsatisfied. In addition, more than 42% of respondents described them as neutral only. A similar situation occurred in the case of training in online teaching methods and in verification of knowledge (Fig. 3.9).

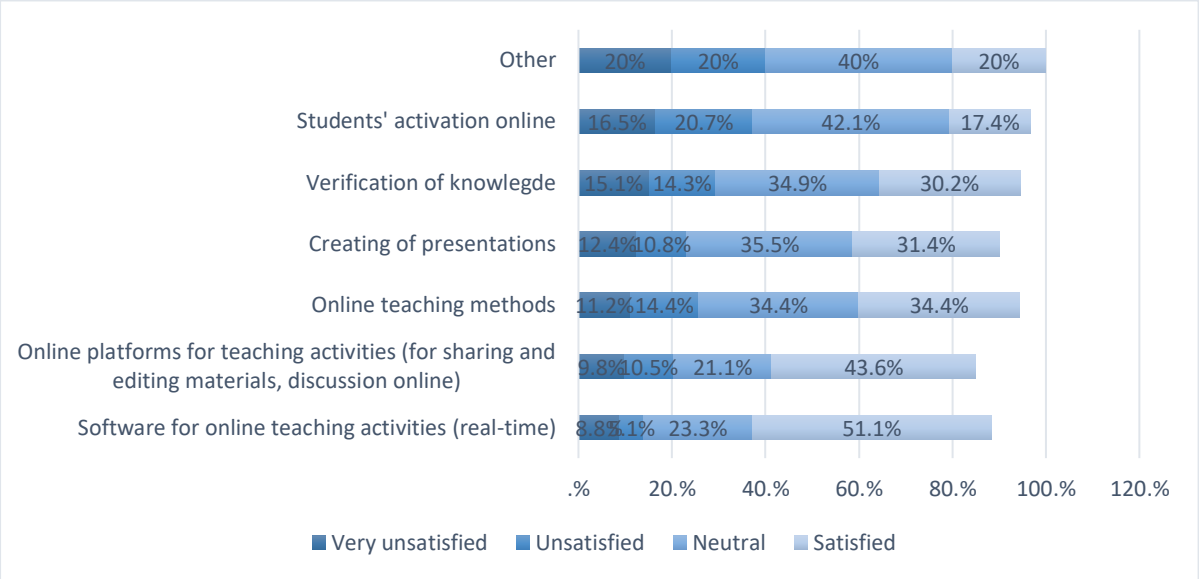

Figure 3.9. Please rate your experience about training and advice related to online teaching

The university teachers also noticed an improvement in their skills in using online tools and platforms, defining it as significant for 47.5% of the respondents (Fig. 3.10).

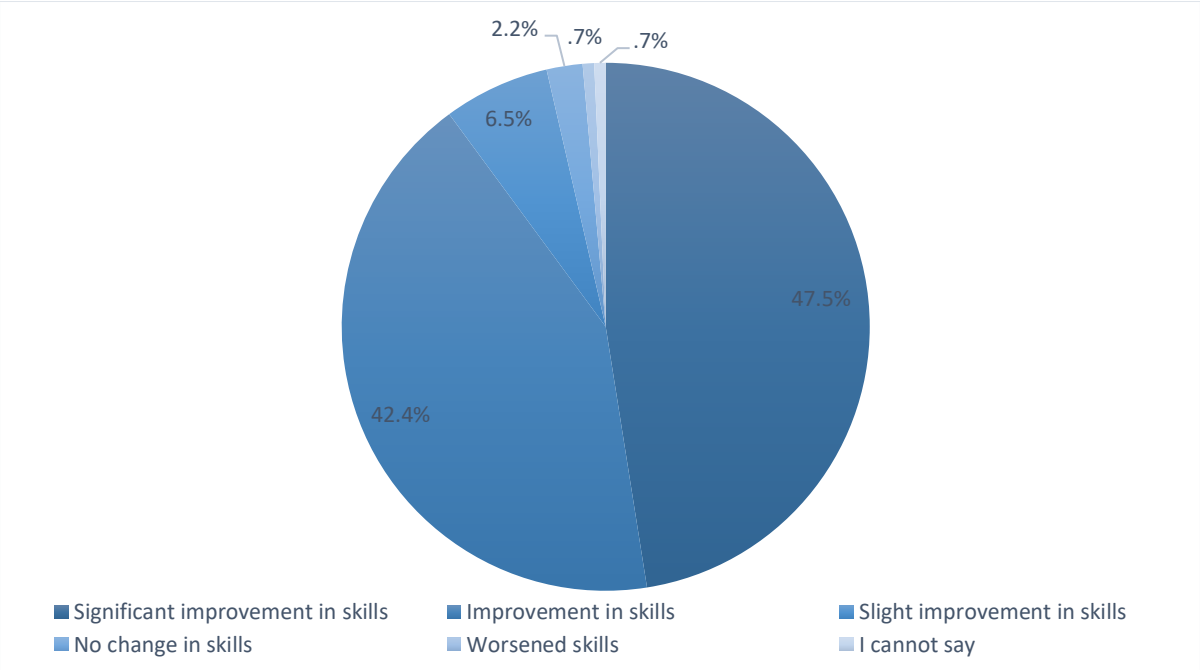

Figure 3.10. How would you consider your proficiency in using online tools and platforms?

4. REPORT ON SOFTWARE OR TOOLS USED FOR ONLINE TEACHING ACTIVITIES IN ROMANIA (University 1 Decembrie 1918 of Alba Iulia)

In Romania, universities have decided to use unitary software. Software was recommended based on existing infrastructure. Among the most used for teaching in Romania are: MS Teams, Zoom, Google Meet.

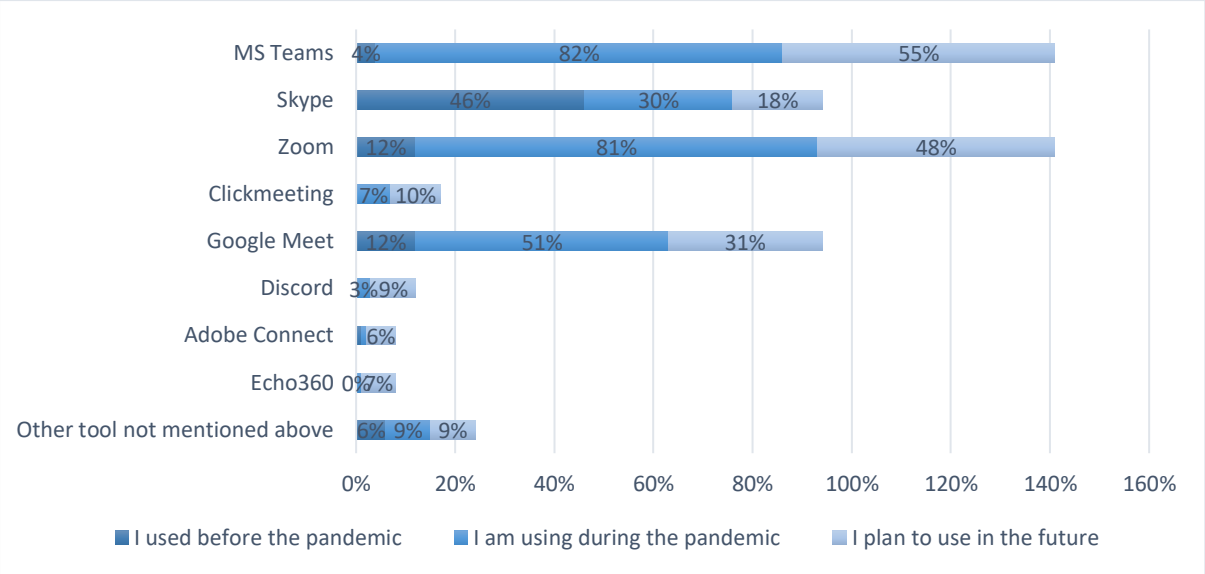

Figure 4.1. Software or tools for online teaching activities

The analysis of the answers to this question shows that Skype and Google Meet were the most frequently used software before the pandemic (46% and 12%, respectively). Over 82% of respondents used MS Teams and 81% used Zoom during the pandemic. The percentage of use of other software decreased for Skype and Google Meet (Fig. 4.1).

For online platforms we mean tools for sharing and editing materials and/or discussion online, which the students may access and use outside the lessons with their own schedule (asynchronic); or those tools which can be used during the lectures (real-time/synchronic).

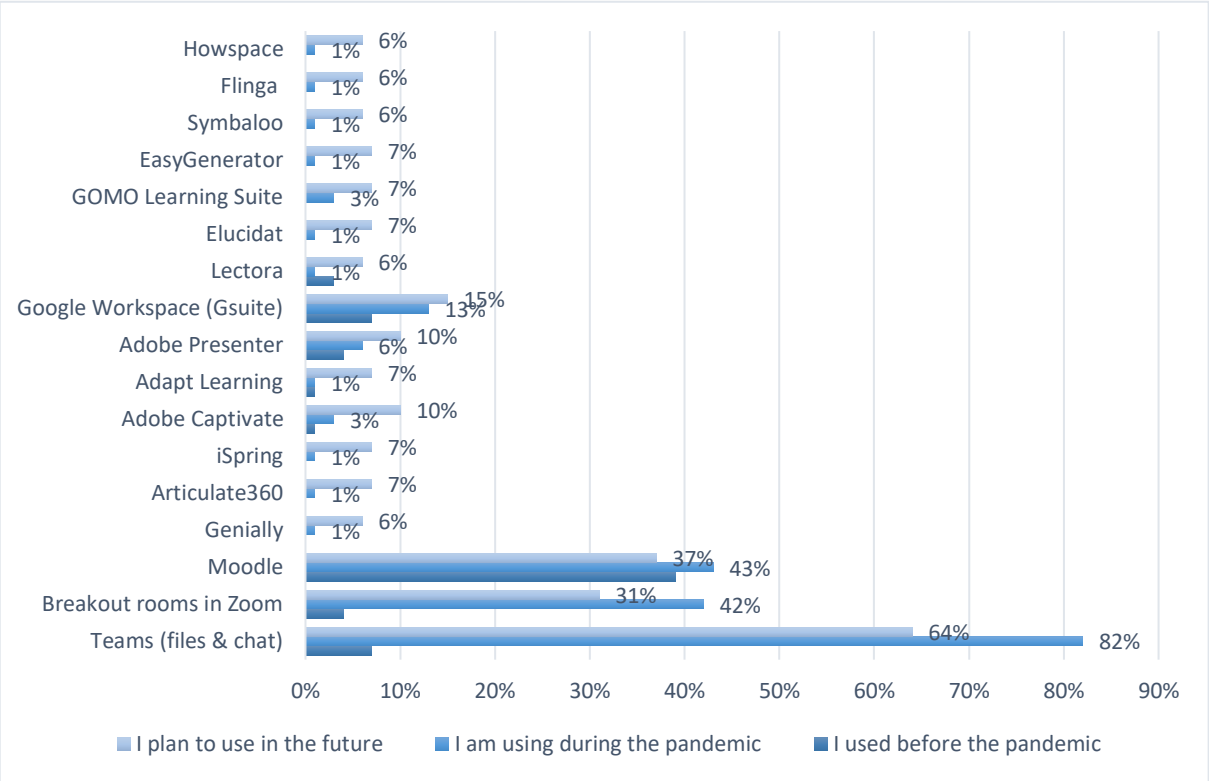

Figure 4.2. Platforms for online teaching activities

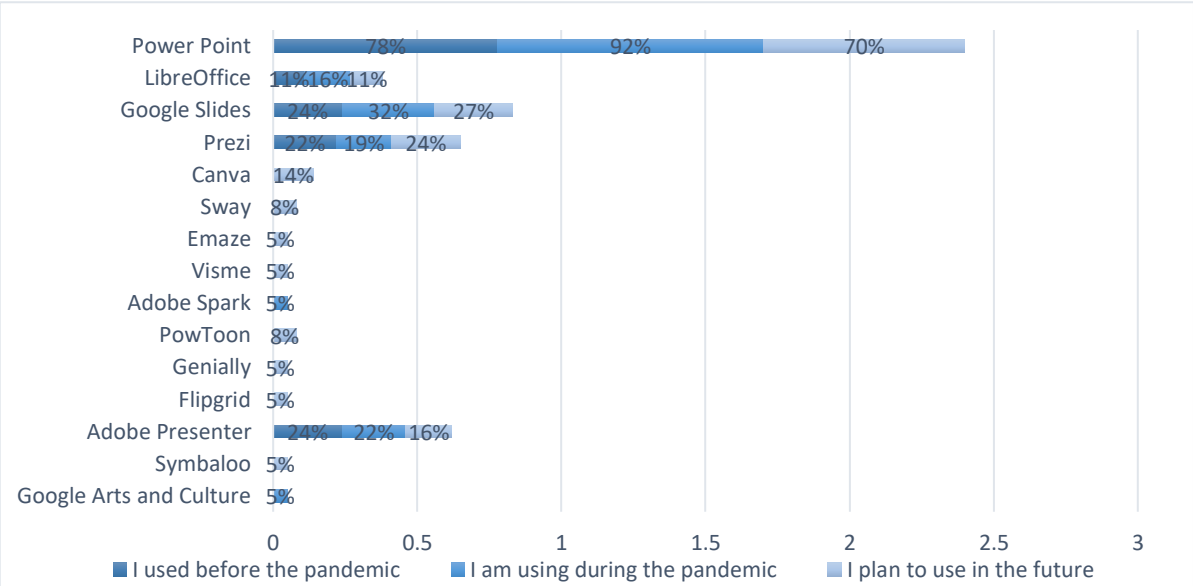

Figure 4.3. Software for creating entire presentations or their elements, connected to your teaching activities

There were 55% positive response to the question "Do you adopt any software for creating entire presentations and/or their elements, connected to your online teaching activities?". But still the percentage of those who do not want to use it is high (37%) and raises many questions about the reasons.

Appreciated among the respondents were Power Point, Libre Office, and Prezi. Increasing interest for using Power Point 78% before and 92% during the pandemic (Fig. 4.3) were seen among our teachers.

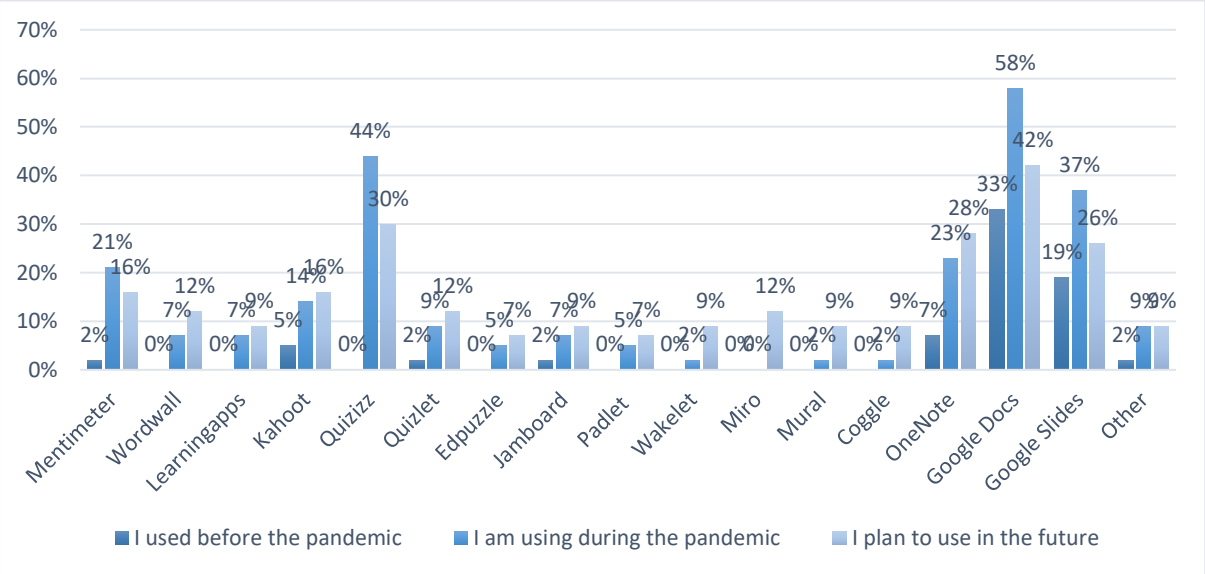

Figure 4.4. Online tools for students' activation during the lessons

Online collaboration tools allow students to share knowledge and real-time feedback on mobile with presentations, polls or brainstorming sessions during classes and other group activities. A great proportion of teachers (68%) used online tools for students' activation during the lessons.

Analysis of responses to the question "Which online tools you used, are using currently or plan to use in the future?" shows that teachers use numerous tools to activate students during class (Fig. 4.4): Analysing the answers to the question “Which online tools you used, are using currently or plan to use in the future?” shows that teachers uses the numerous tools for students' activation during the lessons:

During the pandemic:

- Quizizz – 44%
- Mentimeter – 21%
- Kahoot – 14%
- Google docs – 58%

Plan to use in the future:

- Quizizz – 30%
- Google docs – 42%

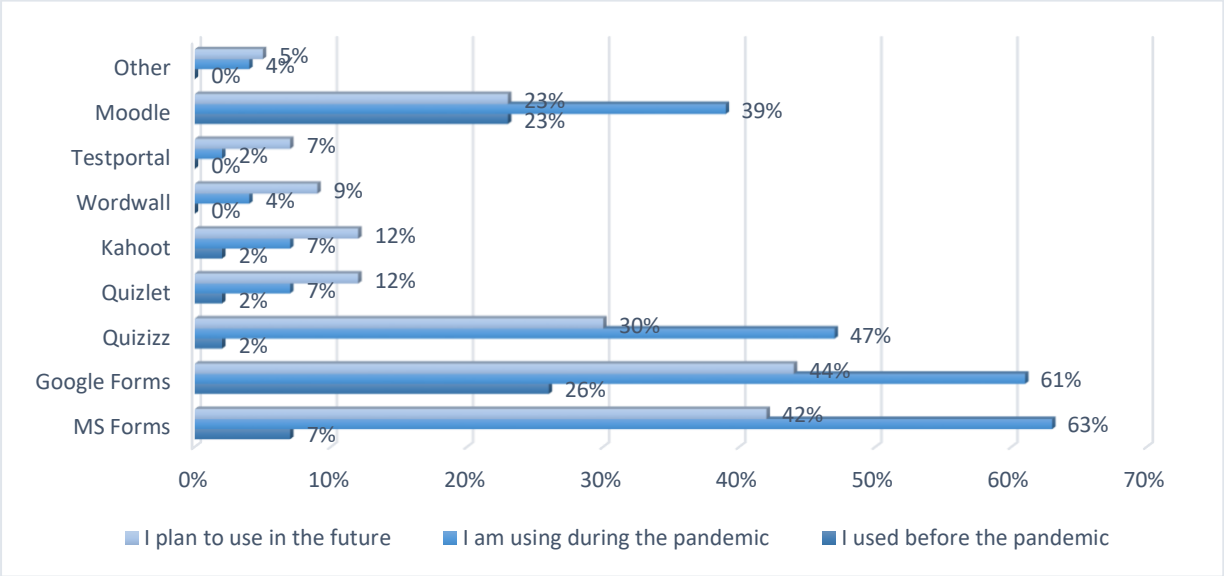

Figure 4.5. Digital tools for verification of knowledge

Verification of knowledge refers to any assessment measure in which evidence of students' learning is collected. 85% of teacher used online tools for verification of students' knowledge. 26% used google forms before the pandemic and during the pandemic 61% and 44% plan to use in the future. MS Forms was not used before the pandemic but 63% using during and 42% want to use in the future. Moodle is regular used for e-learning students and teachers are teachers are used to it (Fig 4.5).

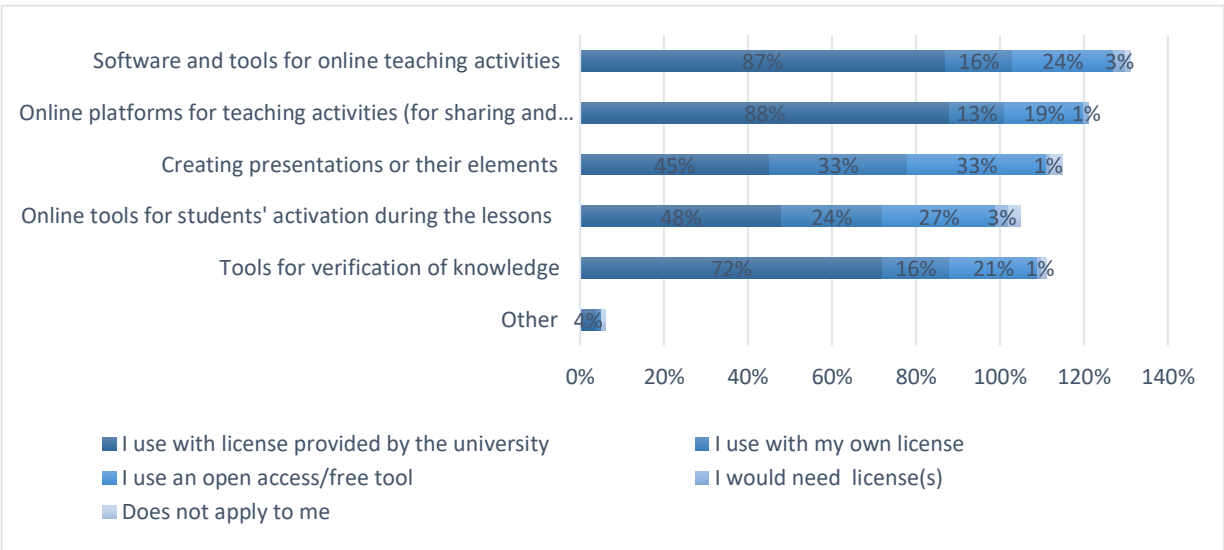

Figure 4.6. Licences for online software and tools

In general, many teachers use the licenses offered by the university. There are many professors who have laptops or PC offered by the university. Licensed software offered by universities was used for online teaching. Microsoft packages also offer e-learning platforms (Fig 4.6):

- 87% - license provided by the university
- 16% with own license

The situation was different with presentation tools that are generally licensed to the user:

- 45%- license provided by the university
- 33 with own license

Individual teachers used open access tools, because the university does not provide appropriate licenses.

During the pandemic, the university provide teachers mainly with laptops (55.4%), and in lesser extent with computer with camera (23.1%), webcams (25%), and microphones (23%) (Fig 4.7).

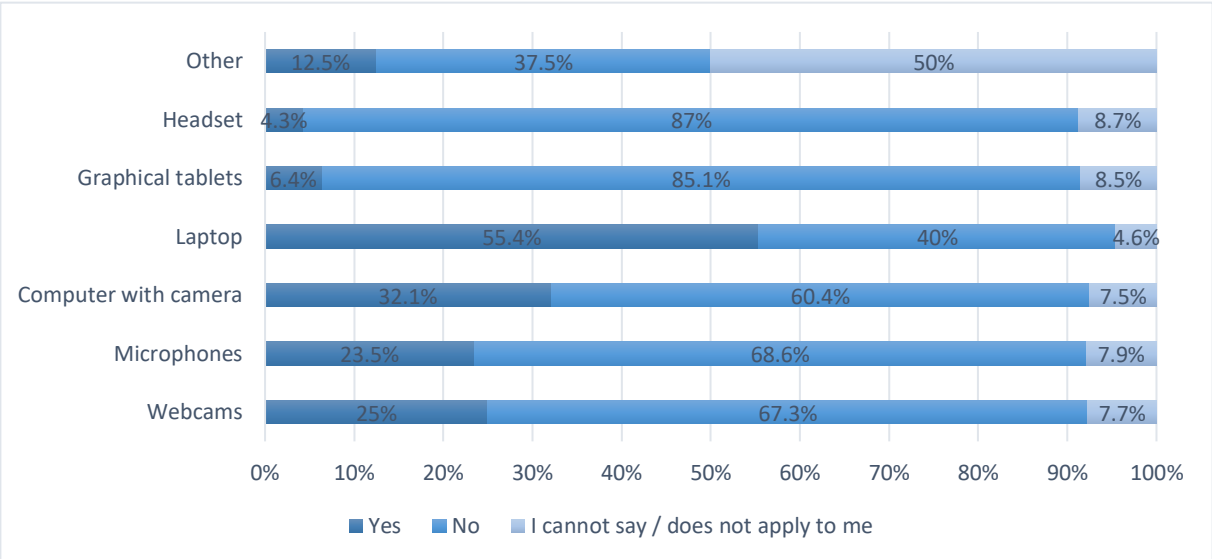

Figure 4.7. Did your university provide you with some dedicated equipment for carrying out teaching activities from remote?

A large proportion of teachers have received training on online platforms for teaching activities (92.3%) and also on software and tools for online teaching (81.5%) provided by the university (Fig 4.8.) Universities also provided training for online teaching methods (51.7%), verification of students' knowledge (60%), and students' activation during lessons (49.1%).

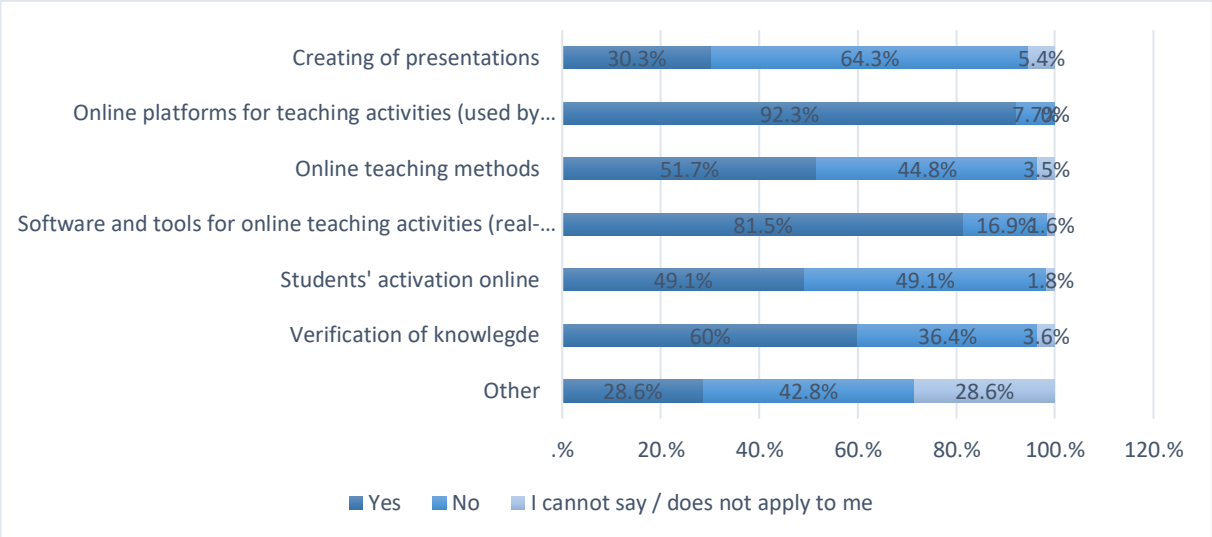

Figure 4.8. Have you received any training from your University for online teaching?

When evaluating experiences with training and advising related to online education, a majority of participants state that they were dissatisfied with most training (15% – 76%) or had a neutral opinion (33% – 57%) (Fig 4.9).

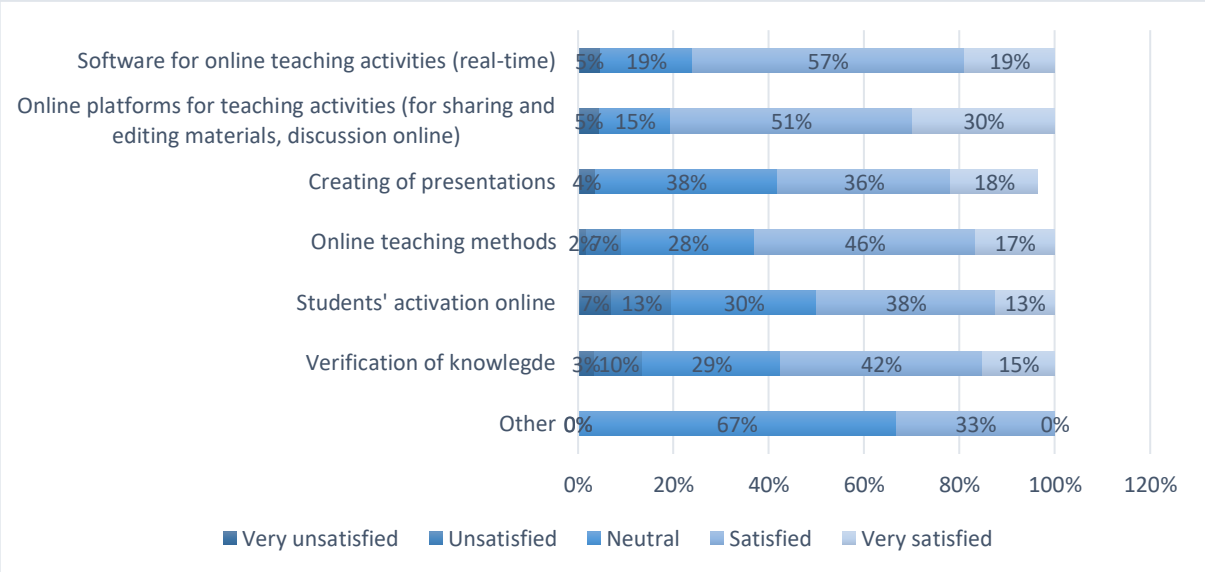

Figure 4.9. Please rate your experience about training and advice related to online teaching

However, a large proportion of teachers felt that they had improved (38%) or even significantly improved (46%) their use of online tools and platforms during the pandemic period.

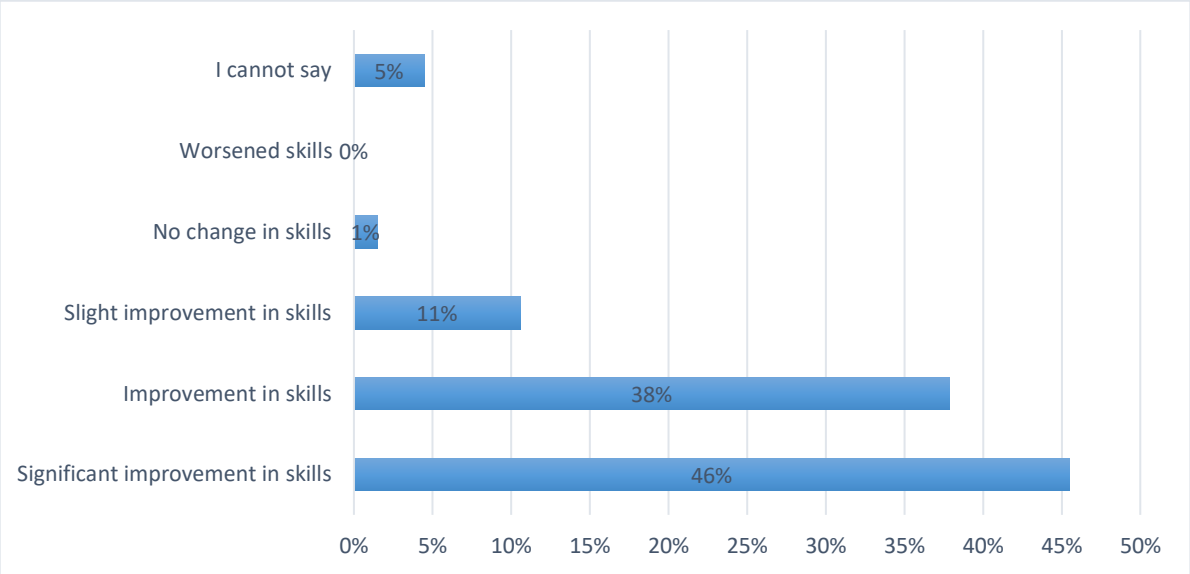

Figure 4.10. How would you consider your proficiency in using online tools and platforms?

5. REPORT ON SOFTWARE OR TOOLS USED FOR ONLINE TEACHING ACTIVITIES IN SLOVENIA (University of Primorska)

The new situation forced teachers to use software and tools they were previously unfamiliar with. Slovene Universities and academic teachers converged on a limited number of available software (Zoom 92%, MS Teams 58%, Skype 32%, Google Meet 26%), but quite a few identified additional solutions. The degree of satisfaction with these solutions vary, but some of them are likely to stay. Our participants mentioned additional solution such as Cisco Webex and Kahoot (Fig. 5.1).

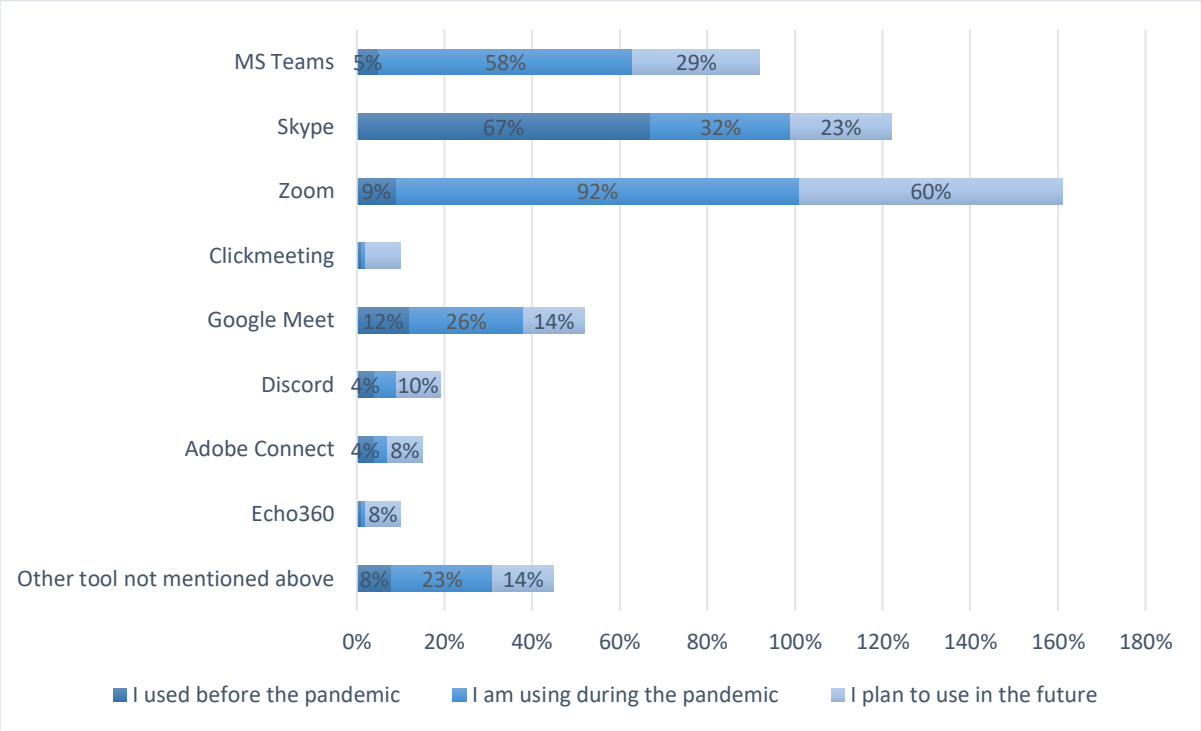

Figure 5.1. Software or tools for online teaching activities

Platforms for online teaching activities give teachers the ability to create online lessons, boards for students to share their thoughts and work, and collaborative learning spaces. They provide teachers with the ability to easily communicate with students. Despite the broad range of available online platforms, it seems that only a few chose to try new solutions during the pandemic, instead our participants preferred to use familiar platforms such as Moodle (68%), breakout rooms in Zoom (69%) or file sharing and chat in MS Teams (57%) (Fig. 5.2).

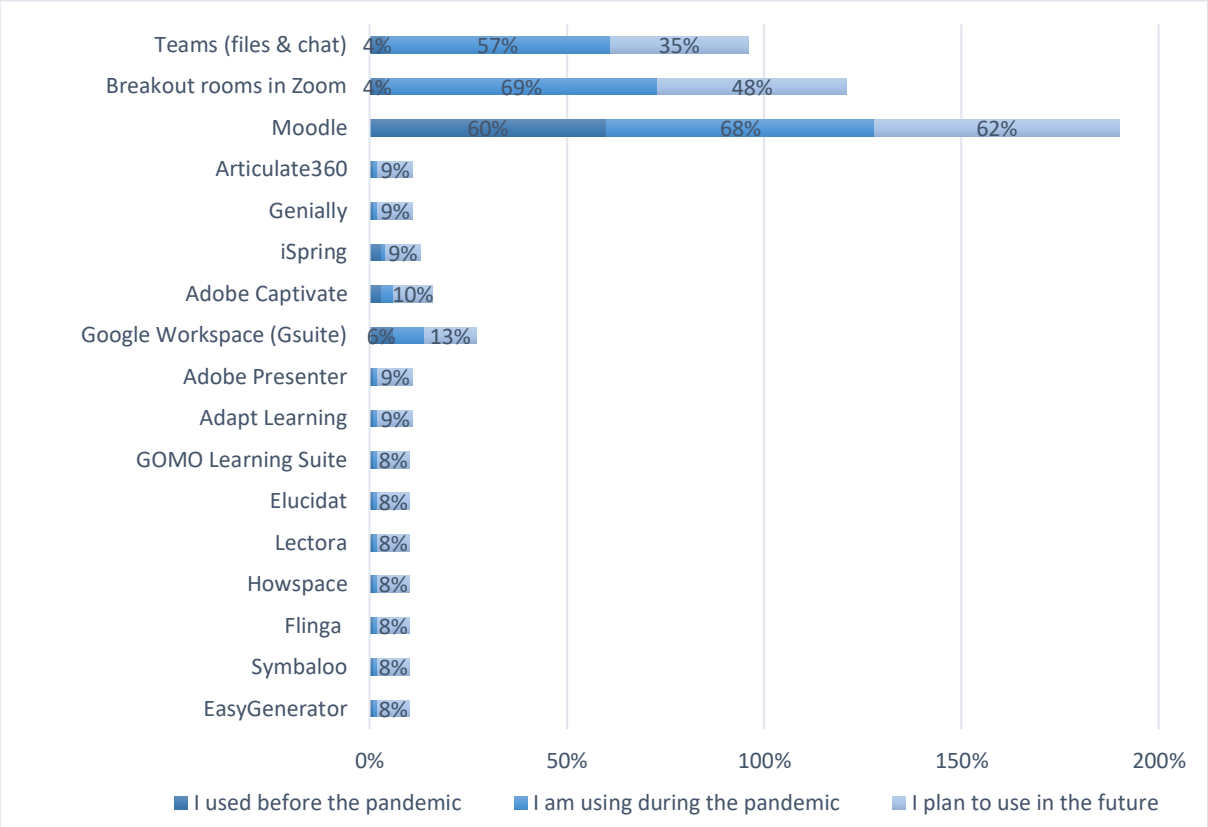

Figure 5.2. Platforms for online teaching activities

The most widely used software for creating entire presentations or their elements was Power Point. Teachers preferred to use this software both before (86%) and during (72%) the pandemic, and a great proportion plans to use it also in the future (64%) (Fig. 5.3). Teachers rarely chose other software like LibreOffice, Google Slides, Prezi, Canva, PowToon, Symbaloo, etc. for creating presentations during online lessons, both before, during and after a pandemic. Some of the teachers mentioned MS Forms, Webex and Kahoot as other tools that were used during the pandemic.

During the COVID-19 situation, the most challenging issue for the teachers was to get the students involved in the online lessons. Teachers had to put a lot of effort into finding appropriate solutions and suitable online tools that fit their subject and were easy to use by the students. Different online tools were chosen by teachers to engage students during lessons (Fig. 5.4). Some of the tools, such as Mentimeter (25%), Kahoot (25%), Google docs (30%) and Google slides (18%), were already familiar before the pandemic. During the pandemic a greater proportion of teachers incorporate in their lessons Mentimeter (43%), Google docs (43%), Kahoot (38%) and in modest proportion Google slides (23%), Quizlet (20%), and Padlet (20%). Part of our respondents were planning to use some of them also in the future, e.g. Mentimeter (38%), Google docs (33%), Kahoot (25%), Padlet (23%) and Google slides (23%).

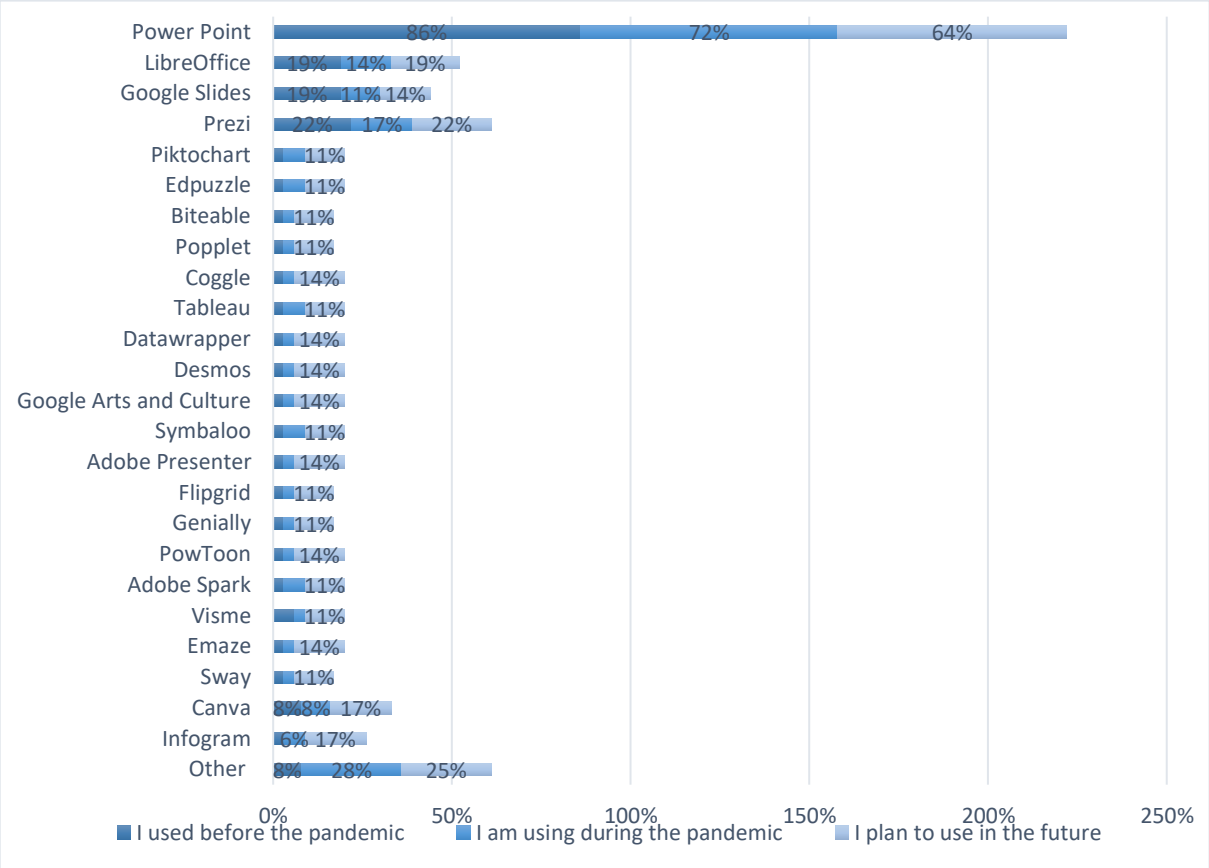

Figure 5.3. Software for creating entire presentations or their elements, connected to your teaching activities

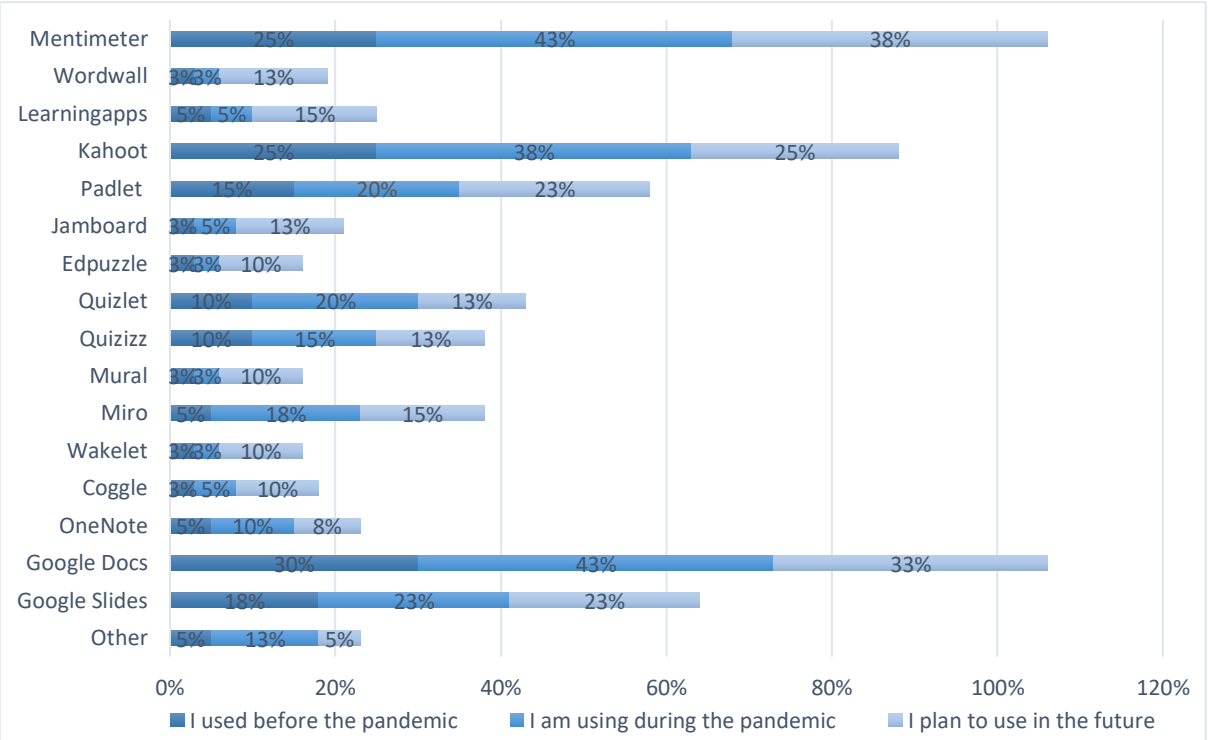

Figure 5.4. Online tools for students' activation during the lessons

Another issue, that most of the teacher found significantly challenging was related to the verification of students' knowledge. Most of the online exams were performed using Moodle (82%). Some teachers were concerned in using online tools for exams and changed the form from written to oral, some introduced additional security measures with video proctoring (asking students to show their environments, and constant monitoring the students).

A great proportion of teachers used Moodle as a tool for creating exams even before the pandemic (47%) and plan to use it also in the future (59%) (Fig. 5.5). To a lesser extent, teachers used programs that were not mentioned in the survey, such as Exam.net or Webex.

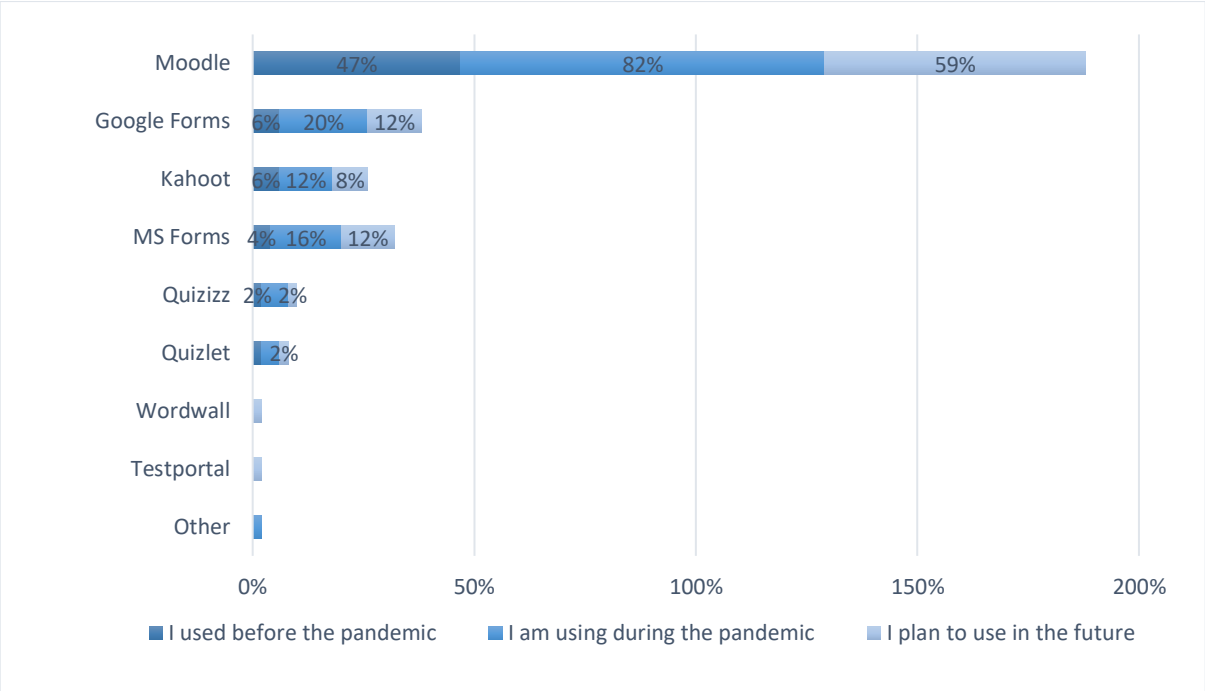

Figure 5.5. Digital tools for verification of knowledge

The relevant licences for online software and tools were in most cases provided by the universities (Fig. 5.6). Almost all teachers had access to licensed software and tools for online teaching activities provided by the University (91%) or choose free online tools (17%). Universities provided the greatest support for the use of Online platforms for teaching activities (for sharing and editing materials, discussion online) (83%) and tools for verification of students' knowledge (64%). Teachers were provided with licensing tools also for Creating presentations (58%) or for students' activation during the lessons (45%).

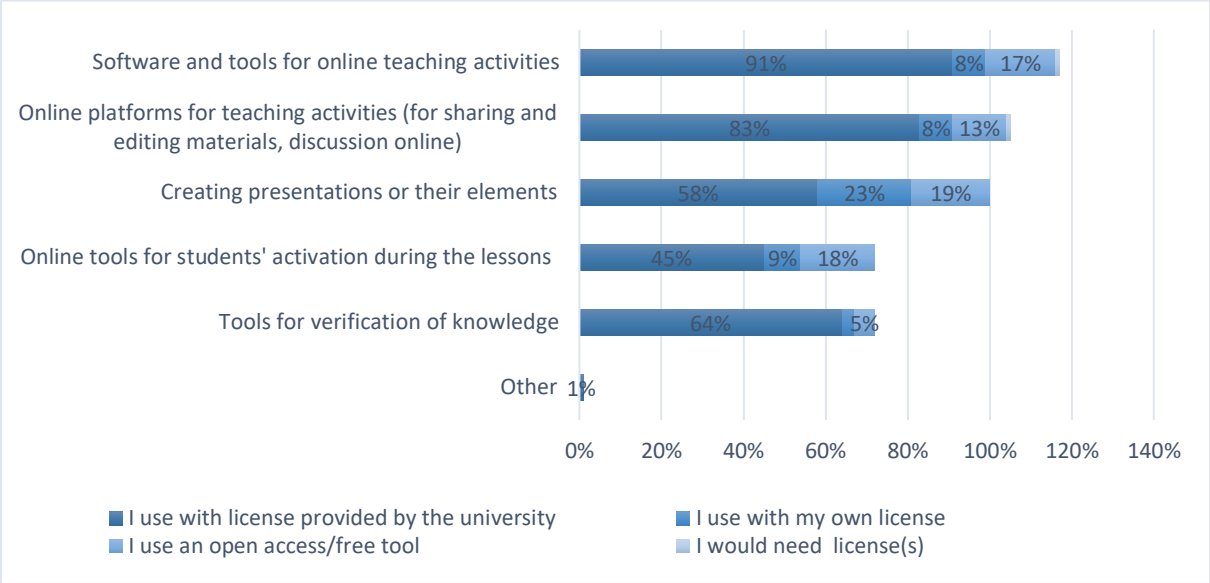

Figure 5.6. Licences for online software and tools

Although teachers reported almost no problems related to digital equipment used in online teaching from remote (identified in IO1 deliverable 1. Report on identified challenges and problems), the necessary equipment in most cases were not provided by universities (Fig. 5.7). Some teachers who did not have the necessary equipment (graphical tablets, webcams or microphone) decided to buy them on their own.

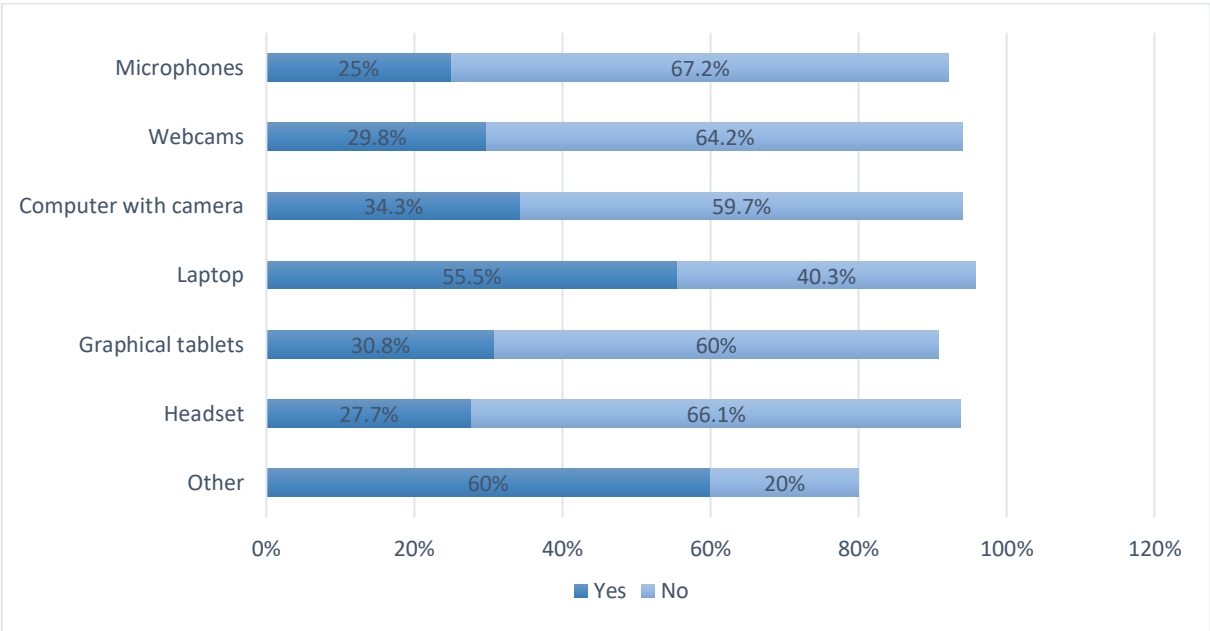

Figure 5.7. Did your University provide you with some dedicated equipment for carrying out teaching activities from remote?

To some extent, universities provided support to overcome the difficulties that teachers faced in the use of new IT tools for online learning. Most of trainings organized by Universities were focused on topics related to software, tools and online platforms for online teaching activities. Additionally, trainings were organized to improve teachers' knowledge on online teaching methods, creation of presentation, verification of students' knowledge, and students' activation online (Fig. 5.8).

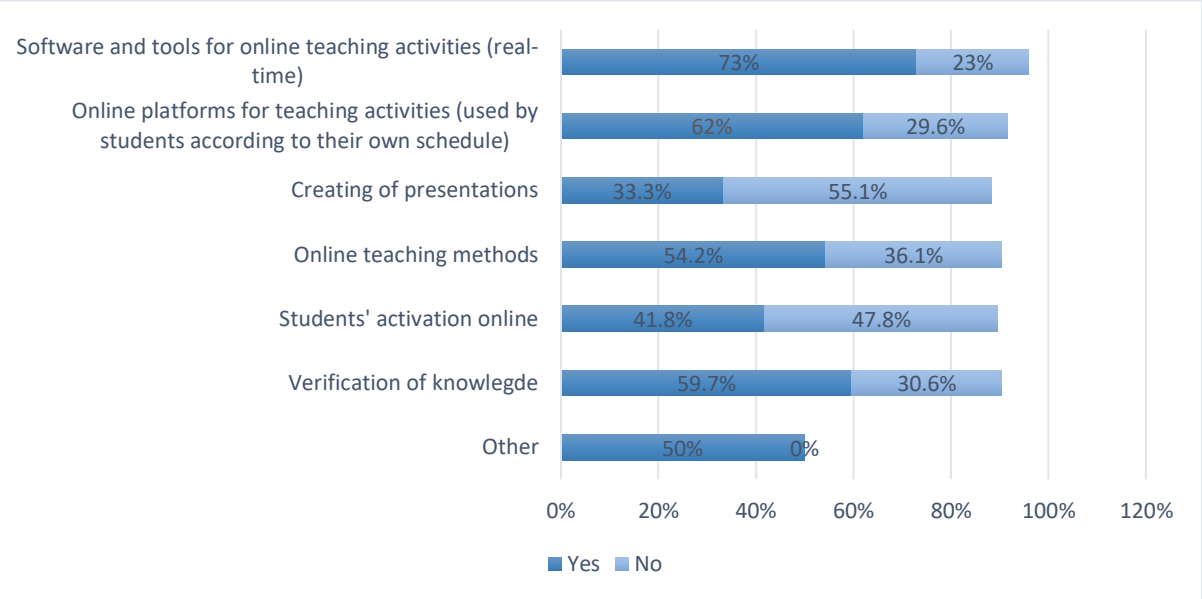

Figure 5.8. Have you received any training from your University for online teaching?

The trainings were organized mainly in the form of webinars (73%) or online meetings (70%). Information were either provided via the University intranet (58%) or in trainings organized at Universities premises (19%). Only about half of the respondents were satisfied with the trainings related to software and tools (45,8%) and online platforms (44,3%) for online teaching activities. The proportion of teachers who were satisfied with the knowledge they had acquired about creating of presentation (32,8%), verification of students' knowledge (31,3%), online teaching methods (27,9%), and students' activation online (22,8%) were significantly lower (Fig. 5.9).

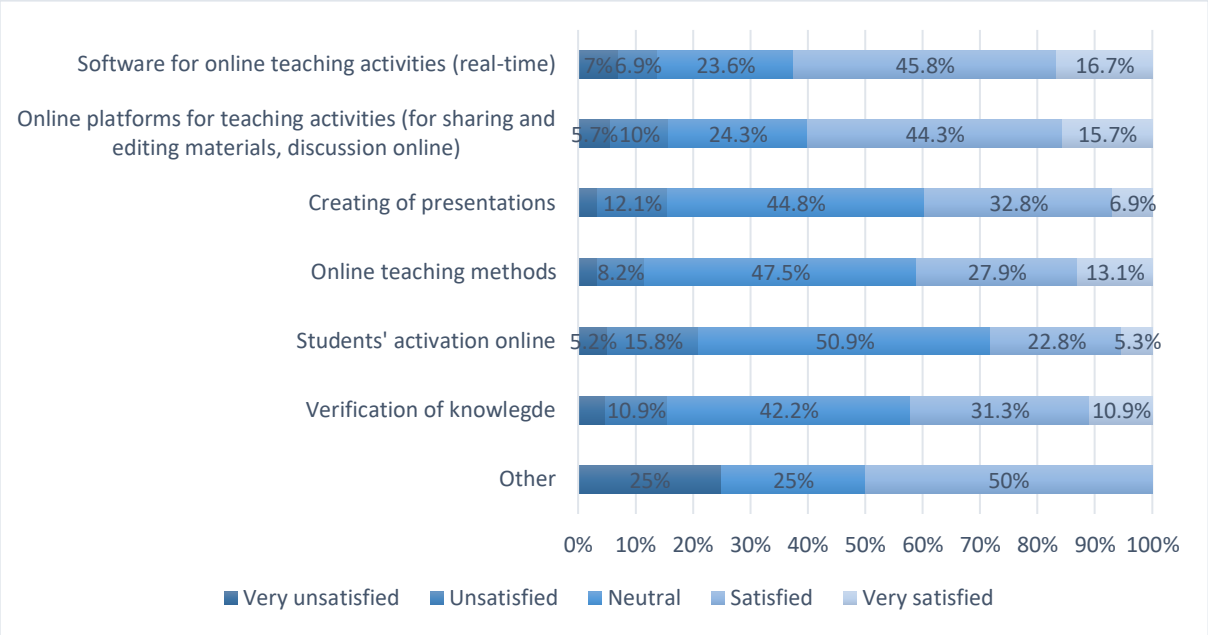

Figure 5.9. Please rate your experience about training and advice related to online teaching

One of the reasons why teachers were dissatisfied was due to the delay in providing the trainings after the insurgence of the emergency. Overall, more than 80% of teachers found different ways to overcome the challenges connected to the use of IT tools in online learning, and 39% of them reported a significant improvement in using online tools and platforms, or at least an overall progress in their skills (42,8%) (Fig. 5.10).

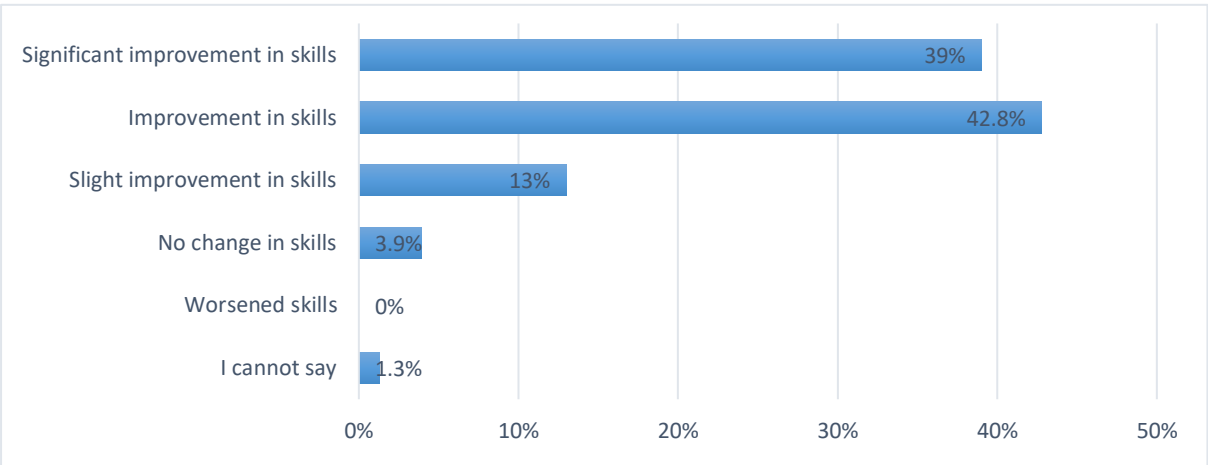

Figure 5.10. How would you consider your proficiency in using online tools and platforms?

6. REPORT ON SOFTWARE OR TOOLS USED FOR ONLINE TEACHING ACTIVITIES IN ITALY (University of Rome Tor Vergata)

Italian universities and academic teachers during the pandemic used a limited number of available software (Zoom 54%, MS Teams 98%, Skype 32%, Google Meet 26%), but quite a few have used additional solutions (Fig. 6.1). The use of MS Teams was prevalent both during and after the pandemic. Our participants mentioned additional solution such as Cisco Webex and Google drive.

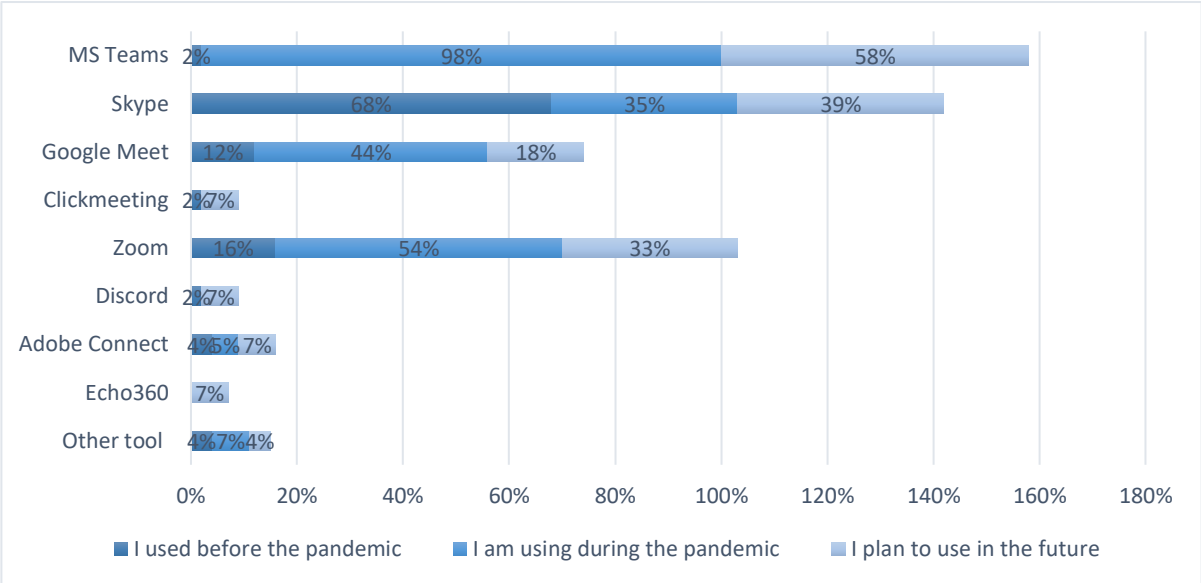

Figure 6.1. Software or tools for online teaching activities

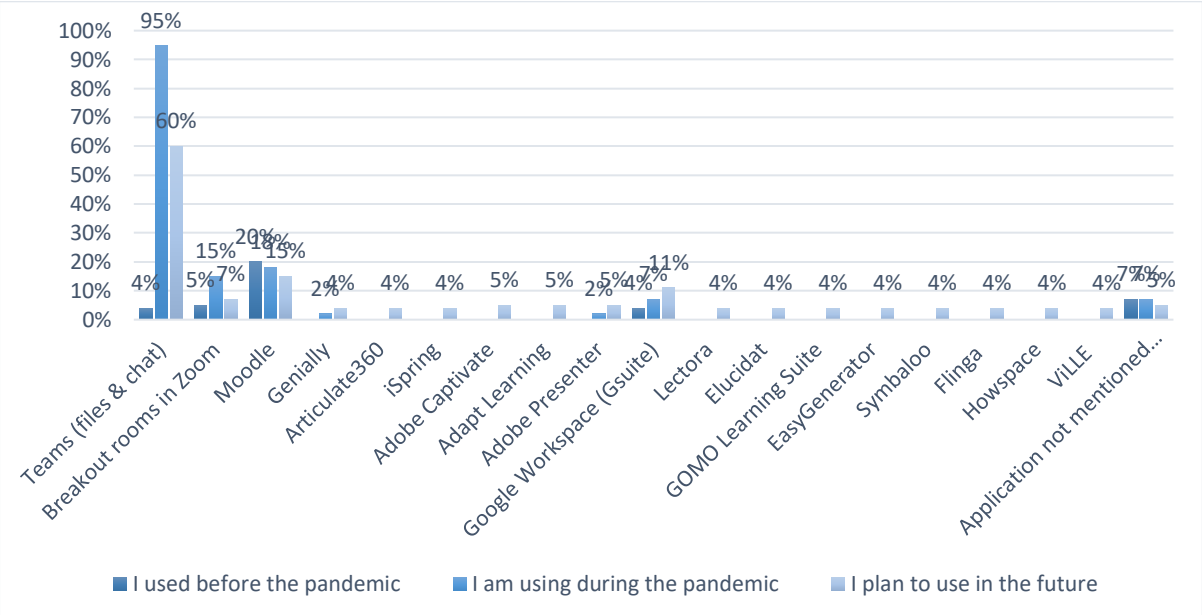

Figure 6.2. Platforms for online teaching activities

Different platforms for online teaching activities was used marginally, despite their broad range, where almost all of the participants chose to use MS Teams platform (95%) such as Teams - files and chat (Fig. 6.2).

The most widely used software for creating entire presentations or their elements was Power Point, before (89%), during (86%) and after (71%) the pandemic period (Fig. 6.3). Teachers rarely chose other software like LibreOffice, Google Slides, Prezi, Canva, PowToon, Symbaloo, etc. for creating presentations during online lessons, both before, during and after a pandemic. Some of the teachers mentioned the software Latex Beamer.

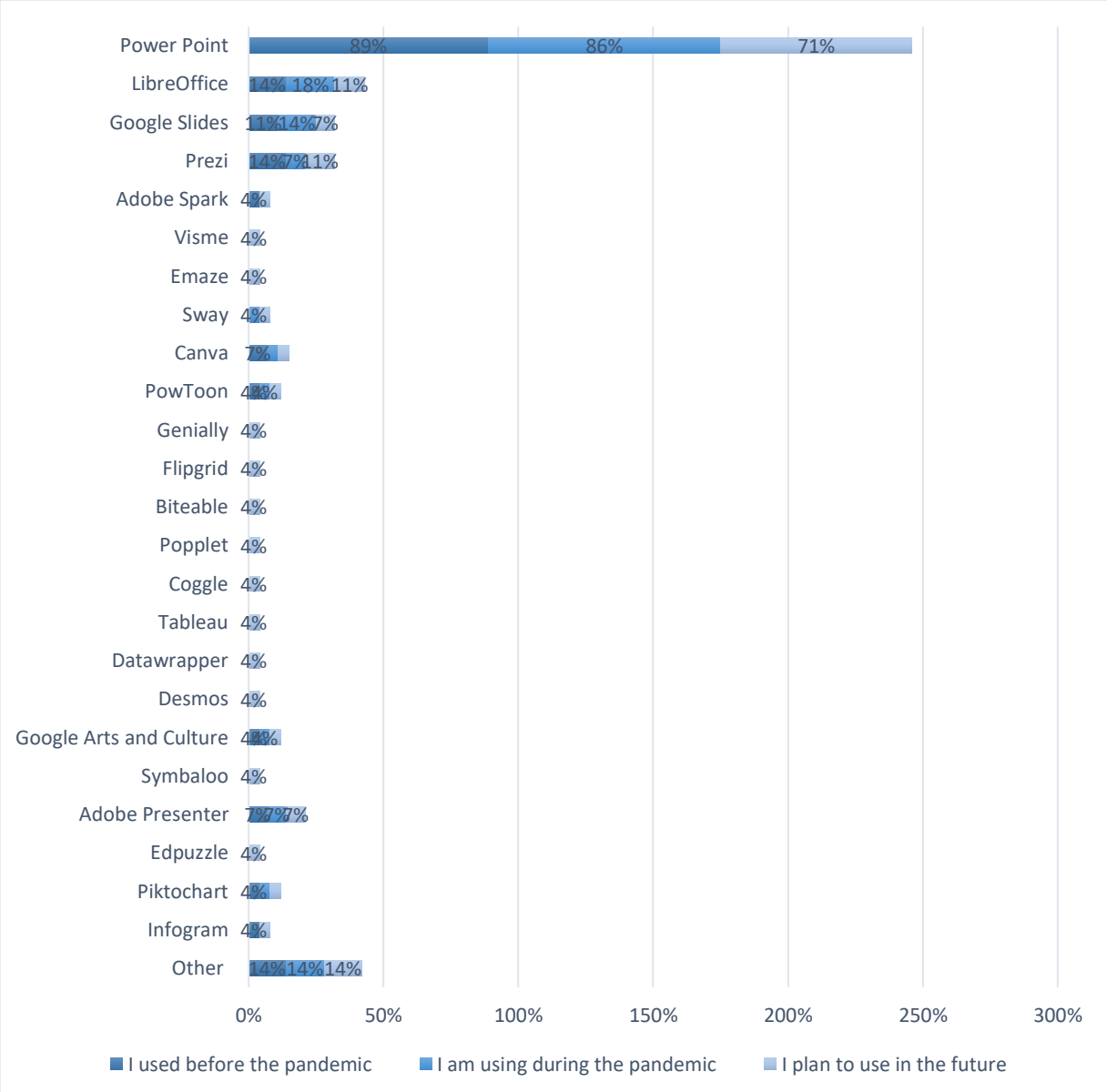

Figure 6.3. Software for creating entire presentations or their elements, connected to your teaching activities

Different online tools were chosen by teachers to engage students during lessons (Fig. 6.4). Some of the tools, such as Mentimeter (15%), Kahoot (15%), Google docs (23%) and Google slides (15%), were already used before the pandemic. During the pandemic a greater proportion of teachers incorporate in their lessons Google docs (46%), Mentimeter (31%), Kahoot (31%) and Google slides (23%). Part of our respondents were planning to use some of them also in the future, e.g. Mentimeter (31%), Google docs (23%), and Kahoot (23%). No other tools for students' activation during the lessons were generated interest or use in our participants.

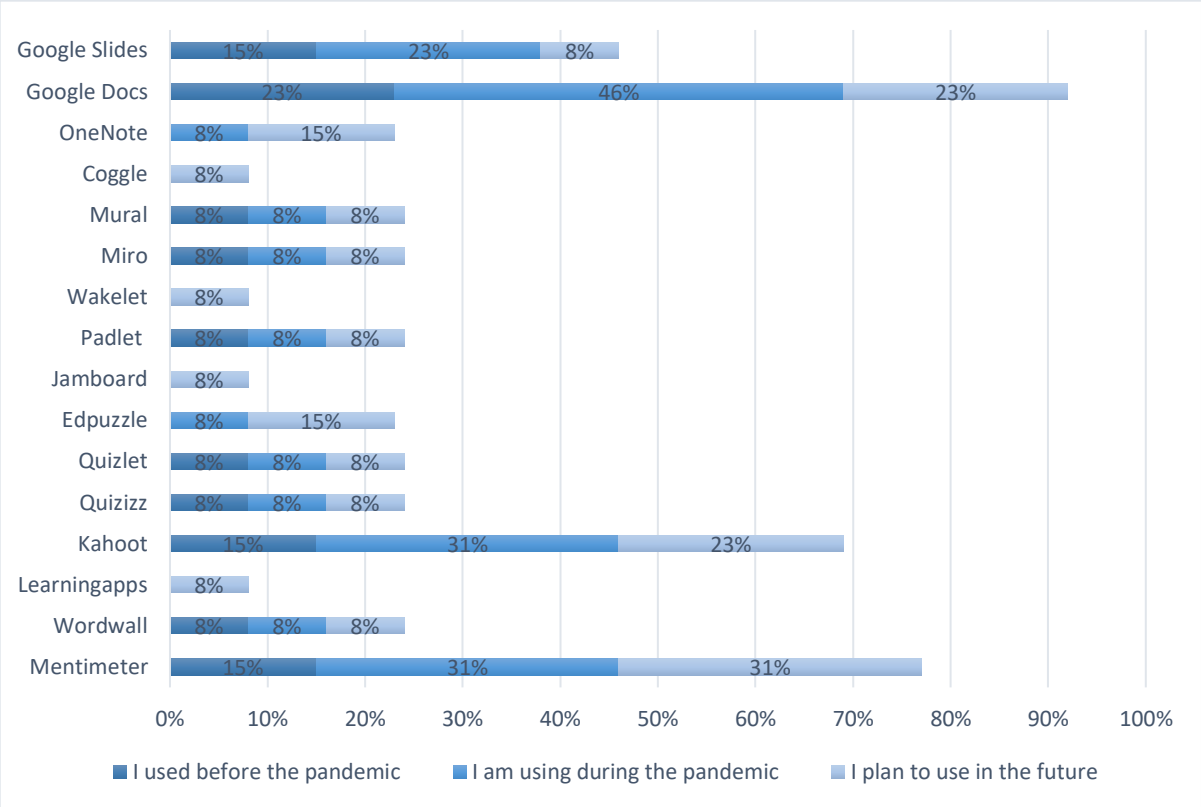

Figure 6.4. Online tools for students' activation during the lessons

Teacher found testing the students' knowledge very challenging. Online exams were administered using a variety of tools during the pandemic, including MS Forms (50%), Moodle (33%), and Google Forms (22%). Some teachers had concerns about using online tools for exams and changed the form from written exams to project work or research groups. In Italy, the use of online assessment tools was not widespread before the pandemic and teachers do not plan to use them in the future (Fig. 6.5).

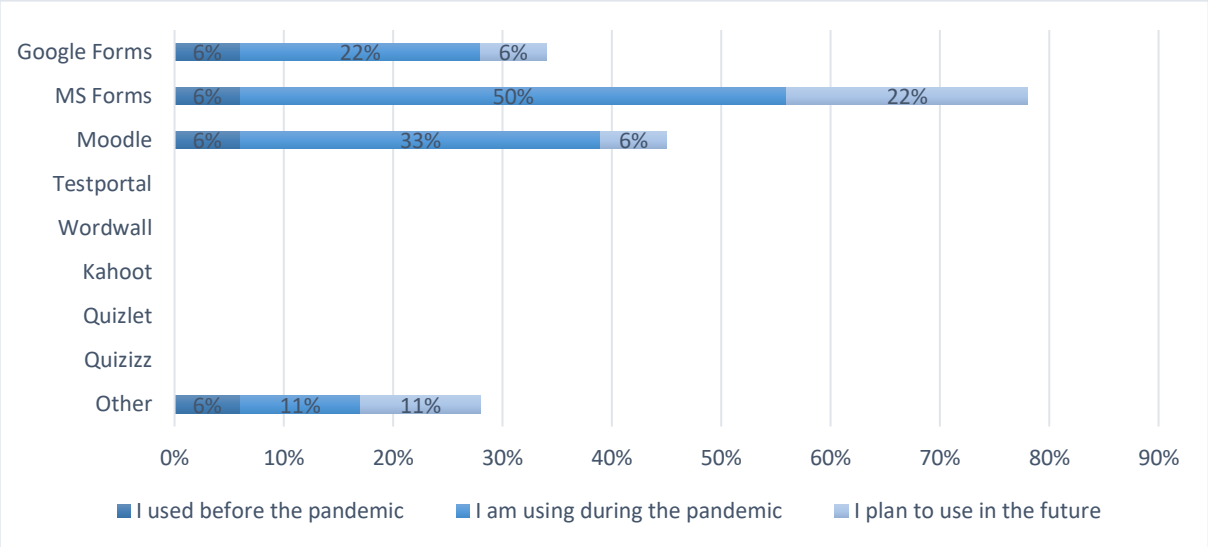

Figure 6.5. Digital tools for verification of knowledge

The relevant licences for online software and tools were in most cases provided by the universities (Fig. 6.6). Teachers had access to licensed software and tools for online teaching activities provided by the university (91%). Universities provided the greatest support for the use of Online platforms for teaching activities (for sharing and editing materials, discussion online) (82%) and tools for creating presentation or their elements (54%). To a lesser extent teacher were provided with licensing tools for students' activation during the lessons (33%) and for verification of students' knowledge (37%).

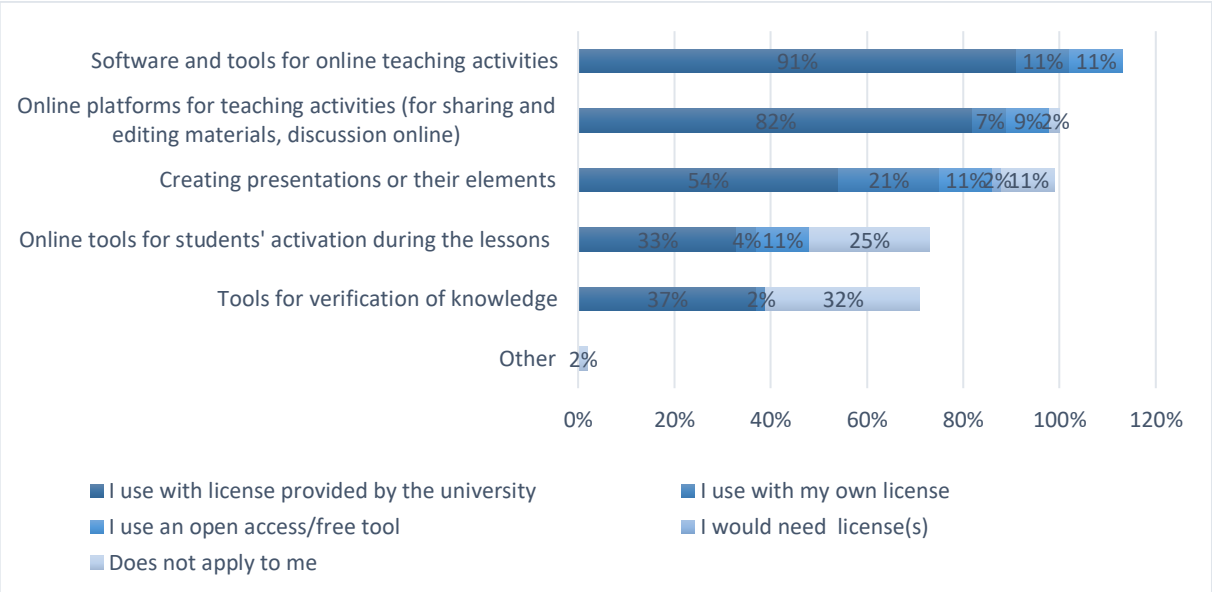

Figure 6.6. Licences for online software and tools

The necessary equipment in most cases were not provided by universities (Fig. 6.7). Some teachers who did not have the necessary equipment (graphical tablets, webcams or microphone) decided to buy them on their own or with the research funds.

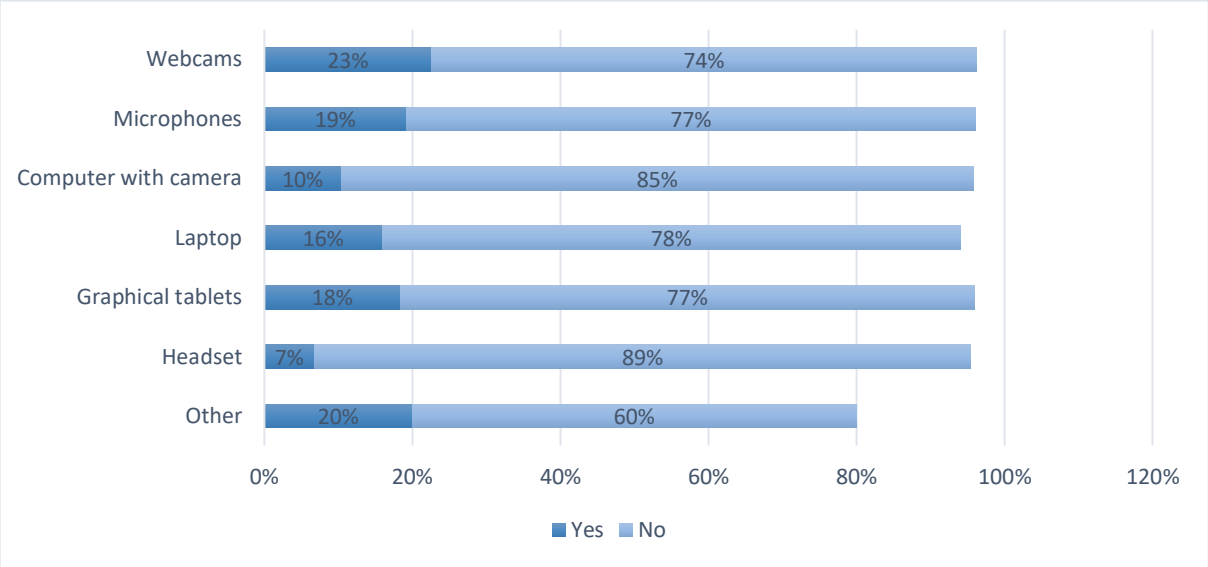

Figure 6.7. Did your University provide you with some dedicated equipment for carrying out teaching activities from remote?

Universities provided some support to overcome the difficulties that teachers faced in the use of new IT tools for online learning. In Italy especially, guidelines for the use of the MS Teams platform were implemented. Most of trainings organized by universities were focused on topics related to software, tools and online platforms for online teaching activities (63%). Additionally, trainings were organized for the use of online platforms for teaching activities (Fig. 6.8).

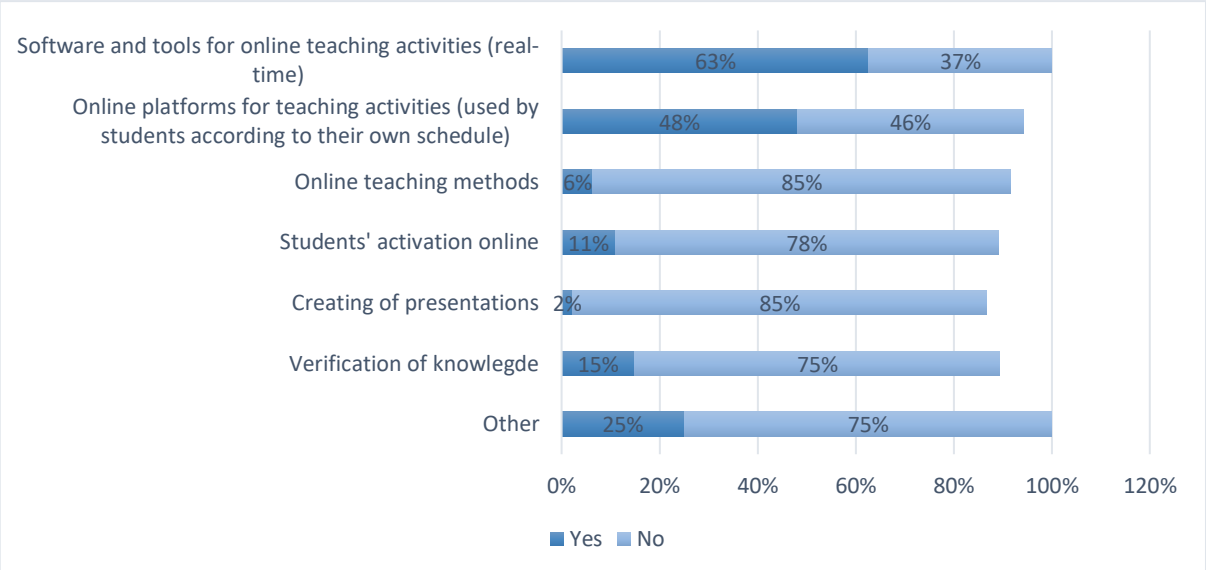

Figure 6.8. Have you received any training from your University for online teaching?

Only about half of the respondents were satisfied with the trainings related to software for online teaching activities (60%) and online platforms (44%) for online teaching activities. The proportion of teachers who were satisfied with the knowledge they had acquired about creating of presentation (42%), verification of students' knowledge (27%), online teaching methods (31%), and students' activation online (30%) were significantly lower (Fig. 6.9).

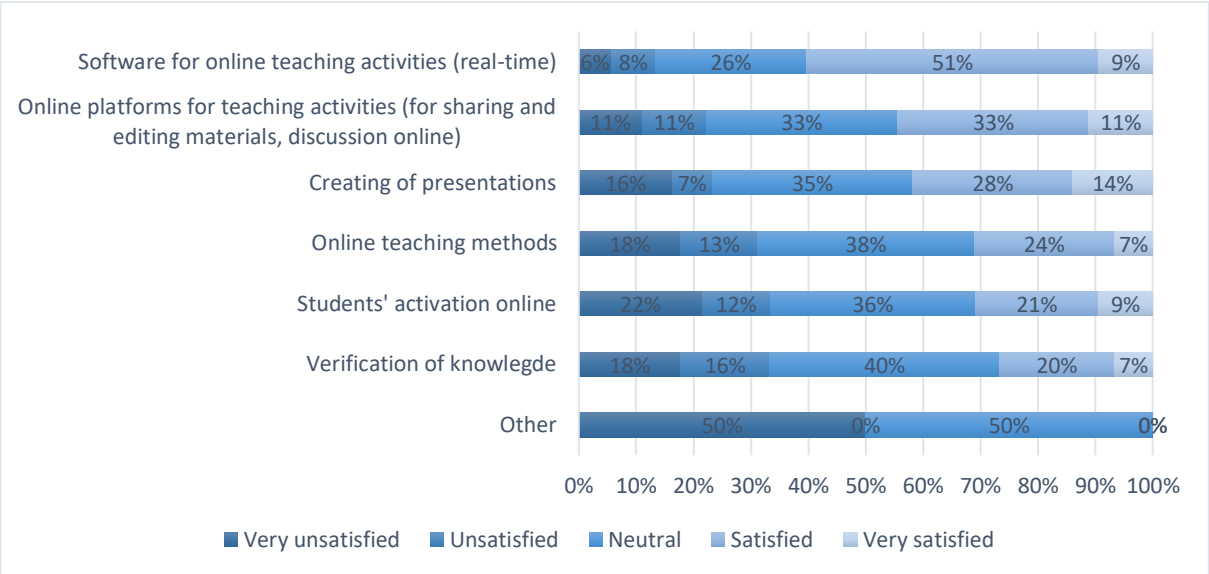

Figure 6.9. Please rate your experience about training and advice related to online teaching

Teachers found different ways to improve skills connected to the use of IT tools in online learning, 33% of them reported a significant improvement in using online tools and platforms, and 51% reported an overall progress in their skills (Fig. 6.10).

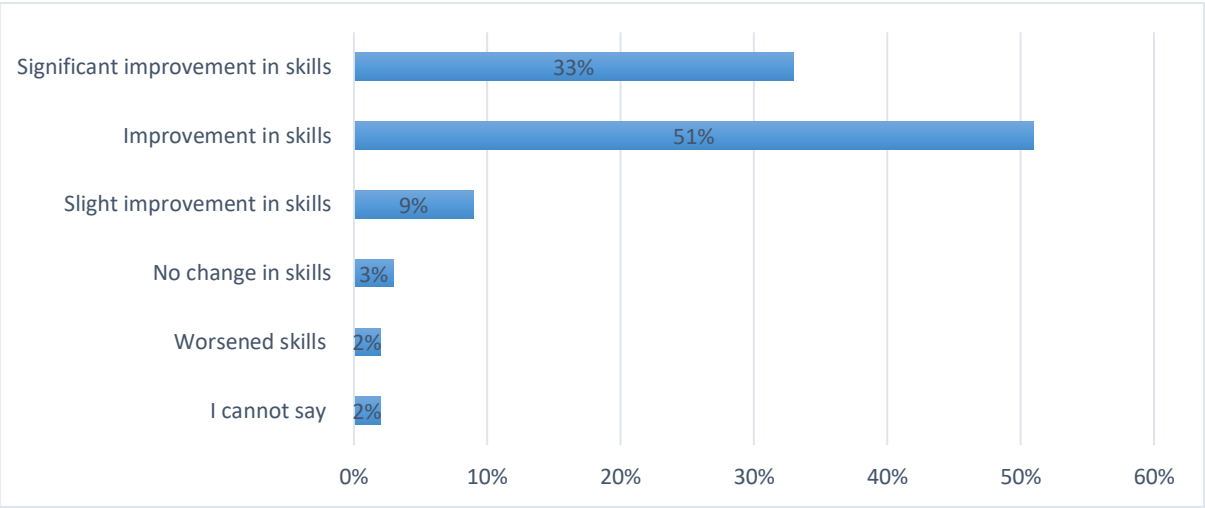

Figure 6.10. How would you consider your proficiency in using online tools and platforms?

RESULTS SUMMARY ON SOFTWARE OR TOOLS USED FOR ONLINE TEACHING ACTIVITIES ACROSS CUNTRIES

Software or tools for online teaching activities

The analysis showed that pre-pandemic teachers used a relatively limited number of software or tools for online teaching activities. Skype was the most commonly used (Croatia = 49%, Finland = 61%, Poland 49%, Romania = 46%, Slovenia = 67%, Italy =68%), followed by Google Meet (Croatia = 13%, Finland = 5%, Poland 6%, Romania = 12%, Slovenia = 12%, Italy =12%), Adobe Connect (Croatia = 16%, Finland = 29%, Poland 1%, Romania = 4%, Slovenia = 4%, Italy =4%), and MS Teams (Croatia = 13%, Finland = 27%, Poland 8%, Romania = 4%, Slovenia = 5%, Italy =2%).

During the pandemic, the number of tools used by teachers remained limited, but the new situation forced teachers to use software and tools with which they were previously unfamiliar. During the pandemic, teachers mainly used Zoom (Croatia = 77%, Finland = 97%, Poland 54%, Romania = 81%, Slovenia = 92%, Italy =54%) and MS Teams (Croatia = 59%, Finland = 73%, Poland 90%, Romania = 82%, Slovenia = 58%, Italy =98%). Google Meet (Croatia = 45%, Finland = 23%, Poland 26%, Romania = 51%, Slovenia = 26%, Italy =44%), was used to a slightly lesser extent

The level of satisfaction with these solutions varies, but some of them are likely to stay. Our participants mentioned other solutions such as Cisco Webex and Kahoot, the Big Blue Button, Panopto, OneNote, Jitsi, TIM, Digicampus and Eduflow, Sannaco Connect, Nudau, etc.

Platforms for online teaching activities

Online teaching platforms provide teachers with an easy way to communicate with students. Moodle is the most frequently chosen platform for online teaching before the pandemic (Croatia = 50%, Finland = 84%, Poland 33%, Romania = 37%, Slovenia = 60%, Italy =20%). All other platforms were only marginally used.

Despite the wide range of online platforms available, most of our teachers chose to use familiar platforms such as file sharing and chat in MS Teams (Croatia = 58%, Finland = 71%, Poland 82%, Romania = 82%, Slovenia = 57%, Italy = 95%), Moodle (Croatia = 68%, Finland = 84%, Poland 43%, Romania = 43%, Slovenia = 68%, Italy = 18%), or breakout rooms in Zoom (Croatia = 43%, Finland = 72%, Poland 20%, Romania = 42%, Slovenia = 69%, Italy = 15%). Only small numbers of teachers tried new solutions during the pandemic.

Teachers appreciated the benefits of using some platforms for online teaching activities and stated their intention to continue using them after the pandemic. Of all the platforms, they mostly appreciated the benefits of Moodle (Croatia = 50%, Finland = 69%,

Poland 36%, Romania = 37%, Slovenia = 62%, Italy = 12%), and MS Teams (Croatia = 28%, Finland = 45%, Poland 7%, Romania = 8%, Slovenia = 35%, Italy = 60%).

Software for creating entire presentations and/or their elements

The most widely used software for creating entire presentations or their elements was Power Point. Teachers preferred to use this software both before (Croatia = 90%, Finland = 83%, Poland 92%, Romania = 78%, Slovenia = 86%, Italy = 89%), and during the pandemic (Croatia = 79%, Finland = 83%, Poland 76%, Romania = 92%, Slovenia = 72%, Italy = 86%), and a great proportion plans to use it also in the future (Croatia = 67%, Finland = 65%, Poland 71%, Romania = 70%, Slovenia = 64%, Italy = 71%).

Prezi (Croatia = 27%, Finland = 19%, Poland 24%, Romania = 22%, Slovenia = 22%, Italy = 14%) and Google Slides (Croatia = 25%, Finland = 15%, Poland 8%, Romania = 24%, Slovenia = 19%, Italy = 11%) follow in pre-pandemic frequency of used software. Google Slides was used relatively frequently during the pandemic (Croatia = 23%, Finland = 10%, Poland 12%, Romania = 32%, Slovenia = 11%, Italy = 14%), followed by Prezi (Croatia = 12%, Finland = 10%, Poland 14%, Romania = 19%, Slovenia = 17%, Italy = 7%), and Canava (Croatia = 15%, Finland = 21%, Poland 14%, Romania = 14%, Slovenia = 8%, Italy = 7%). Some of the teachers mentioned MS Forms, Webex and Kahoot as other tools that were used during the pandemic.

Teachers appreciated the benefits of using software such as Google Slides, Prezi, Canava, and Kahoot for creating entire presentations or their elements and stated their intention to continue using them after the pandemic in similar proportion.

Teachers rarely chose other software like LibreOffice, PowToon, Symbaloo, Genially, Flipgrid, Sway etc. for creating presentations during online lessons, both before, during and after the pandemic.

Students' activation during the lessons

During the COVID-19 situation, the biggest challenge for teachers was engaging students in online lessons. Teachers had to work hard to find appropriate solutions and appropriate online tools that fit their subject and were easy for students to use. The teachers chose different online tools to engage students in the lessons. Some of the tools, such as Google docs (Croatia = 42%, Finland = 34%, Poland 33%, Romania = 33%, Slovenia = 30%, Italy = 23%), Kahoot (Croatia = 38%, Finland = 26%, Poland 26%, Romania = 5%, Slovenia = 25%, Italy = 15%), Google slides (Croatia = 15%, Finland = 6%, Poland 11%, Romania = 19%, Slovenia = 18%, Italy = 15%), and Mentimeter (Croatia = 8%, Finland = 15%, Poland 16%, Romania = 2%, Slovenia = 25%, Italy = 15%), were already familiar before the pandemic.

During the pandemic a greater proportion of teachers incorporated in their lessons Google docs (Croatia = 58%, Finland = 34%, Poland 41%, Romania = 58%, Slovenia = 43%, Italy = 46%), Kahoot (Croatia = 52%, Finland = 34%, Poland 29%, Romania = 14%,

Slovenia = 38%, Italy = 31%), Mentimeter (Croatia = 29%, Finland = 23%, Poland 28%, Romania = 21%, Slovenia = 43%, Italy = 31%), and in modest proportion OneNote (Croatia = 8%, Finland = 6%, Poland 23%, Romania = 23%, Slovenia = 10%, Italy = 8%), Google slides (Croatia = 25%, Finland = 9%, Poland 14%, Romania = 37%, Slovenia = 23%, Italy = 23%), Quizlet (Croatia = 15%, Finland = 4%, Poland 18%, Romania = 9%, Slovenia = 20%, Italy = 8%), and Padlet (Croatia = 19%, Finland = 4%, Poland 9%, Romania = 5%, Slovenia = 20%, Italy = 8%). Some of them have been well received by teachers who still intend to use them in the future, including Google Docs, Kahoot, Mentimeter, and Quizlet.

Online tools for verification of knowledge

Another issue that most teachers found challenging was testing students' knowledge. The most commonly used online tools for checking students' knowledge during the pandemic were Moodle (Croatia = 80%, Finland = 90%, Poland 49%, Romania = 39%, Slovenia = 82%, Italy = 33%), Google forms (Croatia = 36%, Finland = 7%, Poland 24%, Romania = 61%, Slovenia = 20%, Italy = 22%), MS forms (Croatia = 17%, Finland = 10%, Poland 56%, Romania = 63%, Slovenia = 16%, Italy = 50%), and Kahoot (Croatia = 27%, Finland = 19%, Poland 13%, Romania = 7%, Slovenia = 12%, Italy = /).

Most respondents used Moodle as a tool to create exams and intend to do so in the future. Google forms and MS forms were used to a lesser extent and the proportion is similar for intended use in the future, namely Google forms (Croatia = 32%, Finland = 7%, Poland 15%, Romania = 44%, Slovenia = 12%, Italy = 6%), MS forms (Croatia = 15%, Finland = 7%, Poland 56%, Romania = 63%, Slovenia = 16%, Italy = 50%), and Kahoot (Croatia = 27%, Finland = 19%, Poland 37%, Romania = 42%, Slovenia = 12%, Italy = 22).

Licences for online software and tools

In most cases, the appropriate licences for online software and tools were provided by the universities. Almost all teachers had access to licenced software and tools (79% - 95%) and online platforms (76% - 92%) for online teaching activities provided by the university. Licences for tools for verification of students' knowledge (37% - 74%) were provided to a lesser extent. Licences were also provided to faculty for creating presentations (45% - 73%) or their elements. Licences for activating students during lessons (33% - 59%) were provided the least, which is also reflected in the greater use of freely available tools (11% - 39%).

To create presentations, teachers also used open access tools (11% - 33%) or private licences (16% - 33%). They also used open-access tools (5% - 22%) or private licences (1% - 16%) for checking students' knowledge. In the case of some freely available tools such as Miro, Canva, Wakelet or Mentimeter, respondents also indicated their willingness to use advanced premium options available only in the licenced version.

Equipment for carrying out teaching activities from remote

Although teachers reported almost no problems related to digital equipment for remote online teaching (identified in IO1 Deliverable 1. Report on identified challenges and problems), the university's provision of technical equipment in the form of computers, cameras, headsets, and webcams was inadequate. The provision of laptops for teachers was still the best compared to other equipment (Croatia = 51%, Finland = 77%, Poland 47%, Romania = 55%, Slovenia = 55%, Italy = 16%). A small proportion of teachers indicated that the webcams (Croatia = 37%, Finland = 41%, Poland 20%, Romania = 25%, Slovenia = 29%, Italy = 23%) or microphones (Croatia = 31%, Finland = 44%, Poland 20%, Romania = 19%, Slovenia = 25%, Italy = 19%) were provided by the universities. Some teachers who did not have the necessary equipment (graphics tablets, webcams or microphones) decided to buy them on their own.

Training provided by university for online teaching

Universities provided varying degrees of support for faculty to use software and tools for online teaching. To some degree, universities offered support to overcome the difficulties that teachers faced in using the new IT tools for online education. Most of the respondents (70%) had received training for software and tools for online teaching activities (real-time) (Croatia = 65%, Finland = 70%, Poland 80%, Romania = 81%, Slovenia = 73%, Italy =63%) and for online teaching platforms (Croatia = 63%, Finland = 61%, Poland 72%, Romania = 92%, Slovenia = 62%, Italy =48%). In addition, trainings were organized to improve teachers' knowledge of online teaching methods (Croatia = 43%, Finland = 58%, Poland 50%, Romania = 51%, Slovenia = 54%, Italy =6%) and to check students' knowledge (Croatia = 48%, Finland = 41%, Poland 50%, Romania = 60%, Slovenia = 59%, Italy = 15%). Student activation was one of the main problems and only a limited percentage (Croatia = 24%, Finland = 48%, Poland 24%, Romania = 49%, Slovenia = 41%, Italy = 11%) of teachers received training on this topic. However, too little attention was paid to support in creating presentations (Croatia = 17%, Finland = 32%, Poland 21%, Romania = 30%, Slovenia = 33%, Italy = 2%).

Rating experience about training and advice related to online teaching

In evaluating training and advising on most online teaching topics, academic staff rated their experience as neutral or unsatisfied. Only about half of respondents were satisfied with training related to software (Croatia = 44%, Finland = 51%, Poland 57%, Romania = 46%, Slovenia = 51%, Italy =51%) and online platforms (Croatia = 42%, Finland = 44%, Poland 51%, Romania = 44%, Slovenia = 33%, Italy = 44%) for online teaching. Again, the problem was training on student activation methods. According to the respondents, training on online student activation (Croatia = 13%, Finland = 27%, Poland 20%, Romania = 21%, Slovenia = 34%, Italy = 21%) and knowledge verification (Croatia = 19%, Finland = 30%, Poland 13%, Romania = 15%, Slovenia = 34%, Italy = 13%) were

very unsatisfied or unsatisfied. The situation was similar for training in online teaching methods (Croatia = 6%, Finland = 25%, Poland 9%, Romania = 11%, Slovenia = 31%, Italy = 11%).

Proficiency in using online tools and platforms

Teachers' opinions on whether their skills in using online tools and platforms improved during online teaching in the period COVID -19 compared to the pre-pandemic period were positive in most cases. Almost half of them felt that skills had improved (Croatia = 50%, Finland = 49%, Poland 42%, Romania = 38%, Slovenia = 43%, Italy =51%), and about a third (Croatia = 31%, Finland = 30%, Poland 47%, Romania = 46%, Slovenia = 39%, Italy =33%) felt that the improvement was significant.

INTRODUCTION PART II

Delphi analysis

Response of experts from Finland, Romania, Poland, Croatia, Italy and Slovenia.

Consensus view across subject experts.

There are some technology-related benefits of online learning, such as accessibility, affordability, and flexibility, but the unexpected shift from face-to-face to online education required a relatively rapid and unplanned adjustment from the universities, with varying degrees of preparedness to use the online education platforms and tools from both academic staff and students.

One of the main issues regarding online learning is that the length of the class is inversely related to students' motivation, which is a major concern. This decrease of motivation reflects on decreased student engagement, which in turn can translate into poorer academic performance. The online teaching is quite demanding also for teachers. While Universities that were already offering online education before the pandemic had a head start and transitioned quite smoothly, those that were mostly focused on in-person activities before the COVID-19 forced them otherwise had to deal with pedagogical and technical aspects that they were often not prepared for.

To understand these transitions and all the difficulties brought with it, we aim to analyses the situation in six different countries. For the analysis we used the Delphi method. In this analysis, we develop opinions that describe potential view of problems related to online education. These opinions can support some lessons learned and best practices that can be used in the future.

The Delphi method was first developed in the 1950s to predict the impact of technology on warfare. Later, its application was extended to other fields, such as health care, education, management, social and environmental science. The Delphi method could basically be done as anonymously answered questionnaires, with feedback representing the "group response." Their answers need to be discussed and revised to see if they can reach an expert consensus.

The opinions development of our experts was based on a two-round Delphi survey with 30 teachers from five countries. The experts who participated in the Delphi study assessed each of projections.

FIRST ROUND OF DELPHI ANALYSIS

THE RESULTS SUMMARY

The group response includes the answers of experts from Croatia, Finland, Italy, Poland, Romania and Slovenia.

Question1	From the report, it was clear that most teachers had marginally used remote teaching, before the COVID-19 pandemic. In your opinion why was this the case?
	University regulatory policies – some faculties (especially in Finland) have a long-standing tradition of online teaching, but some other universities are quite restrictive in this sense as they perceive online teaching as "less valuable". *Opinions:* 1. *Lack of technical skills or training.* 2. *Face-to-face teaching perceived as more efficient.* 3. *Difficulties in implementing online some activities (e.g., laboratory or field work) that are part of the course.* 4. *High in person attendance before the pandemic, so no real perceived need to implement online teaching.* 5. *Limited confidence in the devices and related methodologies.*

Question2	Considered that the use of online platforms for teaching from remote was marginal, which opportunities could have been missed, by sticking to a widespread use of in-presence lessons?
	Experts cited the following missed opportunities (i.e., benefits of remote teaching). *Opinions:* 1. *Online learning platforms enables programmed learning.* 2. *Online tools allow the simultaneous examination of many students.* 3. *Enable personalization (content, access, feedback).* 4. *Participation of a more diverse group of students (e.g. those who work, limited mobility, special needs, etc.).* 5. *Lower costs (direct and indirect).* 6. *Classes can be delivered also when the teacher is prevented from giving onsite lectures (e.g., business trip).* 7. *Greater participation of external lecturers.* 8. *Greater student activity, exchange of opinions and material, discussions, all activities that help developing critical thinking.* 9. *Possibility for students to go through the lecture several times or to listen when and where they are most receptive.* 10. *Students learn time management.* 11. *Easier communication for students that are now mostly used to communicate using it tools, which might allow even shy students to contribute.*

Question2	Continues
	12. *Online tools, by engaging students in a different way than traditional teaching, significantly support and extend their concentration time and trigger other cognitive processes.* 13. *Online tools allow for efficient monitoring of student progress.* 14. *To further support interactive learning, more independent work is required from students, either individually or in groups.* 15. *Faster and more frequent possibility of consultations with students.* 16. *Better teaching process for courses that use computer support of other software because screen sharing is better than whiteboard.* 17. *More flexible working hours.* 18. *Advances in digital literacy for both teachers and students.* 19. *Greater involvement of students in the research process.*

Question3	In your opinion, who should be responsible for ensuring that teachers have adequate knowledge of online teaching methods and techniques?
	Opinions: 1. *All experts agreed that it is mostly the responsibility of the university or faculty and it is the responsibility of the employer to organize support, equipment and training. This should happen either in a centralized way or with the university providing support to the faculty that then implements the strategy tailoring it to the specific needs of the course taught.* 2. *Another solution proposed was that the ministry / government could support universities in providing these types of emergency solutions, but on the other hand, these trainings and staff are not only for the pandemic, they are needed also in "normal" times.* 3. *Some respondents stated that both the employer and we, the teachers, should be responsible for ensuring that we have adequate knowledge of online teaching methods and techniques. We, as teachers, have the obligation to adapt to the needs of our students and the context in which we must teach, and for that we have to try to get the needed knowledge. The prevailing opinion is that courses, workshops, etc., are not enough if there is no motivation of teachers to learn, to change and accept new online teaching methods. It was pointed out that one's own experience of attending an online course brings much more benefits and knowledge than listening to workshops on how to organize and conduct an online course. The university should, in turn, provide the necessary devices, licenses and other materials as needed, together with the corresponding training.* 4. *Ultimately, everyone agreed on that the whole university community has responsibility to support individual teachers and both we as teachers and the institution have the responsibility to update our knowledge related to online teaching and adapting to the needs of society, respectively to the requirements of the labour market.*

Question4	In your opinion, during the shift to online teaching, which were the strongest challenges associated with student engagement, that university teachers faced?
	Opinions: 1. *The lack of familiarity with online tools and forced speed of the transition led to a transfer of classroom teaching to the online system. Consequently, we taught only online and had no experience integrating other methods/tools to actively engage students.* 2. *"Incorrect" implementation of online teaching, with mere upload of file or lengthy presentations.* 3. *Engage students in discussion of the chosen issue and to solve defined research problems together.* 4. *Unwillingness of students to participate since they could "hide" behind a temporarily non-functioning device or quality of the internet connection. Although these were in many cases actual problems, they were also used as excuses.* 5. *Decreased attention.* 6. *Some students did not know how to use computers to monitor (active) teaching, and the quality of the Internet did not always allow planned interaction (the challenge is to follow trends in technology used by young people, not to apply it, but to better understand them as teachers).* 7. *One challenge is that techniques are inoperative and incomplete, as well as rigid, thus not all the ideas can be implemented.* 8. *General non-compliance with work etiquette in the digital environment.* 9. *Social isolation experienced by students, which for many led to decreased motivation and energy to study and engage in discussion. Reduced social interactions led to decreased engagement and motivation, some students lamented the superficial and isolated implementation of even group activities.* 10. *Psychological barrier limiting the freedom of expression in remote classes.* 11. *Teachers' inability to discern the conditions of the student.* 12. *Inability of lecturers to give the student a sense of individual treatment. Teachers who used modern approaches - a student-centred way of working - did not have major problems with the transition to the web.* 13. *Practical activities could not be correctly implemented, students recognise the usefulness of those activities and were dissatisfied they were not able to attend. Although the use of videos provided the background theoretical knowledge, the practical skills were not acquired by students.* 14. *Prejudice of teachers towards online teaching.*

Question5	In your opinion, during the shift to online teaching to what extent did teachers became better at engaging students?
	Opinions: 1. *A significant number of experts doubt that teachers engage students better during the switchover to online teaching than they did before.* *Experts agree that the activation of students, regardless of the mode of teaching, is related to the diversity of the student group in terms of personality type.* 2. *Some even say that they have become worse at it than before.* *For some courses (e.g., computer science) it is easier to engage students online by reducing the lecture part in favour of the practical application of some activities. However, this is of more difficult implementation for other disciplines (e.g., laboratory exercises).* 3. *Other state that teachers have not only improved their skills in using IT solution but have also started to think about other teaching methods.* *Teachers understood students were better motivated in solving homework's, working in teams for certain topics especially when motivated with points/grades/bonuses. They were also motivated when hearing about deadlines.* *Some teachers asked more questions during the lessons, encouraged more, and kept checking if the students were following along.* *Certain positive changes have been noted in asynchronous student engagement (new online activities are being developed - forum, uploading documents, videos, discussions, etc. - teachers have become more creative), but in synchronous engagement (during class) teachers fail to motivate students. Most teachers were not able to do this and just held ppt slides and spoke to the screen.* *Increasing students' awareness that they are responsible for their own academic progress.* *In Finland most of the respondents agree that the "rules of engagement" were understood better. If we want students to participate, we need to be very clear how and what we expect of them. Loose instructions are not good and they learnt when and how we engage students.*

Question6	Based on your experience with student engagement, was any lesson learnt from the shift to online teaching? Is there anything that was learnt by university teachers and that could be useful in the near future?
	The experts mentioned the following positive experiences that can be used in the future: 1. *We have learned how to conduct online knowledge tests effectively and that there is no difference between face-to-face and online tests if they are well organized.* 2. *Expanded opportunities for working and communicating with students (e.g., holding consultations when the teacher is officially absent, recording lectures when the teacher is unable to give a live lecture, and having students use recordings at a time convenient to them (important for part-time students), greater use of other diverse media to help students master material / adopt learning outcomes).* 3. *Knowing that student engagement should not be forced: they will come when something is interesting to them, call when they want to, but listen without response when it is not necessary (e.g., scored).* 4. *Teachers have evolved both digitally and technologically. They have invested in equipment, tried numerous tools, and attended training on aspects of online education they felt more relevant.* 5. *Teachers learnt that, despite they cannot and should not blame themselves for the students' social isolation, what they can do is being friendly and mindful of their special situations by offering empathy and maybe a bit of humour. They were reminded that it is important to take human nature into account.* 6. *Student peer-discussions on course topics in zoom breakout rooms work really well, and motivates active participation in (synchronous) online teaching. Break out rooms can be used for presenting and discussing students' work, but also to meet, introduce themselves, and agree upon the practicalities on how to work on the course project (division of the tasks, working schedule, communication among the group, and agreeing on joint working rules). This allows them to get to know each other which in turn helps to build trust, eases knowledge sharing and communication among the group, and supports deep-oriented learning.* 7. *It is good practice to test participants' basic knowledge at the end of a lecture.* 8. *Activating students by having them presenting what they are doing and having the members of the group helping in solving the problem at hand, in this way, everyone is involved, and the presenter is often as unprepared as the rest of the class. Sometimes this way of training is full of excitement and usually allows the student's true potential to be uncovered, raising it quickly; also, this method allows the teacher to explain things that they have never presented in a lecture. If the student performs the task so that everyone can see the solving process, very often mistakes and problems can be shown, identified, and solved.* 9. *Teachers became acquainted with different methods of student activation and can now select those which work best in specific classes.*

Question6	Continues
	10. *We learnt that in crisis/extreme situations, online learning can replace (to a large extent) face-to-face teaching. It can be applied not only to whole groups of students but also to those who for some important reason (health, etc.) cannot be at the university.* 11. *Remote classes can be used to complement traditional ways of teaching.* 12. *Adaptability is very important and that also the teaching activities must be adapted to the context.* 13. *Adapting our offer to students' needs increases students' attendance.* 14. *The teacher should have more autonomy - they know the subject, they have the learning outcomes in mind, they know the students, so they should be allowed to decide how to implement what and in what way. Instead of counting the hours, we should move to a different way of assessing the teacher's work and hold the teacher accountable for achieving the learning outcomes.* 15. *Blended learning should be recognised as one of the possibilities.* 16. *It would be useful to provide more video material so that students can watch it over and over again and internalise the topic better.*

Question7	In your opinion, during the shift to online teaching, which was the most challenging aspect related to communication with students?
	The experts' opinions on the aspects of communication with students are divided. *Opinions:* A. *<u>The experts' majority agreed on the following problems related to communication with students during lectures:</u>* 1. *Experts note that the biggest challenge in communicating with students was the conditions under which it took place (sudden shift).* 2. *If the nature of the course is such that writing must be done on a whiteboard, the computer is usually useless, so teachers obtained special writing boards at their own expense.* 3. *They often complained that there was a lack of feedback from students.* 4. *There was no way to observe what students were doing, for example, how they reacted during the lecture.* 5. *Lectures often resembled conversations recorded as podcasts or video tutorials, where interaction between listeners is limited.* 6. *Most technical problems created difficulties in the teaching process. Not all students had access to equipment and internet connection to participate as actively as possible in the sessions. In some cases they could not attend because they were in the household with others who were also attending the lecture online at that time.* 7. *Some students are hesitating to ask for advice if something is unclear to them before they started the coursework. Misunderstandings could be seen only after they had returned their coursework.*

Question7	Continues
	B. *<u>Some experts felt that communication was better, namely:</u>* 1. *Because lectures were held online, many more 1:1 meetings were possible. Zoom or teams allowed for quick resolution of outstanding issues.* 2. *Much of the communication with students was online in forums.* 3. *Communication with students became easier as there are several good communication channels.* 4. *Scheduling zoom meetings is easier, regardless of our geographic locations. It is easier to find appropriate times for both without having to travel.* 5. *Using teams made it much easier to keep track of communication within a course and with a particular student, and we could easily share files with each other.* 6. *Students used this additional form of support more frequently and willingly than in traditional courses.* 7. *Getting students to participate in discussions, feeling that it was okay to ask, and getting the group to form a group.* C. *<u>Experts also point to the importance of group size:</u>* 1. *In small classes, communication was of much better quality and smoother, and student progress was easier to manage and monitor.* 2. *However, in large groups (more than 100 students), the opposite was true - very little and poor communication. Lack of contact, especially with larger groups of students.* D. *<u>Problems related to communication with students outside of lecture hours:</u>* 1. *Inadequately defined communication channels.* 2. *Communication with students was largely limited to written communication. Although clear rules for communication were established, students sometimes ignored them and contacted teachers simultaneously via email, messages in teams, zoom, and moodle. This resulted in a heavy burden on teachers and miscommunication.* 3. *Providing feedback is the most time-consuming and difficult task. In asynchronous teaching, written feedback is important to motivate students and show them what they have learned well and what they need to improve above all.* 4. *Communication is so much more than just words spoken and online or written communication hinders part of it.*

Question8	In your opinion, during the shift to online teaching did teachers became better at communicating with students? To what extent?
	Opinions: A. *<u>Not improved:</u> all Croatian and Polish experts and part of Slovenian agree that communication has not improved.* 1. *Teachers struggled more in this situation.* 2. *In face-to-face classes, teachers receive nonverbal feedback from students and can adjust feedback accordingly. In online classes, this type of feedback is missing, so we have to adjust our message to what we think was understood.* 3. *The teachers got better at communicating, but unfortunately the students also thought they were available 24/7 for communication. At one point this became quite insulting and exhausting. Some Slovenian experts even suggest that, due to the increased load of e-mails and other online notifications, it was even more likely to miss a message from a student.* 4. *However, many Polish experts indicate that teachers have become more flexible in adjusting session times to students' needs.* 5. *Some students are making slightly more use of remote consultation (connecting to discuss a project idea - in a traditional "office hours" setting, they would not always want to come in and speak directly at a specific time), or they are emailing more frequently with updated information.* B. *<u>Improved:</u> while Romanians, Finnish and part of Slovenian experts reported more positive experiences, with some Finnish universities developed targeted platforms that slightly helped, but does not yet solve alone all communication problems.* 1. *Many experts state that teachers learnt to use various forms and channels of communication with students (at a very good level), such as online consultations, seminars, more information posted on the Internet, but communication during lectures and classes did not improve.* 2. *Teachers adapted the language so they could understand better. They adapted to discuss with them in messages when they had questions, could not participate in class or could not speak.* 3. *Teachers found many smart ways to reach students by offering Q & A sessions, encouraging students to contact the teacher by e-mail or via Zoom. Some teachers offered "virtual appointments"* 4. *Teachers learnt to provide more written instructions, which benefitted learners who learn better by reading and writing.*

Question8	Continues
	5. *Teachers learnt they need to be more explicit, clear and transparent. Communication should always be easy and give no room for interpretation. This has sometimes failed.* 6. *During lectures offered via Zoom, teachers activated students by short polls, group discussions (in break-out rooms), or preliminary questions sent before the lecture.* 7. *Overall, it is a human problem, with a strong influence from the personality of the people involved and it also depends on how much time they took to prepare the lectures, to give instructions to the students, how to communicate with them, with other students or through IT.*

Question9	Based on your experience with communication with students during online teaching, was any lesson learnt? Is there anything that was learnt by university teachers and that could be useful in the near future?
	All experts noted that the time of the epidemic and online learning had drawn their attention to forms of communication as such, e.g. that it is necessary to recognize the differences between generations and the fact that young people are much more accustomed to fast communication using IT tools than older generations. Teachers also appreciated the possibility to communicate quickly, especially when it comes to consultations or seminars and discussing theses. When it comes to communicating with the whole team at the same time, they point out the inadequacies of IT tools such as Zoom or MsTeams, which do not show, for example, what all students are doing at any given moment. *Lessons learnt in the communication with students. Opinions:* 1. *When given a choice, students prefer mail to oral communication.* 2. *It is necessary to establish clear rules at the very beginning of classes, to provide very detailed information that must be constantly available to reduce the pressure of students on teachers through countless e-mails.* 3. *The knowledge of the enormous possibilities offered by teaching in a virtual environment can be considered the most useful lesson learned if universities will be willing to invest more in the development of institutional platforms in the future.* 4. *Multiple tools are available for communication with students.* 5. *Online communication has given students confidence to express themselves.* 6. *We have learned that we can involve students more in certain teaching processes by asking for feedback more often or allowing them to make decisions.* 7. *Considering that we are educating young people who will work in digital environments, we should strive to maintain online communication and work with online learning environments, since they need to acquire (if they do not already have) online communication skills, not only synchronous (zoom, chats) but also asynchronous.*

Question9	Continues
	8. *This is an excellent opportunity for argumentative discussion via forums that allow for the development of critical and argumentative debate, an important 21st century skill.* 9. *There have been changes to communication in that students have been encouraged to hand in their assignments and communicate via moodle, rather than just via email, as there is also much better transparency. It would be useful to maintain this approach in the future.* 10. *New interactive methods can be a good way to deliver lessons even if live classes cannot take place for some reason.* 11. *Learning tasks that require the participation of the whole group in written tasks and joint discussion through it work best in online education. Although, for example, moodle is not very well adapted to the assessment of such tasks. The tools started to use during the pandemic (especially teams and zoom) are much preferable to the ones used before (email and moodle messages).* 12. *Clarity and transparency will be important in the future as well.*

Question10	In your opinion, during the shift to online teaching, which was the most critical part, for teachers, about learning how to use tools for online learning?
	Opinions: *In the experts' opinion the technical shift to online teaching and programs were the least difficult challenge. A part of the experts stated that neither they nor their colleagues had problems with the transition to online teaching, as they had already completed an accredited online study and used learning platforms.* A. *<u>No problems with the transition to online teaching</u>* *Another part of them stated that they were on their own in finding ways to better organize their teaching. Most experts believe that the most difficult part was learning to use the numerous functionalities of online learning platforms and IT tools. Some indicated that they did not have sufficient instructions on how to use these tools, but most admitted that learning to use IT tools during their classes was not very difficult and they quickly got used to this form of teaching.*

Question10	Continues
	B. *<u>The critical aspects they cite are:</u>* 1. *The use of tools to conduct synchronous teaching in real time.* 2. *Ignorance of the technology, its use and the possibilities it offers, as well as insufficient time to adapt due to a sudden situation.* 3. *The main disadvantage of the online teaching system is the fact that teachers do not see students during classes, there is a lack of visual feedback.* 4. *One challenge mentioned was to understand if and how planned activities should be changed when using online tools.* 5. *Critical part was to resolve critical situations such as disconnection or inability to connect for students due to technical issues.* 6. *To learn about the tools that we can use for better engaging the students and learning how to use them and which are the most appropriate for our different disciplines.* 7. *Especially an adaptation of the teaching material for online classes; especially for the specific activities like lab courses, tasks that require active student engagement.* 8. *Lack of equipment at home.* 9. *Conflict with family duties.* 10. *Lack of time to properly acquire the necessary skills.* 11. *The lack of freedom in choosing a platform deemed appropriate for the course activities, the university chose the platform and teachers had to comply.* 12. *Tools reliability.* 13. *A big challenge was how to organise and conduct the remote evaluation.*

Question11	During the shift to online teaching, do you believe that the fact that university teachers had to learn about how to use tools for online learning, had some positive consequences for them?
	Opinions: A. *There is <u>no clear and single answer</u> to this question. Slovenian and Croatian experts stated that it's impossible to generalise. It certainly was for some.* B. *Some experts believe that there are <u>no positive consequences</u> - in the beginning it was a necessity that did not motivate them. Older teachers still disagree with the changes, although they have certainly made digital progress, while younger colleagues share many more benefits and positive experiences.*

Question11	Continues
	Opinions: *C. There is <u>no clear and single answer</u> to this question. Slovenian and Croatian experts stated that it's impossible to generalise. It certainly was for some.* *D. Some experts believe that there are <u>no positive consequences</u> - in the beginning it was a necessity that did not motivate them. Older teachers still disagree with the changes, although they have certainly made digital progress, while younger colleagues share many more benefits and positive experiences.* *E. <u>Positive consequences</u>* *1. Teachers have realized that some meetings and arrangements (but also conferences and workshops) can be done online, which reduces the time needed to organize meetings (no travel) and costs.* *2. Acquiring new skills to work in a virtual environment is crucial for the future education of the new generations of students who are heavily focused on the digital world.* *3. Although it was stressful at the beginning, due to all workshops organised for different tools. First, we learned how to use one tool, and a week later we were instructed to use another. This was very exhausting, but also useful, because it allowed us to find out which tool was best for us and to develop and improve its use.* *4. We learned some new pedagogical approaches that we can improve and build upon in the future and that will greatly enrich or even improve the quality of teaching. Perhaps another positive aspect was that we had to go beyond traditional teaching and include online tools.* *5. Experts from other three countries agreed that teachers learned a lot during this digital leap, as well as the students (we learned how to integrate different online tools in our teaching methods, we learned how to better use the online environment to better teach and engage our students). There were new positive experiences especially for those who had not used the tools before.* *6. All experts agree that the fact that university teachers had to learn to use online teaching tools benefited them for their future work.* *7. Most note that learning to use new tools and testing them in practice has given teachers a greater understanding of how the younger generation communicates.* *8. Teachers should learn (or think) more about how to guide students to achieve learning outcomes than about IT tools itself.* *9. One respondent commented that you had to think about what you are teaching, how you are teaching it, and why you are teaching it in a certain way. This was a pedagogically very meaningful exercise.* *10. The forced updated in teaching solutions was beneficial for universities.* *11. The transformations that take place in today's society, the continuous automation of the processes reached even the teaching process. Moreover, this situation once again offered the possibility to adapt to our current needs.*

Question12	Based on your experience with tools for online learning, during online teaching, was any lesson learnt? Is there anything that was learnt by university teachers and that could be useful in the near future?
	Opinions: 1. *Experts believe that this is highly individual: those who are more inclined have used the tools before, and a significant proportion of those who have not used them do not want to do so in the future, so they use online learning tools only to a limited extent.* 2. *This is an aspect that is closely connected to the topic being taught, since some courses benefitted from online implementation but no online tool can replace the manual skills that need to be acquired in others.* 3. *What teachers have learned is to be flexible, to "make" the system work together, to have different tools installed and in preparation, because when one doesn't work, the other should be run immediately during real-time teaching.* 4. *Once "forced" to use online tools, many noticed benefits from using tools for online learning that they could not have achieved in the traditional format. The shift has in many ways enriched teaching and made us more mindful about which tools we use and what is the core of what we are teaching.* 5. *Online applications have brought great new opportunities for student guidance, both individual and group guidance, as well as reaching out to special groups.* 6. *Many say for example that they used to think that the 90-minute lecture is the golden standard. After experiencing online teaching many have revised this idea and notice that shorter lectures are better received and more focused.* 7. *Teachers learnt the importance of using instant pools during the lecture.* 8. *Online implementation allows an easier participation of foreign experts.* 9. *Equipment does not allow the same pedagogy as contact teaching. The presentation of the content should be adapted to the teaching method.* 10. *Two respondents' view is that the tools, e.g. Zoom, Teams, Moodle should be further developed for a more user-friendly experience.* 11. *Jitsi was mentioned as a possible tool, but it is unstable and it has not developed sufficiently in 2 years. (https://meet.jit.si/).* 12. *Most experts stated that they had acquired a few useful skills while teaching online. One expert even concluded that every university teacher has experiences that should be collected in the form of good practices that can be passed on to young teachers (doctoral school, teaching courses).* 13. *Some point out that they still use platforms such as MS Teams in the classroom, e.g. sharing screens and working on a problem together.* 14. *Many indicated that they would continue to use online communication during consultations, thesis work, or exams.*

Question12	Continues
	15. *The separation of teacher and student has contributed to the development of different working methods (for teachers and students). Many of these methods are very good; they encourage independent work, communication, collaboration, research, critical thinking, responsibility for one's own work, etc., and this should certainly enrich the ossified way of working in public universities. All that new knowledge will be useful and can serve as an upgrade for live teaching.* 16. *It would be useful that online classes can be integrated in day-to-day teaching methods.* 17. *On the other hand, some experts believe that IT tools are not even the problem, because even bad technology can be replaced by excellent didactics, while excellent technique cannot be replaced by poor didactics. The fact is that a teacher has to know what they are doing, to have autonomy, etc. IT is just a tool, just as the blackboard and chalk used to be.*

Question13	In your opinion, during the shift to online teaching, did scheduling became a major problem for university teachers? Why?
	All experts agreed that planning classes during the transition to online teaching was not a problem. Opinions: A. *<u>Some experts have highlighted the following positive aspects</u>:* 1. *There is more flexibility to organize the work.* 2. *Guest lecturers could easily join us from anywhere, instead of travelling.* 3. *Reduced commuting time, either from home or within campus, saved time that could be used for other activities (e.g., research, preparing courses or for administrative work).* 4. *Removed the limitations of some lecture rooms that were inadequate (e.g. too small, noisy, etc.).* B. *<u>Some experts have highlighted the following negative aspects</u>:* 1. *There were problems because the schedule was based on contact teaching, and online attention cannot be maintained for several hours at a time, nor does this type of teaching (in one piece) correspond to online teaching.* 2. *More time was needed for the preparation of classes, which reduced the time available for research and scientific work.* 3. *Students expected communication with teachers 24/7.* 4. *Some noted that they sometimes found it difficult to plan their own work because they spent more time in front of the computer screen and it was easier to lose the work-life balance.*

Question13	Continues
	5. *The problem is not with teaching, but with other online meetings that seem to be scheduled much more easily than they used to be. Spending all day on online classes and online meetings is not very productive, so efforts should be made to teach efficiency in online meetings as well, meetings with well-structured agenda, schedule etc..* 6. *It is a pity that these hours spent preparing the lesson are not included in the teacher's direct working load.* 7. *Teachers should be free to reduce the number of direct lectures to replace them with well organised blended learning. In this case, there would be less direct lectures and students would achieve all the objectives listed in the curriculum through well-organised blended learning.*

Question14	In case, could you please tell us if you learned any lesson on how to optimize your scheduling, while teaching from remote?
	Situations changed frequently and required a great deal of adjustment so that the organisation adapted to the rhythm of work. Sometimes we worked according to a system of trial and error, learning and gaining experience from our colleagues along the way. *Of the lessons learned, the following were highlighted:* 1. *Perform many small, fragmented activities rather than large ones.* 2. *Productivity is higher and there are no distractions when working from home.* 3. *Using calendars to memorize the timetable (better visualization of what they had planned for later).* 4. *To use shared calendars and keep those up to date and send calendar invitations.* 5. *They have learned even better to plan their working time and, for example, to use the breaks between classes effectively.* 6. *Using programming tools, efficiently involving students to keep them active despite the impersonal setting.* 7. *In order to coordinate the timetables faster and easier, doodle is used more and more.* 8. *The experience and motivation of teachers and the support of university shorten the preparation over time.* 9. *It is worth offering certain times and then be somewhat flexible according to the needs of students.* *As good practice, someone suggests:* *With online learning, I organized my courses very compactly in 2 or 3 days, so I had a full 2 or 3 days to work on courses or research.*

Question14	Continues
	When it comes to others (students, colleagues), it is not obvious to them if you are busy or not available for certain activities, *Put the same courses one after the other, so we had only one kind of course during the day.* *Someone also commented:* *It depends on the domestic situation. People with young children living in a confined space might have more problems. Another thing is shared open-space offices, which have proven not to be the best scenario when multiple teachers teach remotely in the same office.* *Nowadays, you must be a skilled user of digital platforms to manage your time well. Ultimately, university teachers are required to develop themselves both theoretically and academically, as well as in the digital realm, in order to better access today's generation of students who are becoming more and more familiar with the digital world.*

Question15	Which teaching methods would you use to implement field or lab activities when circumstances allow remote participation only?
	Although not all respondents have field or lab activities, those who do highlighted the following: 1. *It is necessary to combine synchronous teaching with lots of asynchronous materials in the form of video content so that students can work on their own. The synchronous part of the teaching should be used to solve the problem domain, in a flipped classroom approach.* 2. *Instead of visiting companies, online visits to companies are organized. A somewhat weaker experience, but good and interesting enough. It all depends on who you talk to (partner in the company), of course.* 3. *Students conducted research in the research course, communicated with the public about the implementation of the research and asked them to participate, produced a report, and communicated with the media. We were able to achieve several unplanned effects because they were motivated and focused".* 4. *To practice field work one respondent has employed online group activities where the groups solve real-world challenges. Groups have e.g. interviewed stakeholders online.* 5. *In development projects, there have been guided small group discussions to develop the content and themes of the works.* 6. *Lab can be organized either via zoom alone, pairs or in group with proper online tools. An example is "vignette" working in "monierko" (specialized training in multicultural expertise), reinstated in moodle and then vignettes are discussed on Moodle.*

Question15	Continues
	7. *Experts mention methods such as case study, simulation games, own tasks to be solved for students, demonstration films, virtual boards, or other open-source programs. The basis of these methods is solving problems together on specific cases, according to a scenario written by the teacher.* 8. *Short movies and practical cases to discuss and to simulate real cases with the students during seminaries.* 9. *Use online meetings to continue inviting different experts to talk about different topics.* 10. *Use video materials to simulate the whole process and why not involve 2-3 collaborators for a better understanding of concepts, processes and results.* 11. *There is probably no suitable alternative to fieldwork.* 12. *For lab exercises, our experience so far suggests that a combination of selected demonstration videos and live on-camera demonstrations, followed by student activation through quizzes or small group debates and final group discussions, works best.* 13. *It is impossible to generalize, especially if we do not consider other conditions (for example, "field" activities offer fewer problems than "lab" activities and even than "lecture hall" activities when the outdoor activities are supported and the indoor activities are not).* 14. *It worked well to create a facebook group with all the students in the class who could post photos of the experiments they had done at their site, based on the teacher's exact specifications.* 15. *Any platform that allows for informal interaction similar to a live conversation (comments, stories, posts, etc.) is welcome.* 16. *We can work much more and efficiently online with an asynchronous way of working. The student decides when they want to do something, the only important thing is to meet the deadline.* 17. *Having the students teach to their peers.* 18. *Implement immersive teaching/learning.* 19. *Not everything can be replaced by online work.*

Question16	In your opinion, will improving IT skills for remote teaching also improve the overall proficiency at teaching of university teachers?
	Most experts agreed on this question. Opinions. 1. *There are better ways to communicate and more diverse ways to work with students (students are better informed - everything is in one place, ways to submit student papers, programming of deadlines for submitting student papers, automatic assessment of knowledge tests, creation of databases, etc.).* 2. *The online environment has contributed to better interaction between teachers and students. The entire experience is both a challenge and an opportunity for personal development and improvement of teachers' competencies. The online learning process has certainly helped us to realize our own development possibilities.* 3. *Improving IT skills for remote teaching does give the teachers a wider variety of tools to choose from, which is surely a good thing for their overall proficiency.* 4. *Links, videos and open-source materials have brought tremendous added value to teaching.* 5. *Online teaching also makes it possible to reach new groups and generate more equal opportunities for study.* 6. *However, the use of tools needs to be smooth, so that one can concentrate on relevant issues.* 7. *The use of new methods also makes it necessary to analyse the material taught to students in terms of its usefulness and actuality. It is very important to find the bridge between what you want to convey to students and the usefulness of this information on the labour market.* 8. *Some training or given support to teachers in this direction would ultimately mean more success for everyone involved in the educational process.* 9. *One respondent replied that there is small improvement, and assessment and digital pedagogies should be taught.* 10. *Virtual reality experiences should also be implemented.* 11. *One of the teachers did not agree: pedagogical, discipline and subject specific expertise, as well communication & collaboration skills are far more important. They form the "core" of teacher expertise.*

Question17	In your opinion, who should ensure that teachers have adequate knowledge of online teaching methods and techniques (e.g. universities, faculties, the teachers themselves)?
	Opinions: 1. *Most experts believe that it is shared responsibility of the university and the teachers. The university authorities (employer) should ensure that teachers have adequate knowledge of online teaching methods and techniques, but also give access to the needed resources: laptops, tablets, devices, internet, licenses and so on. At the same time, the teachers should invest the time needed to develop such skills.* 2. *In addition to centrally organised courses, more specific ones should be offered at the faculty/department level to meet the needs of the courses taught.* 3. *Teachers also say they would like to have constant assistance in this area in the form of friendly hospitality or advice and not on an on-demand only basis.* 4. *It is important to collaborate between teachers as members of the teaching staff and the institution. Together they have the same purpose, achieving a teaching process at the highest level of efficiency and effectiveness.* 5. *Digital literacy is now a basic skill and should be a must for teachers entering the profession.*

Question18	In your opinion, how could universities optimize the provisioning of IT equipment (e.g. laptops, webcams) and support to teachers, in case of remote learning?
	Opinions: 1. *Most respondents agreed that it is very important that the university provides the faculty with all necessary equipment and licences for the required lectures and that central coordination is preferable. Ideally, each teacher should be given a laptop with standardised software needed to teach a particular subject area, and possibly a tablet if there is a lot of writing to be done.* 2. *Another option to support teachers is technologically equipped lecture halls that allow for both hybrid and online teaching. Classes and labs that provide access to all of these technologies that could support instruction and student access to classes and information (laptops, smartboards, projectors, etc.) would also be helpful.* 3. *Of particular importance is the availability of IT service staff to assist teachers in their daily work and to ensure the availability of online exam materials (textbooks and others).* 4. *Some suggested shortening central procurement procedures and making it easier for teachers to access high-speed Internet connections. There is also remote access to the university network if people want to work on their own laptops or computers.*

Question18	Continues
	5. *In the case of online learning, universities/faculties should reimburse teachers for: IT Equipment (laptop), a lump sum that includes the cost of electricity, the cost of subscribing to a specific network service (internet connection), the cost of heating, and the depreciation of a private budget.* 6. *Expertise present within the university, but coming from other departments (e.g., psychology, economics, sociology, engineering) should be exploited in a concerted way to offer benefits to the university as a whole.* 7. *A shared platform common to the whole university should be developed.*

Question19	In your opinion, how could universities optimize the provisioning of IT equipment (e.g. laptops) and support to students, in case of remote learning?
	Majority of respondents' opinion was that it is not up to the universities or possible for them to make sure that each student has a laptop. Majority of students have access to teaching at least with their personal mobile phone, although most have their own laptop or tablet. *Teachers should make sure that their online teaching is accessible from a variety of devices, but we cannot demand that they have e.g. a webcam.* *They pointed to already existing forms of student support, such as lending equipment (laptops) or preparing special places in teaching rooms or libraries for students to use. On the other hand, equal access to fast Internet connections remains an unresolved problem, which is particularly difficult for students living on the periphery of large cities or small towns.* *Some suggestions were made:* 1. *Rental of equipment for students.* 2. *Subsidizing the price of laptops for students.* 3. *Secure contracts with internet providers who will offer their services to students at lower prices.* 4. *Provide students with access to software licenses and use of applications.* 5. *Ensure that students who do not have the equipment can follow the lessons on computers at the faculty.* 6. *For lower-income students, scholarships could be offered, or have a fund for students who cannot afford the technology.* 7. *Standardisation of hardware and software for students when they enter the university.* 8. *Universities could help find donors/sponsors to help cover the costs of it equipment for students.* 9. *Reconditioning of equipment available but not in use at the university that could then be borrowed by students who do not have adequate basic equipment.*

Question20	In your opinion, how could universities, or other institutions, optimize the proficiency of teachers in student activation, during lessons from remote?
	All experts pointed out that there is much to be done in this area. They point to solutions such as: 1. *Training aimed at conducting active forms in an online version.* 2. *Training on existing applications that can be used for attractive teaching.* 3. *Training on how to prepare attractive electronic materials for online classes.* 4. *Presentation of good practices and online courses.* 5. *Participation in demonstration classes.* 6. *Sending teachers to trainings (good practices or one of the centres for e-learning) with special emphasis on specific methods of teaching and evaluation in the online environment.* 7. *Smaller groups of students.* 8. *Availability of online textbooks.* 9. *Preparation of databases of video materials and other innovative teaching materials suitable for the online environment with a special focus on the development of materials that encourage interactivity during teaching.* 10. *Teachers working in pairs - one teaches and the other monitors and moderates the chat.* 11. *It might be a good idea to find out what the needs are, what the content is, and then organise it, because different audiences have different needs (math professors and history professors, for example).* 12. *Short meetings of faculty to share experiences and best practises in delivering pedagogical work online, or shorter debates led by experts, could be useful.* 13. *With the establishment of a platform where colleagues can share their experiences of different approaches they have used or are using that have proved effective.* 14. *In itinerate evaluation of student's engagement and consequent adaptation of the course itself.* 15. *Incentives system, following assessment of competencies, for teachers who are proficient in both in person and online teaching.* 16. *Teachers who are not primarily pedagogical and are required to complete training in pedagogy and andragogy will also be prepared in this programme on how to appropriately teach online. This should be addressed systematically.* 17. *Pdp - programs for epedagogy + eassessment + analytics + mental support (chat/zoom support).*

Question21	Teaching from remote is deeply different from having in-presence lessons. In your opinion, how could universities improve the proficiency of teachers in methods and techniques that can be adopted to teach from remote?
	Opinions: 1. *Sending teachers to trainings - Universities must primarily provide webinars, workshops, seminars with special emphasis on specific methods and techniques of online learning (especially on online assessment) and providing real-life examples.* 2. *Internal workshops with presentations of good and bad practices.* 3. *Establishing platforms that allow the sharing of feedback from everyone involved in the teaching process.* 4. *Organizing individual support (for creating online exams, designing teaching content).* 5. *The provision of appropriate tools (e.g. Graphics tablets...), as well as a group of people to assist the teacher in case of problems during online teaching, and information about the new e-tools that could be useful for online learning.* 6. *Reorganization of the teaching schedule (shorter classes) to account for the different implementation needs and attention span.* 7. *Most universities collect students' evaluation surveys, those should be modified to better allow the evaluation of online courses, of course the answers should be then used to adapt the teaching strategies.* 8. *Open calls for ideas on how to renew courses.* 9. *An e-learning centre.* 10. *The opinion of one of the respondents, an experienced user of online tools, is particularly interesting to point out: I would like to see a production studio for recording online material. World universities have long had an online teaching system, and rarely conduct live teaching. Everything is recorded in advance, there are editors, sound engineers and suitable lighting… all this can ultimately lead to a good production of online material. Personally, that would motivate me, but we are still far from this type of support.* 11. *On the other hand, there is a need for discussion and training in methods that would improve the online equipment to serve transformative and dialogue led teaching also in an online environment. Now the equipment and the software dictates what is possible to do.*

Question22	Could you please tell us what has been done in the attempt to mitigate IT issues at your research institution? Did these interventions worked well in practice?
	For example, the University of Primorska created lecture rooms for teacher, not to oblige them to teach entirely from home and it installed webcams and microphones in each lecture room. However, having the microphone just for the lecturer and not an environmental one does not allow for interaction during hybrid events. *Since experience in specific institutions is required in this question, all individual answers are listed below by country.* *A. <u>Croatia:</u>* *The FOI online Portal has been opened with instructions for teachers and students on how to use e-learning and e-learning tools at the institution. A survey was conducted on the perception of the quality of teaching and students evaluated all subjects. The results are aggregated and publicly presented, and are used internally to improve teaching. Internal workshops on the transfer of good practice were organized. Equipment was procured for all teachers and part of the classrooms was equipped with specialized equipment for real-time broadcasting. All interventions were extremely effective.* *Introducing online learning platforms and offering instructions on their use* *Classrooms with cameras and computers are equipped. They gave us a tablet and an Internet card. Some got (mathematicians because they need it) wacom tablet. I had my laptop from the project, so I didn't need new equipment. the library is equipped so that students can listen to lectures and take exams online.* *To alleviate the difficulties with information technology, the only thing that has been done at my institution is several online workshops on how to work in the Moodle system, composing exams and online grading. There were absolutely no seminars or workshops about online platforms, everything was left to teachers and their individual engagement on education about online platforms.* *We all got to use the same computers (laptops). For me personally, it was completely counterproductive. I had everything at home and the computer I got didn't serve my needs. When I asked for an exemption in the procurement of equipment - I was refused. I understand the position because we have an obligation towards public procurement, however, when it comes to mass solving of problems, then it means access - the same for everyone - in my opinion it is impossible and completely wrong approach. However, most of my colleagues were helped by this intervention of the Management and I am not dissatisfied with that, I just state that the intervention in my personal case was not effective.* *Zoom platform for teaching has been introduced; the interventions were effective because we got a lot of virtual halls through which classes and other activities were performed.*

Question22	Continues
	B. Finland: *The university has Digi mentors, which are dedicated staff helping teachers with technical support. We have a central team who is in charge of training, which arranges a good number of different training opportunities. Both these worked very well when the pandemic struck. They were already in place before the pandemic, but their role became very central in the pandemic.* *Ongoing activities that have helped in improving my skills. Mostly learning from colleagues and visiting experts. Some miserable attempt, but by those who don't themselves do similar work.* *C. Poland:* *All experts ensure that they had and have access to professional technical assistance at their universities. In case of internet connection problems, one of the universities has made it mandatory to hold online classes from rooms on campus, thus eliminating connectivity problems from private flats or houses located in smaller towns. The universities have also organised online training on how to use the basic functionalities of the learning platforms (for lecturers and students).* *D. Romania:* *Also, our university gave our teachers the opportunity to use the classes for teaching, but almost nobody used them. The only persons that sometimes used the rooms in the university were the teachers that had also administrative work and had to be in the office in certain days, all the others choose to teach from home. Our university let us use the lecture rooms for our classes, if we were interested in that. University provided spaces, equipment's, classes to support the teachers to conduct their teaching activities. Only if we wanted to did we teach at the university. No IT interventions were performed.* *E. Slovenia:* *Expert opinion was that the pedagogical process needs to be renewed. Teaching online requires a different way of working. Lecturing online is like watching a theatrical performance on television. A theatrical performance offers anything but watching people move and talk, does not it? Hibrid, if you/I call this type of teaching some of the worst possible. A teacher who is able to lecture ex-cathedra while looking into the camera, what do the students in the room get out of it? The modern university should be moving toward a student-centred pedagogical process and the recognition that the teacher has long since ceased to be the sole bearer of knowledge.* *There was no particular support in terms of computer equipment. However, the IT department was always available. The success of hybrid lectures also depends on the type of lecture. If it is a more traditional lecture, where the professor mainly lectures and does not involve the students, it is probably possible and useful, but if the lecture involves a lot of exercises, if the professor writes a lot on the blackboard, if the professor works in groups, they are not the best solution. the equipment is outdated in some faculties and did not*

Question22	Continues
	correspond to the hybrid mode of lectures. lecture halls are not adequately equipped. pedagogical work is still evaluated as: lectures, seminars, seminar work, field work, clinical training, laboratory ... and not blended or hybrid learning. unfortunately, this is not even supported by the management of some faculties. *F. Italy:* *Our university organized sessions online for helping teachers to solve IT issues for the many that were not skilled enough to solve all problems.* *In my university, video tutorials have been made for teachers, with instructions on using the MS Teams platform. The department heads have made available specific links and other references in order to solve any technical problems on the use of the software, but not much else. The teachers gave lessons from home.* *My university organized some courses online to explain to us the new tools for teaching online. The classes were recorded and posted in a repository that we could access when needed. Our department did not provide specific courses for teaching our disciplines online, so we lack best practices that we can follow. The university equipped all the teaching rooms with the microphones and webcams necessary for online and blended teaching.* *My institution did not do much in the COVID-emergency moment, we had to provide by ourselves with pc, connection, learning to use Teams etc. I still think, anyway, that besides providing equipment and support, most of the teaching should rely on presence.* *In my research institution, the emergently answer was slow, especially in supporting the faculty classroom with an adequate band rate wi-fi. Even now, when it's possible, I prefer to remote teach from home because my internet connection is better than the university's one.* *Adding webcams and wifi in each teaching room.*

Question23	Which percentage of teaching form remote would be acceptable for you, as a university teacher, under normal circumstances (e.g. no sanitary restrictions)? Why did you select this specific percentage?
	The answers vary: 1. *Without specific percentage (5 answers): Depends on the subject and content, but also on the circumstances of teachers and students (e.g., mobility r health issues). For IT courses, most of it takes place online because is possible to record the lectures and students can watch them multiple times later, at a pace that suits them. Not all students have the same background or command of the country language. Being able to watch the recordings multiple times is helpful for all of these students.* 2. *0%: Teaching process based on direct communication is normal and therefore the best way of teaching.* 3. *5-10% (2 answers): only exceptionally* 4. *10-25% (4 answers): lectures belong in class, some percentage of online lectures could be tolerated in case of illness, conferences or mobility. A*

Question23	Continues
	part of this percentage should be used to involve external experts. Also, for master programmes I would like to be able to teach also online, as most of the master students are from different cities and most of them are not able to attend all the classes. I think online teaching could be as high as 25% in the future. That is the percentage that could be used for more theoretical lectures, tutorials etc. Especially from the point of view of more efficient use of time for teaching and demonstrations. At the same time, this approach would encourage students to search for and study literature more independently. 5. *30% (4 answers): as much as necessary to place teaching materials and some accompanying activities on the internal platform. Hybrid teaching is undesirable and confusing and makes it difficult to organize the whole process. 30% some parts of the lectures, practicum protocols can be given remotely. The most common indication was 30-33 %.* 6. *50% (8 answers): Depends hugely on the course, target audience, topic… I also believe that especially older students (master's level) should have the opportunity to study remotely as much as possible if they want to. When it comes to younger students, I would like to see a mix of online and campus. Experts indicated that lectures (above 50 people) and computer classes could be in 50% online. At the same time, most perceived that classes in face-to-face contact with the teacher and other students are essential for the formation of students' social competencies.* 7. *80%: for master classes (I think 80% of those classes can be online, except for the exams, who should be considered to be face to face).* 8. *100% (3 answers): if we know that in the long run it will be the way the classes will be held. Online teaching, if well acquainted with and using all available tools, can be even better than a classic lecture in the hall. All (100%) of my teaching currently is and will be remote if I continue working at the UTU Open University.* *The experts also draw attention to the fact that regardless of the percentage of classes conducted online, each lecturer should know well how to achieve educational results and what techniques to use, so that the student learning remotely is not deprived of the opportunity to acquire skills and competencies, which could be acquired by studying stationary (traditional).* *I always personally prefer teaching on the spot with support from online activities in Moodle for example. I myself have worked for more than 10 years on online and I do not believe people in masses want to work remotely even when corona is over. When corona is over we will again appreciate the social dimension of belonging to a working group.*

Question24	In your opinion, how could universities design inclusive and effective forms of blended learning?
	The main highlights from experts are listed below: 1. *Getting acquainted with the good practices of other heist and hiring advisors, experts from other institutions who can help in the transition phase.* 2. *Execution of part (direction) of the study program online - it is then a good platform for testing and practicing methods that will be subsequently applied to all study programs.* 3. *For part-time students, it is important that classes and teaching materials are available at a time that suits them personally - so it is important to ensure recordings of lectures, the availability of certain forms of teaching and testing at different times.* 4. *HEI's long-term commitment to online teaching is very important - if teachers perceive it as a temporary phase or a way of teaching that is not as valuable as onsite teaching, they will not invest or spend their resources in the development of such teaching.* 5. *Investment in equipping and modernizing IT equipment.* 6. *Use of dedicated programs, platforms and tools to allow real-time interaction with students.* 7. *Increased collaboration with other Institutions.* 8. *Co-designing of courses by experts with complementary skills.* 9. *Greater involvement of students during teaching.* 10. *Education is needed not only for teachers, but also for students (not everyone is skilled, neither young nor inclined to use technology; does anyone think about lifelong learning and the need for such students?).* 11. *Training with an emphasis on combining transformative learning with online elements.* 12. *By using online teaching platforms, but combined with face to face activities, in proportions that will allow good interactions between teachers and students.* 13. *To allow the teachers to make choices for themselves. It is very important for the university to consider the opinions of individual teachers who know best what material can be delivered online in a quality way. On this basis, the university should then clearly define the proportion of online lectures in advance and also provide for them in the regular timetable.* 14. *We will be more inclusive when we allow for a greater variety in how to study.* 15. *Be very mindful of why we are choosing to do an activity online or face-to-face class.* 16. *So-called "hybrid lectures", i.e. Having Zoom in a live lecture at the same time, were significantly less efficient than face-to-face or online lectures.*

Question25	In your opinion, does blended learning bear any risk for students and universities? In case, which are the main risks associated with the use of mixed in-presence and remote teaching activities?
	There are differing opinions on this topic and for most teachers the distinction among different methods (blended, hybrid, flipped, etc.) remains unclear. 1. *Decreased quality of education* *According to some experts, there is a high risk that the quality of education will decrease. The main reason is the unpreparedness of the teaching staff. From a teacher's point of view, giving hybrid teaching (meaning a form of teaching where a part of the students are in a lecture room with the teacher, and some are taking part via remote access e.g. via Zoom at the same time) can be really stressful, since he/she cannot give attention to both groups at the same time. Usually, a teaching assistant is needed to ensure that the students taking part online can follow the teaching, stay active, and that their questions and comments coming e.g. via chat or microphone can be heard. In general, experts note that students put less effort into preparing for and participating in online classes. The potential risk is that knowledge will be more difficult to acquire in this way. The risk is that the hybrid form will become exclusively online over time. However, we should also think about how to deal with students with disabilities, because the survey showed that 80% of respondents think that online learning is more accessible for them than studying at the faculty.* 2. *Hybrid learning is only an advantage* *The main risk could be the lack of acceptance by faculty or University leadership, or lack of support by management, or unwillingness on the part of some teachers to change the way they teach. No major risks from a students' perspective if the blended/hybrid teaching is well planned and thought, on the contrary this implementation could increase inclusiveness. From a universities' perspective doing it well requires more resources than "traditional" teaching, e.g. in the form of hiring teaching assistants. However, many lecturers could see that it is easier to organize zoom-learning session instead of physical session. More holistic approach should be applied to ensure the wellbeing of the students. Distancing effect of online teaching needs to be identified, and for it support activities need to be developed that provide opportunities for all different learners to participate. Some suggested that a maximum percentage of online teaching should be established having in mind also the specificity of the disciplines, as the ones that are applied sciences are very difficult to be taught online: medicine, sports, music, electronics, land surveys and so on. It is necessary to innovate the processes, to transfer the responsibility to the teacher and the students, and instead of counting the hours of lectures, exercises, and seminars, to review the determination of learning outcomes.* 3. *It is inefficient.* *Some classes require to use the whole available space in the class, which is not possible during online implementation since teachers need to remain within the range of the camera and microphone.*

Question26	Finally, how could these risks be mitigated by universities?
	In the universities, it should be important to support all forms of community, and also consider in pedagogical solutions that genuine participation and inclusion are important elements of learning. The art of transmission of information is mastered. *Experts point to some solutions:* 1. *Develop an effective strategy and action plan for the transition to hybrid learning and providing support to teachers.* 2. *With a clear definition of who can lecture online, why, and to what extent.* 3. *Strict adherence to the accepted division of classes into traditional and online classes.* 4. *The right choice of teaching method for the course topic (e.g. Online labs are ineffective).* 5. *Control of online classes and evaluation of their effectiveness.* 6. *Continuous monitoring of student satisfaction with the subjects, but also monitoring the satisfaction and needs of teachers.* 7. *Virtual reality.* 8. *Training and hiring of qualified teachers.* 9. *Providing appropriate infrastructure.* 10. *Improving well-being at the university and valorising diversity in teaching activities.* 11. *An interdisciplinary team of specialists can be created to try to manage and develop some solutions depending on the situation.* 12. *To encourage them to come to classes and be active.* 13. *With a visionary view, motivation, patience and support for teachers.* 14. *The schedule needs to be adapted to a hybrid or online form of teaching. Eight hours in the classroom is not the same as eight hours online.*

SECOND ROUND OF DELPHI ANALYSIS

THE RESULTS SUMMARY

The group response includes the answers of experts from Finland, Romania, Poland, Croatia and Slovenia.

– The green colour in the text, in the tables and in the figures represents the strong agreement in the evaluation of the experts

– The pink colour in the text, in the tables and in the figures represents the agreement in the evaluation of the experts

Q1 - From the report, it was clear that most teachers had marginally used remote teaching, before the COVID-19 pandemic. In your opinion why was this the case?

University regulatory policies – some faculties (especially in Finland) have a long-standing tradition of online teaching, but some other universities are quite restrictive in this sense as they perceive online teaching as "less valuable".

Opinions:

1. *Lack of technical skills or training.*
2. ***Face-to-face teaching perceived as more efficient.***
3. *Difficulties in implementing online some activities (e.g., laboratory or field work) that are part of the course.*
4. *High in person attendance before the pandemic, so no real perceived need to implement online teaching.*
5. *Limited confidence in the devices and related methodologies.*

Table 1. Experts' opinion on usage of remote teaching

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	4%	12%	15%	46%	23%	3.7	agree
2	4%	0%	4%	35%	58%	4.4	***strongly agree***
3	4%	0%	12%	36%	48%	4.2	agree
4	8%	8%	23%	38%	23%	3.6	agree
5	4%	8%	32%	52%	4%	3.4	neutral

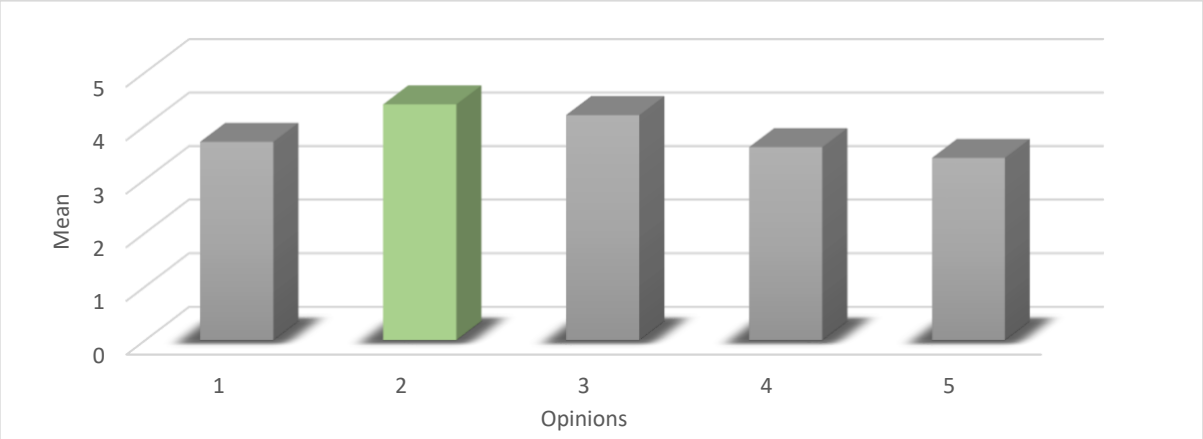

Figure 1. Answers to question on usage of remote teaching

Experts agree that face-to-face teachings is perceived as more efficient compared to online teaching and could have an impact on online learning, which was little used before the pandemic. In addition, it was even more difficult to conduct online activities such as laboratory or field work, where online education loses the most important components, i.e., hands-on learning.

Q2 - Considered that the use of online platforms for teaching from remote was marginal, which opportunities could have been missed, by sticking to a widespread use of in-presence lessons?

Experts cited the following missed opportunities (i.e., benefits of remote teaching):

1. *Online learning platforms enables programmed learning.*
2. *Online tools allow the simultaneous examination of a large number of students.*
3. *Enable personalization (content, access, feedback).*
4. ***Participation of a more diverse group of students (e.g. those who work, limited mobility, special needs, etc.).***
5. *Lower costs (direct and indirect).*
6. ***Classes can be delivered also when the teacher is prevented from giving onsite lectures (e.g., business trip).***
7. ***Greater participation of external lecturers.***
8. *Greater student activity, exchange of opinions and material, discussions, all activities that help developing critical thinking.*
9. *Possibility for students to go through the lecture several times or to listen when and where they are most receptive.*
10. *Students learn time management.*
11. *Easier communication for students that are now mostly used to communicate using it tools, which might allow even shy students to contribute.*
12. *Online tools, by engaging students in a different way than traditional teaching, significantly support and extend their concentration time and trigger other cognitive processes.*

13. *Online tools allow for efficient monitoring of student progress.*
14. *To further support interactive learning, more independent work is required from students, either individually or in groups.*
15. *Faster and more frequent possibility of consultations with students.*
16. *Better teaching process for courses that use computer support of other software because screen sharing is better than whiteboard.*
17. *More flexible working hours.*
18. *Advances in digital literacy for both teachers and students.*
19. *Greater involvement of students in the research process.*

Prior to the pandemic, online platforms for online learning were used only to a limited extent, so some opportunities were missed. According to the expert, one of the most important could be the exclusion of different groups of students (e.g., working people, people with reduced mobility, people with special needs, etc.) who don't have the opportunity to attend face-to-face classes.

From the teacher's perspective, instructional opportunities may be lost if the teacher is prevented from lecturing on site, and the introduction of online teaching could solve the problem of missing lectures. Besides, there could be more opportunities for participation of external lecturers.

Table 2. Experts' opinion on missed opportunities in using online platforms

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	4%	0%	27%	50%	19%	3.8	agree
2	4%	15%	15%	31%	35%	3.8	agree
3	4%	12%	38%	19%	27%	3.5	agree
4	4%	0%	0%	54%	42%	4.3	***strongly agree***
5	4%	8%	28%	36%	24%	3.7	agree
6	4%	8%	0%	38%	50%	4.2	***strongly agree***
7	4%	0%	8%	42%	46%	4.3	***strongly agree***
8	15%	19%	38%	19%	8%	2.8	neutral
9	4%	8%	12%	42%	35%	4.0	agree
10	4%	36%	36%	24%	0%	2.8	neutral
11	12%	27%	27%	31%	4%	2.9	neutral
12	12%	27%	31%	31%	0%	2.8	neutral
13	8%	12%	27%	38%	15%	3.4	agree
14	4%	12%	31%	50%	4%	3.4	agree
15	4%	8%	19%	46%	23%	3.8	agree
16	4%	15%	35%	23%	23%	3.5	agree
17	4%	8%	4%	50%	35%	4.0	agree
18	4%	8%	8%	58%	23%	3.9	agree
19	0%	38%	46%	12%	4%	2.8	agree

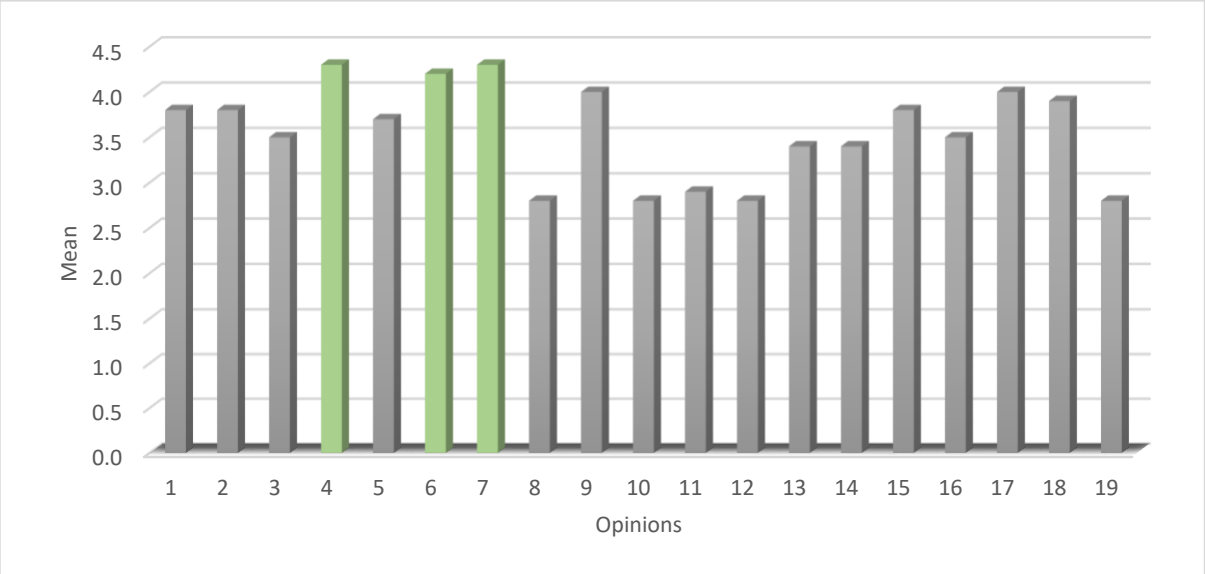

Figure 2. Answers to question on missed opportunities in using online platforms

Q3 - In your opinion, who should be responsible for ensuring that teachers have adequate knowledge of online teaching methods and techniques?

Opinions:

1. ***All experts agreed that it is mostly the responsibility of the university or faculty or responsibility of the employer to organize support, equipment and training. This should happen either in a centralized way or with the university providing support to the faculty that then implements the strategy tailoring it to the specific needs of the course taught.***
2. *Another solution proposed was that the ministry / government should support universities in providing these types of emergency solutions, but on the other hand, these trainings and staff are not only for the pandemic, they are needed also in "normal" times.*
3. *Some respondents stated that both the employer and we, the teachers, should be responsible for ensuring to have adequate knowledge of online teaching methods and techniques. We, as teachers, have the obligation to adapt to the needs of our students and the context in which we have to teach, and for that we have to try to get the needed knowledge. The prevailing opinion is that courses, workshops, etc., are not enough if there is no motivation of teachers to learn, to change and accept new online teaching methods. The university should, in turn, provide the necessary devices, licenses and other materials as needed, together with the corresponding training.*
4. *Ultimately, everyone agreed on that the whole university community has responsibility to support individual teachers and both we as teachers and the institution have the responsibility to update our knowledge related to online teaching and adapting to the needs of society, respectively to the requirements of the labour market.*

Table 3. Experts' opinion on responsibilities for ensuring that teachers have adequate knowledge of online teaching methods and techniques

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	0%	0%	35%	65%	4.7	***strongly agree***
2	0%	4%	4%	58%	35%	4.2	agree
3	0%	4%	12%	50%	35%	4.2	agree
4	0%	4%	19%	46%	31%	4.0	agree

Although the first Delphi round summery pointed out the need for shared responsibility across the university communities to ensure that teachers have adequate knowledge of online teaching methods and techniques, the experts in the second round strongly agreed that the responsibility for organising support, equipment, and training rests with the university or faculty. The way that this happen could be either in a centralized way or with the university providing support to the faculty that then implements the strategy tailoring it to the specific needs of the course taught.

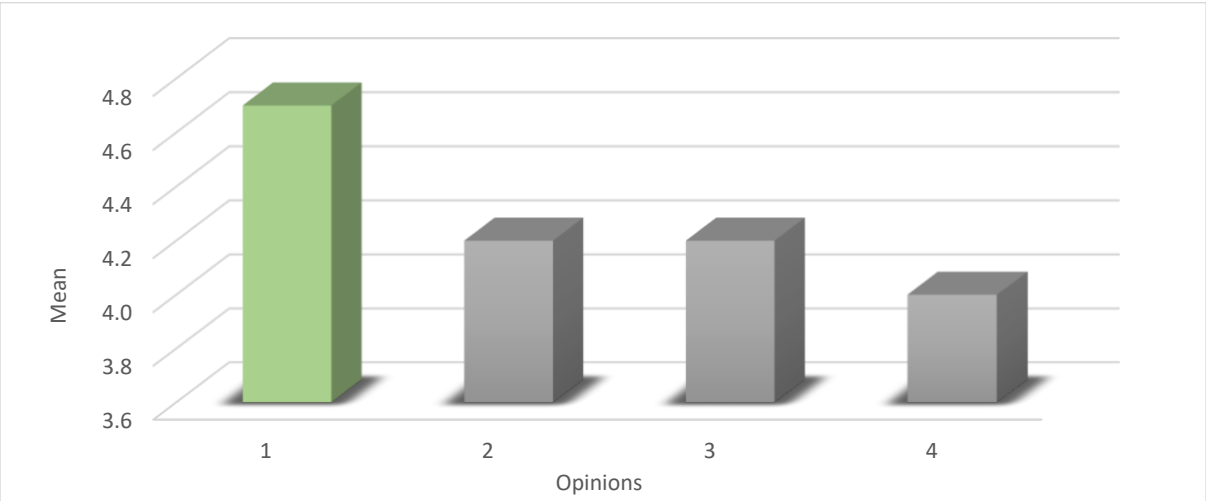

Figure 3. Experts' opinion on responsibilities for ensuring that teachers have adequate knowledge of online teaching methods and techniques

Q4 - In your opinion, during the shift to online teaching, which were the strongest challenges associated with student engagement, that university teachers faced?

Opinions:

1. *The lack of familiarity with online tools and forced speed of the transition led to a transfer of classroom teaching to the online system. Consequently, we taught only online and had no experience integrating other methods/tools to engage students.*
2. *"Incorrect" implementation of online teaching, with mere upload of file or lengthy presentations.*

3. *Engage students in discussion of the chosen issue and to solve defined research problems together.*
4. *Unwillingness of students to participate, since they could "hide" behind a temporarily non-functioning device or quality of the internet connection. Although these were in many cases actual problems, they were also used as excuses.*
5. *Decreased attention.*
6. *Some students did not know how to use computers to monitor (active) teaching, and the quality of the Internet did not always allow planned interaction (the challenge is to follow trends in technology used by young people, not to apply it, but to better understand them as teachers).*
7. *One challenge is that techniques are inoperative and incomplete, as well as rigid, thus not all the ideas can be implemented.*
8. *General non-compliance with work etiquette in the digital environment.*
9. ***Social isolation experienced by students, which for many led to decreased motivation and energy to study and engage in discussion. Reduced social interactions led to decreased engagement and motivation. Some students lamented the superficial and isolated implementation of even group activities.***
10. *Psychological barrier limiting the freedom of expression in remote classes.*
11. *Teachers' inability to discern the conditions of the student.*
12. *Inability of lecturers to give the student a sense of individual treatment. Teachers who used modern approaches - a student-centred way of working - did not have major problems with the transition to the web.*
13. *Practical activities could not be correctly implemented, students recognise the usefulness of those activities and were dissatisfied they were not able to attend. Although the use of videos provided the background theoretical knowledge, the practical skills were not acquired by students.*
14. *Prejudice of teachers towards online teaching.*

Table 4. Experts' opinion on shift to online teaching - which were the strongest challenges associated with student engagement, that university teachers faced

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	4%	8%	15%	58%	15%	3.7	agree
2	0%	15%	12%	62%	12%	3.7	agree
3	0%	12%	19%	35%	35%	3.9	agree
4	0%	27%	12%	27%	35%	3.7	agree
5	0%	12%	23%	23%	42%	4.0	agree
6	8%	23%	8%	46%	15%	3.4	agree
7	8%	12%	19%	46%	15%	3.5	agree
8	4%	27%	38%	31%	0%	3.0	neutral
9	0%	0%	15%	35%	50%	4.3	***strongly agree***
10	0%	19%	12%	31%	38%	3.9	agree
11	4%	8%	15%	46%	27%	3.8	agree
12	4%	15%	27%	35%	19%	3.5	agree
13	4%	15%	4%	31%	46%	4.0	agree
14	0%	27%	31%	31%	12%	3.3	neutral

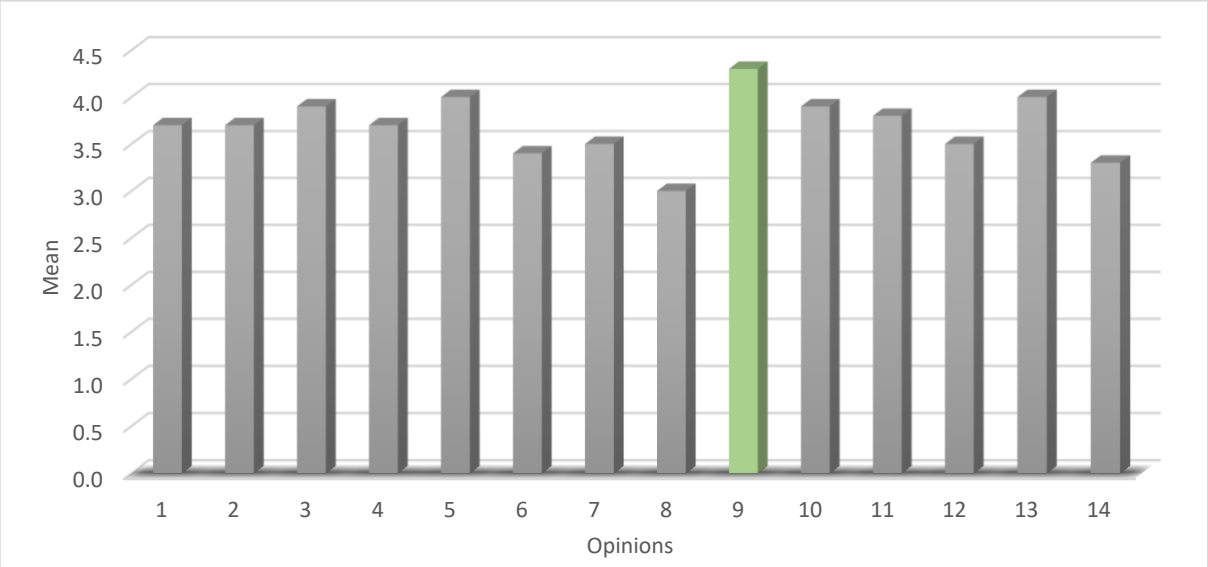

Figure 4. Experts' opinion on shift to online teaching - which were the strongest challenges associated with student engagement, that university teachers faced.

Q5 - In your opinion, during the shift to online teaching to what extent did teachers became better at engaging students?

Opinions:

1. *A significant number of experts doubt that teachers engage students better during the switchover to online teaching than they did before. Experts agree that the activation of students, regardless of the mode of teaching, is related to the diversity of the student group in terms of personality type.*
2. *Some even say that they have become worse at it than before. For some courses (e.g., computer science) it is easier to engage students online by reducing the lecture part in favour of the practical application of some activities. However, this is of more difficult implementation for other disciplines (e.g., laboratory exercises).*
3. ***Other state that teachers have not only improved their skills in using IT solution, but have also started to think about other teaching methods. Teachers understood students were better motivated in solving homework, working in teams for certain topics especially when motivated with points/grades/bonuses. They were also motivated when hearing about deadlines.***

Table 5. Experts' opinion on extent to what did teachers became better at engaging students in online teaching

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	15%	23%	35%	27%	3.7	agree
2	8%	35%	4%	38%	15%	3.2	neutral
3	0%	4%	15%	38%	42%	4.2	***strongly agree***

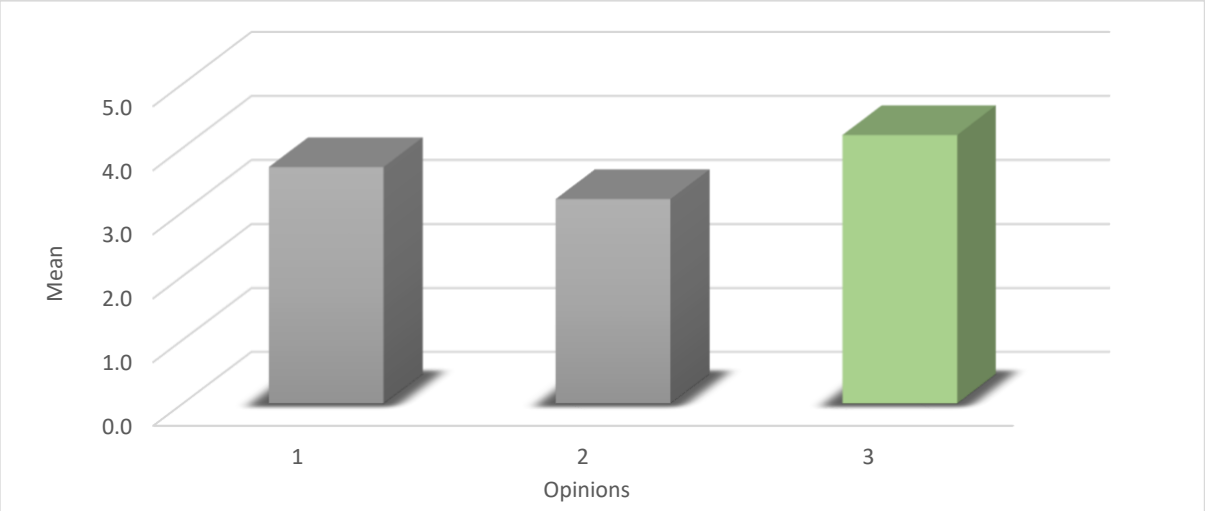

Figure 5. Experts' opinion on extent to what did teachers became better at engaging students in online teaching.

Q6 - Based on your experience with student engagement, was any lesson learnt from the shift to online teaching? Is there anything that was learnt by university teachers and that could be useful in the near future?

The experts mentioned the following positive experiences that can be used in the future:

1. ***We have learned how to conduct online knowledge tests effectively and that there is no difference between face-to-face and online tests if they are well organized.***
2. ***Expanded opportunities for working and communicating with students (e.g., holding consultations when the teacher is officially absent, recording lectures when the teacher is unable to give a live lecture, and having students use recordings at a time convenient to them (important for part-time students), greater use of other diverse media to help students master material / adopt learning outcomes).***
3. *Knowing that student engagement should not be forced: they will come when something is interesting to them, call when they want to, but listen without response when it is not necessary (e.g., scored).*
4. *Teachers have evolved both digitally and technologically. They have invested in equipment, tried numerous tools, and attended training on aspects of online education they felt more relevant.*
5. *Teachers learnt that, despite they cannot and should not blame themselves for the students' social isolation, what they can do is being friendly and mindful of their special situations by offering empathy and maybe a bit of humour.*
6. *Student peer-discussions on course topics in zoom breakout rooms work really well, and motivates active participation in (synchronous) online teaching. Break out rooms can be used for presenting and discussing students' work, but also to meet, introduce themselves, and agree upon the practicalities on how to work on the course*

project (division of the tasks, working schedule, communication among the group, and agreeing on joint working rules).

7. *It is good practice to test participants' basic knowledge at the end of a lecture.*
8. *Activating students by having them presenting what they are doing and having the members of the group helping in solving the problem at hand, in this way, everyone is involved and the presenter is often as unprepared as the rest of the class. Sometimes this way of training is full of excitement and usually allows the student's true potential to be uncovered, raising it quickly; also, this method allows the teacher to explain things that they have never presented in a lecture.*
9. *Teachers became acquainted with different methods of student activation and can now select those which work best in specific classes.*
10. ***We learnt that in crisis/extreme situations, online learning can replace (to a large extent) face-to-face teaching. It can be applied not only to whole groups of students but also to those who for some important reason (health, etc.) cannot be at the university.***
11. ***Remote classes can be used to complement traditional ways of teaching.***
12. *Adaptability is very important and that also the teaching activities must be adapted to the context.*
13. *Adapting our offer to students' needs increases student's attendance.*
14. *The teacher should have more autonomy - they know the subject, they have the learning outcomes in mind, they know the students, so they should be allowed to decide how to implement what and in what way. Instead of counting the hours, we should move to a different way of assessing the teacher's work and hold the teacher accountable for achieving the learning outcomes.*
15. ***Blended learning should be recognised as one of the possibilities.***
16. *It would be useful to provide more video material so that students can watch it over and over again and internalise the topic better.*

Table 6. Experts' opinion on student engagement and the lesson learnt from the shift to online teaching

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	0%	12%	48%	40%	4.3	***strongly agree***
2	0%	0%	12%	48%	40%	4.3	***strongly agree***
3	0%	16%	44%	32%	8%	3.3	neutral
4	0%	0%	4%	68%	28%	4.2	agree
5	0%	8%	12%	40%	40%	4.1	agree
6	4%	12%	40%	24%	20%	3.4	neutral
7	0%	8%	20%	68%	4%	3.7	agree
8	0%	8%	36%	36%	20%	3.7	agree
9	0%	12%	20%	64%	4%	3.6	agree
10	0%	0%	8%	48%	44%	4.4	***strongly agree***
11	0%	0%	0%	48%	52%	4.5	***strongly agree***
12	0%	4%	0%	67%	29%	4.2	agree
13	0%	8%	38%	29%	25%	3.7	agree
14	0%	12%	28%	24%	36%	3.8	agree
15	0%	4%	8%	40%	48%	4.3	***strongly agree***
16	0%	4%	20%	48%	28%	4.0	agree

The experts recognise five out of 16 answers as the most important and strongly agree that we have learned how to conduct online knowledge tests effectively and that there is no difference between face-to-face and online tests if they are well organised, and that teachers have the opportunity to expand their work and communication with students and replace face-to-face teaching with online learning, which can be applied not only to whole groups of students but also to those who cannot be at the university for an important reason (health, etc.). Online education can be used as a supplement to traditional teaching methods, and blended learning is one of the possibilities.

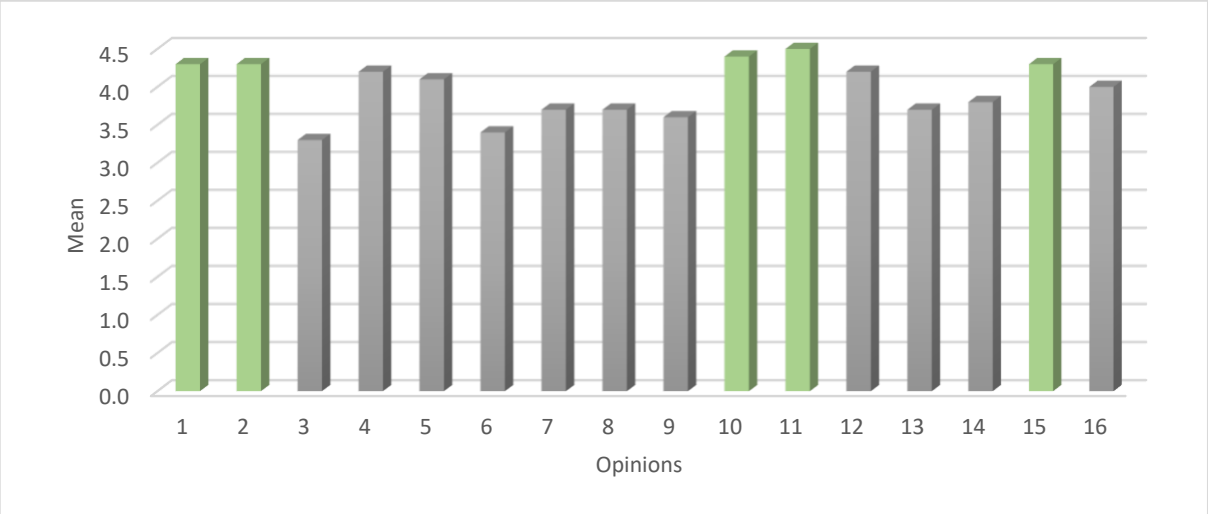

Figure 6. Experts' opinion on student engagement and the lesson learnt from the shift to online teaching

Q7 - In your opinion, during the shift to online teaching, which was the most challenging aspect related to communication with students?

The experts' opinions on the aspects of communication with students are divided.
Opinions:

A. *The experts' majority agreed on the following problems related to communication with students during lectures:*
1. *Experts note that the biggest challenge in communicating with students was the conditions under which it took place (sudden shift).*
2. *If the nature of the course is such that writing must be done on a whiteboard, the computer is usually useless, so teachers buy writing boards at their own expense.*
3. ***They often complained that there was a lack of feedback from students.***
4. ***There was no way to observe what students were doing, for example, how they reacted during the lecture.***
5. *Lectures often resembled conversations recorded as podcasts or video tutorials, where interaction between listeners is limited.*
6. *Most technical problems created difficulties in the teaching process. Not all students had access to equipment and internet connection to participate in the sessions.*
7. *Some students are hesitating to ask for advice if something is unclear to them before they started the coursework.*

The experts agreed that the main problems related to communication with students during the online lecture were the lack of student feedback and the impossibility to observe what students did, e.g., how they reacted during the lecture.

Table 7A. Experts' opinion on problems related to communication with students during the online lectures

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	8%	40%	44%	8%	3.5	agree
2	8%	16%	28%	40%	8%	3.2	neutral
3	0%	0%	16%	40%	44%	4.3	***strongly agree***
4	4%	8%	4%	36%	48%	4.2	***strongly agree***
5	0%	12%	32%	20%	36%	3.8	agree
6	0%	12%	20%	64%	4%	3.6	agree
7	0%	8%	20%	48%	24%	3.9	agree

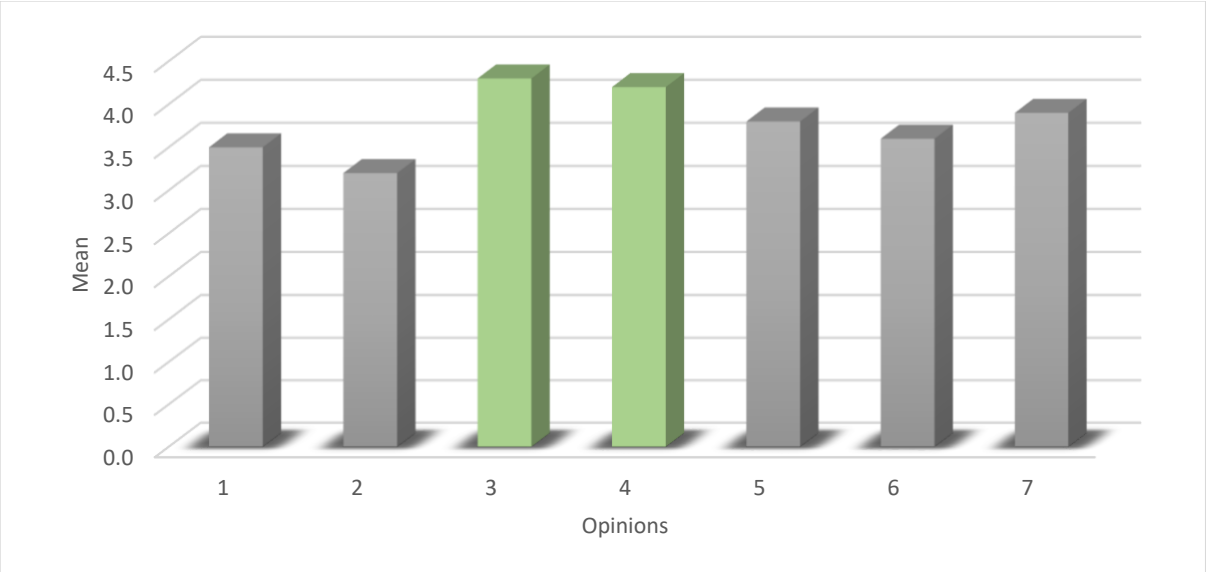

Figure 7A. Experts' opinion on problems related to communication with students during the online lectures

B. *<u>Some experts felt that communication was better, namely:</u>*
1. *Because lectures were held online, many more 1:1 meeting were possible. Zoom or teams allowed for quick resolution of outstanding issues.*
2. *Much of the communication with students was online in forums.*
3. *Communication with students became easier due to new communication channels.*
4. ***Scheduling zoom meetings is easier, regardless of our geographic locations. It is easier to find appropriate times for both without having to travel.***
5. *Using teams made it much easier to keep track of communication within a course and with a particular student, and we could easily share files with each other.*
6. *Students used this additional form of support more frequently and willingly than in traditional courses.*
7. *Getting students to participate in discussions, feeling that it was okay to ask, and getting the group to form a group.*

Some experts felt that communication was better in several ways, but all agreed that scheduling Zoom sessions is easier, regardless of our geographic locations. It is easier to find appropriate times for both without having to travel.

Table 7B. Experts' opinion related to communication with students

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	12%	28%	40%	20%	3.7	agree
2	4%	20%	36%	32%	8%	3.2	neutral
3	0%	20%	28%	32%	20%	3.5	agree
4	0%	0%	8%	40%	52%	4.4	***strongly agree***
5	4%	8%	28%	32%	28%	3.7	agree
6	0%	8%	32%	52%	8%	3.6	agree
7	12%	20%	40%	28%	0%	2.8	neutral

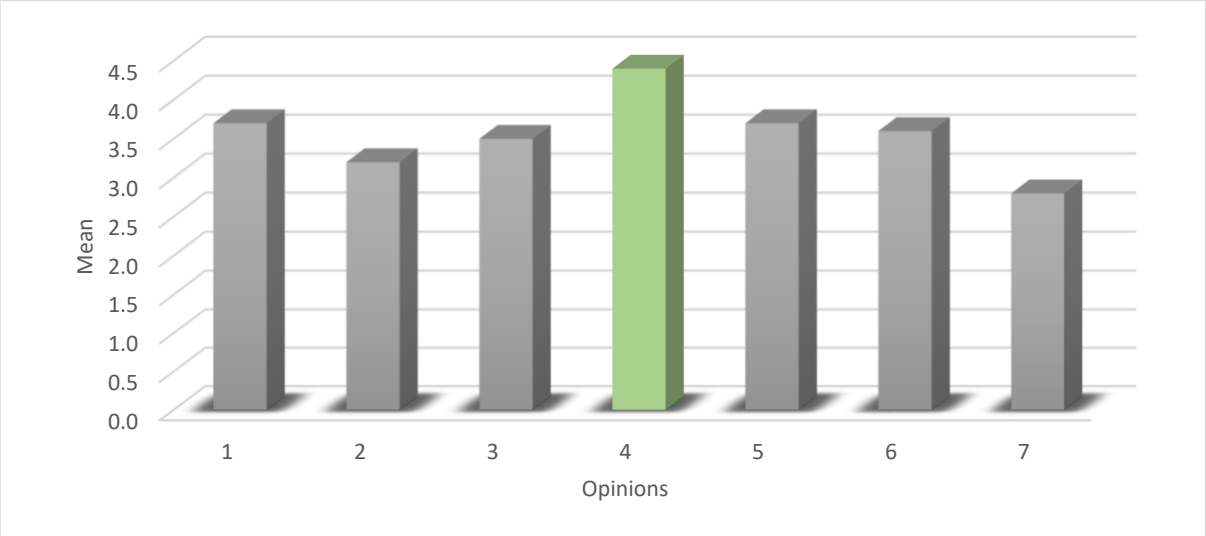

Figure 7B. Experts' opinion on problems related to communication with students

C. *<u>Experts also point to the importance of group size:</u>*

1. *In small classes, communication was of much better quality and smoother, and student progress was easier to manage and monitor.*
2. *However, in large groups (more than 100 students), the opposite was true - very little and poor communication. Lack of contact, especially with larger groups of students.*

Table 7C. Experts' opinion related to group size in communication with students

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	8%	0%	17%	25%	8%	4.1	agree
2	8%	0%	20%	48%	8%	3.8	agree

In the second round of Delphi the experts agreed on the importance of group size in online teaching. Small student groups allow teachers to better communicate with students and make it easier to monitor student progress.

D. *Problems related to communication with students outside of lecture hours:*

1. *Inadequately defined communication channels.*
2. *Communication with students was largely limited to written communication. Although clear rules for communication were established, students sometimes ignored them and contacted teachers simultaneously via email, messages in teams, zoom, and moodle. This resulted in a heavy burden on teachers and miscommunication.*
3. ***Providing feedback is the most time-consuming and difficult task. In asynchronous teaching, written feedback is important to motivate students and show them what they have learned well and what they need to improve above all.***
4. ***Communication is so much more than just words spoken and online or written communication hinders part of it.***

Table 7D. Experts' opinion on problems related to communication with students outside of lecture hours

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	28%	40%	20%	12%	3.2	neutral
2	0%	28%	24%	32%	16%	3.4	neutral
3	0%	20%	12%	44%	24%	3.7	agree
4	0%	12%	16%	44%	28%	3.9	agree

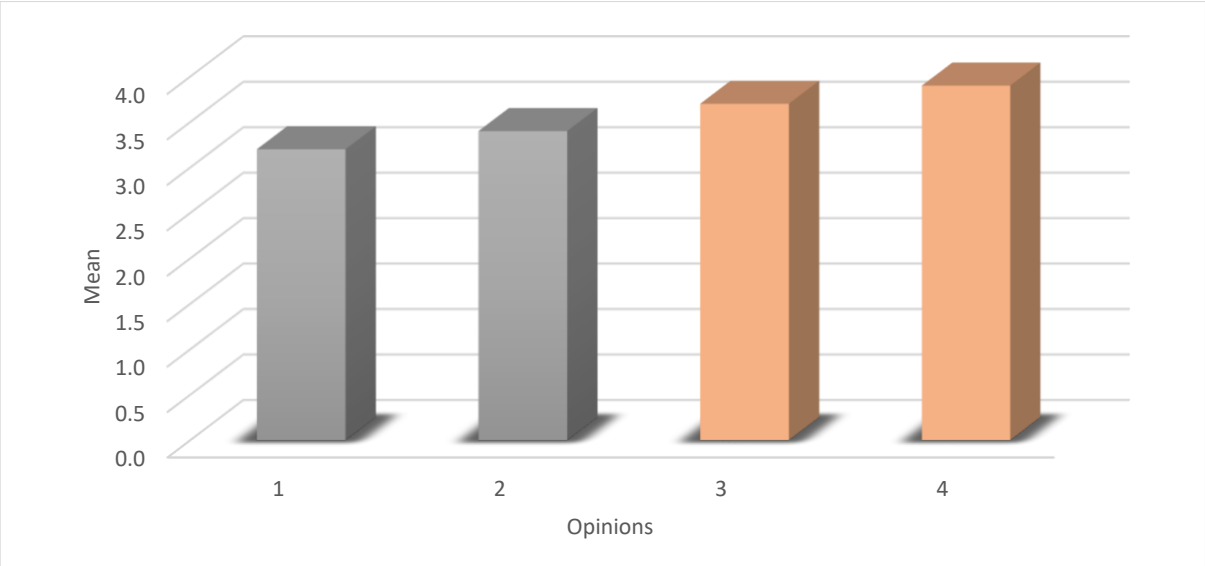

Figure 7D. Experts' opinion on problems related to communication with students outside of lecture hours

Although there was no strong agreement, the experts highlighted two aspects that are important for communicating with students outside of lecture hours. The first is related to the fact that it is time-consuming and difficult to give adequate feedback to students, but it is important to motivate students and show them what they have learned well and what they need to improve. The second reason is that even if the teacher masters writing, written communication still hinders the unspoken words.

Q8 - In your opinion, during the shift to online teaching did teachers became better at communicating with students? To what extent?

Opinions:

A. *<u>Not improved:</u> all Croatian and Polish experts and part of Slovenian agree that communication has not improved.*

1. *Teachers struggled more in this situation.*
2. *In face-to-face classes, teachers receive nonverbal feedback from students and can adjust feedback accordingly. In online classes, this type of feedback is missing, so we have to adjust our message to what we think was understood.*
3. *The teachers got better at communicating, but unfortunately the students also thought they were available 24/7 for communication. At one point this became quite insulting and exhausting. Some Slovenian experts even suggest that, due to the increased load of e-mails and other online notifications, it was even more likely to miss a message from a student.*
4. *However, many Polish experts indicate that teachers have become more flexible in adjusting session times to students' needs.*
5. *Some students are making slightly more use of remote consultation (connecting to discuss a project idea - in a traditional "office hours" setting, they would not always want to come in and speak directly at a specific time), or they are emailing more frequently with updated information.*

Table 8A. Experts' opinion related to improvement of teachers in communication with students

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	4%	20%	28%	36%	12%	3.3	neutral
2	0%	8%	16%	32%	44%	4.1	agree
3	0%	4%	24%	40%	32%	4.0	agree
4	4%	8%	17%	63%	8%	3.6	agree
5	4%	8%	12%	68%	8%	3.7	agree

B. *<u>Improved:</u> while experts from Romania, Finland and Slovenia reported more positive experiences, with some Finnish universities developed targeted platforms that slightly helped, but does not yet solve alone all communication problems.*

1. ***Many experts state that teachers learnt to use various forms and channels of communication with students (at a very good level), such as online consultations, seminars, more information posted on the Internet, but communication during lectures and classes did not improve.***
2. *Teachers adapted the language so they could understand better. They adapted to discuss with them in messages when they had questions, could not participate in class or could not speak.*
3. *Teachers found many smart ways to reach students by offering Q & A sessions, encouraging students to contact the teacher by e-mail or via Zoom. Some teachers offered "virtual appointments".*
4. *Teachers learnt to provide more written instructions, which benefitted learners who learn better by reading and writing.*
5. *Teachers learnt they need to be more explicit, clear and transparent. Communication should always be easy and give no room for interpretation. This has sometimes failed.*
6. *During lectures offered via Zoom, teachers activated students by short polls, group discussions (in break-out rooms), or preliminary questions sent before the lecture.*

Table 8B. Experts' opinion related to improvement of teachers in communication with students

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	0%	8%	56%	36%	4.3	***strongly agree***
2	4%	0%	36%	44%	16%	3.7	agree
3	4%	0%	40%	48%	8%	3.6	agree
4	0%	0%	20%	52%	28%	4.1	agree
5	0%	0%	24%	56%	20%	4.0	agree
6	4%	8%	28%	36%	24%	3.7	agree

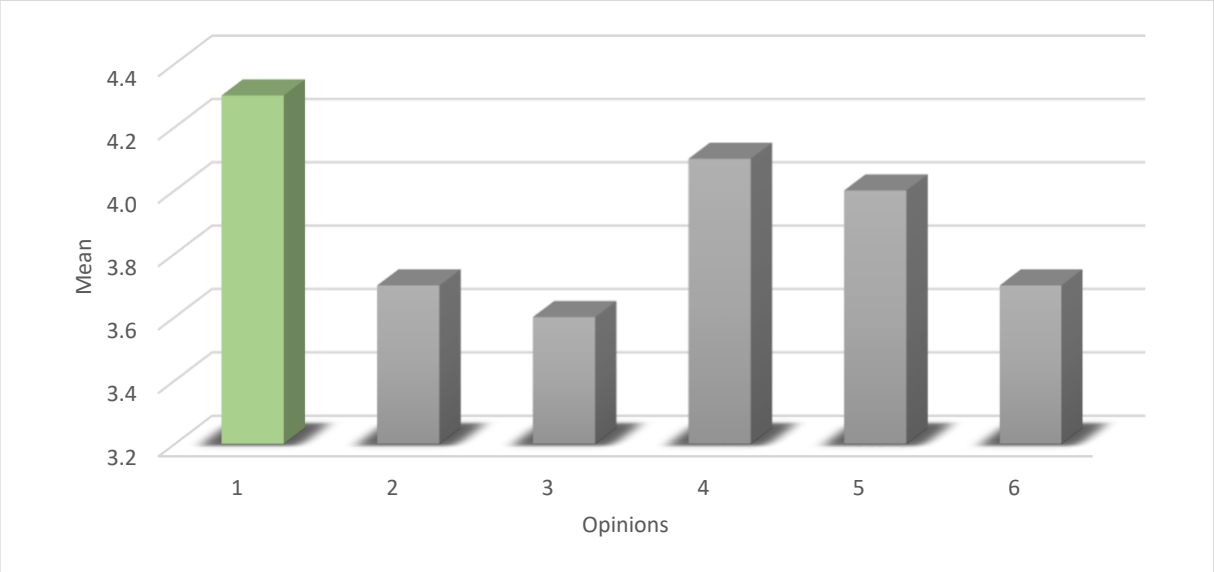

Figure 8B. Experts' opinion related to improvement of teachers in communication with students

In the first round the expert's opinion on the teacher's improvement in communication with students were divided in the opinion that teachers did not improved and in the opinion that some improvements were made. In the second round, experts agreed that teachers have learned to use different forms and channels of communication with students, e.g., online consultations, seminars, more information on the Internet, but communication during lectures and classes has not improved.

Q9 - Based on your experience with communication with students during online teaching, was any lesson learnt? Is there anything that was learnt by university teachers and that could be useful in the near future?

Lessons learnt in the communication with students. Opinions:

1. *When given a choice, students prefer mail to oral communication.*
2. *It is necessary to establish clear rules at the very beginning of classes, to provide very detailed information that must be constantly available to reduce the pressure of students on teachers through countless e-mails.*
3. *The knowledge of the enormous possibilities offered by teaching in a virtual environment can be considered the most useful lesson learned if universities will be willing to invest more in the development of institutional platforms in the future.*
4. *Multiple tools are available for communication with students.*
5. *Online communication has given students confidence to express themselves.*
6. *We have learned that we can involve students more in certain teaching processes by asking for feedback more often or allowing them to make decisions.*
7. *Considering that we are educating young people who will work in digital environments, we should strive to maintain online communication and work with online learning environments, since they need to acquire (if they do not already have) online communication skills, not only synchronous (zoom, chats) but also asynchronous.*
8. *This is an excellent opportunity for argumentative discussion via forums that allow for the development of critical and argumentative debate, an important 21st century skill.*
9. *There have been changes to communication in that students have been encouraged to hand in their assignments and communicate via Moodle, rather than just via email, as there is also much better transparency. It would be useful to maintain this approach in the future.*
10. ***New interactive methods can be a good way to deliver lessons even if live classes cannot take place for some reason.***
11. *Learning tasks that require the participation of the whole group in written tasks and joint discussion through it work best in online education. Although, for example, Moodle is not very well adapted to the assessment of such tasks. The tools started to use during the pandemic (especially teams and zoom) are much preferable to the ones used before (email and Moodle messages).*
12. ***Clarity and transparency will be important in the future as well.***

Table 9. Experts' opinion related to lesson learnt in communication with students

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	25%	38%	25%	13%	3.3	neutral
2	0%	0%	13%	58%	29%	4.2	agree
3	0%	0%	17%	54%	29%	4.1	agree
4	0%	0%	8%	67%	25%	4.2	agree
5	4%	13%	42%	33%	8%	3.3	neutral
6	4%	4%	22%	61%	9%	3.7	agree
7	0%	4%	8%	54%	33%	4.2	agree
8	4%	4%	33%	54%	4%	3.5	agree
9	0%	13%	38%	42%	8%	3.5	agree
10	0%	0%	0%	58%	42%	4.4	***strongly agree***
11	4%	8%	25%	58%	4%	3.5	agree
12	0%	4%	4%	46%	46%	4.3	***strongly agree***

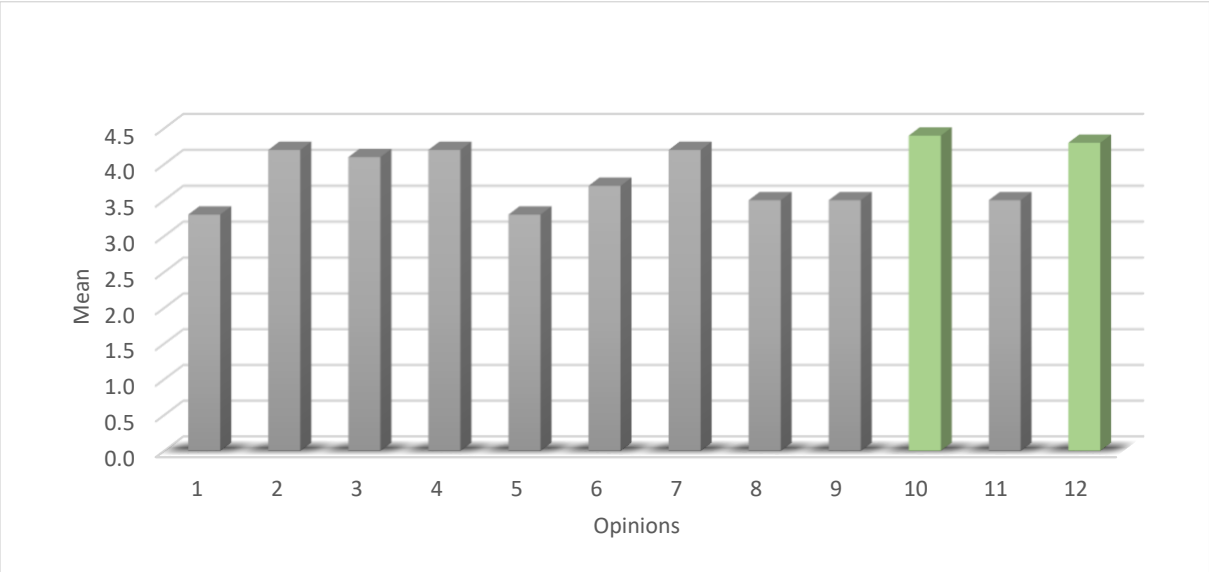

Figure 9. Experts' opinion related to lesson learnt in communication with students

Because of the sudden shift to online teaching, teachers had to learn many lessons in communicating with students. The experts agreed in eight out of twelve answers/lessons and believe that new interactive methods can be a good way to deliver lessons when for some reason face-to-face teaching cannot take place, but this requires clarity and transparency.

Q10 - In your opinion, during the shift to online teaching, which was the most critical part, for teachers, about learning how to use tools for online learning?

Opinions:

In the experts' opinion the technical shift to online teaching and programs were the least difficult challenge. A part of the experts stated that neither they nor their colleagues had problems with the transition to online teaching, as they had already completed an accredited online study and used learning platforms.

A. *<u>No problems with the transition to online teaching</u>*

Table 10A. Experts' opinion about learning how to use tools for online learning

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	5%	32%	14%	23%	27%	3.4	neutral

Another part of them stated that during the shift to online teaching learning how to use tools for online learning was the critical part.

B. *<u>The critical aspects they cite are:</u>*

1. *The use of tools to conduct synchronous teaching in real time.*
2. *Ignorance of the technology, its use and the possibilities it offers, as well as insufficient time to adapt due to a sudden situation.*
3. *The main disadvantage of the online teaching system is the fact that teachers do not see students during classes, there is a lack of visual feedback.*
4. *One challenge mentioned was to understand if and how planned activities should be changed when using online tools.*
5. *Critical part was to resolve critical situations such as disconnection or inability to connect for students due to technical issues.*
6. *To learn about the tools that we can use for better engaging the students and learning how to use them and which are the most appropriate for our different disciplines.*
7. *Especially an adaptation of the teaching material for online classes; especially for the specific activities like lab courses, tasks that require active student engagement.*
8. *Lack of equipment at home.*
9. *Conflict with family duties.*
10. *Lack of time to properly acquire the necessary skills.*
11. *The lack of freedom in choosing a platform deemed appropriate for the course activities, the university chose the platform and teachers had to comply.*
12. *Tools reliability.*
13. *A big challenge was how to organise and conduct the remote evaluation.*

Table 10B. Experts' opinion about learning how to use tools for online learning

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	5%	5%	41%	32%	18%	3.5	agree
2	5%	5%	32%	50%	9%	3.5	agree
3	0%	14%	0%	45%	41%	4.1	agree
4	0%	5%	27%	59%	9%	3.7	agree
5	0%	5%	18%	59%	18%	3.9	agree
6	0%	9%	18%	59%	14%	3.8	agree
7	0%	5%	14%	59%	23%	4.0	agree
8	5%	14%	27%	50%	5%	3.4	neutral
9	5%	14%	36%	32%	14%	3.4	neutral
10	5%	18%	32%	36%	9%	3.3	neutral
11	5%	14%	41%	27%	14%	3.3	neutral
12	0%	41%	32%	18%	9%	3.0	neutral
13	5%	14%	27%	36%	18%	3.5	agree

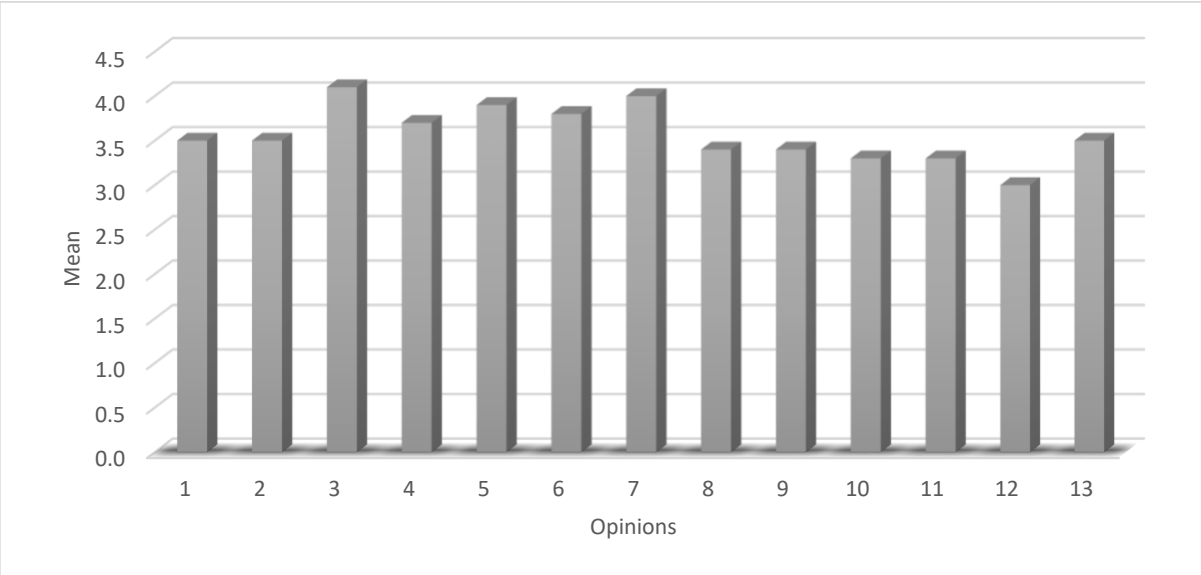

Figure 10B. Experts' opinion about learning how to use tools for online learning

Despite a single consensus has not been reached in the second round of Delphi analysis, experts mostly agree on the critical aspect teachers faced in learning how to use tools for online learning during the shift to online teaching. Mostly stated that they were on their own in finding ways to better organize their teaching. Most experts believe that the most difficult part was learning to use the numerous functionalities of online learning platforms and IT tools. Some indicated that they did not have sufficient instructions on how to use these tools, but most admitted that learning to use IT tools during their classes was not very difficult and they quickly got used to this form of teaching.

Q11 - During the shift to online teaching, do you believe that the fact that university teachers had to learn about how to use tools for online learning, had some positive consequences for them?

Opinions:

A. *There is <u>no clear and single answer</u> to this question. Experts from Slovenia and Croatia stated that it's impossible to generalise. It certainly was for some.*

B. *Some experts believe that there are <u>no positive consequences</u> - in the beginning it was a necessity that did not motivate them. Older teachers still disagree with the changes, although they have certainly made digital progress, while younger colleagues share many more benefits and positive experiences.*

Table 11AB. Experts' opinion related to positive consequences of learning about how to use tools for online learning

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
A	9%	32%	23%	32%	5%	2.9	neutral
B	23%	64%	14%	0%	0%	1.9	disagree

C. *<u>Positive consequences</u>*

1. ***Teachers have realized that some meetings and arrangements (but also conferences and workshops) can be done online, which reduces the time needed to organize meetings (no travel) and costs.***
2. ***Acquiring new skills to work in a virtual environment is crucial for the future education of the new generations of students who are heavily focused on the digital world.***
3. *Although it was stressful at the beginning, due to all workshops organised for different tools. First, we learned how to use one tool, and a week later we were instructed to use another. This was very exhausting, but also useful, because it allowed us to find out which tool was best for us and to develop and improve its use.*
4. *We learned some new pedagogical approaches that we can improve and build upon in the future and that will greatly enrich or even improve the quality of teaching. Perhaps another positive aspect was that we had to go beyond traditional teaching and include online tools.*
5. *Experts from other three countries agreed that teachers learned a lot during this digital leap, as well as the students (we learned how to integrate different online tools in our teaching methods, we learned how to better use the online environment to better teach and engage our students). There were new positive experiences especially for those who had not used the tools before.*
6. *All experts agree that the fact that university teachers had to learn to use online teaching tools benefited them for their future work.*
7. *Most note that learning to use new tools and testing them in practice has given teachers a greater understanding of how the younger generation communicates.*

8. *Teachers should learn (or think) more about how to guide students to achieve learning outcomes than about IT tools itself.*
9. *One respondent commented that you had to think about what you are teaching, how you are teaching it, and why you are teaching it in a certain way. This was a pedagogically very meaningful exercise.*
10. *The forced updated in teaching solutions was beneficial for universities.*
11. *The transformations that take place in today's society, the continuous automation of the processes reached even the teaching process. Moreover, this situation once again offered the possibility to adapt to our current needs.*

Table 11C. Experts' opinion related to positive consequences of learning about how to use tools for online learning

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	0%	0%	23%	77%	4.8	***strongly agree***
2	0%	0%	14%	50%	36%	4.2	***strongly agree***
3	0%	5%	18%	64%	14%	3.9	agree
4	5%	0%	0%	68%	27%	4.1	agree
5	0%	5%	14%	55%	27%	4.0	agree
6	0%	5%	5%	68%	23%	4.1	agree
7	9%	23%	18%	36%	14%	3.2	neutral
8	5%	5%	23%	59%	9%	3.6	agree
9	5%	5%	18%	64%	9%	3.7	agree
10	0%	5%	18%	59%	18%	3.9	agree
11	0%	9%	9%	77%	5%	3.8	agree

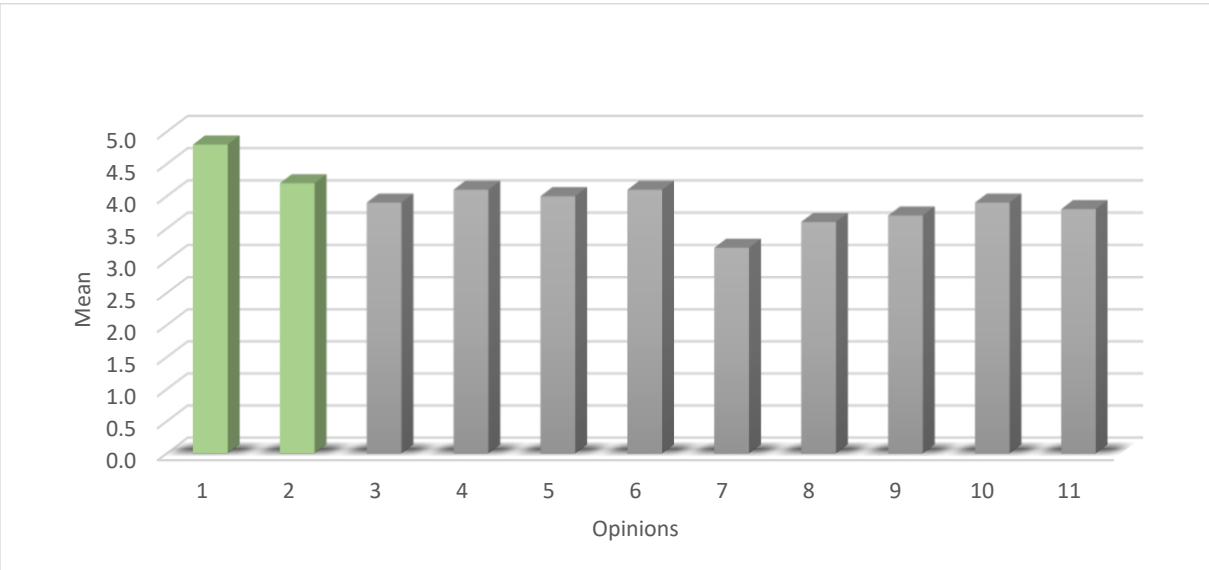

Figure 11C. Experts' opinion related to positive consequences of learning about how to use tools for online learning

Experts agree that during the shift to online teaching, learning how to use online learning tools has had some positive effects for teachers. They strongly agree on the opinion that online meetings, arrangements, and conferences and workshops reduce the amount of time spent organizing meetings (no travel) and costs. They also agreed that acquiring new skills to work in a virtual environment is crucial for the future education of the new generations of students who are highly oriented towards the digital world.

Q12 - Based on your experience with tools for online learning, during online teaching, was any lesson learnt? Is there anything that was learnt by university teachers and that could be useful in the near future?

Opinions:

1. *Experts believe that this is highly individual: those who are more inclined have used the tools before, and a significant proportion of those who have not used them do not want to do so in the future, so they use online learning tools only to a limited extent.*
2. *This is an aspect that is closely connected to the topic being taught, since some courses benefitted from online implementation but no online tool can replace the manual skills that need to be acquired in others.*
3. *What teachers have learned is to be flexible, to "make" the system work together, to have different tools installed and in preparation, because when one doesn't work, the other should be run immediately during real-time teaching.*
4. *Once "forced" to use online tools, many noticed benefits from using tools for online learning that they could not have achieved in the traditional format. The shift has in many ways enriched teaching and made us more mindful about which tools we use and what is the core of what we are teaching.*
5. *Online applications have brought great new opportunities for student guidance, both individual and group guidance, as well as reaching out to special groups.*
6. *Many say for example that they used to think that the 90-minute lecture is the golden standard. After experiencing online teaching many have revised this idea and notice that shorter lectures are better received and more focused.*
7. *Teachers learnt the importance of using instant pools during the lecture.*
8. ***Online implementation allows an easier participation of foreign experts.***
9. *Equipment does not allow the same pedagogy as contact teaching. The presentation of the content should be adapted to the teaching method.*
10. *Two respondents' view is that the tools, e.g. Zoom, Teams, Moodle should be further developed for a more user-friendly experience.*
11. *Softeare Jitsi was mentioned as a possible tool, but it is unstable and it has not developed sufficiently in 2 years. (https://meet.jit.si/).*
12. *Most experts stated that they had acquired a few useful skills while teaching online. One expert even concluded that every university teacher has experiences that should be collected in the form of good practices that can be passed on to young teachers (doctoral school, teaching courses).*

13. *Some point out that they still use platforms such as MS Teams in the classroom, e.g. sharing screens and working on a problem together.*
14. ***Many indicated that they would continue to use online communication during consultations, thesis work, or exams.***
15. *The separation of teacher and student has contributed to the development of different working methods (for teachers and students). Many of these methods are very good; they encourage independent work, communication, collaboration, research, critical thinking, responsibility for one's own work, etc., and this should certainly enrich the ossified way of working in public universities. All that new knowledge will be useful and can serve as an upgrade for live teaching.*
16. *It would be useful that online classes can be integrated in day-to-day teaching methods.*

    On the other hand, some experts believe that IT tools are not even the problem, because even bad technology can be replaced by excellent didactics, while excellent technique cannot be replaced by poor didactics. The fact is that a teacher has to know what they are doing, to have autonomy, etc. IT is just a tool, just as the blackboard and chalk used to be.

Table 12. Experts' opinion on the lessons that could be useful in the near future

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	5%	23%	59%	14%	3.8	agree
2	0%	0%	32%	59%	9%	3.8	agree
3	0%	0%	32%	59%	9%	3.8	agree
4	0%	0%	14%	64%	23%	4.1	agree
5	0%	14%	5%	73%	9%	3.8	agree
6	0%	9%	23%	36%	32%	3.9	agree
7	0%	14%	14%	64%	9%	3.7	agree
8	0%	0%	9%	27%	64%	4.5	***strongly agree***
9	0%	5%	14%	50%	32%	4.1	agree
10	0%	0%	18%	64%	18%	4.0	agree
11	0%	5%	82%	5%	9%	3.2	neutral
12	0%	9%	14%	59%	18%	3.9	agree
13	0%	5%	27%	50%	18%	3.8	agree
14	0%	0%	9%	64%	27%	4.2	***strongly agree***
15	0%	5%	14%	62%	19%	4.0	agree
16	0%	9%	23%	59%	9%	3.7	agree

The experts believe that online implementation allows easier participation of foreign teachers/researchers and that these lessons could be useful in the near future. The experts strongly agree on the usefulness of the tools for online education and the fact that many teachers would continue to use online tools during consultations, final papers or exams.

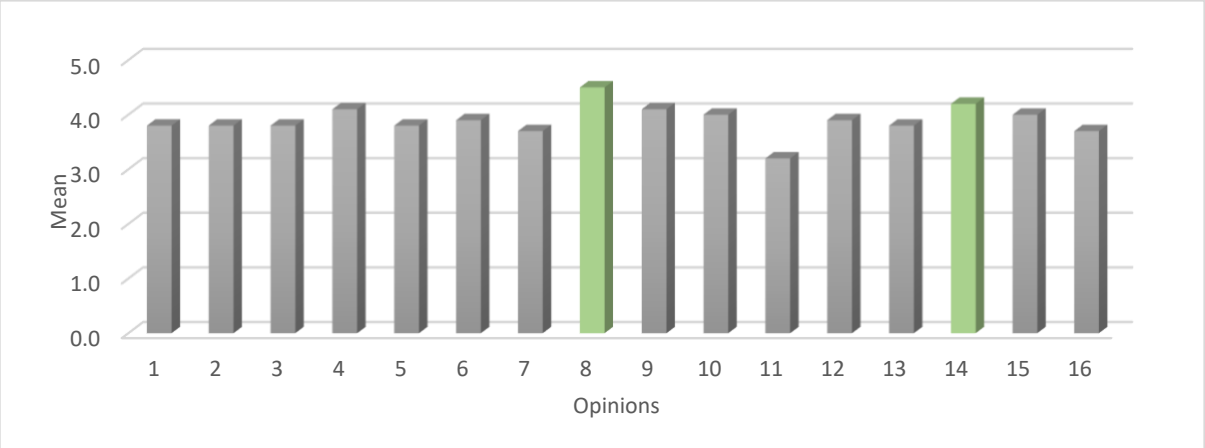

Figure 12. Experts' opinion on the lessons that could be useful in the near future

Q13 - In your opinion, during the shift to online teaching, did scheduling became a major problem for university teachers? Why?

All experts agreed that planning classes during the transition to online teaching was not a problem.

Opinions:

A. *Some experts have highlighted the following positive aspects:*

1. *There is more flexibility to organize the work.*
2. ***Reduced commuting time, either from home or within campus, saved time that could be used for other activities (e.g., research, preparing courses or for administrative work).***
3. *Removed the limitations of some lecture rooms that were inadequate (e.g. Too small, noisy, etc.).*

Table 13A. Experts' opinion related to scheduling

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	0%	18%	41%	41%	4.1	agree
2	0%	0%	5%	41%	55%	4.5	***strongly agree***
3	0%	0%	23%	50%	27%	4.0	agree

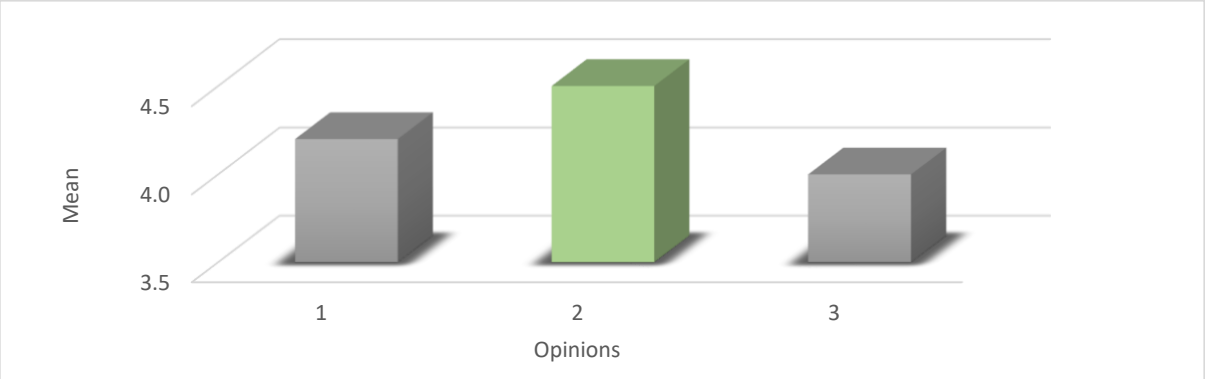

Figure 13A. Experts' opinion related to scheduling

B. *Some experts have highlighted the following negative aspects:*

1. *There were problems because the schedule was based on contact teaching, and online attention cannot be maintained for several hours at a time, nor does this type of teaching (in one piece) correspond to online teaching.*
2. *More time was needed for the preparation of classes, which reduced the time available for research and scientific work.*
3. *Students expected communication with teachers 24/7.*
4. *Some noted that they sometimes found it difficult to plan their own work because they spent more time in front of the computer screen and it was easier to lose the work-life balance.*
5. *The problem is not with teaching, but with other online meetings that seem to be scheduled much more easily than they used to be. Spending all day on online classes and online meetings is not very productive, so efforts should be made to teach efficiency in online meetings as well, meetings with well-structured agenda, schedule etc.*
6. *It is a pity that these hours spent preparing the lesson are not included in the teacher's direct working load.*
7. *Teachers should be free to reduce the number of direct lectures to replace them with well organised blended learning. In this case, there would be less direct lectures and students would achieve all the objectives listed in the curriculum through well-organised blended learning.*

Table 13B. Experts' opinion related to scheduling

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	14%	14%	45%	27%	3.9	agree
2	0%	14%	23%	23%	41%	3.9	agree
3	5%	18%	0%	45%	32%	3.8	agree
4	0%	9%	32%	36%	23%	3.7	agree
5	5%	0%	18%	45%	32%	4.0	agree
6	0%	10%	14%	38%	38%	4.0	agree
7	0%	9%	14%	45%	32%	4.0	agree

Experts believe that scheduling has a positive impact by reducing commute time from home or within campus and saving time that can be used for other activities. The negative opinion that scheduling has become a major problem for university lecturers in the transition to online teaching doesn't meet with the experts' agreement.

Q14 - In case, could you please tell us if you learned any lesson on how to optimize your scheduling, while teaching from remote?

Opinions. Of the lessons learned, the following were highlighted:

1. *Perform many small, fragmented activities rather than large ones.*
2. *Productivity is higher and there are no distractions when working from home.*
3. *Using calendars to memorize the timetable (better visualization of what they had planned for later).*
4. *To use shared calendars and keep those up to date, and send calendar invitations.*
5. *They have learned even better to plan their working time and, for example, to use the breaks between classes effectively.*
6. *Using programming tools, efficiently involving students to keep them active despite the impersonal setting.*
7. *In order to coordinate the timetables faster and easier, doodle is used more and more.*
8. *The experience and motivation of teachers and the support of university shorten the preparation over time.*
9. *It is worth offering certain times and then be somewhat flexible according to the needs of students.*

Not strong consensus was reached in the statement on lessons learned from optimizing scheduling. But nowadays, teachers have to be a skilled user of digital platforms to manage the time well. Ultimately, university teachers are required to develop themselves both theoretically and academically, as well as in the digital realm, in order to better access today's generation of students who are becoming more and more familiar with the digital world.

Table 14. Experts' opinion on the lessons learned from optimizing the scheduling

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	5%	41%	27%	27%	3.8	agree
2	5%	18%	23%	36%	18%	3.5	agree
3	0%	5%	9%	73%	14%	4.0	agree
4	0%	0%	23%	64%	14%	3.9	agree
5	0%	9%	45%	32%	14%	3.5	agree
6	0%	14%	45%	41%	0%	3.3	neutral
7	0%	18%	50%	32%	0%	3.1	neutral
8	5%	5%	33%	48%	10%	3.5	agree
9	0%	14%	27%	45%	14%	3.6	agree

Q15 - Which teaching methods would you use to implement field or lab activities when circumstances allow remote participation only, or constrain physical participation?

Opinions:

1. ***It is necessary to combine synchronous teaching with lots of asynchronous materials in the form of video content so that students can work on their own. The synchronous part of the teaching should be used to solve the problem domain, in a flipped classroom approach.***
2. *Instead of visiting companies, online visits to companies are organized. A somewhat weaker experience, but good and interesting enough. It all depends on who you talk to (partner in the company), of course.*
3. *Students conducted research in the research course, communicated with the public about the implementation of the research and asked them to participate, produced a report, and communicated with the media. We were able to achieve several unplanned effects because they were motivated and focused".*
4. *To practice field work one respondent has employed online group activities where the groups solve real-world challenges. Groups have e.g. interviewed stakeholders online.*
5. *In development projects, there have been guided small group discussions to develop the content and themes of the works.*
6. *Lab can be organized either via zoom alone, pairs or in group with proper online tools. An example is "vignette" working in "monierko" (specialized training in multicultural expertise), reinstated in Moodle and then vignettes are discussed on Moodle.*
7. *Experts mention methods such as case study, simulation games, own tasks to be solved for students, demonstration films, virtual boards, or other open-source programs. The basis of these methods is solving problems together on specific cases, according to a scenario written by the teacher.*
8. *Short movies and practical cases to discuss and to simulate real cases with the students during seminaries.*
9. *Use online meetings to continue inviting different experts to talk about different topics.*
10. *Use video materials to simulate the whole process and why not involve 2-3 collaborators for a better understanding of concepts, processes and results.*
11. *There is probably no suitable alternative to fieldwork.*
12. *For lab exercises, our experience so far suggests that a combination of selected demonstration videos and live on-camera demonstrations, followed by student activation through quizzes or small group debates and final group discussions, works best.*
13. *It worked well to create a Facebook group with all the students in the class who could post photos of the experiments they had done at their site, based on the teacher's exact specifications.*
14. *Any platform that allows for informal interaction similar to a live conversation (comments, stories, posts, etc.) is welcome.*

15. *We can work much more and efficiently online with an asynchronous way of working. The student decides when they want to do something, the only important thing is to meet the deadline.*
16. *Having the students teach to their peers.*

Table 15. Experts' opinion on the implementation of field or lab activities when circumstances allow remote participation only

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	0%	14%	55%	32%	4.2	***strongly agree***
2	5%	14%	27%	41%	14%	3.5	agree
3	5%	9%	41%	36%	9%	3.4	agree
4	0%	9%	45%	36%	9%	3.5	agree
5	0%	0%	55%	41%	5%	3.5	agree
6	0%	14%	59%	23%	5%	3.2	neutral
7	0%	0%	32%	55%	14%	3.8	agree
8	0%	0%	18%	68%	14%	4.0	agree
9	0%	0%	14%	68%	18%	4.0	agree
10	0%	0%	5%	77%	18%	4.1	agree
11	5%	18%	32%	32%	14%	3.3	neutral
12	0%	5%	36%	45%	14%	3.7	agree
13	9%	14%	55%	23%	0%	2.9	neutral
14	9%	5%	14%	64%	9%	3.6	agree
15	14%	9%	36%	32%	9%	3.1	neutral
16	5%	0%	50%	32%	14%	3.5	agree

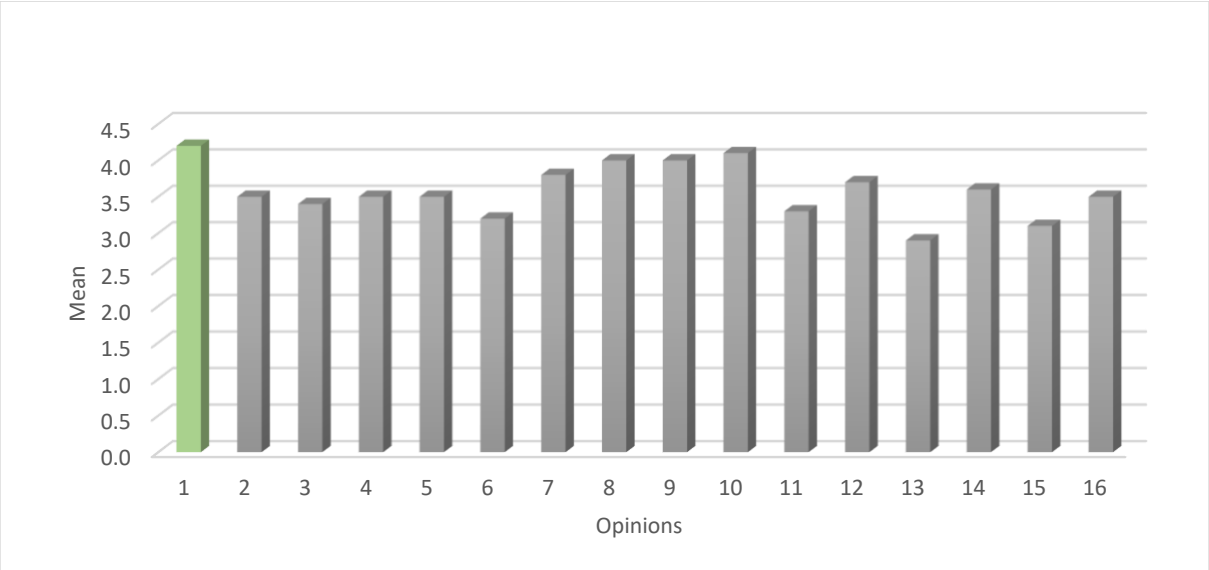

Figure 15. Experts' opinion on the implementation of field or lab activities when circumstances allow remote participation only

In the second Delphi round, the experts agreed that to conduct laboratory or fieldwork when circumstances permit only remote participation, synchronous instruction must be combined with lots of asynchronous materials in the form of video content to allow students to work independently. The synchronous part of the instruction should be used to solve the problem area, in a "flipped classroom" approach.

Q16 - In your opinion, will improving IT skills for remote teaching also improve the overall proficiency at teaching of university teachers?

Opinions:

1. *There are better ways to communicate and more diverse ways to work with students (students are better informed - everything is in one place, ways to submit student papers, programming of deadlines for submitting student papers, automatic assessment of knowledge tests, creation of databases, etc.).*
2. *The online environment has contributed to better interaction between teachers and students. The entire experience is both a challenge and an opportunity for personal development and improvement of teachers' competencies. The online learning process has certainly helped us to realize our own development possibilities.*
3. ***Improving IT skills for remote teaching does give the teachers a wider variety of tools to choose from, which is surely a good thing for their overall proficiency.***
4. ***Links, videos and open source materials have brought tremendous added value to teaching.***
5. *Online teaching also makes it possible to reach new groups and generate more equal opportunities for study.*
6. *However, the use of tools needs to be smooth, so that one can concentrate on relevant issues.*
7. *The use of new methods also makes it necessary to analyse the material taught to students in terms of its usefulness and actuality. It is very important to find the bridge between what you want to convey to students and the usefulness of this information on the labour market.*
8. *Some training or given support to teachers in this direction would ultimately mean more success for everyone involved in the educational process.*
9. *One respondent replied that there is small improvement, and eAssessment and digital pedagogies should be taught.*
10. *Virtual reality experiences should also be implemented.*
11. *One of the teachers did not agree: pedagogical, discipline and subject specific expertise, as well communication & collaboration skills are far more important. They form the "core" of teacher expertise.*

Table 16. Experts' opinion on the impact of improving IT skills for remote teaching on the proficiency at teaching

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	9%	27%	59%	5%	3.6	agree
2	0%	14%	36%	36%	14%	3.5	agree
3	0%	0%	0%	73%	27%	4.3	***strongly agree***
4	0%	0%	9%	55%	36%	4.3	***strongly agree***
5	0%	0%	18%	59%	23%	4.0	agree
6	0%	0%	18%	73%	9%	3.9	agree
7	0%	5%	18%	73%	5%	3.8	agree
8	0%	5%	18%	55%	23%	4.0	agree
9	0%	0%	27%	55%	18%	3.9	agree
10	0%	5%	41%	41%	14%	3.6	agree
11	0%	0%	27%	50%	23%	4.0	agree

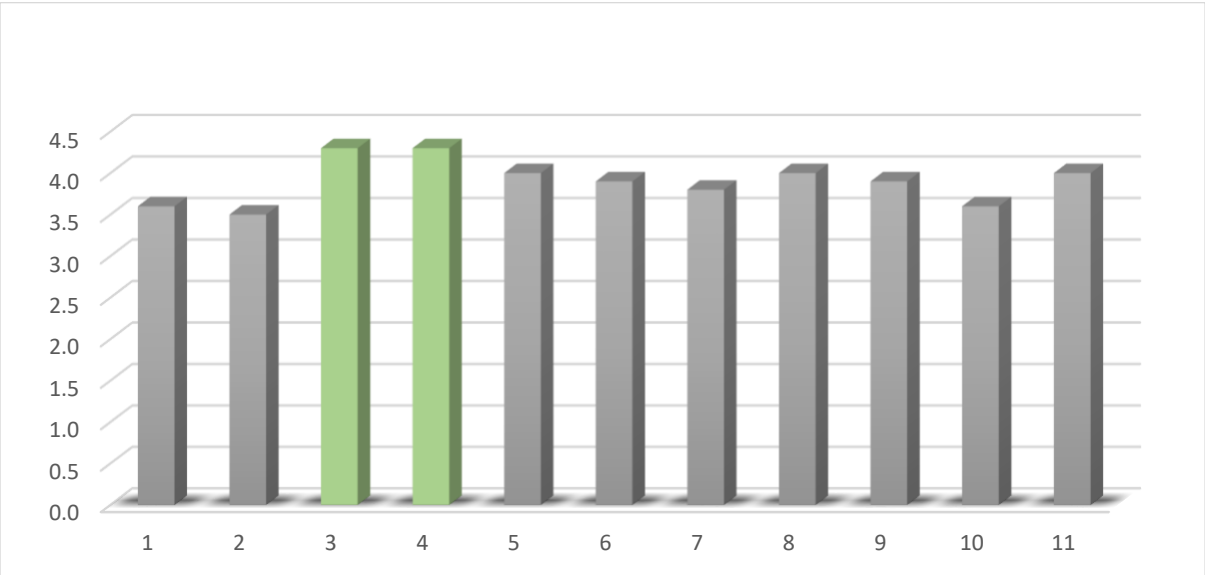

Figure 16. Experts' opinion on the impact of improving IT skills for remote teaching on the proficiency at teaching

There were two opinions among the experts that improving the IT skills for online learning also improves the general teaching skills of university teachers. The first opinion is that teachers have a wider range of tools at their disposal, which is certainly good for their overall competence. The second opinion, which the experts agreed with, is that links, videos, and open source materials add tremendous value to teaching.

Q17 - In your opinion, who should ensure that teachers have adequate knowledge of online teaching methods and techniques (e.g. universities, faculties, the teachers themselves)?

Opinions:

1. ***Most experts believe that it is shared responsibility of the university and the teachers. The university authorities (employer) should ensure that teachers have adequate knowledge of online teaching methods and techniques, but also give access to the needed resources: laptops, tablets, devices, internet, licenses and so on. At the same time, the teachers should invest the time needed to develop such skills.***
2. *In addition to centrally organised courses, more specific ones should be offered at the faculty/department level to meet the needs of the courses taught.*
3. *Teachers also say they would like to have constant assistance in this area in the form of friendly hospitality or advice and not on an on-demand only basis.*
4. *It is important to collaborate between teachers as members of the teaching staff and the institution. Together they have the same purpose; achieving a teaching process at the highest level of efficiency and effectiveness.*
5. *Digital literacy is now a basic skill and should be a must for teachers entering the profession.*

Table 17. Experts' opinion on the responsibility to ensure that teachers have adequate knowledge of online teaching methods and techniques

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	5%	0%	36%	59%	4.5	***strongly agree***
2	0%	0%	18%	55%	27%	4.1	agree
3	0%	9%	36%	32%	23%	3.7	agree
4	0%	5%	5%	64%	27%	4.1	agree
5	5%	5%	9%	55%	27%	4.0	agree

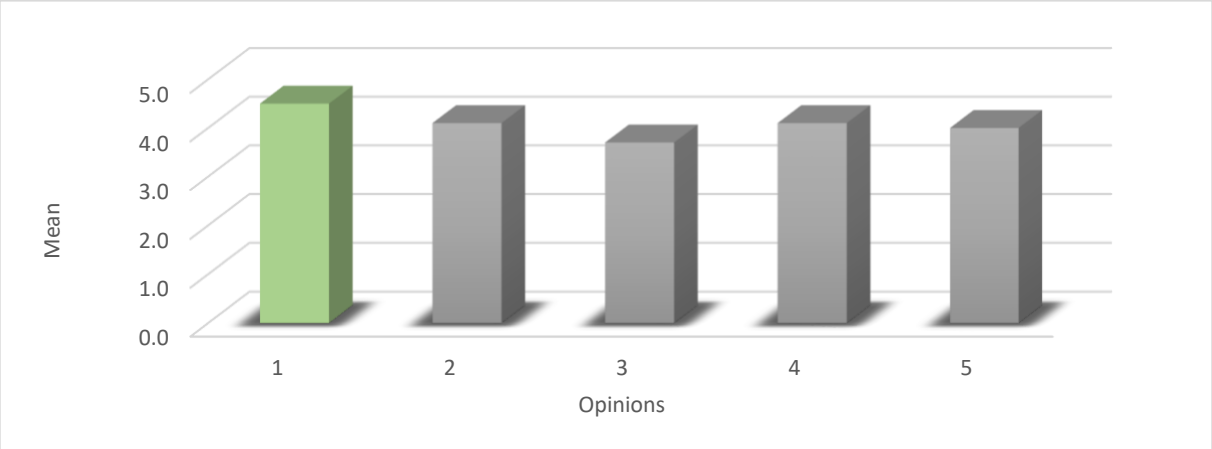

Figure 17. Experts' opinion on the responsibility to ensure that teachers have adequate knowledge of online teaching methods and techniques

The experts believe that the university and faculty share responsibility for ensuring that teachers have adequate knowledge of online teaching methods and techniques. University authorities are responsible for ensuring that teachers have adequate knowledge of online teaching methods and techniques, but also that they have access to the necessary resources: Laptops, tablets, devices, internet, licences, and so on. At the same time, teachers should invest the necessary time to develop these skills.

Q18 - In your opinion, how could universities optimize the provisioning of IT equipment (e.g. laptops, webcams) and support to teachers, in case of remote learning?

Opinions:

1. ***Most respondents agreed that it is very important that the university provides the faculty with all necessary equipment and licences for the required lectures and that central coordination is preferable. Ideally, each teacher should be given a laptop with standardised software needed to teach a particular subject area, and possibly a tablet if there is a lot of writing to be done.***
2. ***Another option to support teachers is technologically equipped lecture halls that allow for both hybrid and online teaching. Classes and labs that provide access to all of these technologies that could support instruction and student access to classes and information (laptops, smartboards, projectors, etc.) would also be helpful.***
3. ***Of particular importance is the availability of IT service staff to assist teachers in their daily work and to ensure the availability of online exam materials (textbooks and others).***
4. *Some suggested shortening central procurement procedures and making it easier for teachers to access high-speed Internet connections. There is also remote access to the university network if people want to work on their own laptops or computers.*
5. *In the case of online learning, universities/faculties should reimburse teachers for: IT Equipment (laptop), a lump sum that includes the cost of electricity, the cost of subscribing to a specific network service (internet connection), the cost of heating, and the depreciation of a private budget.*
6. *Expertise present within the university, but coming from other departments (e.g., psychology, economics, sociology, engineering) should be exploited in a concerted way to offer benefits to the university as a whole.*
7. *A shared platform common to the whole university should be developed.*

Table 18. Experts' opinion on the provisioning of IT equipment for teachers

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	5%	0%	23%	73%	4.6	***strongly agree***
2	0%	0%	5%	55%	41%	4.4	***strongly agree***
3	0%	0%	5%	50%	45%	4.4	***strongly agree***
4	0%	5%	9%	45%	41%	4.2	agree
5	0%	5%	9%	50%	36%	4.2	agree
6	0%	5%	18%	55%	23%	4.0	agree
7	0%	14%	14%	41%	32%	3.9	agree

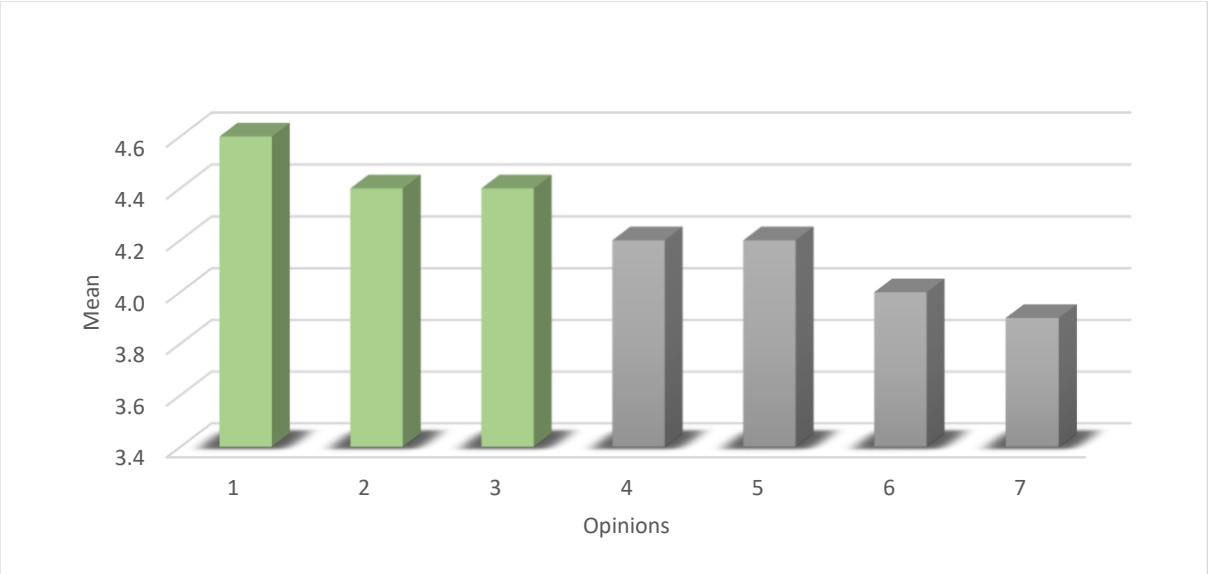

Figure 18. Experts' opinion on the provisioning of IT equipment for teachers

In the second round of Delphi, experts strongly agreed on three points regarding ways universities can optimise the delivery of IT and support to teachers, in case of remote learning. The university should provide the teachers with the equipment and licences, preferably a laptop with standardised software needed to teach a particular subject area, and possibly a tablet if a lot of writing needs to be done. Central coordination by the university is desirable. Another option to support teachers is technologically equipped lecture halls that allow for both hybrid and online teaching. There are also classes and labs with access to all of these technologies that could support instruction and student access to courses and information. To ensure a smooth workflow, the availability of IT service personnel is necessary to support teachers in their daily work and to ensure the availability of online exam materials.

Q19 - In your opinion, how could universities optimize the provisioning of IT equipment (e.g. laptops) and support to students, in case of remote learning?

Opinions:

1. *Rental of equipment for students.*
2. *Subsidizing the price of laptops for students.*
3. *Secure contracts with internet providers who will offer their services to students at lower prices.*
4. *Provide students with access to software licenses and use of applications.*
5. ***Ensure that students who do not have the equipment can follow the lessons on computers at the faculty.***
6. *For lower-income students, scholarships could be offered, or have a fund for students who cannot afford the technology.*
7. *Standardisation of hardware and software for students when they enter the university.*
8. *Universities could help find donors/sponsors to help cover the costs of equipment for students.*
9. *Reconditioning of equipment available but not in use at the university that could then be borrowed by students who do not have adequate basic equipment.*

Table 19. Experts' opinion on the provisioning of IT equipment for students

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	18%	23%	45%	14%	3.5	agree
2	5%	0%	32%	50%	14%	3.7	agree
3	5%	5%	18%	55%	18%	3.8	agree
4	0%	5%	14%	55%	27%	4.0	agree
5	0%	0%	5%	68%	27%	4.2	***strongly agree***
6	0%	0%	9%	68%	23%	4.1	agree
7	0%	9%	41%	45%	5%	3.5	agree
8	5%	5%	32%	50%	9%	3.5	agree
9	0%	5%	27%	55%	14%	3.8	agree

Teachers should make sure that their online teaching is accessible from a variety of devices, but we cannot demand that they have e.g. a webcam.

Majority of respondents' opinion was that it is not up to the universities or possible for them to make sure that each student has a laptop. Majority of students have access to teaching at least with their personal mobile phone, although most have their own laptop or tablet. They pointed to already existing forms of student support, such as lending equipment (laptops) or preparing special places in teaching rooms or libraries for students to use. On the other hand, equal access to fast Internet connections remains an unresolved problem, which is particularly difficult for students living on the periphery of large cities or small towns.

Q20 - In your opinion, how could universities, or other institutions, optimize the proficiency of teachers in student activation, during lessons from remote?

Opinions. All experts pointed out that there is much to be done in this area. They point to solutions such as:

1. *Training aimed at conducting active forms in an online version.*
2. ***Training on existing applications that can be used for attractive teaching.***
3. ***Training on how to prepare attractive electronic materials for online classes.***
4. ***Presentation of good practices and online courses.***
5. *Participation in demonstration classes.*
6. *Sending teachers to trainings (good practices or one of the centres for e-learning) with special emphasis on specific methods of teaching and evaluation in the online environment.*
7. *Smaller groups of students.*
8. *Availability of online textbooks.*
9. *Preparation of databases of video materials and other innovative teaching materials suitable for the online environment with a special focus on the development of materials that encourage interactivity during teaching.*
10. *Teachers working in pairs - one teaches and the other monitors and moderates the chat.*
11. *It might be a good idea to find out what the needs are, what the content is, and then organise it, because different audiences have different needs (math professors and history professors, for example).*
12. *Short meetings of faculty to share experiences and best practises in delivering pedagogical work online, or shorter debates led by experts, could be useful.*
13. *With the establishment of a platform where colleagues can share their experiences of different approaches they have used or are using that have proved effective.*
14. *In itinerate evaluation of students' engagement and consequent adaptation of the course itself.*
15. *Incentives system, following assessment of competencies, for teachers who are proficient in both in person and online teaching.*
16. *Teachers who are not primarily pedagogical and are required to complete training in pedagogy and andragogy will also be prepared in this programme on how to appropriately teach online. This should be addressed systematically.*
17. *Pdp - programs for e-pedagogy + e-assessment + analytics + mental support (chat/zoom support).*

Experts' opinion on how universities or other institutions could optimize the proficiency of teachers in activating students during online learning strongly supports the need for training on existing applications that can be used for engaging teaching, training on preparing engaging electronic materials for online courses, and presenting best practices and online courses.

Table 20. Experts' opinion on optimizing the proficiency of teachers in student activation, during lessons from remote

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	0%	14%	55%	32%	4.1	agree
2	0%	0%	5%	59%	36%	4.3	***strongly agree***
3	0%	0%	14%	36%	50%	4.4	***strongly agree***
4	0%	0%	0%	41%	59%	4.6	***strongly agree***
5	0%	0%	23%	59%	18%	4.0	agree
6	0%	0%	9%	59%	32%	4.2	agree
7	0%	9%	23%	50%	18%	3.8	agree
8	0%	5%	9%	68%	18%	4.0	agree
9	0%	5%	5%	77%	14%	4.0	agree
10	5%	23%	32%	36%	5%	3.1	neutral
11	0%	5%	27%	55%	14%	3.8	agree
12	0%	5%	14%	73%	9%	3.9	agree
13	5%	14%	23%	50%	9%	3.5	agree
14	5%	5%	36%	50%	5%	3.5	agree
15	0%	5%	41%	41%	14%	3.6	agree
16	5%	5%	27%	45%	18%	3.7	agree
17	0%	5%	23%	64%	9%	3.8	agree

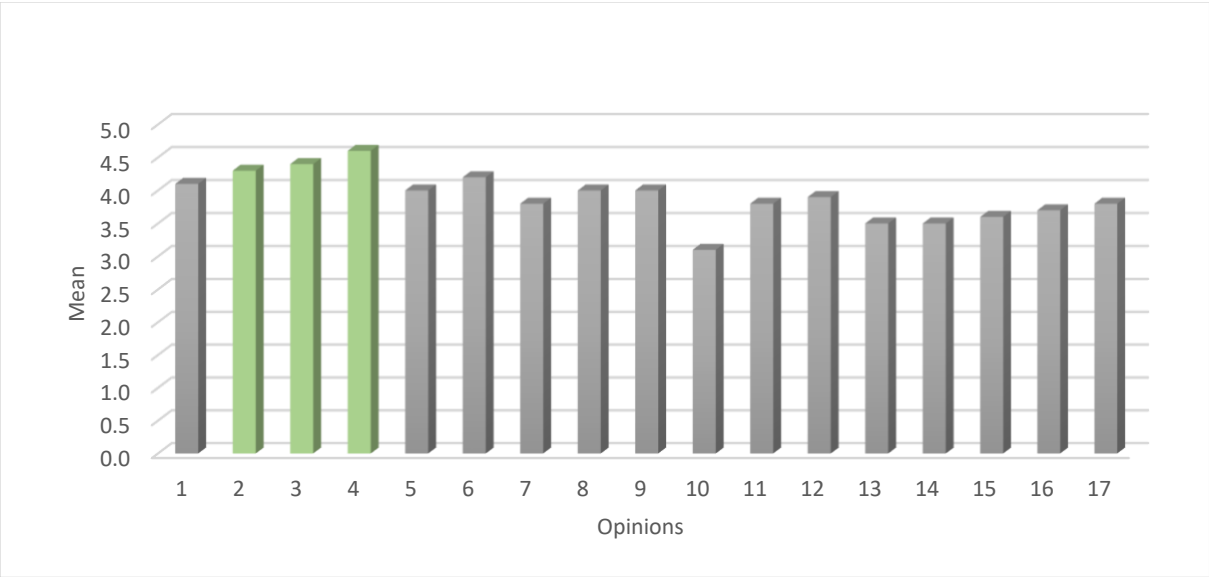

Figure 20. Experts' opinion on optimizing the proficiency of teachers in student activation, during lessons from remote

Q21 - Teaching from remote is deeply different from having in-presence lessons. In your opinion, how could universities improve the proficiency of teachers in methods and techniques that can be adopted to teach from remote?

Opinions:

1. ***Sending teachers to trainings - Universities must primarily provide webinars, workshops, seminars with special emphasis on specific methods and techniques of online learning (especially on online assessment) and providing real-life examples.***
2. ***Internal workshops with presentations of good and bad practices.***
3. *Establishing platforms that allow the sharing of feedback from everyone involved in the teaching process.*
4. *Organizing individual support (for creating online exams, designing teaching content).*
5. *The provision of appropriate tools (e.g. Graphics tablets...), as well as a group of people to assist the teacher in case of problems during online teaching, and information about the new e-tools that could be useful for online learning.*
6. *Reorganization of the teaching schedule (shorter classes) to account for the different implementation needs and attention span.*
7. *Most universities collect students' evaluation surveys, those should be modified to better allow the evaluation of online courses, of course the answers should be then used to adapt the teaching strategies.*
8. *Open calls for ideas on how to renew courses.*
9. *An e-learning centre.*
10. *The opinion of one of the respondents, an experienced user of online tools, is particularly interesting to point out: I would like to see a production studio for recording online material. World universities have long had an online teaching system, and rarely conduct live teaching. Everything is recorded in advance, there are editors, sound engineers and suitable lighting... all this can ultimately lead to a good production of online material. Personally, that would motivate me, but we are still far from this type of support.*
11. *On the other hand, there is a need for discussion and training in methods that would improve the online equipment to serve transformative and dialogue led teaching also in an online environment. Now the equipment and the software dictates what is possible to do.*

The experts agreed on the role of universities in improving the proficiency of teachers in methods and techniques that can be used for online learning by sending the teachers to trainings and, in particular, by providing webinars, workshops, and seminars with a special focus on specific methods and techniques of online learning (especially online assessment) and by providing real-life examples.

Table 21. Experts' opinion on how could universities improve the proficiency of teachers in methods and techniques that can be adopted to teach from remote

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	0%	5%	68%	27%	4.2	***strongly agree***
2	0%	0%	14%	55%	32%	4.2	***strongly agree***
3	0%	5%	18%	59%	18%	3.9	agree
4	0%	5%	9%	64%	23%	4.0	agree
5	0%	5%	9%	73%	14%	4.0	agree
6	0%	0%	23%	68%	9%	3.9	agree
7	0%	5%	14%	45%	36%	4.1	agree
8	5%	5%	23%	50%	18%	3.7	agree
9	0%	0%	36%	45%	18%	3.8	agree
10	0%	14%	36%	41%	9%	3.5	agree
11	0%	5%	18%	68%	9%	3.8	agree

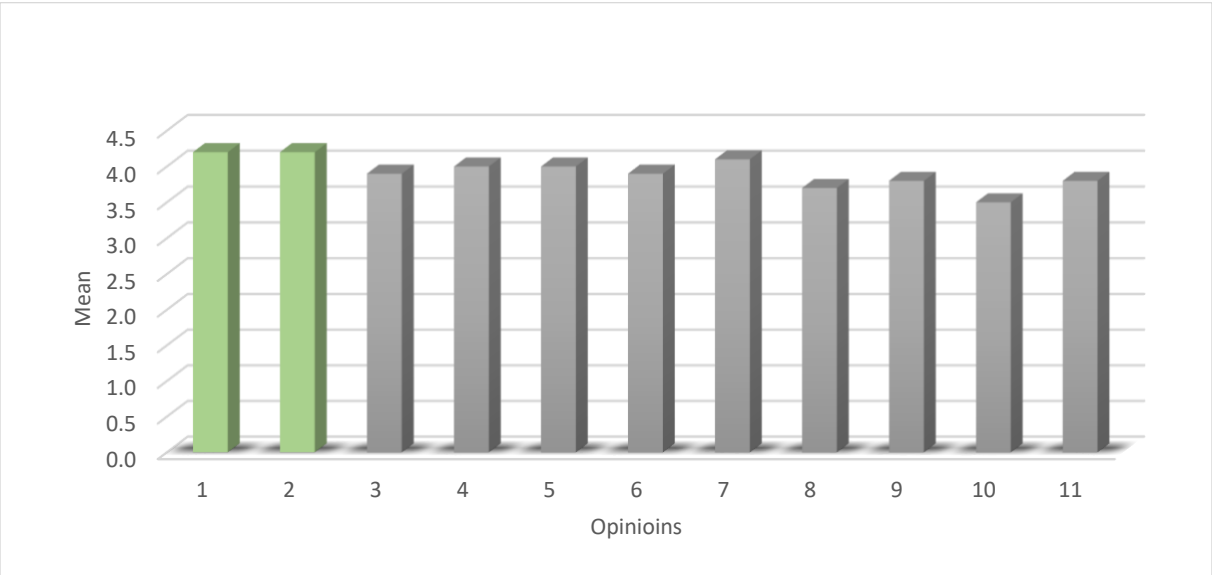

Figure 21. Experts' opinion on how could universities improve the proficiency of teachers in methods and techniques that can be adopted to teach from remote

Q22 - Could you please tell us what has been done in the attempt to mitigate IT issues at your research institution? Did these interventions work well in practice?

For example, the University of Primorska created lecture rooms for teacher, so that they would not be forced to teach entirely from home, and it installed webcams and microphones in each lecture room. However, having the microphone just for the lecturer and not an environmental one does not allow for interaction during hybrid events.

Opinions. Since experience in specific institutions is required in this question, all individual answers are listed below by country.

A. *Croatia:*

The FOI online Portal has been opened with instructions for teachers and students on how to use e-learning and e-learning tools at the institution. A survey was conducted on the perception of the quality of teaching and students evaluated all subjects. The results are aggregated and publicly presented, and are used internally to improve teaching. Internal workshops on the transfer of good practice were organized. Equipment was procured for all teachers and part of the classrooms was equipped with specialized equipment for real-time broadcasting. All interventions were extremely effective.

Introducing online learning platforms and offering instructions on their use

Classrooms with cameras and computers are equipped. They gave us a tablet and an Internet card. Some got (mathematicians because they need it) Wacom tablet. I had my laptop from the project so I didn't need new equipment. the library is equipped so that students can listen to lectures and take exams online.

To alleviate the difficulties with information technology, the only thing that has been done at my institution is several online workshops on how to work in the Moodle system, composing exams and online grading. There were absolutely no seminars or workshops about online platforms, everything was left to teachers and their individual engagement on education about online platforms.

We all got to use the same computers (laptops). For me personally, it was completely counterproductive. I had everything at home and the computer I got didn't serve my needs. When I asked for an exemption in the procurement of equipment - I was refused. I understand the position because we have an obligation towards public procurement, however, when it comes to mass solving of problems, then it means access - the same for everyone - in my opinion it is impossible and completely wrong approach. However, most of my colleagues were helped by this intervention of the Management and I am not dissatisfied with that, I just state that the intervention in my personal case was not effective.

Zoom platform for teaching has been introduced; the interventions were effective because we got a lot of virtual halls through which classes and other activities were performed.

B. *Finland:*

The university has Digi mentors, which are dedicated staff helping teachers with technical support. We have a central team who is in charge of training, which arranges a good number of different training opportunities. Both these worked very well when the pandemic struck. They were already in place before the pandemic, but their role became very central in the pandemic.

Ongoing activities that have helped in improving my skills. Mostly learning from colleagues and visiting experts.

Some miserable attempt, but by those who don't themselves do similar work.

C. *Poland:*

All experts ensure that they had and have access to professional technical assistance at their universities. In case of internet connection problems, one of the universities has made it mandatory to hold online classes from rooms on campus, thus eliminating connectivity problems from private flats or houses located in smaller towns. The universities have also organised online training on how to use the basic functionalities of the learning platforms (for lecturers and students).

D. *Romania:*

Also, our university gave our teachers the opportunity to use the classes for teaching, but almost nobody used them. The only persons that sometimes used the rooms in the university were the teachers that had also administrative work and had to be in the office in certain days, all the others choose to teach from home.
Our university let us use the lecture rooms for our classes, if we were interested in that.
University provided spaces, equipment's, classes to support the teachers to conduct their teaching activities.
Only if we wanted to did we teach at the university. No IT interventions were performed

E. *Slovenia:*

Expert opinion was that the pedagogical process needs to be renewed. Teaching online requires a different way of working. Lecturing online is like watching a theatrical performance on television. A theatrical performance offers anything but watching people move and talk, does not it? Hybrid, if you/I call this type of teaching some of the worst possible. A teacher who is able to lecture ex-cathedra while looking into the camera, what do the students in the room get out of it? The modern university should be moving toward a student-centred pedagogical process and the recognition that the teacher has long since ceased to be the sole bearer of knowledge.
There was no support in terms of computer equipment. However, the IT department was always available. The success of hybrid lectures also depends on the type of lecture. If it is a more traditional lecture, where the professor mainly lectures and does not involve the students, it is probably possible and useful, but if the lecture involves a lot of exercises, if the professor writes a lot on the blackboard, if the professor works in groups, they are not the best solution. the equipment is outdated in some faculties and did not correspond to the hybrid mode of lectures. lecture halls are not adequately equipped. pedagogical work is still evaluated as: lectures, seminars, seminar work, field work, clinical training, laboratory ... and not blended or hybrid learning. unfortunately, this is not even supported by the management of some faculties.

F. *Italy:*

Our university organized sessions online for helping teachers to solve IT issues for the many that were not skilled enough to solve all problems.
In my university, video tutorials have been made for teachers, with instructions on using the MS Teams platform. The department heads have made available specific links and other references in order to solve any technical problems on the use of the software, but not much else. The teachers gave lessons from home.
My University organized some courses online to explain to us the new tools for teaching online. The classes were recorded and posted in a repository that we could access when needed. Our Department did not provide specific courses for teaching our disciplines online, so we lack best practices that we can follow. The university equipped all the teaching rooms with the microphones and webcams necessary for online and blended teaching.
My institution did not do much in the COVID-emergency moment, we had to provide by ourselves with pc, connection, learning to use Teams etc. I still think, anyway, that besides providing equipment and support, most of the teaching should rely on presence.

In my research institution, the emergently answer was slow, especially in supporting the faculty classroom with an adequate band rate wi-fi. Even now, when it's possible, I prefer to remote teach from home because my internet connection is better than the university's one. Adding webcams and Wi-Fi in each teaching room.

Q23 - Which percentage of teaching form remote would be acceptable for you, as a university teacher, under normal circumstances (e.g. no sanitary restrictions)? Why did you select this specific percentage?

Opinions. Each expert gave a different answer, and the explanations refer to possibility to choose the amount of teaching from remote, according to the topic and course.
The answers vary:

1. *Without specific percentage (5 answers): Depends on the subject and content, but also on the circumstances of teachers and students (e.g., mobility r health issues). For IT courses, most of it takes place online because is possible to record the lectures and students can watch them multiple times later, at a pace that suits them. Not all students have the same background or command of the country language. Being able to watch the recordings multiple times is helpful for all of these students.*
2. *0%: Teaching process based on direct communication is normal and therefore the best way of teaching.*
3. *5-10% (2 answers): only exceptionally*
4. *10-25% (4 answers): lectures belong in class, some percentage of online lectures could be tolerated in case of illness, conferences or mobility. A part of this percentage should be used to involve external experts. Also, for master programmes I would like to be able to teach also online, as most of the master students are from different cities and most of them are not able to attend all the classes. I think online teaching could be as high as 25% in the future. That is the percentage that could be used for more theoretical lectures, tutorials etc. Especially from the point of view of more efficient use of time for teaching and demonstrations. At the same time, this approach would encourage students to search for and study literature more independently.*
5. *30% (4 answers): as much as necessary to place teaching materials and some accompanying activities on the internal platform. Hybrid teaching is undesirable and confusing and makes it difficult to organize the whole process. 30% some parts of the lectures, practicum protocols can be given remotely. The most common indication was 30-33 %.*
6. *50% (8 answers): Depends hugely on the course, target audience, topic… I also believe that especially older students (master's level) should have the opportunity to study remotely as much as possible if they want to. When it comes to younger students, I would like to see a mix of online and campus. Experts indicated that lectures (above 50 people) and computer classes could be in 50% online. At the same time, most perceived that classes in face-to-face contact with the teacher and other students are essential for the formation of students' social competencies.*
7. *80%: for master classes (I think 80% of those classes can be online, except for the exams, who should be face to face).*

8. *100% (3 answers): if we know that in the long run it will be the way the classes will be held. Online teaching, if well acquainted with and using all available tools, can be even better than a classic lecture in the hall. All (100%) of my teaching currently is and will be remote if I continue working at the UTU Open University.*

The experts also draw attention to the fact that regardless of the percentage of classes conducted online, each lecturer should know well how to achieve educational results and what techniques to use, so that the student learning remotely is not deprived of the opportunity to acquire skills and competencies, which could be acquired by studying stationary (traditional).
I always personally prefer teaching on the spot with support from online activities in Moodle for example. I have worked for more than 10 years on online, and I do not believe people in masses want to work remotely even when corona is over. When corona is over, we will again appreciate the social dimension of belonging to a working group.

Table 23. Experts' opinion on the acceptable percentage of teaching form remote under normal circumstances

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	9%	9%	59%	23%	4.0	agree
2	32%	23%	23%	14%	9%	2.5	disagree
3	5%	32%	32%	23%	9%	3.0	neutral
4	9%	14%	23%	36%	18%	3.4	neutral
5	0%	27%	23%	50%	0%	3.2	neutral
6	9%	36%	23%	23%	9%	2.9	neutral
7	23%	23%	27%	27%	0%	2.6	disagree
8	36%	14%	27%	14%	9%	2.5	disagree

Experts disagree on this issue because it is difficult to set a fixed percentage for online learning that should apply to all subjects. Most experts agreed that it depends on the subject and content, as well as the circumstances of the teachers and students.

Q24 - In your opinion, how could universities design inclusive and effective forms of blended learning?

Opinions. The main highlights from experts are listed below:

1. *Getting acquainted with the good practices of other heist and hiring advisors, experts from other institutions who can help in the transition phase.*
2. *Execution of part (direction) of the study program online - it is then a good platform for testing and practicing methods that will be subsequently applied to all study programs.*
3. ***For part-time students, it is important that classes and teaching materials are available at a time that suits them personally - so it is important to ensure***

recordings of lectures, the availability of certain forms of teaching and testing at different times.

4. *HEI's long-term commitment to online teaching is very important - if teachers perceive it as a temporary phase or a way of teaching that is not as valuable as onsite teaching, they will not invest or spend their resources in the development of such teaching.*
5. *Investment in equipping and modernizing IT equipment.*
6. *Use of dedicated programs, platforms and tools to allow real-time interaction with students.*
7. *Increased collaboration with other Institutions.*
8. *Co-designing of courses by experts with complementary skills.*
9. *Greater involvement of students during teaching.*
10. *Education is needed not only for teachers, but also for students.*
11. *Training with an emphasis on combining transformative learning with online elements.*
12. ***By using online teaching platforms, but combined with face to face activities, in proportions that will allow good interactions between teachers and students.***
13. *To allow the teachers to make choices for themselves. It is very important for the university to consider the opinions of individual teachers who know best what material can be delivered online in a quality way.*
14. *We will be more inclusive when we allow for a greater variety in how to study.*
15. *Be very mindful of why we are choosing to do an activity online or face-to-face class.*
16. *So-called "hybrid lectures", i.e. Having Zoom in a live lecture at the same time, were significantly less efficient than face-to-face or online lectures.*

Table 24. Experts' opinion on the role of the universities in design inclusive and effective forms of blended learning

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	9%	27%	50%	14%	3.7	agree
2	5%	5%	32%	55%	5%	3.5	agree
3	0%	0%	5%	73%	23%	4.2	***strongly agree***
4	5%	9%	18%	50%	18%	3.7	agree
5	0%	0%	14%	64%	23%	4.1	agree
6	0%	0%	27%	55%	18%	3.9	agree
7	0%	0%	27%	64%	9%	3.8	agree
8	0%	0%	23%	55%	23%	4.0	agree
9	0%	9%	18%	55%	18%	3.8	agree
10	0%	5%	32%	45%	18%	3.8	agree
11	0%	0%	14%	77%	9%	4.0	agree
12	0%	0%	9%	55%	36%	4.3	***strongly agree***
13	0%	5%	18%	55%	23%	4.0	agree
14	0%	5%	27%	45%	23%	3.9	agree
15	0%	9%	14%	50%	27%	4.0	agree
16	0%	14%	45%	27%	14%	3.4	neutral

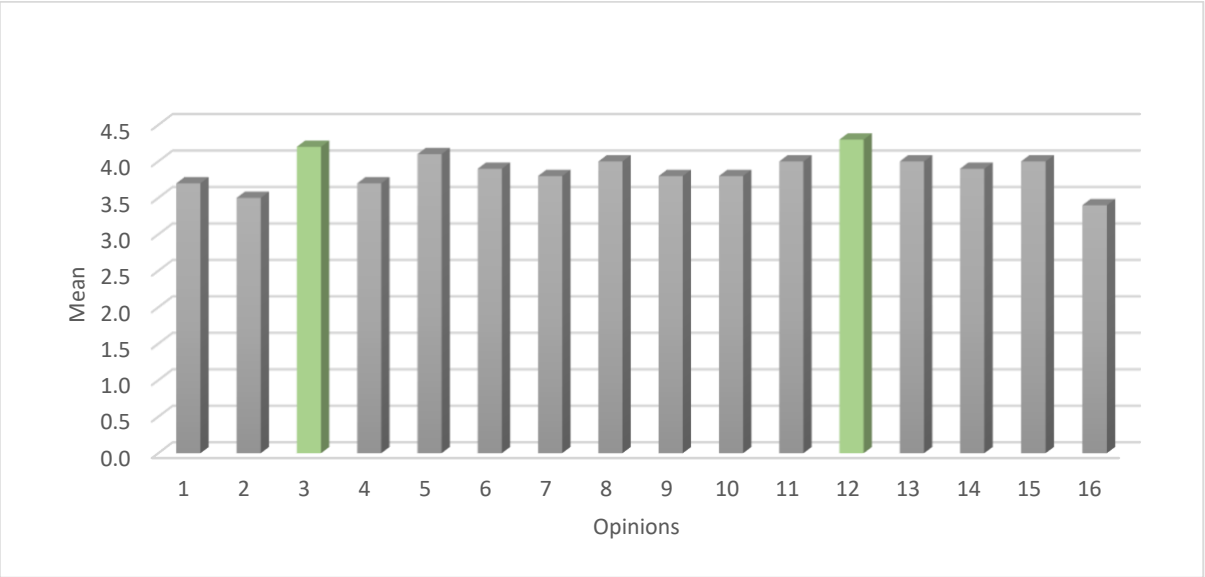

Figure 24. Experts' opinion on the role of the universities in design inclusive and effective forms of blended learning

In the second Delphi round, the experts tended toward blended forms of teaching, in which online teaching platforms are used, but in combination with face-to-face courses, and in a ratio that allows good interaction between teachers and students. They believe that it is important for part-time students to have classes and course material available at a time that suits them personally - so it is important to ensure the recording of lectures, the availability of certain forms of teaching and exams at different times.

Q25 - In your opinion, does blended learning bear any risk for students and universities? In case, which are the main risks associated with the use of mixed in-presence and remote teaching activities?

There are differing opinions on this topic and for most teachers the distinction among different methods (blended, hybrid, flipped, etc.) remains unclear.

Opinions:

1. *Decreased quality of education*

According to some experts, there is a high risk that the quality of education will decrease. The main reason is the unpreparedness of the teaching staff. From a teacher's point of view, giving hybrid teaching (meaning a form of teaching where a part of the students are in a lecture room with the teacher, and some are taking part via remote access e.g. via Zoom at the same time) can be really stressful, since he/she cannot give attention to both groups at the same time. Usually, a teaching assistant is needed to ensure that the students taking part online can follow the teaching, stay active, and that their questions and comments coming

e.g. via chat or microphone can be heard. In general, experts note that students put less effort into preparing for and participating in online classes. The potential risk is that knowledge will be more difficult to acquire in this way. The risk is that the hybrid form will become exclusively online over time. However, we should also think about how to deal with students with disabilities, because the survey showed that 80% of respondents think that online learning is more accessible for them than studying at the faculty.

2. *Blended learning is only an advantage*

The main risk could be the lack of acceptance by faculty or University leadership, or lack of support by management, or unwillingness on the part of some teachers to change the way they teach. No major risks from a students' perspective if the blended/hybrid teaching is well planned and thought, on the contrary this implementation could increase inclusiveness. From a universities' perspective doing it well requires more resources than "traditional" teaching, e.g. in the form of hiring teaching assistants. However, many lecturers could see that it is easier to organize zoom-learning session instead of physical session. More holistic approach should be applied to ensure the wellbeing of the students. Distancing effect of online teaching needs to be identified, and for it support activities need to be developed that provide opportunities for all different learners to participate. Some suggested that a maximum percentage of online teaching should be established having in mind also the specificity of the disciplines, as the ones that are applied sciences are very difficult to be taught online: medicine, sports, music, electronics, land surveys and so on. It is necessary to innovate the processes, to transfer the responsibility to the teacher and the students, and instead of counting the hours of lectures, exercises and seminars, to review the determination of learning outcomes.

3. *It is inefficient.*

Some classes require to use the whole available space in the class, which is not possible during online implementation since teachers need to remain within the range of the camera and microphone.

Table 25. Experts' opinion on the main risks associated with the use of mixed in-presence and remote teaching activities

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	23%	32%	27%	18%	3.4	neutral
2	0%	9%	36%	41%	14%	3.6	agree
3	14%	36%	36%	14%	0%	2.5	disagree

Experts see blended learning as an advantage when it is well planned and takes a holistic approach to ensure student well-being.

Q26 - Finally, how could these risks be mitigated by universities?

In the universities, it should be important to support all forms of community, and also consider in pedagogical solutions that genuine participation and inclusion are important elements of learning. The art of transmission of information is mastered.

Opinions. Experts point to some solutions:

1. *Develop an effective strategy and action plan for the transition to hybrid learning and providing support to teachers.*
2. *With a clear definition of who can lecture online, why, and to what extent.*
3. ***The right choice of teaching method for the course topic (e.g. online labs are ineffective).***
4. *Control of online classes and evaluation of their effectiveness.*
5. *Continuous monitoring of student satisfaction with the subjects, but also monitoring the satisfaction and needs of teachers.*
6. *Virtual reality.*
7. *Training and hiring of qualified teachers.*
8. ***Providing appropriate infrastructure.***
9. *Improving well-being at the university and valorising diversity in teaching activities.*
10. *An interdisciplinary team of specialists can be created to try to manage and develop some solutions depending on the situation.*
11. *To encourage them to come to classes and be active.*
12. *With a visionary view, motivation, patience and support for teachers.*
13. *The schedule needs to be adapted to a hybrid or online form of teaching. Eight hours in the classroom is not the same as eight hours online.*

Table 26. Experts' opinion on the possibilities for universities to mitigate the risk of blended learning.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Rating
1	0%	0%	5%	82%	14%	4.1	agree
2	5%	0%	18%	64%	14%	3.8	agree
3	0%	5%	5%	59%	32%	4.2	***strongly agree***
4	5%	9%	18%	59%	9%	3.6	agree
5	0%	9%	14%	64%	14%	3.8	agree
6	5%	18%	36%	32%	9%	3.2	neutral
7	0%	0%	36%	50%	14%	3.8	agree
8	0%	0%	0%	73%	27%	4.3	***strongly agree***
9	0%	5%	18%	59%	18%	3.9	agree
10	0%	5%	41%	36%	18%	3.7	agree
11	0%	5%	36%	55%	5%	3.6	agree
12	0%	5%	23%	59%	14%	3.8	agree
13	0%	0%	10%	67%	24%	4.1	agree

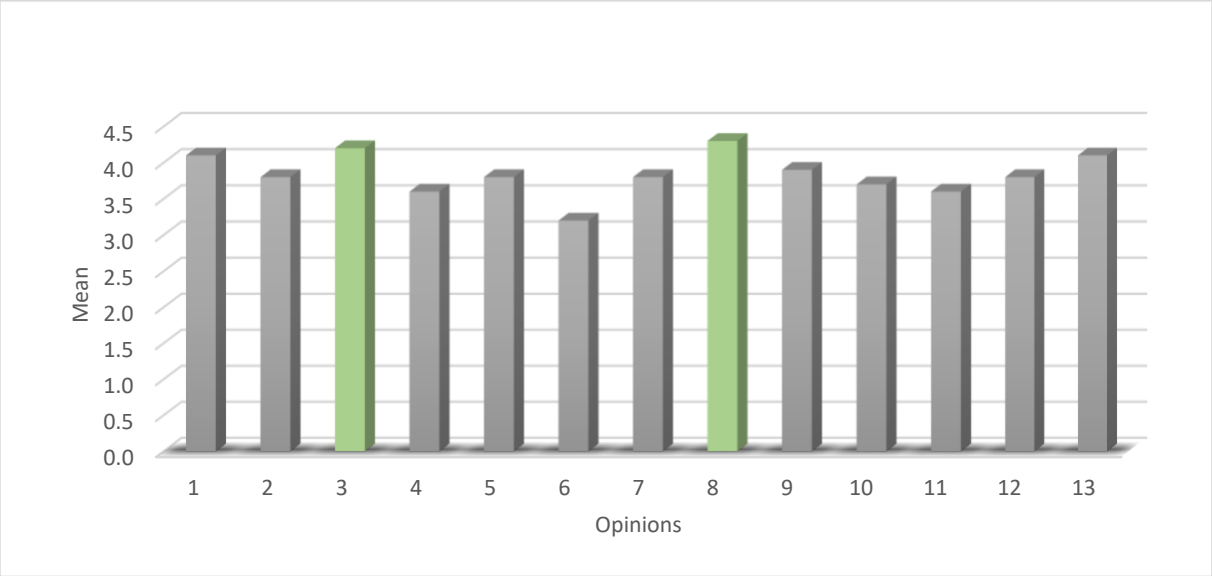

Figure 26. Experts' opinion on the possibilities for universities to mitigate the risk of blended learning.

Experts believe that universities could mitigate the risk of blended learning by considering the right choice of teaching method for the course topic (e.g., online labs are ineffective) with the provision of appropriate infrastructure.

RESULTS SUMMARY ON DELPHI ANALYSIS

The report indicates that most teachers used online (online) learning only to a limited extent in the pre-pandemic period, probably because most universities are restrictive in this sense, since they consider online teaching as "less valuable". A statement that was supported by the experts' perception of face-to-face teaching asmore efficient.

The experts state that probably due to fact that use of online platforms for online education was marginal, some opportunities may have been nott seen or missed. They pointed out the advantages of online learning, especially the possibility of participation of a more diverse group of students (e.g., working people, people with limited mobility, people with special needs, etc. Additionally, classes can take place even if the teacher is unable to attend (e.g., due to a business trip), and more external lecturers could attend the lectures.

Although experts recognised the transition to online teaching presented multiple difficulties, they believe providing teachers with adequate knowledge on online teaching methods, platforms, softwares and techniques would help to overcome these problems. All experts agreed that it is the responsibility of the university or faculty to organize support, equipment and training. This should happen either in a centralized way or with the university providing support to the faculty that then implements the strategy tailoring it to the specific needs of the course taught.

The experts' opinion on how universities can improve the proficiency of teachers in methods and techniques for online education states that universities must primarily offer webinars, workshops, and seminars with a particular focus on specific methods and techniques of online learning (especially online assessment) and provide real-world examples. Organised internal workshops with presentations of good and bad practises would also be helpful.

In the transition to online teaching, university teachers faced a major challenge in terms of student engagement. Experts believe that this is mainly due to the social isolation, superficial and isolated conduct of group activities, which has led to lower motivation and energy among students to learn and participate in discussions.

This situation has led to teachers being encouraged to engage better with students. In fact, teachers not only improved their skills in using IT solution, but also started to think about other teaching methods. Teachers understood that students were better motivated to solve homework problems, to work in teams on certain topics, especially when motivated with points/grades/bonuses. They were also motivated when they heard about deadlines.

They recognised expanded opportunities for working and communicating with students (e.g., holding consultations when the teacher is officially absent, recording lectures when the teacher is unable to give a live lecture, and having students use recordings at a time convenient to them - important for part-time students), and greater use of other media to help students master material / adopt learning outcomes. In addition, they also learnt that in crisis/extreme situations, online learning can replace (to a large extent) face-to-face teaching, and it can be applied not only to whole groups of students but also to those who, for some important reason (health, etc.), cannot be at the university. The experts felt that remote classes can be used to complement traditional ways of teaching and blended learning should be recognised as one of the possibilities.

Even though teachers have learned some lessons, the most difficult aspect remains in terms of communicating with students, especially how to get feedback from students or how to deal with not being able to observe what students are doing, such as how they react during the lecture. Experts' opinion is that providing feedback to the students is the most time-consuming and difficult task. In asynchronous teaching, written feedback is important to motivate students and show them what they have learned well and what they need to improve above all. Communication is so much more than just words spoken and online or written communication hinders part of it. Many experts state that teachers learnt to use various forms and channels of communication with students (at a very good level), such as online consultations, seminars, more information posted on the Internet, but still communication during lectures and classes did not improve.

New interactive methods can be a good way to deliver lessons even if live (in person) classes cannot take place for some reason, together with clarity and transparency could be useful in the near future. Teachers have realized that some meetings and arrangements (but also conferences and workshops) can be done online, which reduces the time needed to organize meetings (no travel) and costs. Acquiring new skills to work in a virtual environment is crucial for the future education of the new generations of students who are heavily focused on the digital world.

Experts' opinion is that university teachers have learned how to conduct online knowledge tests effectively and that there is no difference between face-to-face and online tests if they are well organized.

The experts' opinion on how universities or other institutions could optimize the proficiency of teachers in activating students during online learning focused mainly on training on existing applications that can be used for attractive teaching, training on how to create attractive electronic materials for online teaching, and presentation of best practices and online courses.

Improving IT skills for remote teaching does give the teachers a wider variety of tools to choose from, which is surely a good thing for their overall proficiency. Links, videos and open-source materials have brought tremendous added value to teaching.

Despite some advantages of online teaching and the knowledge acquired by the teachers, it has not solved the problems encountered in carrying out laboratory and field exercises. Experts recommended some strategies that could facilitate the implementation, such as the necessity to combine synchronous teaching with lots of asynchronous materials in the form of video content so that students can work on their own. The synchronous part of the teaching should be used to solve the problem domain, in a flipped classroom approach.

In addition, teachers must also have the necessary equipment and licenses for tools and software. Most experts believe that the university authorities (employers) should ensure that teachers have adequate knowledge of online teaching methods and techniques, but also provide access to the resources they need: laptops, tablets, devices, internet, licenses and so on. At the same time, teachers should invest the necessary time to develop these skills. Experts agreed that it is very important that the university provides the faculty with all necessary equipment and licences for the required lectures and that central coordination is preferable. Ideally, each teacher should be given a laptop with standardised software needed to teach a particular subject area, and possibly a tablet if there is a lot of writing to be done. Another option to support teachers is technologically equipped lecture halls that allow for both hybrid and online teaching. Classes and labs that provide access to all of these technologies that could support instruction and student access to classes and information (laptops, smartboards, projectors, etc.) would also be helpful. They also stress out the importance of the availability of IT service staff to assist teachers in their daily work and to ensure the availability of online exam materials (textbooks and others).

Universities should develop integrative and effective forms of blended learning. For part-time students, it is important that classes and course materials are available at a time that suits them personally - so it is important to ensure recordings of lectures, availability of certain types of classes, and exams at different times. Teachers need to use online teaching platforms, but in combination with face-to-face activities, and in a ratio that allows good interaction between teachers and students.

Some risks could be mitigated by universities by making the right choice of teaching method for the course topic (e.g., online labs are ineffective) and providing appropriate infrastructure.

The InCompEdu project promotes innovative digital skills

that can be implemented both in online and hybrid higher education.

Technical platform booklet

Software or tools used for online teaching activities and Delphi analysis on identified challenges and problems in online teaching

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