DECriS Project IO2 Report
Digital Education appraisal and quality perception by students, teachers and trainers at the partner Higher Education Institutions (HEI) during the COVID-19 crisis

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Table of contents

1. Executive summary

This research forms part of the Erasmus+ project *Digital Education for Crisis Situations: Times when there is no alternative (DECriS)*. The project is focused on innovative digital practices implemented in Higher Education Institutions (HEI) in the field of Library and Information Science (LIS), their relationship to Digital Education (DE) in general, and the adoption of Open Education Resources (OER) in any learning situation, but especially in crisis situations such as the COVID-19 pandemic.

DECriS IO2 Report. The present report belongs to the Project's Intellectual Output 2: "Digital Education appraisal and quality perception by students, teachers and trainers at the partner HEI during the COVID-19 crisis". The aim of this output is to gain insights into the students' and teachers' attitudes towards DE and educational resources, in general, and towards canonical OER, in particular, mainly during the COVID-19 crisis and in contrast with their pre-pandemic experiences.

Research Methodology. A qualitative approach involving semi-structured interviews with teachers and focus groups with students was applied. A purposive sample was performed with proportionality between genders and age groups according to the following inclusion criteria: 1) teachers of bachelor degrees or master's degrees and teachers who teach in the two levels of education; 2) students of various courses and levels of education (bachelor and master's degrees who were enrolled during the pandemic lockdown periods: 2020-2021).

Results. A total of 39 interviews with teachers and 10 focus groups with students were conducted in the LIS centres of the five institutions that are project partners. For each partner, a report is presented with the results of the analysis of the teachers' and students' transcripts separately, structured in seven blocks: Context, attitudes and expectations; Adaptations; Problems; Advantages; Lessons learned; Good Practices; and Improvements.

Main findings and takeaways. The collected data were analysed from two perspectives: first, considering the general response to online teaching and learning during the pandemic; and second, more specific feedback regarding the creation and use of OER. Finally, we formulate some future lines of work and proposals.

General response to online teaching and learning during the pandemic. In each country of each HEI, the situation was treated differently. Each country had different prevention measures. Each HEI also took specific instructions from the general national health guidelines for education institutions. For instance, access to HEI campuses was totally restricted in some cases during long periods of time, while in other cases the situation was more relaxed after the firsts weeks of the onset of the pandemic, and in these cases there was the option to do exams or practical face-to-face classes while keeping certain distances and wearing masks. Therefore, while some findings are common to all universities, others are very specific to certain partner countries. The most important common trends identified are:

- All the teachers and academic authorities faced the uncertainty of the situation with perplexity and pragmatism. The word "rush" describes very accurately the process of switching all teaching to the emergency remote digital format. Indeed, there was no pause for teachers and students to re-establish themselves in the new teaching model, nor was the duration and extent of the lockdown clear. The harshness and duration of the

confinement in most countries exceeded expectations and made it difficult to plan teaching alternatives realistically and systemically.

- Previous experience with blended learning or with LMS platforms for face-to-face teaching made the difference for a better adaptation to the emergency remote teaching. There was a very diverse variety of adaptations, with a range of levels from "exact replication in synchronous online streaming format of the previous face-to-face class timetable and activities" to "A mainly self-paced asynchronous model, with few synchronous spaces (in groups or in person)" and passing through "A 50% synchronous and 50% asynchronous allocation of time, with a symmetrical flipped classroom approach".

- It was very difficult to keep students' attention, participation, and focus. The black camera mode triggered a kind of "feedback blackout" from the students. The lack of clear feedback from the students, especially through spontaneous verbal and non-verbal communication in the face-to-face classes, was an important conditioning factor for the teachers' actions.

- Students' and teachers' were overloaded with work. Students perceived that the workload had increased, largely due to teachers being committed to giving the best response to the crisis. The students thought that more homework was a way of overcoming the lack of face-to-face teaching. Furthermore, this overload of activities was linked to an attempt to replace traditional examinations with a larger number of continuous assessment activities. However, more work for students meant that teachers had more preparation and follow-up work.

- The technological infrastructures of the HEIs were not ready for the intense demand placed on them. However, in the end, the institutions managed to overcome the difficulties quite efficiently, either with more in-house resources or by outsourcing, like in the case of SaaS licences for videoconferencing platforms to provide online classes. Moreover, some gaps in the digital competence of both teachers and students were also identified. The results show the necessity for teachers to be trained to shift from face-to-face teaching to online teaching. However, students also need to be trained to be able to learn online, including how they should behave in class in terms of engagement, interaction, collaboration, and self-management.

- Socialization, psychological and health issues had a high impact on the students' academic performance. In the end, from the perspective of the overall academic performance, the technological or pedagogical problems were solved one way or another; however, if one thing is common in all the interviews and focus groups, it is that "human" factors related to interpersonal communication, health, preservation of the privacy of the home, etc., had an influence on the psychological state of both students and teachers.

Particularities of the creation and use of OER. This study's findings are considered a partial contribution to the overall research project on OER penetration in five European HEI in the LIS area. Some of the main findings observed for teachers and students regarding the use of OER are the following:

- The Covid-19 pandemic has not encouraged higher education institutions to adopt OER, since most teachers interviewed do not know about them and ignore them in practice. Those who were familiar with OER reported that they could not find what they needed. Of the few teachers who reported that they did use OER, some were not aware that the resources they used could be defined as OER. It was also evidenced that the students were

unaware of what OER were, and they also did not have the perception of having used OER provided by teachers.

- Reasons for not using OER included not having information about them, their dispersion in very different platforms and repositories, their inconsistent quality, that they were not in the teacher's language, and the low coverage for a specific course. Therefore, OER do not seem to be an out-of-the-box solution, unless the teachers and students have some previous knowledge of them. Some teachers highlighted that it is very time-consuming to look for them and later adapt them to their teaching purpose. As a result, OER are unlikely to be considered during crisis situations if the cultural shift has still not happened.

- Teachers' information seeking behaviour and OER discoverability issues: in general, it was observed that HEI do not promote OER sources (specific repositories and search engines) very much and provide little training in how to find OER.

- There was evidence that educational resources were produced and made available in the LMS or among colleagues and students. However, these materials were not properly incorporated into an OER repository as open access to them was not ensured. Textbooks, sets of ppt and recorded presentations for lessons and tutorials were, alongside videos of lessons, some of the most prevalent resources that teachers created. The volume of video and audio recordings made available to students increased significantly compared to pre-pandemic courses.

Future proposals and lines of work for boosting the use of OER. Based on the results, we have established some future lines of work revolving around the following topics:

- Collaboration and networking in OER creation, sharing and use.
- Institutional policies, support, and human resources to foster OER creation and use.
- Knowledge about the availability of information sources to discover, assess and reutilize OER. The creation of new specific repositories is also proposed if there is a need in terms of discipline area, language, or other specific unavailable scope.
- Formulation of national, institutional or by discipline policies that lead to the design of overall planning about the creation, treatment, and dissemination of OER for teaching.
- Framing OER under the Open Science momentum: regarding the push for new models of academic performance evaluation and incentives, it would be appropriate and fair to reward teachers who create OER.
- Raise awareness among teachers of the possibilities of the flipped classroom and the incorporation of online and blended elements in face-to-face teaching as a way for stimulating the production and use of OER.
- Capacity building: integrating the OER into the continuing education of teachers, since one of the main barriers found was the lack of training in this area.

2. Introduction

This research forms part of the Erasmus+ project *Digital Education for Crisis Situations: Times when there is no alternative (DECriS)*. The project is focused on innovative digital practices implemented in Higher Education Institutions (HEI) in the field of LIS during the COVID-19 pandemic. It has several aims which were presented in the original proposal that was submitted[1], including: to create a framework for proper adoption of Open Educational Resources (OER) and Digital Education (DE) in general, and in crisis situations in particular; to promote, enrich and improve the use of OER and DE in crisis situations and beyond; to contribute to further advocacy and capacity-building regarding OER and the open education movement; and to take full advantage of DE and OER in achieving accessible and quality education for all.

During the project, it is planned to carry out six intellectual outputs. In addition, the aim is to design and produce two tutorials regarding DE and OER, and organize four multiplier events and two Summer Schools. The main coordinator of the project is the Faculty of Humanities and Social Sciences, University of Osijek, Croatia, along with four partners, Stiftung Universität Hildesheim (Germany), Universitat de Barcelona (Spain), Universitet po bibliotekoznanie i informacionni tehnologii (Bulgaria), University Computing Centre, University of Zagreb (Croatia), and four associate partners, University of Sarajevo (Bosnia and Herzegovina), University of Mostar (Bosnia and Herzegovina), Victoria University of Wellington (New Zealand), and St. Petersburg State University of Culture (Russia).

2.1. Framework of the DECriS Project Intellectual Outputs and IO1 findings

The six Intellectual Outputs (IO) are aligned, step by step, with the overall purpose of the project: the study of innovative digital teaching practices in HEI and their relationship to the adoption of Open Education Resources (OER) in any learning situation, and particularly in crisis situations such as that experienced across Europe and beyond during the COVID-19 pandemic:

- IO1: Survey of the state-of-the-play of the use and policymaking documents on OER at European HEI during the COVID-19 crisis.
- IO2: Digital Education appraisal and quality perception by students, teachers and trainers in the partner HEIs during the COVID-19 crisis.
- IO3: List of critical success factors and their typological classification for evaluating the OER.
- IO4: Case study of how the critical success factors work in practice.
- IO5: Optimization of OER.
- IO6: Apprenticeship framework for crisis situations.

Therefore, the first two IO have been devoted to carrying out fieldwork with HEI leaders (deans, directors of departments and teaching coordinators), teachers and students from the institutions participating as partners in the DECriS project to learn about their response to the COVID-19 crisis as well as their experiences. Our work is based on the premise that studying the stress situations

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[1] Project Reference: 2020-1-HR01-KA226-HE-094685: https://erasmus-plus.ec.europa.eu/projects/search/details/2020-1-HR01-KA226-HE-094685

that institutions and people have experienced during the crisis can be used to determine trends and show what will be useful for the project's following outputs from IO3 to IO6.

For IO1, our first overall approach was to apply a survey to determine the state-of-the-play of the use of DE and OER in European HEI in the field of library and information sciences (LIS) during the pandemic. Questionnaire-based exploratory research was conducted with the heads and directors of LIS schools and departments. These participants provided us with insights into their institutional practices and policies. Some important clues obtained from IO1 that we have aimed to contrast and verify during the IO2 field work are:

- "The two most dominant aspects of digital education that were implemented during the COVID-19 pandemic were live teaching sessions via video conferencing tools and online communication with students."
- "Almost all the LIS schools/departments implemented new didactics, i.e. new teaching and learning modalities in their teaching."
- "The COVID-19 pandemic did not encourage HEIs to adopt OER on a large-scale: all LIS schools/departments used digital learning materials, while about 50% of them used digital OER. The COVID-19 pandemic greatly disrupted the teaching and learning process, but it also served as an impetus for DE and OER to be adopted more extensively."
- "The results indicated a certain lack of awareness, policies, resources, and funding regarding OER. This, of course, can be understood to some extent, since part of institutional support, i.e. most of the funds, documents, and procedure frameworks in many HEIs were focused primarily on managing urgent health risks, rather than ensuring the same quality of education during the crisis."
- "HEIs need a more comprehensive and planned strategy for guaranteeing the continuity and quality of classes during crisis situations. Although the challenging circumstances of crisis situations make it impossible for new OER to be created due to their customizable character, existing learning materials created as part of full online courses could easily be redesigned as openly licensed OER."
- "Most of LIS schools/departments successfully found the ways to address students' problems and issues regarding DE, either through regular consultations and live online Q&A sessions or by providing technical support to students."
- "Most of the teaching staff at LIS schools/departments had the option of customization of the teaching and learning process."
- "Academic libraries played a crucial role during the COVID-19 pandemic, either as providers of necessary teaching and learning materials (in libraries or repositories) or as providers of virtual information services."
- "In most cases the implementation of DE was ensured at the institution level, but in more than 1/3 of the cases it was also the decision and responsibility of the individual teacher."
- "Creating and implementing OER was often the result of an engaged individual."

In a first stage, the responses to the survey carried out in IO1 allowed us to see what had occurred at an overall level in Europe from the perspective of academic leaders (deans, directors, etc.). In a second step, with IO2, we aim to gain a better understanding of the context and the nuances that the direct protagonists (teachers and students) can provide to gain a better understanding of why and how the events unfolded.

2.2. Purpose and objectives of the IO2 research

The goal of IO2 is to obtain insights into the attitudes of the students and teachers/trainers towards Digital Education (DE), educational resources in general and canonical OER[2] in particular, mainly during the COVID-19 crisis and in contrast with their pre-pandemic experiences.

The context of the shift to DE triggered by the lockdowns/semi-lockdowns in the COVID-19 pandemic allows us to see the solutions that teachers applied. We can also see their reflections on several issues of DE that many teachers did not have so clearly formulated before the crisis. Although most of the students are digital natives and despite their familiarity with the digital/online environment, during the lockdowns they were exposed to DE in an intensity that most of them had not experienced before the arrival of the crisis. This exceptional situation allows us to perform a very particular and interesting level of analysis that can provide clues for the future use of OER in teaching in "normal" situations. It also makes it possible to establish key solutions that are especially useful for future crisis situations.

Our goals are distributed among seven blocks, which were the foundations of the questionnaires used in the interviews and focus groups (see annexes 8.1 and 8.2):

- **[Attitudes]** To identify, analyse and classify teachers' and students' attitudes towards digital education, especially towards OER, in the COVID-19 era in contrast to their attitudes before the pandemic.
- **[Expectations]** To identify, analyse and classify the expectations that teachers and students had at the beginning of the crisis situation about teaching in a fully digital/remote environment.
- **[Problems]** To identify, analyse and classify the actual and objective problems that teachers and students encountered while working with digital material and activities during the crisis (tools, applications, platforms, connection, devices, etc.).
- **[Adaptability]** To identify and analyse the kind of adjustments and the degree of flexibility with which teachers and students have adapted to new circumstances, especially those teachers who had no experience in DE pedagogical requirements.
- **[Advantages and disadvantages]** To identify, analyse and classify the reasons expressed by teachers and students for whether they foresee further use (or not) in "normal" situations of some of the tools that DE offers and that were used during the crisis situation.
- **[Lessons learned & Improvements/good practices]** In a general approach, to collect, analyse and summarize the framework of lessons learned about DE during the crisis. In a more specific approach, to collect, analyse and classify teachers' and students' proposals (or good practices of third parties that have been identified) for improving the online teaching/learning, the use of digital material and OER in the future, in the case of new crisis situations, or in an integrated way in future normal teaching, based on the lessons learned.

The design of the IO2 study and the contextualization of its findings are based on the data and conclusions obtained from the project's IO1 ("Survey of the state-of-the-play on the use and policymaking documents on OER in European HEIs during the COVID-19 crisis") and also on a

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[2] Beyond the general concept of "educational resource" we consider as "canonical" OER those that follow the UNESCO (2019) definition: "Open Educational Resources (OER) are learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open licence, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others." (p. 5)

literature review of a large volume of publications on the impact of COVID-19 on teaching and learning in HEIs in Europe and abroad (see section 3).

In summary, this study aims to answer the following questions:

- What expectations did teachers and students have at the beginning of the crisis?
- How did teachers and students cope with the challenge of the crisis situation and how did they adapt and adjust to new circumstances? Was the institutional response from their authorities and teaching/learning support services adequate?
- Which problems did they encounter while working with digital materials and teaching tools during the shift to online or blended modes of teaching due to the COVID-19 crisis?
- What digital education resources and strategies played a relevant role in the solutions taken to adapt teaching to the new scenario?
- In the case that it can be confirmed that the most dominant aspects of digital education that were implemented during the COVID-19 pandemic were live teaching sessions via video conferencing tools and online communication with students, why did this occur?
- In the case that it can be confirmed that the COVID-19 pandemic did not encourage HEIs to adopt OER on a large scale, why did this happen?
- Did the students have the perception that their teachers offered a more diverse and wider range of learning activities and resources (exercises, games, quizzes, audio-visual tutorials, etc.) during the Emergency Remote Teaching (ERT) in contrast with their pre-pandemic experiences? Did they recognize some of them as OER?
- What differences in teaching/learning performance were observed between the first semester of teaching, which was affected by the pandemic (spring-summer of the 2019-2020 academic year), and the second semester (autumn-winter of the 2020-2021 academic year)?
- What are the main reflections and lessons learned about digital online education that can be taken from the experiences and opinions of the teachers and learners involved?

3. Literature overview

A huge amount of papers have been published on the shift to remote emergency teaching/learning during the pandemic. We explored and reviewed similar works to the IO2 study to contextualize our methodological approach; however, it was not our goal to make a broad systematic review of the literature as this is outside the scope of this report. All of the literature reviewed has been taken as a reference to shape the themes and dimensions to be considered for designing our questionnaires (see annexes 8.1 and 8.2). A systematic review to contrast the IO2 results with the literature is envisaged as a possible further development of our project.

There are different studies on satisfaction, motivation, and dissatisfaction levels concerning the shift from face-to-face to online learning. In this sample, studies are more focused on the students' perceptions rather than on the teachers' perceptions. These studies reflected the beliefs and thoughts in a precise moment during the COVID-19 pandemic. All these studies were carried out at the beginning of the lockdowns in most countries. It is certainly true that the lockdown did not start in the same way in all countries, and there was not a lockdown in all countries.

There are two exceptions. The first exception was in South Africa where Czerniewicz et al. (2019) carried out a study to research blended learning in four universities during the students' protest of 2015: Cape Town, Johannesburg, Free State and Pretoria. They conducted interviews with academics, students and professional staff regarding their experience with blended learning. The sample was composed by (N=16) faculty members from the faculties of Commerce, Engineering and Humanities. They found that blended learning was considered a legitimate supplement to face-to-face activities. Many teachers had to incorporate blended learning into their courses. Among their results, they found that teachers indicated that it is necessary for students to participate in social activities and interaction in class. Moreover, they also found low engagement from the students and probably exacerbated inequalities among students with different economic levels. They concluded that blended learning was a problematic strategy for completing the curriculum before exams. In addition, these teachers wanted to finish the curriculum and give students opportunities to practice exams.

The second exception is related to COVID-19, but the study was carried out before the lockdown and during the lockdown. Žuljević et al. (2021) performed a study at the University of Split School of Medicine (USSM), a medical school in Split, Croatia. They analysed the satisfaction and burnout in medical students. They carried out surveys and obtained responses before the lockdown (N=437) and after the lockdown (N=235). They concluded that switching into an e-learning environment did not affect the burnout levels among medical students.

Focusing solely on the pandemic, we have sampled many studies, both nationally and internationally, in the scope of the participants studied. For instance, a study in the Kingdom of Saudi Arabia (KSA) evaluated the level of postsecondary student satisfaction with online learning experiences. In this study, a survey was performed with a sample of students (N=283) enrolled in an HEI in KSA. The results indicated that students were satisfied with staff and faculty members, as well as the use of Google Hangout to give classes. Google Classroom and Moodle were also much appreciated. Overall, students were highly satisfied with online teaching, but the authors found that faculty members should rethink assessment types and weights to correctly evaluate the students' learning processes (Almusharraf & Khahro, 2020).

Baber (2020) did a survey in South Korea and India to explore the determinants resulting in students' perceptions of their learning outcomes and student satisfaction. The sample was composed by students (N=100, 50 of each country) from different institutions in the two countries, using a convenience sample. The results indicated that students had no previous experience in online education, and online learning increased student motivation and satisfaction. These factors were due to interaction in the online class, course structure and the instructor as a knowledge facilitator. Moreover, lack of physical socialization was a challenge and electronic communication seemed to be not as effective as traditional communication.

In Romania, Boca (2021) performed a study at the Technical University of Cluj Napoca about students' behaviour concerning online education in the pandemic period. A sample of students (N=300) answered the questionnaire, which was structured in four parts: socio-demographic characteristics, students' behaviour related to time spent using online educational tools, students' knowledge to determine the culture of virtual media, and identifying students' satisfaction with the quality of learning activity and online courses during the pandemic period. Among the results, the author found that there was a higher percentage of female respondents (56.66%). A total of 33% considered that online education was better, but 23% considered that online education can be used in a complementary way to face-to-face lectures to improve education. Other results indicated that females preferred test (multiple choice) exams (70%), and these were also the overall preference (38.33%). The author concluded that the strongest correlation was between students' individual characteristics and students' knowledge about using digital platforms.

Buttler et al. (2021) performed a study among students (N=400) in Central Alberta, Canada. These authors sent a questionnaire by email and obtained a 65.5% response rate. In this questionnaire, students were asked about the quality of Emergency Remote Teaching during the COVID-19 lockdown. Using structural equation modelling, they found that students were satisfied with the final exam format, and teacher support and care, which led to better student learning. Moreover, technology issues did not play a major role for students or the quality of presentations. Nevertheless, communication between the university and students and between teachers and students had a significant impact on student performance. They concluded that a range of factors should be considered in further studies: high-quality presentation, promoting interaction in the many ways that online programs allow, encouraging positive emotions, having adequate technology, and frequent contact with classes and individual students.

In Egypt, Eltaybani et al. (2021) performed a cross-sectional online survey addressed to nursing students (N=580) and nursing educators (N=95). The survey, on a Likert Scale, assessed participants' preferences for online versus paper surveys and e-learning experiences. They found that 71% of students and 76% of educators preferred responding to online surveys. However, students perceived the quality of e-learning as significantly lower (2.5 ± 1.3) than educators did (3.5 ± 1.0). Students also rated teaching (2.6 ± 1.2), social (2.6 ± 1.4), and cognitive (2.8 ± 1.3) presences significantly lower than the educators did (3.9 ± 0.9,3). In fact, 72.9% of students and 46.3% of educators said that traditional learning is more effective than e-learning. They concluded that the students' experience during the COVID-19 pandemic was worse than that of the educators. These lower rates of students could be explained because students did not receive any training in e-learning and lacked digital skills. Educators were in a similar situation, as they needed to be trained on distance learning and computer tools.

In Pakistan, Faize & Nawaz (2020) performed a study measuring the students' satisfaction level concerning adopting online learning. They performed a pre-modification and a post-modification test. In the first phase they got 179 responses and in the second phase 163 responses. In the first phase, they found that the main challenges in learning were connectivity, resources, and lack of interaction. However, in the second phase, they found that students were satisfied with the interaction level with the instructor during an online class. They concluded that training teachers to teach online before the second phase led to better reported results than in the first phase. Nevertheless, online learning cannot replace formal classrooms because, despite students' satisfaction, it was not their preferred method.

Shim and Lee (2020) applied a semi-structured questionnaire with a sample (N=393) of students at Dongguk University (South Korea). The goal was to analyse satisfaction and dissatisfaction with emergency remote teaching. In their results, they found that laptops were identified as the most used (n=303, 69.82%) followed by desktop computers (n=67, 15.44%) and then mobile devices. In the case of remote learning, they found that the use of Webex for remote learning was a comfortable educational environment. However, students indicated that network instability was a shortcoming of remote learning. Another shortcoming was unilateral interactions, when teachers did not answer any questions in the chat room. Students highlighted these two areas to be improved. They concluded that to aid students, learning in a proper educational environment needs to be prepared.

Concerning teachers, Boté-Vericad (2021) performed a case study at the University of Barcelona (Spain). He sent a questionnaire to teachers (N=15) who were part of a community that he internally created during the first days of the COVID-19 lockdown. He generated educational videos to show teachers how to teach online and how to create educational videos with simple digital tools. Among the results, he found that teachers did not have the training to perform online teaching and also lacked institutional support.

Chierichetti & Backer (2021) at the College of Engineering at San José State University (SJSU) (California, United States), explored the impact of COVID-19 on faculty who were forced to shift to an online learning environment. They performed mixed method research using a quantitative survey followed by a qualitative study using interviews. The survey was completed by 98 faculty members (34%). Interviews were held with 23 participants, six were identified as female and 16 were identified as male. In their results, they found that in the survey 34.8% had to care for children. A total 59% of female faculty had much higher responsibilities than male faculty because they had to take care of children or elderly people, compared to 24.6% of the male faculty. Most faculty members reported feeling more stress as a result of COVID-19, especially females (62%). In relation to online tools, the faculty reported that Canvas was the most used tool (95.7%), followed by online videos or tutorials. The teachers indicated that they had difficulties at first and had to change the evaluation system. One of the main problems was students cheating. Nevertheless, faculty members reported that they had a positive experience shifting to emergency online teaching. They concluded that it was challenging to keep students engaged and carry out hands-on laboratory activities in a fully online environment.

Crick et al. (2020) analysed emergency remote teaching in the community of computer science teachers in the United Kingdom. They carried out a large survey (N=2,197) among teachers who were actively involved in learning, teaching and assessment. They sent the survey in March 2020. They found that computer science teachers were well-prepared to deliver online learning and they

could access appropriate technologies to support it. The survey also had open questions for qualitative data, and they found that teachers thought positively about online teaching. They concluded that there will be a considerable demand for digital skills and infrastructure to support post-COVID economic renewal.

Watermeyer et al. (2021) performed a survey among academics (N=1,148) working in universities in the United Kingdom and representing all the major disciplines. The goal was to analyse how the education workforce was responding to the shift to online teaching and assessment. The survey used a five-point Likert-scale and also had open-ended questions. In the results, they found that 72.7% of respondents said that their institutions were supportive of the shift to online learning, teaching and assessment. There were especially high percentages in computer sciences (86.3%) and education (85.3%). They concluded that some disciplines will be more vulnerable to digital pedagogies, and it is necessary to perform longitudinal research.

Finally, other studies focus on faculty members and students. Altwaijry et al. (2021) explored the experience of academic staff and students with distance education during the COVID-19 pandemic at the College of Pharmacy in Saudi Arabia. They performed a mixed-method approach using a survey followed by a focus group discussion. In their results, they found that participants were satisfied with their readiness for distance education (faculty=3.89, students=3.82 on the Likert Scale). The perception of distance education was also evaluated positively (faculty=3.95, students=3.47). However, they also found some barriers, such as technical issues during the assessment (faculty=4.03) and teaching (faculty=3.97) process. For students, focusing on the computer screen for a long time (students=4.19) and limited communication compared to face-to-face classes (students=4) were considered obstacles. Both teachers and students considered focusing on a computer screen for a long time as a barrier (faculty=4.03, students=4.19). They concluded that the main challenge was active communication among students and faculty members. Faculty members considered it an opportunity to develop teaching skills and students regarded it as a chance to improve independent learning skills.

In the United States, Gelles et al. (2020) performed a study on students and faculty in the field of Engineering in relation to the shift from face-to-face to online learning. They performed a qualitative methodology using semi-structured interviews and convenience sampling (N=11). They chose a single-second-year undergraduate engineering class in a private institution in western USA. In their results, they found that students had several challenges, such as having more "busywork" and their homework increased in length. Students also had to watch asynchronous classes multiple times to get the same amount of learning. Another challenge was that students could not get help and that they perceived that there was a lack of communication from faculty members and from the university. However, students valued the accessibility of the faculty members. One relevant challenge was time management as a part of their self-discipline. Following a schedule was the right way to get the work done. The researchers also perceived some inequalities among their students, such as having enough Wi-Fi bandwidth or a phone to engage in the classes.

On a national scale and promoted by institutions of university support and cooperation, it is worth mentioning the studies carried out in Croatia and in the Catalan linguistic domain in Spain. The research by the Croatian Agency for Science and Higher Education (2021) was titled *Students and the pandemic: How did we survive*? It was carried out with 4,300 students in higher education and indicated that the transition to online modalities of education in the pandemic had a significant impact on the mental health of students, their social inclusion, study experience and the quality of

student life. Students expressed satisfaction with certain parts of the organization of online classes and exams, such as home access to learning materials (73%), interaction with teachers in a virtual environment (60%), criteria and methods of student evaluation (63%) and objectivity of evaluation (60%).

A similar study was carried out by the Xarxa Vives d'Universitats (Ariño et al., 2022), a network of Spanish universities from the Catalan linguistic domain (Andorra, Balearic Islands, Catalonia, and Valencia), that every academic year publish the report *Via Universitaria: Access, learning conditions, expectations and returns for university studies* to gain insights from the students. The last report, covering the years 2020-2022 with a participation of 49,291 students, was mainly focused on the pandemic experience; however, the results were compared with previous years. For instance, the data collected show that the activities that students prefer continue to be the same as in the last edition, i.e. those that promote active and experiential learning, which was a real challenge during the pandemic. The study devoted particular attention to psychological issues, creating a picture of what the pandemic may have caused: 17.1% of students reported suffering from depression over the previous twelve months. In terms of anxiety, the percentage reached 19.5%, whereas for other mental health problems the percentage was 10.2%. The answers on the difficulties generated by distance learning in the 20-21 academic year show that the difficulties were mainly related to not seeing the lecturers and classmates in person. On the other hand, difficulties that were the least experienced were the lack of technological skills, the lack of physical space for studying and the lack of equipment for accessing the system with sufficient quality. It should also be borne in mind that self-regulation of time and dedication and workload have been major difficulties for students in this period.

With a similar approach to the two previous studies, but on a European scale, it is worth mentioning the work by Doolan et al. (2021), commissioned by the European Students' Union (ESU) under the title *Student Life During the COVID-19 Pandemic Lockdown: Europe-wide Insights*. The survey was answered by 17,116 students from 41 European countries. Although participation had a very uneven geographical representation (almost 80% of the responses came from only four countries: Portugal, Romania, Croatia and the Czech Republic), the topics covered and some findings are relevant to our study. It is worth noting that most of the students indicated that their study workload was larger than before on-site classes were cancelled (50.74%). Only 19.04% said that their workload was smaller than before, whereas 25.46% reported no changes in their perceived study workload. Students indicated that their workload had increased because teachers compensated for the lack of on-site classes with additional assignment. A total 47.43% of students indicated their performance as a student had changed for the worse since on-site classes had been cancelled.

Also with a broad international scope and with a very different methodological approach, Stracke et al. (2020) worked to identify the diverse responses that governments, educational systems and their policymakers from 13 countries (Australia, Brazil, France, India, Mexico, the Netherlands, Nigeria, Spain, South Korea, Sweden, Taiwan, Turkey, and the United Kingdom) chose and followed during the COVID-19 pandemic. The data were collected by observers who analysed institutional and government documents from the assigned areas to identify good practices of open education and recommendations from the collected case studies that can be taken forward in the future.

In summary, we can say that most of the papers and reports analysed used survey techniques and to a lesser extent qualitative techniques such as interviews and focus groups. There were no studies

on the LIS discipline, nor were there many studies that compared what happened in different countries using qualitative approaches applied jointly to teachers and students. Therefore, the literature review has allowed us to confirm that our study is highly original and complementary to previous studies.

4. Methodology

For IO-2 we have used a qualitative approach through semi-structured interviews with teachers and focus groups with students. The focus groups and interviews were carried out face-to-face or online, depending on the Covid-19 situation or participant's preference.
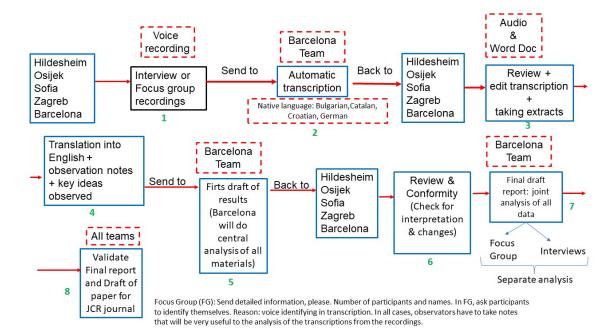
4.1. Sampling

As we use two qualitative techniques that involve a relatively small number of people compared to the total teacher and student populations, it was necessary to determine very well the criteria and the sampling system to decide who would be interviewed and who would be part of the focus group meetings. Purposive sampling (i.e. non-probabilistic sampling) was performed according to the criteria of each partner in order to coordinate their interviews and focus groups. To simplify carrying out the interviews and focus groups, once the criteria and the sampling routine had been established, each partner institution selected participants taking into account that it was necessary to ensure that the samples have the appropriate representation of the different levels and types of groups of subjects included in the study:

- Students of various courses and levels of education who were enrolled during the pandemic period of lockdowns (2020-2021). Bachelor and master's degree students must be represented. The proportionality between genders and age groups should also be represented. For example, on the subject of gender, proportionality must be combined with the assurance that there are participants of both genders.
- Bachelor degree teachers, master's degree teachers and teachers who teach at both levels of education must be represented. The proportionality between genders and age groups should also be respected.
- The teaching area of each teacher should also be considered as a variable. We should keep in mind that some people teach in more technological/practical areas and other people in less technological/practical areas, and each area involved a different approach for shifting to the emergency digital remote teaching.

Participants were requested to give their informed consent and the process of interviews and focus groups was approved by the Bioethics Commission (CBUB)[3] of University of Barcelona as the project team from the UB led this IO2 and the outputs of this study were planned in a unitary approach.

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[3] http://www.ub.edu/comissiobioetica/en

4.2. Workflow

Focus Group (FG): Send detailed information, please. Number of participants and names. In FG, ask participants to identify themselves. Reason: voice identifying in transcription. In all cases, observators have to take notes that will be very useful to the analysis of the transcriptions from the recordings.

The interviews and focus groups were conducted by each centre under common guidelines but in the languages of each country. The audio recordings were transferred to the University of Barcelona, which made an automatic transcription that was subsequently edited and translated into English by each of the participating teams. During the editing and translation process, the most important phrases and concepts were highlighted to guide the Barcelona team. With all the text files in English, the Barcelona team worked on the inductive coding of all the transcriptions and data analysis to prepare the reports of each centre and the final joint report.

5. Data analysis

A total of 39 interviews with teachers and 10 focus groups with students were conducted during the first quarter of the year 2022. The breakdown by partner can be seen in Table 1. Along the report, all the quotes from the interviews are labelled with thee partner code followed by the interview number (e.g. [OJ_1] for Osijek teacher #1); in the case of focus groups before the number we added the letters FG (e.g. [OJ_FG_1] for Osijek focus group #1).

Table 1. Number of interviews and focus groups held by all partners in alphabetical order

Partner	Interviews	Focus Groups (students)
Barcelona [BA]	14	2 (10)
Hildesheim [HI]	3	2 (9)
Osijek [OJ]	9	1 (6)
Sofia [SO]	8	4 (16)
Zagreb [ZA]	5	1 (6)
Total	39	10 (47)

5.1. University of Barcelona report

All teachers interviewed, and the students involved in the focus groups, were affiliated to the library and information science area of the Faculty of Information and Media of the Universitat de Barcelona.

5.1.1. Teachers

Context, attitudes and expectations

Most of the teachers interviewed were teaching undergraduate subjects at the time when lockdown began (March 2020, academic year 2019-2020) and the subsequent academic year 2020-2021. All of them had previous experience in teaching in blended learning mode, which has been implemented at the centre since the academic year 2011-2012 in the case of the information and documentation bachelor degree (now degree on digital management of information and documentation) and also, later, in the case of some different master's degrees at the centre.

Teachers' attitude was positive. In most cases, previous experience in blended teaching was explicitly mentioned in interviews as a key factor in facilitating the use of technology for the online teaching-learning process without fear. According to the opinion of the teachers interviewed, this fact has involved a widespread positive attitude regarding the use of technology in teaching. The availability of digital teaching material before the crisis, or the knowledge of tools and technological

resources already used previously, were aspects that have helped to cope with the situation having a background that have made the shift to online teaching less dramatic.

> It is true that many of the professors have been doing blended learning for a long time. Despite it is not exactly the same, there is a certain familiarity with the virtual campus as a communication space. Not only as a repository, but also as a space for communication. I think we were very familiar with that .... [BA_10]

> ...I had already experienced blended learning in undergraduate and master's degree subjects. And part of the problem of the students' guided work and the autonomous work had already been raised before [the pandemic]... [BA_8]

The most repeated attitude during the interviews was the need to learn to adapt themselves in response to the situation in the best possible way. This attitude is accompanied by a good predisposition to educational technology and the lack of fear to teach in a non-face-to-face and non-physical setting. But in some cases they acknowledged a certain degree of low self-confidence and lack of training for teaching in the digital environment. Also, it was present a concern on whether students in such an environment can reach the required level of learning.

In many cases, teachers expressed their concern about the lack of face-to-face and spontaneous interaction in online digital education settings, losing the non-verbal communication properties of that mode. Non-verbal communication is a key factor to enhance the teaching interaction; so that, it's a type of relationship with students that it's complicated to replicate at the online teaching environment, no matter it would be synchronous or asynchronous.

> I think that all things considered, it has worked out quite well given the difficulties involved. But I think that this purely virtual online model for undergraduates is not the most appropriate. [BA_12]

At the very beginning of the lockdown there was surprise and uncertainty, with little room for expectations. A kind of shock experienced in personal isolation as teachers. But despite that, having the positive attitude towards digital online education that we have observed in the previous section, it can be said that in general, there were initial good expectations of operation and subsequent results. In most of the cases, expectations were promising in general and few people placed themselves in a context of "everything will go wrong". In fact, some teachers commented that by having good devices and good connection, they expected everything to go quite well and work smoothly from home, even optimizing their time thanks to savings in travel time to the university.

However, once the initial willingness to face the crisis situation had been expressed, some teachers verbalised some of their reservations on the ability to successfully meet the challenge posed, for instance on problems related to technology and connections. Others thought it would be difficult for them and were unsure if they would succeed moving the atmosphere and dynamics achieved in a face-to-face classroom to a screen (for instance, it was the case of teachers of bibliographical and archival heritage subjects, that usually work doing practical exercises with actual old documents, manuscripts and unique archival documents).

In terms of the expectations teachers had on students' performance in the new situation, they thought the students would participate and be being part of the solution. But they realized with surprise and disappointment that, in general, this did not was always the case. It could be said that

the teachers did not expect the attitude of the students. Teachers thought that students of first courses of the undergraduate bachelor degree, accustomed to constant interaction via smart mobile phone and very involved in social networks, will have a more enthusiastic involvement in the online communication that supposed the new setting for online emergency learning.

In general, therefore, initial expectations were rather optimistic, as no major problems were foreseen. Certainly a somewhat naïve vision if we see it in the perspective of the final output at the end of the academic term of the first lockdown.

Adaptations (AD)

AD01/ Approaches to emergency remote teaching

The emphasis of the teachers' answers was on the actions for adapting the sessions and the activities, an adaptation that was done in most cases with a short horizon of time ahead for planning, as far as most teachers went through it on a week by week basis (even day by day). Also, such adaptations were done with the handicap of the lack of information and feedback from the students in order to do the best possible ongoing improvements. A professor verbalised this situation with the concept of "negative adaptation" in a reactive mode, trailing the complex and non planned events of those days, a kind of adaptation that was an online-distance replica of what was planned for the teaching as usual before the crisis, as far as nobody had had the time and the mood to think and prepare a renewed teaching plan for the new situation on the first days or weeks of the crisis. The shift in the activity to the online mode was almost instantaneous, without a break to give space for teachers to retooling and reorganizing the teaching activity.

> ... I wouldn't say it was a question of lack of experience, but of capacity to react. I think the problem was adapting to the new situation, teaching and emotional, I would insist on this. All of that was enough work. What's more, I think we focused on trying to make sure that the students didn't lose the rhythm and that they felt accompanied, rather than trying to innovate with the types of activities, which is something that we did perhaps later on when we had already mastered the situation emotionally, which we might have thought we were more used to. [BA_10]

Some teachers shared the feeling they were "just in the survival teaching mode" during those lockdown days, doing their best, with the intention of getting as far as possible and improving what can be done, but with an acknowledgment of its many limitations and the failure for not achieving an optimal level for the students learning outcomes. In this sense, some of them mentioned changes that they would have liked to make but that it was impossible for them to do due to the number of students, lack of time, availability of applications and resources, etc.

> ... when you start you don't know how long it will last [pandemic restrictions]. Because if it's going to last two weeks, you don't think about big things, but if you know that it's going to last a year, two years or a whole course, then maybe you can think about organising the classes in another way. [BA_1]

> It could have been a disaster, a debacle, a lost academic year, and it was not the case despite there have been problems, shortfalls,........ It has not been a disaster and that points to the way universities have been organised to cope with the crisis. And of how we teachers have organised ourselves and how we have been able to adapt to the students. [BA_4]

With a broader perspective and a more reflective eye, at the moment of the interviews (beginning of the year 2022), what they did for teaching at the lockdown and restrictions periods is now seen mainly as an entirely provisional emergency response and not an ideal situation.

AD02/ LMS, videoconference and virtual classroom tools for online teaching

It is important to remember that the widespread commitment to synchronous online classes started the first few days on disarray, when teachers worked with different tools chosen by themselves to connect with the students. Later, the institution started to provide solutions with tools not previously used in an institutional way or to offer advice. For instance, this was the case with the virtual classroom synchronous solution for sessions with Blackboard Collaborate integrated within Moodle just some few days after the beginning of the lockdown, in March 2020.

But some teachers expressed concern with BB Collaborate, the platform chosen by the university. Some of them mentioned the convenience of choosing other options with more complete features, like options to have a full display of all people connected. For some of them, the platform lacks applications that would have been useful to facilitate teaching in some cases if it had been available to them, as opposed to the platform chosen by the institution, which in general did not convince the teaching staff to offer synchronous online teaching. Also, for most of the teachers it was the first time they performed in front of the camera lecturing.

> ... [synchronous online teaching was very difficult] with the platform provided by the UB [BB Collaborate] because I couldn't see the students. [...] Start talking for an hour and a half sharing a PowerPoint with them while they saw me as a little thumbnail; and I didn't see them. [BA_2]

> The first feeling, in a way, was one of concern. Well, that's because you're not in the teaching environment where you usually conduct classes. You're in your home. You're not on a TV set where you have cameras, where you have sound, where you have a space set up to communicate. You have your home set up just for what you set up a home. But you don't have a space to communicate with the network and that. The first feeling was this. [BA_5]

AD05/ Looking for new educational resources and use of OER

Some teachers did not use new methodologies or introduced new tools and activities due to the new situation, because they said they had already used some in face-to-face teaching. Despite that, some teachers did online searches for any kind of material that could be used in a non-face-to-face environment to facilitate a more dynamic and autonomous learning, but the outcome of that work does not seem to have been fully successful.

> This is about looking for other digital materials... In fact, I had already looked for them before [the pandemic], but I hadn't managed to find them. [...] We should have more repositories of materials that are useful to us,... [the problem is that] we don't share them or we don't know how to find them... [BA_12]

Searching for videos and online material available in open access not previously used in face-to-face teaching has been an important trend among some teachers to make adjustments in their teaching planning. Also, some of them have expanded and modified materials in order the students could operate autonomously avoiding, if possible, the teaching model that generates materials mainly as a support script for face-to-face explanations. Also, different teachers expressed concerns on not

having enough online bibliography and digital material openly available on their campus, a problem that they said existed before the crisis situation.

> ... I looked for more bibliography online, also for available YouTube videos or films [a search] that I might not have done in the case of normal face-to-face teaching ... [BA_1].

Searches to locate resources and tools were not much focused on OER, which has been sought and used only in very few specific cases. Real purposely built OER materials were mostly absent in the discourse and reflections of the teachers. In this sense, they did not differentiate between open digital material (books, journal articles, etc.) and the educational resources that would respond strictly to the set of characteristics that define an OER. In some cases where OER were specifically mentioned, teachers said the OER they found never adapt to what is really needed, beyond tutorials or textbooks in some cases. In any case, the knowledge and use of OER repositories of this type of material seems to be very low, almost negligible. OER were not on the agenda before the pandemic, nor were they taken into account as might have been expected during lockdown.

> It's hard for me to find things that I find useful. You spend a lot of time looking and what I find isn't much... I don't know if it's because of the orientation I give to the subject or because there isn't [what I'm looking for]. ... I find that this idea of open educational materials is very good, but in practice it's hard for me to apply it. [BA_12]

Some teachers made selections of new material; but mostly updated, removed and replaced resources previously used in face-to-face classes, based on quality, specifications and utility in the light of the new emergency situation. Almost in no case teachers used OER, at least being the teachers aware that the resources they have used could be defined as OER, and that they were willingly using that kind of educational resource. Most of them had a blurred idea of what it is an OER and where to look for them.

> ...I suppose that teachers should investigate the educational resources available in order to make more use of the resources that already exist out there ... But, of course, you start searching from your personal experience of contents created by you for a face-to-face class. Finding equivalents that refer to that exact content is very difficult. Maybe the search strategy should be more elaborate [to find] specific activities to make the non-attendance class more dynamic. [BA_1]

AD07/ Recording videos of live lectures for deferred distribution

Most of the teachers interviewed started to record their live lectures, but expressed concerns about the utility of recording the synchronous lectures for deferred distribution. Some of them they kept the recording of their live lectures during the lockdown period, as some students request it and it was a kind of option the centre did suggest as could help the students.

> If I were a student, I would prefer to go to class and ask questions directly and discuss live there and so on. But if for some reason I couldn't go to class, at least I wouldn't miss the lessons. I could follow it online at the time or watch the recorded video afterwards. Therefore, I would be in favour of streaming the class live and also to record it [BA_1]

> ... we recorded [the classes] so that if someone couldn't connect they could recover it; also to comment on doubts or to make an assessment of what we had done in class,... what were the things that seemed most significant [in the course] ... it seemed to me that if a student couldn't connect live to the streaming, they could recover it and this could be useful for them. [BA_10]

But some teachers were sceptical about the real need and utility of uploading the recordings of the lectures, and some others did it in a session by session case.

> ...I understand that a recording of a lecture that has been performed synchronously is absurd because those who recover the recording later would be watching it in a different context. [...] To record for asynchronous teaching is different to record for synchronic teaching. ... in this case, it is a poor quality product. But for some specific cases I recorded the session, for instance in case there was a problem for an important share of students to attend. Otherwise, I wouldn't normally record the lectures... just to boost attendance [to the live session]. [BA_14]

AD08/ Production of videos or voice clips other than recorded live lectures

There was minimal activity in the production of ad hoc videos with core explanations of theory to replace the classic live lecture delivered by the teacher, with or without slides support. What was more prevalent was the purposely produced videos to deliver instructions or very specific directions to the students in order to help them in their assignments and exercises. So that, most of the teachers did not record long videos with theoretical explanations or step by step procedures for practical exercises. In case of those who did upload videos produced by themselves other than recordings of the online lectures, they produced small pills to clarify very specific issues or to give instructions on installation and use of software, use of information resources, etc.

> I used a free application that allows me to record 15 minutes of video to make shorter clips. I also used the LOOM tool. [BA_7]

> … perhaps the most innovative thing in my case was that I gave them these mini-lessons... I recorded 10 minutes clips, so that they are clear about that specific part [of the syllabus] for which I can't find any article that convinces me... For instance, with the three compulsory evaluable exercises of the course ... I prepared a practical example of demonstration [how to solve the exercise] and I made a recording to upload it [on Moodle], ... [BA_3]

> [I did] videos where rather than explaining the theory [of the course syllabus] I explained something very specific ... some students tell me "I have a problem, it doesn't work, I don't know how to get out of it [a software installation for example]"... Then I make a video explaining it. I put it on YouTube in one of these private channels. ... instead of writing a text with an answer it is much easier to make a video where it is explained. And that is much appreciated. [BA_12]

AD09/ Task-oriented activities and workgroup

One option among some teachers was to set up certain activities in pairs or groups precisely to support students' socialisation.

> ... one of the strategies I followed was for them to work together. In other words, a lot of group work. They had to have a lot of communication between them to solve some problems. Working a lot on case studies; setting up a scenario to solve a situation from different points of view, working as a team. [BA_5]

AD10/ Strategies for more dynamic synchronous sessions

In some cases, new methodologies were introduced to make the lectures and synchronous sessions more dynamic and participative, breaking the rhythm of long teachers' lectures. This was the case of the use of strategies such as the flipped classroom or the introduction of tools such as Kahoot, Socrative, Lino, Padlet, etc. The use of such tools, when it happened, was done with the aim of breaking the dynamics of the sessions in order to obtain some kind of feedback. But, few teachers

did use those tools, and most of them have used such strategies and tools previously in the face-to-face environment.

In order to achieve greater student participation, some teachers decided not to maintain the same rhythm, timetable and dynamics of the face-to-face classes as planned before the pandemic. This was in order to concentrate the interaction between students and teachers in synchronous online moments, shifting to asynchronous mode the acquisition of certain content or the completion of certain activities that then had to be discussed or reviewed in the synchronous session.

> It was a new situation and we didn't have any guidelines either. Trying to replicate what had been planned for face-to-face teaching was not what we wanted... it seemed to us that the situation was different enough to try to change the context we were in. [...] So what we did was to give very clear guidelines on what was the weekly work that the students had to do and once a week we would meet with them [synchronously] to solve doubts. [...] We didn't want to lose contact with the students. That was clear to us, we wanted them to have a clear idea that we were there as a reference point, and therefore we wanted to maintain this communication, but it seemed good that we give them self-pace learning directions, so that they could organise themselves. And therefore maintain an hour and a half weekly synchronous session. [BA_10]

AD11/ Enhanced directions for students' tasks, exercises, self-paced study, etc.
One thing everyone seems to had done is to increase the delivery of guidelines and directions to help the students to situate themselves at the path of the course, giving them answers to questions like "where we are?", "what we have done today?", "what material do you need?", "what to do for next class?", "what to read?", "where it is something available?", "how to do the activity X?"... Partly to help them and partly because not having the students face-to-face at the classroom, and unaware of who came and listened and who didn't, it was necessary to remind all of that directions to give everyone options, just in case.

AD12/ Student communications (LMS forums, teachers' feedback and mentoring, e-mail, messaging systems, videoconference, …)
Moving the "conversation" from the face-to-face classroom to virtual campus forums, feedback tools and personal messaging systems was a challenge because of the risk of saturation of communication channels. For instance, the increased use of forums in Moodle by the teachers was a clear adaptation to booster communication between teachers and students, despite some of them complained during the students focus groups with the proliferation of messages that saturated the communication channels as they received many messages without a regular schedule. Sure, It was an option for the visible accompaniment offered by the teaching staff to solve possible problems or doubts.

> … I started to take more into account the use of the virtual campus forums. It seems that I used to think about using the forums before, but actually, I used it very little. [Because of lockdown] I used more tools that were already available [before lockdown] but I didn't use them as much. Basically I used forums, nothing else [during lockdown]. [BA_7]

However, given certain limitations of asynchronous feedback, the number of online mentoring sessions grew.

> For example, I did increase the number of online mentoring sessions a lot. Of course, I didn't do that before. In that sense, it was an extra workload for me to have to resolve doubts, because many doubts could not be answered by mail or forum posts. Especially in subjects [related with digital media and sources], you need to see the student screen. Of course, this could not be solved by post. When it was face-to-face, I would go to their computer and look at it, but here they had to share their screen with me. [BA_7]

AD13/ Exams, assessments and grading

All the individual teachers decisions on the adaptation of examinations and assessment were conditioned by the uncertainty about the directions on very specific issues that the university could give because of the adaptation of the regulatory framework during the crisis situation. It was critical the issues related with possible students' cheating: plagiarism or copying detection and mostly the accreditation of the identity of the person who actually took the online exams (checking he/she was alone doing the exam).

> ...I think [UB's reaction] was slow, as everything in the university is slow... I don't think we professors were as protected as we would have liked to be in relation to assessment. Because there was a certain uncertainty about the assessment systems. And the guarantee of them. [BA_8]

Because of the regulatory challenge and given the difficulty of devising entirely new assessment systems, a significant number of teachers took similar examinations approaches to those of previous years, but with the challenge of taking them remotely, applying various remote monitoring measures to ensure their validity.

> ... [the change] was the system to do it online ... the difference was that it made much more work [for the teacher]. [...] [for the students] it didn't change the type of evaluation because they did exactly the same as if they had done it face-to-face. [BA_9]

The accreditation of the summative evaluation and grading was adapted in all cases in which there was an exam. Since if it was maintained, it became online and, in other cases, was replaced by work or exercises during the Spring term of the academic year 2019-2020. Alongside with the activities used for grading, teachers also added to the available learning material more elements of formative evaluation than usual in normal times, such as self-assessment questionnaires.

> ... I did a lot of tests, so that they could be done through the virtual campus. As self-assessment. They like those tests to practice, because they have a bit of a playful point, where they can see the score obtained. [BA_12]

Beyond the strictly teaching-related adaptations to the academic programme of each subject, many teachers opted for an empathetic attitude to the general students' mood and emotional issues, which triggered greater flexibility in compulsory deliveries of exercises or term paper assignments. Teachers took into account personal circumstances or problems like bad Internet connections or low availability of devices and tools because all members of families were at home teleworking and studying remotely. Related to this and within the context of the general atmosphere of pandemic bewilderment and fatigue, some teachers commented that they had lowered the bar of the grades'

threshold for passing the course. Some teachers said they have been very generous with the students' grades, a trend which is suspected to have continued in the second academic year of the pandemic.

> I tried to be a lot more flexible with the whole issue of the assignments' deadlines... Everyone also comments that there were quite distressed students,... There were probably a lot of students in complicated family situations... So, because of all that, I tried to be more flexible with the whole theme of deadline deliveries… [BA_12]

> We were very generous [grading]... In this sense, I believe that the grades the students have received are quite good. But some students under normal conditions, would not have achieved these grades ... [BA_14]

AD14/ Ad hoc training courses and directions to support teachers in emergency online teaching
In order to cope with the challenges of the adaptation to the new situation, some few teachers took training courses offered by the institution. Courses on the features of the Moodle platform to get more out of it, on active teaching and educational technology, on online questionnaires, etc. Others, mainly the large group of part-time and non-permanent teachers, but not only, did not have notice about their existence (or didn't have the time to follow the courses) and therefore did not enrol on them.

> ... those of us who part-time lecturers, who have two jobs, find it very difficult to fit in [the course offer]... they didn't fit in with my timetable and organisation. [BA_3]

Problems (PR)

PR01/ Online replication of normal face-to face teaching
Other question discussed by the professors in the interviews was that the centre's directions invited to just a replication of the face-to-face courses to the online environment (with a rigid calendar and rigid timetables as usual). Despite some teachers made some adaptions that changed the purpose of the synchronous online sessions to perform interaction activities, it was not the case in all situations. Most of the teachers complained with the fact of having, by default and because of centre directions, the same schedule and timetable for virtual teaching than in face-to-face teaching.

In some cases, this model was justified as a way of maintaining a certain normality in rhythms and timetables for students. This was something that the students themselves in some cases explicitly requested.

> ..., we converted them [the previous scheduled class timetables] into online work sessions. We kept the timetable, a bit to maintain academic discipline. Above all because they already had a working dynamic from the on-site classroom and we wanted to maintain it. […] But then it was difficult online and as it was to build it and many times I guess it would have been the similar result recording the sessions, but the first feeling was to try to keep the academic sessions. [BA_8]

> In fact, I asked the students if they preferred synchronous classes or recorded lectures with my explanations uploaded to the campus with subsequent resolution of their doubts. They told me that they preferred synchronous [online] classes. [BA_12]

PR03/ Lack of directions/regulations from the university on online teaching and evaluation

The university and the centre had to improvise guidelines and regulations for the remote emergency teaching. New guidelines and information newsletters were produced, but there was neither the capacity to cover all aspects nor the time on the part of teachers to take them on board and adapt them. For example, on the issue of the presence of students with cameras switched off, many teachers expressed insecurity about making full audio and video connection compulsory. Similar problems were encountered with regard to adapting class timetables or exams.

> It was never clear to me whether you could say to a student with black camera: "you're going to leave class". What I found most lacking was clear indications from the university on how we could manage the relationship with students, beyond common-sense and good faith. .... [I found] a lack of clear addresses for certain things. [BA_14]

PR04/ Teachers overloaded with work

Teachers were also concerned because the volume of work involved in modifying all the available support material at the point of the shift to online teaching, as far as they didn't expect to have enough institutional support for this work. For instance, to help the students with directions and clues that usually they receive smoothly and verbally through the interaction and explanations in the classroom.

> I thought honestly, the work that awaited me to transform everything. When some people told me that the change wasn't too much work, I thought "You're not doing it online. You're doing the same thing you've been doing." What basically worried me was the immense amount of work, [...] and the concern about the lack of support for that work in fact ... [BA_14]

PR06/ Not a good time to create new, purposely designed, material from scratch

Regarding to educational materials a diversity of experiences and opinions emerged among teachers' responses, but what is clear is that the vast majority did not create new materials from the scratch to cope with the new situation during the first lockdown, as the course was underway and was not planned for a time of crisis:

> I didn't create new materials to try not to change their work dynamics much. In fact, it is true that we have some materials that are already well prepared, documents that are very well planned. We tried to work much harder to accompany these materials than to create new ones. [...] Well, maybe we made a lot more choices because we couldn't present all the materials as you do in the classroom, it forced us to make a more careful selection. But, I would say that we did not add resources that we do not have previously. [BA_10]

Some teachers explained that the crisis situation prompted modifications of existing material, for instance adding more explanations and links to other materials, in order to modify their initial function of supporting a face-to-face session to be more suitable for a more autonomous learning. There were also some cases of teachers taking advantage of the situation to review and replace material that was already pending review before the pandemic, with the aim of eliminating real non-relevant material and leaving only useful quality material, with the idea of not to saturate students without need.

PR05/ Teachers' lack of knowledge about advanced use of digital platforms and tools

The lack of knowledge of advanced features of the LMS platform (Moodle), or the new videoconference tool licensed by UB just as institutional the response to the lockdown (BB Collaborate), among other tools, was a common problem for most of the teachers. It caused a waste of time and a use of those tools in an uneven way. Lack of knowledge, of course, was linked to lack of time to learn new solutions, or lack of time to adapt everything when new knowledge was acquired. Also, they indicated the lack of centralized support and resources on the part of the institution, related to good practices, the solution to troubleshooting problems experienced using the digital tools, resources or platforms, etc. Teachers complained about the lack of synchronous and personalised live support to solve doubts and problems and the absence of a "kit for new teachers", even more in situations experienced by teachers that started their activity just during the academic year 2010-2020 and experienced the pandemic as fresh teachers.

> …[we need] more technical directives on tools, less dispersion…. less "do it yourself"[...] more centralized [support is needed], more training for teachers on resources to work online with a different model of courses. It can't be that we have to watch 200 videos [to learn how to do things] and it gives us so much work… [BA_14]

PR08/ Access to library resources and copyright problems

During the most severe periods of lockdown, library services and access to some resources were very limited. For the preparation of some activities, or for the access to materials by students, it was not an easy time, despite during the second pandemic year services on a request basis improved. But the students' appraisal of the crisis situation make them most "disconnected" from the library than in previous years. A lot of effort was made by the library providing digital materials as the months passed, but it was not always de case for some materials the first months.

Legal problems meant that teachers could not scan and upload to Moodle documents only available on paper, beyond a small portion, to offer bibliography or complementary reading material. Most of the resources from the analogical library fell out of reach because everything in the move to online teaching was so sudden from one day to the next.

> I needed materials and it was as easy as someone in the library, even if it was closed, could digitize materials for me. In five minutes with a mobile camera you can take 10 images of the book I need, and that's it. We don't need to set up a complex system. Quick alternatives exist… [BA_8]

PR09/ Difficulties keeping students' attention, participation and focus

Almost all teachers highlighted the difficulty of maintaining the attention of the students, and some of them identified a key issue: the tiredness of being "active" in front of the camera after long hours watching a screen without any social interaction. This situation resulted in less and less interactive and engaging class sessions for the students, less involvement and more demotivation. When asked about the change that the new emergency remote teaching was the most negative one, teachers highlighted the challenge of keeping the attention of the students in front of the screen for an hour and a half and introduce enough dynamism.

Certainly, there was a decrease in the quality of communication, with negative consequences for learning, especially in first-year courses and younger people, who were not prepared. In a face-to-face environment sometimes, it is already difficult for students to participate and get involved, but it seems that the virtual environment made it even more difficult. In a face-to-face environment it

is easier to know the students' likes and dislikes, how they receive things, how difficult certain activities are, if all things explained are understood or not, etc. It also allows to identify individual problems as it facilitates non-verbal communication. In addition, it facilitates an easier communication by the teacher who can capture glances and gestures from one or a set of individuals. This cannot be done in front of a camera as it addresses the whole group at the same time and this makes it difficult to customize the non-verbal message in a subtle way, as well as the non-explicit nuances in verbal communication.

Regarding the courses delivered during the pandemic period analysed (March 2020-December 2021), important differences have been detected according to the course level to which the students belonged: the attitude of the students throughout the time of more severe lockdown (when teaching was exclusively online) was very variable, depending on the seniority and experience of the students. The master's degrees students and those taking elective subjects scheduled in the lasts years of the bachelor degree syllabus had a better adaptation to the crisis situation: they attended online synchronous sessions more actively, with greater motivation and a higher degree of interaction during the sessions (for instance, the share of students turning on the camera for enhancing synchronous interaction was higher). But in the case of first and second year undergraduate fresh students, the teachers interviewed always highlighted the students' lower interaction, motivation and active participation in the sessions, an attitude which could be linked to the fact that most of the students had their cameras off, a situation that undermined communication and feedback. These issues, have been an important source of concern and insecurity for teachers teaching those "emergency online courses", as they did not receive enough feedback for a good follow-up of learning. Some teachers expressed their doubts about whether online teaching is appropriate for fresh students entering the university (18 to 19-year-olds), and most said that it's not.

This was for teachers the biggest problem discussed and shared in all interviews: black camera, lack of feedback when not seeing students and not having participation. A professor pointed out that this is not the bidirectional communication process needed in education, just a kind of "broadcasting" of information, but without knowing who is actually integrating that information as knowledge into their learning, or how it is being received (or if it is being received at all). This problem of teachers speaking alone in front of a screen with most of the students hidden behind a black camera seems to be the element that caused the highest levels of anxiety, frustration and insecurity among the teachers interviewed.

> I think the main problem is the drop in the quality of communication mentioned above. You talk to the wall because there are no visible faces. You give a speech, you know the content, but you explain to the plants, to the books, to the wall. It's not communication, it's an emission of information, but you don't know how it's received. This is the main problem. [BA_1]

> This is one of the things that I found most difficult. Not being able to see their faces and not being able to interpret the general atmosphere of the class. To know whetther they were following the class with interest or not. We had no inputs to be able to assess this. I didn't know when the students were distracted. I didn't know whether they were looking at me or another web page on the computer. [BA_7]

Not being able to go up and down through the classroom among the desks, or looking at the students' computers screens at the computer room, commenting on the evolution of practical life activities, asking questions about what they did, etc. (as it is done in classical face-to-face sessions),

added to the fact that the students did not ask questions or give their comments, was a recurrent complaint among teachers. As far as teachers didn't know how well the students were doing the class exercises/activities, or if they did it at all, such important non-grading formative evaluation activities, were in most of the cases a failure, because the teachers were not sure if the students were there, doing the class work, or they did only connect at the beginning and were not there any more.

PR11/ Lack of appropriate equipment and connectivity issues

Some teachers talked about problems and the lacking of gadgets related to digital devices that have been solved in some cases as time have gone by. For instance, this was the case of having (or not) two screens to have a more flexible setting to manage/produce the online interaction with the students while sharing material or writing at a digital whiteboard to explain something. As for the students, an important volume of problems that the teachers put on the table were those related to the lack, or the shortcomings, of digital devices.

The lack of awareness of these factors, the failure to take them into account when requiring higher quality results from students, was mentioned by many teachers as a major problem, although not all of them highlighted it as a key problem. Despite Universitat de Barcelona opened a first-aid program to resolve hardware issues, some other things could not be solved, as of course the work spaces settings at home.

> …problems, also technological on their part. For example, students who lived in more rural environments, who had a bad connection. Sometimes I felt guilty, because I asked them to turn on the cameras and they answered that they had a bad connection and then they had to turn off the camera because otherwise they would have no signal. That is, suffering that they could have technological problems with the signal because it was the usual. [BA_7]

PR12/ Lack of adequate home space for teaching/learning

An important issue was the absence of reserved spaces to work without interruptions, with privacy and with good Internet connection (as far as during lockdown most people were sharing everything with their relatives). At the end, it is undeniable there is a need to have adequate devices, connections and spaces to be "visible" and participative, to be able to focus following the class. At different levels, this problem has been present in the case of some teachers, but in a greater proportion among students.

> The first feeling, in a way, was one of concern. Well, that's why, because you're not in a normal teaching environment, where you usually take your classes. You are at home. You're not on a set where you have cameras, where you have sound, where you have a space prepared for communication. [...] [moreover] in my particular case, as I live outside Barcelona, there is no fibre optic network. We had a small bandwidth. I had to make a personal investment with an ADSL, … [BA_5]

PR16/ Sociability issues

Another topic that emerged was the students' needs of socialization and the negative mood among them because of the few options for socialisation. Also it can be traced in the case of some teachers, who mentioned the reduction of relationships and interaction with colleagues as problem for a more cooperative work. Professors considered that socialization and the personal growth in human relations are key component of what is the purpose of university education, the "university

way of life". Because of the lockdown, these extracurricular components were lost without real alternatives, like virtual café meeting points for students.

> With formal education in the case of the young people …, I think they have to meet and see other people. If everybody is in virtual mode and we just do the class, they don't have an environment to communicate with their peers. I think it's important that they have such experience. Any teacher should tell them when the class is finished 'go to a kind of virtual cafeteria and start talking to each other. [BA_11]

PR19/ Decline in attendance at live sessions when a recording is available

All teachers have carried out online synchronous sessions to replace more or less face-to-face lessons. In some cases, most of the sessions have been recorded and made available on Moodle virtual campus. This option could be seen as an interesting solution for making the videos available to students who have not been able to attend the class, of for those who attended the lecture but need further clarification for understanding. But most of the teachers interviewed have said that they think that this option can promote absenteeism.

So that, in those cases where teachers decided to not to video tape the classes, they took that decision in order to avoid the risk of declining attendance and participation in classes. In this sense, a teacher pointed out that if you try to do an interactive and participative synchronous session, it makes no sense to offer later a recording of it for students who didn't attend the session, since they can't answer the questions raised by the teacher, participate with comments in debates or do the group activities with colleagues. Also, if students know that all classes are recorded, attendance could be compromised. Attendance to synchronous sessions, was for all teachers interviewed a key success factor for participative and interactive planned sessions, but attendance during the lockdown remote teaching was very uneven. So was the teachers' decision on whether to record or no live lectures.

> There were conflicting messages as to whether it should be recorded or not. I remember other teachers in the faculty saying.... "You'd better not record it because then they won't attend the live class". I decided... I don't care. I'll record it and if they don't come, they'll watch it. [BA_4]

> I mean, nobody will take a video of a lecture, that was a live lecture, and spend an hour and a half watching that video. They won't. They won't do it all. And this is an incentive not to attend the live class. […] You'll see that there will be a thousand accesses to a file but nobody has finished looking at it. [...] I mean, that's not a resource that I think is good in this case. Unless you have a set, a script, a team of teachers who plan some classes with their script, their material, I don't know how many, and you make "the film". [BA_5]

PR20/ Decline in students' academic performance

Some teachers complained about students' low academic performance. They said that somehow quality dropped and learning achievements were lower due to a lack of interaction and communication. However, as has been said, that problem was most focused on the case of young fresh students of first or second year. More mature students, with a greater capacity to organize their work, with more motivation and clear focus on their academic goals, thrived better, as usually they do compared with younger students. Remote online digital learning increased the differences between the two types of students.

> ... I would like to say that this is also a year in which the results have not been good, not by far. Not even the good students have had the same marks as in other years. And it has really had to adapt a lot [the evaluation]. It's true that many of them were grateful for it afterwards... [BA_9].

PR23/ On-site field visits are difficult to replace online

Another insurmountable problem was the loss of the field visits to libraries and other information centres, since that activities provide a different view of what the teacher can give, in some cases they were replaced by videos of the centres or other places that had it, but the human relationship with actual professionals from those places were absent.

Looking ahead. Advantages (AV)

AV01/ Time savings and more freedom to use it (less travel time, self-paced learning, students/teachers ubiquity, etc.)

Online remote teaching could help to save travel time due most of the students could avoid time-consuming commuting to reach the university. Even some teachers said the attendance to some classes was higher online in the case of students living far away of Barcelona city. Also, in some cases, being able to work in a more pleasant physical environment than that of the office in the case of teachers. Saving travel time working at home but in a more isolated setting, allows a most efficient use of time, but only if people knows how to organise their own agenda and tasks. In the case of younger students it was not the case for most of them.

> Strengths beyond the practical nature of logistics, I honestly don't see. Beyond a question of time, transportation. Especially when you have students coming from distant locations and then in this sense attendance was higher online. [BA_7]

AV02/ Convenience for those who study and work (or are in internships or mobility agreements) at the same time

In the case of fourth-year courses of the bachelor degree, it has been seen that the online modality has allowed more students to attend the sessions than those who attended the face-to-face class, since they also worked online and connected even at work times, while face-to-face work makes it impossible to be in two places at the same time or prevents attendance by distance and / or lack of travel time.

Looking ahead. Lessons learned (LL)

LL01/ Entering university life has essential extra-academic components of a social nature

The case of young students (18-20 years old) who entered university during the years of the pandemic helps us to highlight the importance of the extracurricular components of what is an initiation into adult life for these students. An area where there is room to convey concerns, values, experiences, beyond a syllabus of a subject. Our experience shows that this space for personal growth can be better cultivated in an on-site face-to-face format, and that if this is not possible, we

need to think of strategies so that this extra-curricular pillar does not fail, as it helps the student's performance in the rest of the curricular activities.

> What happens is that I understand that there is a part of learning, above all related to the socialisation of students, of interpersonal interaction, that they do need because they are maturing as people. Sometimes we forget that they are 19 years old, or that they have just arrived at university, that they need to understand the new academic context, to get out of their comfort zone... [BA_8]

LL03/ Recognition of the unique properties of face-to-face teaching contact in the case of certain activities

The pandemic experience has made it possible to discover the unique value of face-to-face teaching (and difficult to reproduce in digital form) in the case of certain practical or interactive learning activities between teachers and students. Teachers said it is important for the future to take advantage of the unique, great value, that face-to-face learning offers for some key interactive learning activities and moments.

Some teachers said the experience with remote online emergency teaching have highlighted the real hallmark value of face-to-face activities to promote interaction and human relations. So, they think there is a need for a change in the traditional face-to-face teaching dynamics to invest those precious moments to the most suitable activities that make sense to convene all people together at the same place and the same time. In this line, some teachers claim the experience during lockdown has been an opportunity to rethink face-to-face teaching and assess well what could be converted to the online mode and what could not; what can be done without face-to-face and what needs it. Maybe, at the end, we need to reach a hybrid model that could work better and take advantage of both models; surely, we have observed that it is not needed as much face-to-face if classes are most of the time only lectures with low interaction. Actually, we can say we had a "teaching by lecturing crisis" before the "covid-19 crisis".

> ... for me, on-site teaching does not mean that everything has to be face-to-face. Whatever formulas we find... for me, one of the lessons learned is precisely the value of the on-site face-to-face encounter. So, for me, one lesson learned is this: we can't arrive at the classroom [face-to-face or online] to spew out a speech and leave. Rather, we must encourage learning spaces and learning not understood as, "I'm the teacher and I'll "teach you", but as the search for dynamics, collaborative virtual and face-to-face activities. But going beyond the traditional teaching vision. [BA_3]

The clue for the future, no matter online of face-to-face teaching is considered, could be to limit the abuse of long teachers' lectures, and replace the time of lectures with more interactive activities to give dynamism and increase communication even based upon asynchronous activities. It is not possible to reproduce the teaching designed in face-to-face mode to an online teaching, it is not enough to adapt materials and learn how to use Kahoot to energize. A totally different teaching and methodological design from the scratch is needed.

In short, the learning that some teachers talk about is clear: the reason for attending a synchronous session (on-site at the classroom or online) must be clear; the understanding of what are the objectives and the purpose of the session must be clear. Investing time in attending a synchronous session requires a prospective return that the student must feel cannot be obtained in any other way. That is worth to attend that session.

LL05/ Teachers' shift concerning digital skills

Some teachers commented they have acquired suddenly and forcefully many useful digital knowledge and skills that otherwise would not have achieved due to lack of time. All the research the teachers have done on the features of the institutional platforms the university offers, and all the experiences they have had with them based on trial and error effort, has accelerated its knowledge and more normal use outside the acute pandemic period. For instance, they were are aware of some tools on Moodle campus that they did not have used as much as they did those crisis days, like questionnaires and the interoperability with other platforms and software, that now are more used features. They have managed to get out of an exceptional situation, but also they have lost fear of taking online classes, although quality is no better than in person and they have adapted to on the fly. Despite a return to normal face-to-face teaching, some tools and strategies have been refocused in the light of experience during the pandemic.

> ... I think everyone, including myself, has become more accustomed to working online. ... Online meetings and online individual tuition have been incorporated much more. I think maybe before it was more cumbersome. Now we do a videoconference with a student instead of solving by e-mail... [BA_7]

Looking ahead. Good practices (GP)

GP01/ Videoconferencing as the new normal way for meetings with students and mentoring

Institutional videoconferencing tools (like Teams o Zoom) have remained after the pandemic experience a very common tool, very used day by day because it's a very convenient way for having student mentoring meetings and for organizational meetings with other professors. Videoconferencing is now the new normal for ordinary meetings because it is convenient and it facilitates the setting of meetings regardless of where the participants are located. Now it is less complicated to set appointments for meetings.

> I would say that from the exceptional situation we have lived through, we have to incorporate into normal life videoconferencing as a means of meeting for mentoring or meetings with students... [BA_1]

Looking ahead. Improvements (IM)

IM02/ Flexible organization of the time tables, calendars, activities and mode of teaching delivery

Some teachers suggested that it would be good to have more freedom and flexibility to organize their teaching activities. They proposed to be able to split time from the sessions in half, since you cannot maintain attention been sited and quite so many hours, you have to leave time for the students to stretch their legs and do other things and go towards asynchronous operation, so that everyone can keep up with their rhythm. It could be a kind of "reinvention" of face-to-face teaching with activities that don't require to bring all the students of a group together in a specific physical space. That is to say it should be avoided the reproduction of old face-to-face trends in online digital teaching.

> To change the timetables, maybe what we deliver when we teach.... We have an on-site classroom operation because we gather students in a specific space at a specific time. I understand that if this

> is done online, maybe it shouldn't be like that. And convene all the students at the same classroom forces a simultaneous follow-up in which everybody has to follow the same rhythm… Maybe certain elements of online teaching should allow for different paces." [BA_14]

> ... it seems to me that there is a good deal of learning about new tools that I am going to incorporate. Not all of them, but some of them, yes.... And to continue experimenting with these kinds of tools. And I suppose that part of our teaching will have to take virtually into account. I would prefer to give 40 hours of class instead of 50 and give 10 virtual ones. That's probably something we should think about. I don't have to, I don't have to be in the classroom for 50 hours. [BA_8]

> I think we need to reformulate the way we understand face-to face teaching as we have understood it up to now. [...] I think we need more individualised mentoring [with the students]... We need more flexibility so that everyone can find their own way of doing things... I think we are still very pigeon-holed by the way we classify the activities; it seems that we have to necessarily use two one-and-a-half hour sessions [each week] throughout the semester. [BA_10]

However, greater flexibility must be accompanied by thorough planning and analysis, as it implies greater complexity. Combining different learning options in course provision for the same learner is a challenge.

> It is difficult for someone to have both modalities, virtual and face-to-face. And that was a challenge for me. I think at some point they got bored or disconnected. Logically because the sessions were so long. I think it was a learning experience" [BA_8]

IM03/ Promotion and support for improving OER use and creation

Although it seems that teachers will hardly find on the web just the perfect resources they would like to use, to be more open-minded to OER could help to have ideas and resources to reuse alongside with the creation of their own material from the scratch in a tailor-made way. After the experience during lockdown, and for the sake of better normal teaching or emergency situations in the future, during the interviews arose the need to have a kind of portfolio, a guide, listing quality teaching material of the different subjects, as well as material to know how to do things related to technology (videos, subtitles, etc.) and also to look for existing applications suitable to work concepts related to specific subjects. Investing time in a cooperative way on such kind of guides would have a great return; the absence of it during the crisis situations has demonstrated its great potential for the future.

IM04/ Coordination and cooperation among teachers

Focusing on a more coordinated teaching, working in teams and with cooperative links with other centres should be a key line of improving the transition to digital education. A better coordination among the professors is needed in order to avoid overlapping of content between different subjects. It could help to free up working hours for students, select essential things, thinking holistically from the point of view of a set of curses from different teachers, not only from the point of view of the single teacher within it course. In cases of moving teaching to an online distance teaching (because of crisis situation or convenience for students in some subjects), it would be necessary to plan the online alternative well. If teaching shift to the online distance mode is done without specific resources, tools or calendars, and as a suddenly non planned move, it cannot lead to any good result.

> ... since we are not heroes and we don't have to do it alone, learning has to be institutionalised learning, so to speak. To be able to turn it into a set of ways of improvement that have repercussions at a global level, because otherwise it is an additional overload for us. And I think we have to avoid that. [...] I don't know how a space for the exchange of experiences could be articulated. That could be interesting. I'm not sure to what extent, because, of course, personal experiences are one thing, yes, and the possibility of exchanging [teaching experiences], creating Creative Commons materials, for example, and having them available in a community of users, is another... [BA_8]

IM05/ Teacher training and mindset change

Teachers are often short of time, so training provision should respond to their needs and should be problem-solving oriented to the new teaching environment resulting from the pandemic experience. Also, teachers with a more recent background within the university and at the LIS area of the centre (i.e. newcomers as well as part-time lecturers with a professional profile, not academics) expected to receive more support from the institution and from the department colleagues: better tools, more resources, examples of good practices, technical support, training, clear guidelines and guidelines and more contact-guidance.

IM07/ Differentiated teaching strategies according to the students' seniority

Some teachers commented that it would be necessary to talk about adaptation of specific teaching models and tools to different profiles of students, leaving face-to-face for young people and non-face-to-face for the most mature students, since the youngest do not have enough capacity to be able to take advantage optimally of the most positive features of the non-face-to-face learning.

> ... e-learning with some advantages that save a lot of travel time to begin with. You organise your time in your own way, ... but to organise your time you need to be able to organise yourself. And you have to have enough self-discipline, to know you have to dedicate time to study. But this is not the case for most undergraduate students, who are 19-20 years old and don't have this self-discipline, nor the ability to organise their time. I also think they lose the whole social part. [BA_12]

IM12/ Guidelines for a better UX and content selection at the LMS virtual campus

In order to overcome a perceived low user experience of the campus by the students some guidelines for teachers should be highlighted: tidy up, organize and better select the resources available on campus, reduce volume, eliminating obsolete and excessive, generic and inaccurate material. For instance, during the emergency remote teaching period, some teachers have added a lot of materials to the virtual campus to compensate for the non-attendance and what has been done is saturating them.

> For me, one of the things I think we have to learn as teachers [...] is to choose materials better. [...] sometimes we have wanted to give a lot of information, and what we give is a lot of noise ... maybe with a paper it's enough for them [they don't need a lot of papers]. And we are not doing better or worse, just to give just one article. But perhaps we need to make this effort. [We have to] choose very carefully the information we want to give them because they don't have all the time in the world. And so we have to go to the sources they really need and at the moment they need it [BA_3].

IM14/ Policies and guidelines for streaming and recording online lectures

Mandatory participation and camera connection should be requested to the students if the teachers consider it a key component of the assessment. So, it would be necessary teachers have

clear guidelines and legal advice from the institution, more guidelines and more technological support of all kind, to set the best way to interact with the student in an online environment or anything else related with online asynchronous attendance to the lessons and activities.

> [we need] clear guidelines.... If the student has to log on turning on the camera, let them do so and let us know from the beginning. If we can or cannot record lessons, we should know this from the beginning. If we need to modify materials or assessment activities, plan it from the beginning. [BA_4]

IM15/ Strengthening the role and resources of libraries and support services for teachers

A much more powerful teaching oriented library team combined with teaching support units from the university is a common improvement highlighted by most of the teachers. Those services have to accompany and help teachers in educational technology, both from a technological point of view and from the most pedagogical point of view. They claim for someone managing spaces and opportunities of exchange between teachers, institutions and colleagues, sharing materials, tools, problems, ideas and knowledge.

> [we need support] but in a much simpler way. For example, [receiving solutions] if you want to do this, that, something concrete. In this sense, perhaps it would have been better to have clearer [support]... [and operational, not merely informative on resources]. [BA_9]

IM16/ Better integration of tools and resources into unified platforms for the online environment

A teacher suggested that to facilitate the students socialisation the platform and the way it is locally set up should be more like virtual spaces, for instance type Second Life, which more options and with features for interaction and customization.

> ...the problem was also the tool we had to give synchronous classes, which did not help the students to participate more fluently. Yes, because for example it could have been decided to put us all in something like Second Life [...] [BA_2].

5.1.2. Students

Context, attitudes and expectations

Generally speaking, Universitat de Barcelona students had the feeling that online education/teaching was adequate to them, and their preference is face-to-face lectures. This also relies on the sociability issues. Face-to-face classes allow them to have more connections with their peers, and distance online teaching does not offer this possibility to avoid the feeling of isolation. From both focus groups, just one student indicated that online teaching was most adequate to him.

> I mean, I already knew that online courses were not my type. Because that's what it is. I need to be forced to pay attention. You have to go to class, you have to do it and that's it. So I knew I didn't. The online part was not going to work for me. [BA_FG_1]

> Before the lockdown and the whole pandemic situation started, when I thought about remote learning, it seemed to me that especially the university environment could be a very good alternative for people who have more facility to learn in this way. But I knew that it would be very difficult for me. If I'm not in class, it's much harder for me to retain information and understand things, because my brain assumes that you're not in class, you're at home, so you're going to do other things. And when I had to start remote learning, my worst fears were confirmed and I discovered that I wasn't

> really able to [study that way] … Now I think it would have been much better for me the on-site face-to-face learning, obviously; not being in the classroom wasn't for me. [BA_FG_2]

There was a consensus among University of Barcelona students that most of the teachers replicated during the lockdown emergency remote education the same structure of traditional face-to-face courses. This situation, more or less was exactly the same in the first term of confinement (March to June 2020) and the following semesters. In their opinions, following the same system as in face-to-face as well as the same schedule felt them to be overwhelmed in the everyday life. Students expected that the lectures and evaluation would have been different from the face-to-face courses. In relation to the lectures, they expected to have more dynamic lectures or at least different from the face-to-face option where professors teach a master class. They expected more interaction from the professors' side, but also from their peers. In their opinions, students who shared courses with them were absent and not participative as usual. One of the reasons was precisely the isolation at home and the replication of the teaching from the face-to-face tradition.

> … I expected a different dynamic [with a] change in the timetable. I didn't expect that the face-to-face schedules would be maintained in the online mode, because it is impossible for a person to pay attention for three or four and a half hours in front of a screen every day. [BA_FG_1]

Adaptations (AD)

AD04/ Supplementary materials provided by teachers

It was not always possible to perform digital teaching with digital samples and object at some specific courses. Sometimes it was necessary to touch materials for practical exercises. For instance, ancient books at the Master of heritage libraries. So that, professors left sets of books in the faculty and students came to pick them up to analyse them at home.

> … [the teacher] had to teach us what that paper was, without touching the paper [it was complicated], because there was no way to do it [online]. And as we were all at home and we had to do everything online, he managed to manage, in a couple of subjects, to send us the materials. He left them here at the faculty. So we would pick them up when we could, we took them home because we were working from home. And in that sense I think there was an effort on his part. [BA_FG_2]

AD05/ Looking for new educational resources and use of OER

Some students said that they turned to YouTube on their own for solutions, such as software tutorials, for instance in the face of a certain gap in teachers' guidance on how to do practical work with software.

> … if we passed the subject because of the YouTube tutorials. Not by the teacher's will, because even he didn't let you record his classes. So, you couldn't record his class to follow it as a tutorial, you couldn't do the exercise while he was doing it because you'd miss what he was doing on the screen. In the end it was, either you went with tutorials or we recorded it without him knowing and that was it. [BA_FG_1]

AD12/ Student communications (LMS forums, teachers' feedback and mentoring, e-mail, messaging systems, videoconference, …)

One interesting point emerged in these focus groups was their personal information management behaviour. In their opinions, they had to learn to be more receptive to the emails that in face-to-face teaching, but also the management of the overwhelming information they received everyday from different forums they were involved, task and homework. They had to learn to manage this amount of information, with the added problem that their personal life messages were not always differentiated from their academic life.

> Then my email habits also changed completely. I didn't check email every day before. Well, once or so, but during the pandemic it was crazy, because the forums kept coming up with a lot of stuff. That's one thing I'd like to say, which is that you have to work with forums, but be careful, because they can become very intense and saturate your inbox, your head and everything. And well, in terms of technological applications, I wouldn't say it was a change. I adapted perfectly because, well, I'm already interested in the subject... it didn't involve any complications for me. And adapting to the dynamics of being in front of a screen for I don't know how many hours, which I still haven't got used to. [BA_FG_1]

Problems (PR)

PR01/ Online replication of normal face-to face teaching

They felt that most of the professors did not make substantial changes in the way of teaching; only a minority of them performed important changes to have the course adapted to the online situation. Since the system was mostly replicated, students' motivation as sometimes compromised. Then, professors had a lack of skills in this sense, this is lack of digital competencies but also online pedagogy.

> I think the balance of [the shift to online learning] should be positive. I think the advantages outweigh the disadvantages. The problem has been that we have transferred the face-to-face modality to the virtual modality in an integral way. This has been the problem, I would say, not changing things, changing the medium, but not changing the way of doing things, not changing the substance. [BA_FG_1]

PR09/ Difficulties keeping students' attention, participation and focus

The students said that overall they had a low active participation during the online synchronous lessons. They recognized this outcome despite some of them verbalized that, at a given moment and in the face of the problems observed, they decided by themselves to be more participative and sociable in the online lectures, in order to defeat loneliness at home and to improve the follow-up of the courses. But this kind of resolution was implemented only by few colleagues: there were 2 o 3 students online active during online lessons and the rest of the class did not involve in a participative way. For them, online teaching does not promote active participation in lectures unless the professors strongly promote it, which in their opinions was not the case in some cases.

> In my case, I am the kind of person who needs to be in the classroom paying attention and busy. When I am with the computer at home, [...] I look things up on Google or wherever, whereas in the classroom I have the feeling that if I have the computer it's to take notes and that's it. It's like a very different perception. I feel that I wasted a lot of the classes that were online, probably the ones I learnt the least during my degree, [...] most of the teachers did like arriving, giving a speech, leaving

and you were probably preparing your coffee or doing something else and you weren't [paying attention]. [BA_FG_1]

[Cameras] were turned off and of course, you could only see the teacher. Of course, the fact that you couldn't see the others, that we were all turned off, it was a bit like a bit, you just felt alone .... because you didn't see the reactions of the others... [BA_FG_1]

PR10/ Exams not well adapted to remote emergency digital education

Regarding the evaluation system, bachelor students indicated that a different system to be evaluated need to be done. Continuous evaluation for one side indicates, according to their definition, another sort of evaluation and not precisely an exam at the end of the semester with a high ponderation in the final grade. And in this occasion, during the lockdown, was a good opportunity to change this ponderation system, even stop using the final exam as a component of the evaluation. Bachelor students expressed their disagreement with some of the rudimentary systems that were used to prevent cheating during the exams.

> ... I think the vast majority of us expected them to cancel exams. And well, let's see, they could approve us or they could ask us for a final paper, which I think was also something that many of us expected. [BA_FG_1]

> Yes, I mean, we expected them to change the system to adapt to the situation, but instead they made us change the way we understand an exam. For example, to be able to do an online exam without copying with I don't know how many precautions. [BA_FG_1]

> There were some teachers who forced us to put the camera over the paper and take a photo [of the handwritten exam]. Other exams were on the virtual campus, but with limited time and with the chronometer there, counting down the seconds and stress, stress... Because of course to avoid copying. But you also say damn it! It's not healthy, it's not healthy. [BA_FG_1]

The case of master students was different because they have almost no exams; their assessment relies mostly on term papers, exercises and participation.

PR11/ Lack of appropriate equipment and connectivity issues

Students indicated that they had internet connections problems. Sometimes the complete family was online connected, and the bandwidth felt. In other cases, their equipment was not adequate or too old to follow online lectures. Some were aware about the program that the University of Barcelona had to loan equipment during the lockdown. But actually some of them explained that they did investments to update their equipment but their income family was not always optimal. Some of them had no good equipment to learn online, no cameras and in some cases their family situation was not the adequate in this context. Also, some students said they had to do that improvement because during lockdown it was not possible, or convenient, to come to the university to use the computers and special software arranged for them in normal times at the computer classrooms labs.

> Well, yes, in addition to technical problems, connection problems and so on, we bought a... another laptop, let's say to give us another vision, because in my house almost everything was with IOS and we had the need to have Windows for a specific issue. [BA_FG_2]

The other issue is precisely to have their cameras blacked out during online synchronous lessons because of the limitations of their Internet connection bandwidth, and this situation compromised active participation and relation at class.

PR12/ Lack of adequate home space for teaching/learning

In some cases they need to share the computer with other members of the family, even they need to be in silence the complete family to not disturb each other because their home was rather small. Having the camera on sometimes supposed to them problems, because sometimes there was on more than one activity and sometimes it triggered chaos; for example, during the exams period or in online classes.

> I live in a flat that doesn't even have a terrace or a balcony. So I can't sit on the balcony and get some fresh air. In other words, a matchbox. Well, I was very oppressed when I couldn't go out, because it was already unbearable. It was like living in, I don't know, locked up in a prison. [BA_FG_1]

> ...I had to make a lot of adaptations because [I live with] my parents in an extremely small flat. [During the pandemic] I had to move into the other room, which is there, which was the guest room, which was absolutely tiny .... [BA_FG_2]

Students indicated that they had lack of privacy at their homes. Students turned the cameras off and rarely turned it on and. In most cases, showing their home to others could be a problem for them, as a lack of privacy or their social status. Most of the students were not experts in the use of video conferencing software and did not set the background options to obscure the view of their home space.

> Yes, also the fact of having family around, because a lot of people had to go home or were at home with the family and it was like "please don't make noise, I have an exam". But it's something you can't avoid because there's always activity in a house where there are more people. So it was chaos, both in classes and exams. [BA_FG_1]

PR13/ Too many different video conferencing applications

Mostly at the beginning of the lockdown in 2020, students had to cope with a big variety of applications, because there was not a unique criterion followed by professors in relation to which applications for online teaching or online mentoring they should use; for instance Google Meet, Jitsi, Microsoft Teams or Zoom. Later the university made an institutional procurement to choose for online classes BB Collaborate.

PR16/ Sociability issues

Students indicated that the relation with their peers and professors was very detached. The situation of being at home and isolated is one of the causes. This is an important aspect also indicated by professors. The online system does not allow sociability as in face-to-face courses and not everybody was prepared to attend online teaching.

> I would like to add that there has been a kind of distancing from my classmates... It's not that I don't feel integrated in the class group, but I don't have the confidence that I think I should have with my classmates. And I think it's partly because of this, because I entered the course [in the 2019-2020

academic year], the first semester I didn't go to class much and the second semester we were already in lockdown because of the pandemic. That is, until this academic year. So we haven't had so little time to socialise much and I don't know, [that makes] you feel very lonely at home and that... It's made everything very, very impersonal and a bit cold. And I get together or talk to the others because I have to, but not because there's a sincere relationship of, I don't know, of camaraderie, I don't know. It's a bit strange the atmosphere, after all this. [BA_FG_1]

Back to the classrooms after the lockdowns but with masks, even when they have stable relations with peers as a friends or colleagues, they have the sensation that they have to restart the relations again. This situation is not only at personal level, but also in the social networking sites. They have the sensation of not being integrated in the class-group.

PR17/ Psychological and health issues

Students indicated that they have suffered different psychological and health situations such as anxiety because it was very difficult to balance private life and academic life. In addition, they felt tired because of the sensation they had of a never-ending semester: students indicated that they did not have enough time to rest. In some cases, they have problems to pay attention a long period of time when they are online: being all day long in front of the screen could trigger anxiety or physical tiredness.

... it triggered my anxiety. In other words, I ended up having no time to rest. Because entertainment was also on the Internet. Of course, there was a boom of resources on the Internet and so on. And what do you do if you can't leave the house? You have the university online and online entertainment... well, all day long in front of the screen and of course, insomnia. The sleep rhythms were fatal. Getting up five minutes before class, running to the kitchen to make a coffee and coming back without lunch. Well, things like that. It's a lot of rubbish. Yes, yes. Well, of course, I totally lost track of time. [BA_FG_1]

... my anxiety and depression symptoms worsened and I haven't come out of the well. That is to say, I already had problems, OK, but I had more or less mitigated them, because having a routine of being able to go to college helps me mentally, it forces me to get out of bed, to take the bus, to do things... [BA_FG_1]

Another question is those with family who had a severe covid-19 or who had died during the lockdowns; this situation also provoked them emotional problems, for instance in cases they could not bury their relatives. These were emotionally complex months and the whole context conditioned the learning outcome of the emergency remote teaching adaptations.

PR18/ Students overloaded with work

To this matter one of the problems is that professors give them lots of homework and teamwork's, more than usual to overcome the learning challenges of emergency shift to remote learning. They felt overwhelmed having not much space for their private life.

Many times I did have the feeling that being at home had taken away that right to have a moment to stop and rest and disconnect. Like there was a lot more work than there seemed to be, or a lot

The notable increase in incoming messages related to the remote follow-up of courses (messages from virtual campus forums, queries and answers from the teaching staff, notices) caused problems due to the lack of personal time organisation habits and the culture of permanent connection to devices on which messages are received. This also increased the students' feeling of work overload.

PR22/ Students leaving

Some participants in the focus groups indicated that some students were unable to cope with the situation and decided to postpone courses for the following semesters because of the big amount of homework they had. The feeling of being overwhelmed is constant in the transcriptions, also in some cases a lack of motivation problem.

> And now I find that I am afraid, in fact, of finishing my degree and not being able to perform my duties as I should be able to perform them. That is one of my fears at the moment. And well, and in fact this has meant that I'm going to split my fourth year of my degree into two years. In other words, I haven't done [subject X] and I dropped a subject from the previous semester because psychologically I'm not well and I'm very tired. [BA_FG_1]

Looking ahead. Advantages (AV)

AV01/ Time savings and more freedom to use it (less travel time, self-paced learning, students/teachers ubiquity, etc.)

For students an important advantage of online teaching is savings in travel time and costs of transportation. Saving two or more commuting hours from home to the university could be very convenient for most of those living far from the university.

> It is true that one of the strong points is that I saved a lot of commuting time. Because I used to spend an average of three hours, or three and fifteen minutes, a day just getting from my house to the faculty [and back]. [BA_FG_1]

> Because buses are not like trains... You get on the bus that makes all the stops [on the route]... and on the road you pray that there are no accidents, get to [bus stop X], take the metro and go to the university. In other words, I'm already tired. That's time you save ... [BA_FG_1]

AV04/ Promotion of the creation and reuse of educational resources

Another advantage they observe is digital oriented education foster the creation and control of access to open materials and this results in a democratisation of knowledge. The use of digital tools encourages sharing open resources and everybody can get these resources.

> The use of digital tools I think facilitates a lot the democratisation of knowledge, people are encouraged to share resources. Well, it creates cool communities. [BA_FG_1]

LL06/ Students' shift concerning digital skills

The intense period during the pandemic, with sudden and forced use of digital tools, has led to an improvement in students' digital skills, especially in terms of communication and group work in a digital environment.

> I don't know, I don't know if I've improved at all. Well, it's true that now it's true that I'm more used to looking at my mail or I reply much more quickly. I've got used to the dynamic of writing mail much more quickly. If they tell me to make a video call, it's nothing new to me. I'm used to it, ... [BA_FG_1]

Looking ahead. Good practices (GP)

GP01/ Videoconferencing as the new normal way for meetings with students and mentoring

As mentioned before, students had to learn to manage the information they received from the university because it was overwhelming. But some good habits of communication have emerged. For instance, they see as a new digital habit doing online mentoring meetings with professors using applications like Microsoft Teams, Google Meet or Zoom.

GP08/ Videos and podcasts to facilitate the flipped classroom

Some professors recorded in podcast format the lectures, the students studied the materials and once a week they meet together to ask questions, commenting doubts or issues. In addition, a good communication by email with explanatory details to help to solve their questions. This was an example of asynchronous teaching during the lockdown. Other good practice was that the professor prepared some recorded videos that students could watch at their own pace and to make later a questionnaire who was on the campus. Also, one day per week they meet all the class to share questions, doubts and issues. Some students did appreciate such materials as very convenient for them for self-paced learning, despite others as we have seen before were reluctant to avoid the regular time table with all the classes in a synchronous way. So that these good practices for flipped classroom, present risks for pupils with weak self-organising habits, as has already been noted in previous testimonies.

> [Professor X] used to make videos and in the end he stopped giving classes. He uploaded the videos to the campus and for such and such a day you have to watch this video and do this questionnaire. Yes, yes, yes, yes. So that, for example, seemed much more comfortable and good, and it wasn't so tiresome. We met once a week, I think, to discuss the subject and I think that's the way to do it. And not to transfer everything that is face-to-face to the virtual, you have to adapt, both in terms of the means and the dynamics. [BA_FG_1]

> A good practice that the teacher [Z] did, who said "I'm not going to give classes, I'll leave you a voice recording, I'll leave you the power points, you play the recording when you feel like it, you put the PowerPoint in front of you, you go ahead". "And if you have any doubts, we take a day and we have a kind of coffee where we all get together and there we ask all the questions". And I think that was a very good practice. [BA_FG_1]

IM08/ Improvement of the students' workload estimation when courses are planned

As a result of the observation of the work overload experienced, some students proposed a better teaching planning. This is certainly a classic pre-pandemic debate, well present among teachers and also among some students, which has to do with the challenge of planning for a typical student who does not always fit the circumstances and profiles of the actual students enrolled in the subjects.

> ... I think teachers need to improve planning... talking about what they are going to work on during the semester seems to me crucial. Calculate [well] the volume of hours, for example. [...] Planning has to lead to coordination so that the workload, for example, is controllable. Because if not, maybe one or the other is going too far and it's unmanageable. [BA_FG_2]

IM10/ Asynchronous self-paced activities should have an essential share in online learning

For distance digital learning the asynchronous mode was considered by some of Barcelona students a better option. Asynchronous self-paced learning works better than synchronous online for content delivery and in the case of some activities that really don't need synchronous interactions with classmates or the teacher. In any case, it all depends on the type of subject, the approach of each teacher, etc. Each case could need a different mix of synchronous and asynchronous activities.

> I think asynchronous teaching is the best in this type of modality [emergency remote teaching], because it allows you to do it at your own pace, when it suits you, in the conditions you consider best. And well, I don't know, it's a very good practice that I think should be considered in case we go back to a [crisis] situation like this. [BA_FG_1]

> I would consider asynchronous teaching to be better than synchronous teaching, [...] although [synchronous] can sometimes be more beneficial for certain subjects, of course. [...] [BA_FG_1]

At the same time as some students claimed this, other students claimed that it was convenient to have a regular discipline of synchronous classes with timetables. As we have seen in Barcelona students section "PR09" an important number of them were not much self-confident in their willpower to manage their learning mainly through primarily asynchronous supervised self-paced work

IM13/ Exams designed to assess competences, not just memory skills

Consensus was noted on the need to that in the future, regardless of whether the teaching is online or face-to-face, it will be necessary a shift from classical evaluation to a truly continuous system of evaluation combined with a kind of mandatory follow-up by the student. A clear improvement like this is a matter of change at mentalities level, but also on the regulations side, that could have positive implications on the concerns that teachers and academic authorities had during the pandemic online exams about copy and impersonation.

> I think that during the pandemic it became very clear that we are still basing a lot of learning on memorising things. And that's it. And when you're at home and you can copy, and that's the main concern, you can see that there's something wrong. If it was based more on learning and not so much on memorising, we wouldn't have these problems of the main problem in the exams. What if they copy? Well, what if you make a test that can't be cheated? Because what if it's not the memory capacity of the student [what it's assessed]. [BA_FG_1]

5.2. University of Hildesheim report

Teachers and students involved in the study belong to the area of information science at the Faculty of Linguistics and Information Sciences.

5.2.1. Teachers

Context, attitudes and expectations

According to the answers from teachers with their main dedication focused at Hildesheim (3 out of the total 8 teachers interviewed), before the pandemic the number of courses offered online, or in blended learning, were low. So that, except for the use of Moodle as an LMS for virtual campus, and other platforms like Github, they had not substantial and systematic previous experience on online teaching. But in any case, no matter their previous experience, all the people interviewed had quite positive attitude to digital education and their fears were more focused in the performance of digital infrastructures and how to get in touch with students in distance. Some said they have a previous positive inclination to the move to a more blended teaching model.

> I actually had an opinion about it beforehand, because I've been to foreign universities quite a bit as a student. That then. They did a lot more than we did. With us it was still very classical, I would have said. You went to a course once a week. And that's what I got to know abroad, that many people said "OK, we'll make a blog". Then you have two weeks of online content, some group work and so on and so forth. Of course, they didn't have to be online. Of course, the groups could also meet in person, but the teacher was [just available] so to speak. And that's exactly what I always had abroad and I thought it was really cool and it often makes sense because everyone has a full timetable, especially for practical things … [HI_4]

As a general picture, it could be said that professors expressed preference for on-site face-to-face courses instead on online teaching. A better communication and contact with students are some of the reasons. They highlighted the advantages of the face-to-face teaching because it offers better conditions for a more intense communication with students and greater spaces for sociability among students. In particular, for first year undergraduate students the online environment is maybe not the best approach.

Adaptations (AD)

AD01/ Approaches to emergency remote teaching

Professors from Hildesheim had a diversity of reflections on approaches to emergency remote teaching, but mostly positive. They had confidence in their institution and were aware that the crisis situation should be confronted with a positive mind-set, with all the actors involved committed to found solutions. It was a moment to experiment with new teaching approaches taking advantage of the exceptional moment that the pandemic implied. A very flexible framework has been detected; it could be in some circumstances an advantage, while in others a disadvantage.

> Then came the pandemic. We had to do everything online and hardly anyone had a clue how to do it. Of course, because it was a completely new situation, we had a lot of freedom. And I actually found that very nice, that you could simply try out a lot of things. […] So in the pandemic there was certainly a lot more freedom, as far as that was concerned, and that you could really try things out, I thought that was nice. […] And then there was also the previous experience that it could work well,

which I also thought. So what then? Well, apart from the fact that the pandemic is terrible, of course. I referred to it. Somehow I thought it would be great if we could just try out a lot of things that we couldn't do otherwise or weren't allowed to do. I also have colleagues in Hildesheim who are really interested in integrating new things and we were able to implement a lot. [HI_8]

AD02/ LMS, videoconference and virtual classroom tools for online teaching

Moodle platform combined with Big Blue Button (BBB), for synchronous teaching or videoconferencing, were the main software tools used to offer a kind of virtual framework to the students.

…the university was pretty quick to make BBB available, I would say. And we all took it up, thankfully, because it was integrated into Moodle and you had everything in one place. So I was, first of all I followed the recommendation of our computer centre and our e-learning department. I don't know whose e-learning department followed the university's recommendation. And then quite a lot of people, my colleagues, started to try it out and I did too. [HI_4]

AD05/ Looking for new educational resources and use of OER

I have used some of them, but they were not my own resources, but rather the other way round, for example, we took things from Hasso Plattner, OpenHPI, which I'm sure means something to you, that we simply said to the students: "In this session, take a look at this and that, because it's simply high-quality and good and I couldn't do it any better". And that is already there and then simply from these. So it's not that I've built it in myself, but it's already there in terms of content. But you looked at it and then we did tasks on it in the next session, for example, and discussed it. So something like that. But that's exactly what I did once and I know of other things that you can use. So these are just the things that I have used. I've already forgotten what it's called, a kind of online university where you have Massive Open Online Courses. [HI_8]

Yes, so my idea now is something like resources that I can find online or somewhere like that for free and use and pass on to my students. I have already used this in the form of Open HPI, for example. At the beginning I thought, "Oh no, I don't know. Isn't it stupid if I don't explain it to them. But if I just tell them to do this Open HP course?" Then I thought it would be quite a waste of time and then also a waste of money if I sit down and do again myself what someone has already ideally prepared. And that's exactly how I've already used it in programme courses, for example, because these basics are really the ones that you always have to learn. [I said to the students] "It takes a week or two. You can do this course. Which lasts 5 or 6 hours and then you come back and everyone has a command with which you can continue". [HI_4]

AD06/ Creation of OER

There was interesting evidence of educational resources being produced and made openly available, although not under a fully canonical model of what is meant by OER (Unesco, 2019), for instance their incorporation into an OER repository or directory. Teachers endorse the OER philosophy, but their productions are not conceived as such under such a label and characteristics.

What I just remembered is that in the last two semesters, what I have done more of, is to make videos, screencasts for the teachers, which are then also published on the YouTube channel of the university or the faculty, so that outsiders can of course also access them. [HI_8]

Ultimately, the philosophy of sharing is fully embraced, but the costs of more elaborate preparation for public presentation of materials and the of managing the issues of licensing, deposit, indexing, etc. in a formal and canonical OER manner does not seem to be integrated.

> I shared some things with colleagues. So in the first online semester, when it was just starting, I recorded a lot of things and later, in the following semesters, I no longer had this course, but gave it to colleagues. Of course, I gave them my slides, sentences and my videos and my additional links. […] So I shared it among colleagues. [HI_4]

There are many barriers that teachers perceive as obstacles to the "canonical" creation and sharing of OER. For instance, an important barrier is self-restraint to share it because the creator think the resource is not good enough or completely finished.

> I think it's a great idea. My only concern [doing OER] is that it's not the best quality, so to speak. And then I think it would be stupid if someone uses it and then somehow disappoints and says it doesn't work properly. […] So if it didn't cost anything, I would probably say, well, don't cry, if something doesn't work, it's free. But then I would have it. I would like to have it in such an optimal condition, which of course would require a lot of work and refinement. And that. So I don't have the time to do that now and then I wouldn't do it either. [HI_4]

AD07/ Recording videos of live lectures for deferred distribution

In general, the teachers interviewed were in favour of recording online sessions for later use by students, or re-use by teachers in the future. In some cases, the teacher directly records the lesson for fully asynchronous use by students at a time convenient to them.

> I recorded them because there was a pandemic. And then I also recycled them. So we've been in the pandemic a bit longer than I recorded again and actually found that. So I find that quite good in lectures, I found it very funny because I have. I've got you live all the time. I've done you live I think twice or something before. The lecture once I was mega sick, a fat cold and it was awful and I thought So, now I have to talk for 90 minutes. How awful! Exactly, and I didn't have that any more, because I had recorded everything. I also recorded it in portions. I divided the thematic blocks into smaller ones. [HI_4]

> I also like to use screencasts, because I think it's a good opportunity, especially for people who perhaps couldn't be present, but also for those who are otherwise regularly present in a course. You simply have the opportunity to look at it again. I think that's a good thing. Which is not the case otherwise, of course. Then they have a lecture or whatever, and then as a student you notice it again afterwards. Yes, I would have understood that quite correctly. And then maybe you don't ask in the next session because there's no time or whatever. And then you can just look it up again. So I think that's a good possibility, another one. [HI_8]

AD08/ Production of videos or voice clips other than recorded live lectures

> Videos should not be longer than six minutes and you have to prepare your material accordingly. And the classic is that the professors take their lectures and talk into the computer for an hour and a half. I would actually like to avoid that. I've already made it a bit smaller, but I'm not yet at six or seven and I'm not down yet. [HI_7]

> I have a screencast on such a very basic topic. When you have something like Introduction to Information Science, you basically always have the same topics. So sometimes things change a bit, but the reason remains the same and then of course you can reuse it, which I also think is good, of

course. So everything you can reuse saves resources that you can then put into something else. For example, you have more time to correct homework or for discussions with students or the like. [HI_8]

AD13/ Exams, assessments and grading

I think that the biggest point is probably exams. So we have, so I at least and many colleagues have actually also followed that, have done online exams. Um, and that wasn't really common before. So exams were not common at all. We did have online courses before the pandemic, so to speak, but then you did normal homework, I'd say, which was then corrected somehow. And exams were somehow not yet online. [...] So I think exams. I thought that should tell us, I thought that was stupid before, because it's just such a selective knowledge query, so many things somehow before I cram everything into my brain and forget everything afterwards. And so you can say, well, there's probably a kind of cheating rate. But you can ask the questions a bit differently. You can ask them in such a way that you have to apply them more and not learn them by heart, so that even if you get the keyword, this and that, you can still think a bit more. And then I think it's actually quite good. [HI_4]

Problems (PR)

PR04/ Teachers overloaded with work

Teachers mentioned that the first semester, the second semester and the third semester of the pandemic they were busier than usual. Preparing materials to online and also adapt themselves to the online teaching was a challenge because the overload of work, for instance creating new materials like video canned lectures.

it's a lot of work to record it [videos]. I think it took three times as long, because then you think about where do I make the cut now, this and that. And then once, which I was still recording, my mother rang the doorbell. I was recording because I thought something like that and then you redo the part and stuff. So it took a lot of time. That's probably why I wouldn't have thought of it, because I would have always thought, well, I can just stand there and tell it and then it's done, so to speak. But of course you don't think about the fact that you can recycle it. Of course, you have to update it somehow in between. [HI_4]

PR09/ Difficulties keeping students' attention, participation and focus

Students were not used to online learning and their behaviour online was not much active. Their participation was more complex, less active than usual in a face-to-face teaching and, of course, personal interactions beyond the academic content are not present.

I also meant that the courses, that you have them online and that's not so bad, but that all the social stuff is gone, that's just stupid. And they tried to compensate for that a bit by doing group work and creating [online] rooms for groups to do things in. But I think that only compensates for that on the academic level, so to speak, and not in this social area. [HI_4]

Other problems were the use of the black screen mode by students, a common situation among all other DECriS partners. It is interesting to note that the argument for not forcing students to activate their camera is sometimes technologically based, but also of a legal nature.

So I have to say, my main problem was actually I missed being in the room with the students and seeing. So just then I stand there in front, I tell something and so on and so forth. And then you just immediately see Ah yes, you understood that, didn't you? That was total nonsense that I'm telling now when you teach online. So of course there's the possibility of forcing everyone to tell you that they can't do that, but that's actually questionable from a data protection point of view. And then of course [students say] "my camera doesn't work" and "I think my connection is really bad". I'll leave that one off as well. And then there are the three people who would actually want to do it with a camera. They don't feel like it any more. [HI_8]

PR11/ Lack of appropriate equipment and connectivity issues

First, on the technical side with infrastructure problems at the beginning of the pandemic. This connectivity problems, bandwidth. The main problems found in Hildesheim was infrastructure who at the beginning had some issues. This question is similar to other partners, since no institution was initially prepared. They also reported that students had also infrastructure problems and had to adapt materials to the situation.

I would have been afraid that the technical construct on which it stands is unstable or too unstable, because we live in Germany and in Germany, if I may put it that way, the internet is bad, as far as that's concerned, exactly. But that came to nothing quite quickly, because the first two weeks were a bit like that, but then they set it up really well as the data centre and now you don't even notice it anymore. [HI_4]

PR16/ Sociability issues

Sociability problems or lack of communication into the online environment were also reported. The contact in class seems essential to professors. In the online environment, the personal contact with the student is lost.

First of all, it's difficult for me because I've noticed that it's different when you have this direct contact and you also talk differently with people and maybe about other things on the side and you just don't see them. Does it arrive or does it not arrive. And also the question of daring. I think it's good for some people, they dare to ask such a question online. They are even less confident with a lecturer they don't know. So is it this interpersonal thing or this kind of thing? That's what I missed. In fact, we have seen a disadvantage. [HI_8]

I've had students who suffer so much from it, who have told me in the courses that they suffer so much from not being able to go to the university and talk to me, but also not being able to see the other people, that it's a torture for them to do it like that. [HI_8]

… there's a bit more to studying than just learning content. So I'm a bit sorry about this whole business of not being able to do that, because I've already done that before, that I had online courses and such as a student myself, but I was still allowed to go to a bar in the evening with the other international students, who just made it a nice evening for me, so to speak. And that's just a big part of studying. [HI_4]

AV01/ Time savings and more freedom to use it (less travel time, self-paced learning, students/teachers ubiquity, etc.)

In relation to advantages to the online environment, professors especially mentioned the freedom to be in any place to follow the courses and savings in time and money for transportation. One teacher pointed out that this saving in commuting time, also for teachers, somehow compensates for the extra effort involved in converting courses to digital mode.

> The biggest advantage of online teaching is the flexibility in terms of time, which means that you can separate things out because you say, "OK, you look at that and then we'll meet and do it together, so to speak". And then you have more time, simply because you have outsourced it. The second thing would definitely be flexibility in terms of location. I actually had students who sat everywhere, one even sat in the ICE [train] and as long as you don't really have a crappy internet connection. But the ICE also has a good connection, so you can also say. Yes, you have this time, you have this, that combines, that then a bit. You don't have to travel from A to B, but just like that. [HI_4]

> Yes, at the beginning I would say you have more work. I can't prove it or anything, but overall I think so. Once you have it, you're more efficient, because all the travelling time is gone, too. Not only mine, but also the students'. I think that all in all it fits and I have already recycled videos. [HI_7]

AV02/ Convenience for those who study and work (or are in internships or mobility agreements) at the same time

> …you could also say that someone can also do a semester abroad outside the rule and can still take part, because now you might. It has already happened. The university already has rooms in which both are possible at the same time, so people can connect from outside, but the others just sit there in attendance. [HI_4]

AV04/ Promotion of the creation and reuse of educational resources

Another interesting topic when adapting educational materials for online teaching is that it encourages and fosters reusability of materials, despite it also possible with materials for on site face-to-face teaching.

> Maybe really the reusability of some. And through that. So if you can reuse it, then I can also be sick for a week and then just upload it or tell it to switch itself on. You can do that too. You can also do the timing. [HI_4]

LL03/ Recognition of the unique properties of face-to-face teaching contact in the case of certain activities

Reserving attendance for those activities where being face-to-face at the same time and the same place makes the difference. Commuting to reach a face-to-face class is only worthwhile if the activity offered on is difficult to implement digitally: learning from each other, group work, exchange, communication, field or lab work, etc. So everything that is knowledge transfer could go asynchronously as a preparation for face-to-face activities: convening the students to a place at the

same time should be done for important activities planned to do something together. It has to be worthwhile.

It is in this sense of giving real value to the face-to-face meeting, that "canned" solutions are envisaged to replace certain key lectures devoted to a teacher master speech in which it maybe is not always necessary to bring students together at the same time and in the same place.

> We've been doing screencasts and such for a while now, I don't know if there's an example. But I think we've been doing that for a while now, that you occasionally throw in a screencast instead of a lecture. I myself. I'm not a fan of lectures these days either, because there are so many advantages to doing it online that you don't actually have to queue up and people have to travel to sit in a room. [HI_7]

LL08/ Concept clarification about what is hybrid, blended and online learning is needed

A topic that we have mentioned and emerges from the interviews is the concept of hybrid teaching to certain activities such as seminars. But some time there is confusion between hybrid and blended in the use of the vocabulary. In any case, being aware of the distinctive features of these three modalities is important in order to know under what circumstances these options can be complementary for some subjects or activities in educational programmes where the face-to-face approach dominates. Hybrid, blending or full online options may improve in the educational system.

> So probably already a mixture somehow, but not a mixture so that a few are at home and a couple are there. I don't think that works. The so-called hybrid. Um, I would actually quite like to decide it per course together with the students. There is a trend, I have the feeling. Masters students don't seem to like to come because they don't study that long and therefore don't want to look for a flat or anything like that. It's different with the Bachelor's programme. […] I would then put it up for discussion how I would prefer it, otherwise I wouldn't want to do lectures any more, just as I wouldn't want to have exams written. [HI_7]

Looking ahead. Good practices (GP)

GP08/ Videos and podcasts to facilitate the flipped classroom

> I've actually thought about it because I thought to myself, "Well, I don't think it's as pointless as going back to a state simply because it was like that before [pandemic]". I think it's stupid to go back to the old without thinking about it. So I thought that you could combine it very well with this lecture, for example, that you could convey the contents in this way. Yes, by recording, for example. And that you then use the time you have to do group work or something like that. [HI_4]

> I have, so to speak, 14 weeks of practice. And then you have 90 minutes in a room that you have fought for. You have little scarcity of space and then of course you have to fit everything in there and then you have the main topic X and the topic X has various sub-topics, so to speak, which you don't divide up live because then you just slip through because you have 90 minutes in this valuable space. And so of course I had the freedom to say OK, now I can divide topic X into three main topics and then you can look at them individually and also take a break in between. [HI_4]

GP14/ Extended scope of what is meant by recommended bibliography

Another perception is the educational materials. Traditionally, books are recommended to students. However, other sort of educational materials such as videos are now more highlighted as part of these recommendations.

> it's a continuation of what we've known from the university for centuries anyway. In the past they just recommended books. Today they recommend online resources. And videos have only become good in the last 10-15 years, I'd say, and from there it's not just a continuation of the texts that were offered in the past. And I would see it as complementary at university. [HI_7]

Looking ahead. Improvements (IM)

IM02/ Flexible organization of the time tables, calendars, activities and mode of teaching delivery

During the three or four semesters of Covid-19 restrictions in Hildesheim, teachers were able to organise the teaching of their subjects with a great degree of freedom. As mentioned at the beginning of this report on Hildesheim, the teachers interviewed valued this flexibility as an opportunity to experiment and innovate. This is a flexibility that can be used as a strength in the future under a more stable planning framework. For instance to combine for mixed solutions with hybrid, blended, online of face-to-face components. However, among the options tested was the so-called hybrid model (with part of the students in the physical classroom and others connected online), but on its validity and sustainability there was no consensus among the teachers interviewed.

> We are a on campus university, everything is done in presence. And there's nothing about digital teachers. Even if you and the students have found that it is perhaps good in parts. I'm not saying that it's always good, but some events just lend themselves very well, even if they take something like this, where you just mentioned lectures. Great, most people would certainly say that it's much more pleasant as a screencast than if I have to sit there and listen for an hour and a half. That's why I think it's perhaps a bit more that we include digital things, simply because we've had the experience. But it will certainly be the case that it will primarily, I assume, be face-to-face and then supplement it with a bit more digital than before. What I would like is for teachers to have more freedom to say yes, I have the competence to decide that. [HI_8]

> So probably already a mixture somehow, but not a mixture so that a few are at home and a couple are there. I don't think that works. The so-called hybrid. Um, I would actually quite like to decide it per course together with the students. [HI_7]

IM03/ Promotion and support for improving OER use and creation

> I think it [fostering OER creation] should come from the top, i.e. the university is still a very hierarchical system, and as long as there is no directive from the top in the presidium that we want to do this, it is important to us that it is used more. But if you put more into it and publish it, it simply won't happen. Simply because many people may not be aware that it can be done at all, and because it is certainly additional work. You can't underestimate that either. For me, creating a screencast, if I do it sensibly and well, is more time-consuming than simply doing a course. You just have to see it that way. I think more resources should be made available, time resources. There should be an announcement from the top: "We are doing this now and we want to do this and we stand behind it." […] It would certainly be good if there was a person who you knew would take care of this and perhaps also other things in this OER context, where you could go with it. And as long as that's not

the case, I think people are very inhibited, because many people are very busy and you don't necessarily want to disturb them. [HI_8]

IM05/ Teacher training and mindset change

Professors need more and better training in relation to online teaching. Nevertheless, behind the training of online teaching are more questions. Preparing or adapting materials, the way in which the online teaching has to be done. But all that shift could be linked to the forecasted generational replacement on the way at the German university system.

> Yes, well, I think it's a problem in Germany anyway, because we have an education system... Well, I don't want to say that it's backward, which is also very negative. But it has a very long tradition and it seems to be difficult to deviate from it. I have the feeling that it is difficult to deviate from it or to try something new, but I also have the feeling that a lot is changing right now. At the universities, too, because we're going through a period of upheaval. Many older professors are retiring who are perhaps very attached to this old system. Perhaps simply because they have a lot of experience with it, and the other things are so new that they don't really want to do them. Yes, I have the feeling that something is changing in Germany, simply because many new, younger professors are coming in who are also willing to try something new. [HI_8]

IM17/ Transfer of credits earned in online courses outside the university where the student is enrolled

One of the Hildesheim professors, in his/her final reflections on the future of university education, looked at transformative elements in the digital context, such as MOOCs and the transfer of credits to open academic programmes. That is, the pandemic has only accelerated certain debates about the way teaching is delivered, which from other points of view were already present before: the deconstruction of rigid academic curricula, corporate universities, lifelong learning, open education in the context of open science, etc.

> I can only speculate. I think that the universities have to work out the concept, because the advantage you have at the moment is that you have a certification competence and can somehow issue Bachelor's and Master's certificates. But probably they don't have more competence than is already out there on the internet. We just have to find the stuff somehow. And there are already virtual courses of study in the USA, where you look for courses worldwide and then have them certified, for example. And many things that are taught at university are available on Udemy, for 10 euros 99, for example. And then it will happen very quickly that something happens and the things are recognised. At the Open HPI, Bachelor points can already be awarded now, if necessary. And if the universities don't. Hurry up a bit. Then I think the landscape will have changed completely in 20 years. [HI_7]
>
> So the classic is I study in Hildesheim because there is a certain course of study and then I study that there and learn that. Primarily depending on the people who are teaching at the university. And I think that will be totally broken up in the next few years. That you look for the content and not the place and this dependence on place. I think you have to do that. …. Because what I believe will also become an economic question at some point. So the ministries will realise that the universities or the people will realise that they can learn what they can learn at the university and also the decision-makers that you can get it cheaper out there… [HI_7]

5.2.2. Students

Teaching in Hildesheim is almost divided among asynchronous teaching and synchronous teaching which differs from other partners. Synchronous teaching was held with small seminars and minor subjects. In addition, exams were held online. Asynchronous teaching was held in different subjects. The usual way to this teaching was to record videos or podcast and later the student could contact the professors by e-mail or by telephone. In relation to the context, students mention that there were replication of the system but only in some precise subjects. Also that during the second semester of the lockdown, they found that Hildesheim university improved their infrastructure and professors had improved their teaching methods.

Their perceptions about accepting or rejecting online teaching are based in how a person is. For example, a more sociable student or a first year fresh young student prefers face-to-face courses. Those who were master students and had a solid circle of friends found that online teaching was adequate to them. So that, in relation to the rejection or not acceptance of online teaching arguments are varied, but very linked to the previous personal networking experience.

> Personally, I didn't find it so bad, because the only thing I miss about online teaching is the personal contact with other fellow students, and of course that's gone. But from my personal point of view, it was just that I was already in the Master's programme and already had a circle of friends, a solid one from the Bachelor's programme, and that had already consolidated it a bit and I didn't have the feeling that I was missing out on so much or that I wanted to get to know so many more people or something. Of course you can meet new people through your Master's degree, but you already knew a lot of people. That's why I found it … Yes, for me, personally, I didn't find it so bad. [HI_FG_2]

However, it is interesting to note that attitudes towards digital and remote education on the part of the participants were conditioned by the pandemic and the lockdown regulations that affected all aspects of daily life. As two student participants in a different focus group explained, remote digital education in a normal setting would not have the same problems they experienced because of the socialisation restrictions.

> Most of the things that I see as a disadvantage are due to the pandemic. Online teaching can't really do anything about that, so as far as social contacts and so on are concerned, you just can't change that. That's why I can't think of anything right now. [HI_FG_2]

> I think that the fact that we don't have a daily routine is also connected to the fact that we are currently in a pandemic. I have the feeling that if we were online and still had everything exactly as it was before the pandemic, then we wouldn't have such massive problems, because we have other things besides university, but we didn't have anything besides university. We only had university and nothing else, because we couldn't work either because everything was closed and otherwise we couldn't go anywhere. And that's why we didn't have any everyday life, because there was simply nothing going on. I think it would be different if it weren't for the pandemic, but with the pandemic, where we had nothing to do, we really had no everyday life. We had, we just didn't exist, somehow we didn't live. [HI_FG_1]

Their expectation about pandemic duration was very optimistic. They thought, that it would not take so long. Their reaction to the pandemic was of stupefaction; they did not imagine the

magnitude of the pandemic and at the beginning they found it "exaggerated" because the change was so abrupt, from one day to another. They found that they could not plan anything.

But anyway, in Hildesheim the lockdown situation was different because students were allowed to travel and some participants at the focus group were abroad from Germany in another universities like Netherlands, Norway, South Korea or Turkey. This situation provoked them comparing the situation with these countries in relation to Germany. For example, a student said that in South Korea she could go anywhere and on coming back to Germany she felt miserable because everything was closed. Moreover, students have indicated that there were some students at internships abroad.

Adaptations (AD)

AD01/ Approaches to emergency remote teaching

It is interesting to note how some students picked up on the problem of uncertainty, with changes of plans on the fly that teachers had to deal with when reformulating teaching activities. As in the autumn of 2020, it was thought that a return to normal face-to-face teaching was possible, and so there was no further insistence on a more intensive remote digital approach, but then new waves of Corona again complicated the teaching organisation.

> I was in the fourth semester, or rather I came in in the fourth semester, and it was quite strange at the beginning, because you really didn't know, okay, what's going to happen now? Are we really only going to have online courses or are we also going to have some presence? It was just so much back and forth and I remember, I still remember, that even the lecturers couldn't really answer the e-mail. They didn't know themselves how things were going. And it was either yes, so regarding the exams, for example, it was at that time that precise instructions would come later. We don't know yet whether we'll write online or in person... [HI_FG_2]

> But I don't think we should blame the university completely, I think we should blame the politics completely. I'm honest about that, because we never knew, so the rule changed every day. […] Back then we didn't know what kind of regulation would come tomorrow, what kind of regulation would come the day after tomorrow, so I don't want to blame the university completely, because no matter what they had planned, it could have been thwarted by the government, … [HI_FG_1]

AD08/ Production of videos or voice clips other than recorded live lectures

Teachers used video or sound recorded as canned lessons for asynchronous lecturing, as most of Hildesheim students highlighted that a large number of the face-to-face lessons were transformed directly into recordings that were first made by the teacher and then watched by the students. In other words, an asynchronous input model was used rather than live streaming and recording and subsequent distribution of the recorded video of that synchronous session.

> I actually think lectures were asynchrone. I think they simply uploaded all the podcasts, not podcasts, but videos or I don't know what they were called. They've already uploaded them and you could call them all up again and again, so to speak, and then in seminars they were either via Zoom or via the BBB rooms. [HI_FG_2]

AD12/ Student communications (LMS forums, teachers' feedback and mentoring, e-mail, messaging systems, videoconference, …)

In regard to the optimisation of their communications with other students and their social relations one student indicated that a huge WhatsApp group among students were created and everybody could ask questions around different subjects in the university. It's interesting how students complemented (or bypassed) by themselves the institutional channels linked to Moodle forums.

> Yes, I also found that for group work, so you had to adapt your communication. I found it particularly difficult when you were assigned to a group with people you didn't know before. Then it was just really like that sometimes someone tried to reach others via the Learnweb forum or this chat or just via the email address. But it wasn't that easy, because some people don't look in there very often, or, uh, yes, exactly, so that's why, and by the time you got together via WhatsApp or something and had reliable communication, a lot of time had passed, or people who didn't want to contribute to the group work had an easy time just disappearing completely and not answering any more. I found that difficult. Later on, when you were allowed to divide up the groups yourself and already knew people you knew who were in the seminar with you. [HI_FG_2]

> Yes, I also tried via WhatsApp to keep in touch with the people I already knew from before Corona, so to speak, and that we met a few times. Then in the summer, when it was allowed again and so on, and yes, with the lecturers. I don't think I asked many questions in person before Corona, but in the first semester I think you only have these big lectures, so you didn't really need it. But yes, when I did, I also wrote in the forum or asked questions by email. But I always got answers relatively quickly. So it wasn't like I didn't get an answer or anything. Otherwise, we also had a WhatsApp group, somehow from IIM, where sometimes people asked or answered questions and that's why. Sometimes you got to know something faster than if you had written an email to the lecturer. [HI_FG_2]

Problems (PR)

PR09/ Difficulties keeping students' attention, participation and focus

> I always thought home office was cool. […] Yeah, how cool would it be if we could have some things online, especially the courses at eight o'clock, because who wants to get up at six or seven o'clock and then drive to university? I've often thought about it, and now that we only have online classes, it's pretty stupid. So my attitude has changed completely. […] I have [now] a course that was the first one this semester, the first part was all attendance, you noticed that everyone was participating, everyone was fully motivated. That was really cool, it was fun to be face-to-face again, and now that the numbers have increased after Christmas, we only have online courses and no one is participating. So nobody is up for it. Somehow, even if attendance is compulsory, you just mute it. It's not like you can force anyone to talk. I used to think it was a great idea, now I think it's really stupid. [HI_FG_1]

> … so that you still just listened and didn't have any interactive discussions or anything, but actually with me it was mainly the lecturer who read out something and maybe you could write something in the chat, but somehow no one really knew what the interaction had to look like and no one wanted to say it, … [HI_FG_2]

PR10/ Exams not well adapted to remote emergency digital education

They found that evaluation would have been different. They found that online exams were more demanding tasks and with more much time pressure.

> I somehow had the feeling in the online exams that they had many more tasks or much more demanding tasks than in the face-to-face exam. I had the feeling that I was under much more time pressure than I would have been if I had taken the exam in presence. For some reason. I felt much more pressured than I did when I wrote exams in the presence. I don't think that's good at all. I don't know, I'd rather write online now, but I have the feeling that they've crammed a lot more material into it because they thought, okay, we're at home anyway and we're not doing anything. So we can somehow torture them in the exam, it seemed to me somehow, I don't know why. [HI_FG_1]

PR11/ Lack of appropriate equipment and connectivity issues

Students had problems at home with their home internet connections but also they observed problems with the infrastructure of the university. However, in case of the university they observed as time went by that these problems were being solved. In certain moments, for instance, where an exam was held, the completed family had to turn-off the Wi-Fi connection.

> My brother is also studying at the moment and whenever he wrote an exam, we all had to turn off our wifi [HI_FG_1]

> Yes, I think that's a general problem at the moment because some people only work from home. For example, in my flat-share it's also the case that our Wi-Fi is super overloaded, because we also live in the XXXX, where there are already so many people and I couldn't even get into so many lectures, because when your flatmates are also studying, and they also have to get in somewhere that's why. [HI_FG_1]

It is particularly interesting to hear students' comments on the connection problems that arise when the same student has both face-to-face and online classes in the same morning or afternoon.

> That's just the way it is, they have a few things online and a few things present and then they had to be there already, for example, the course started at 4 p.m., but they had to be there at 2 p.m. because they had an online course before that, but they come from Hanover. That means they can't take part online on the way. That means they had to be in Hildesheim much earlier, but the wifi in Hildesheim is very weak. That means they could never really participate because they were always kicked out. Yes so, the Wi-Fi at the university is really weak when super many students are trying to participate in online courses at the same time. [HI_FG_1]

PR12/ Lack of adequate home space for teaching/learning

Parental home, or shared flats, were not always adequate to have a quite and appropriate space to remote online learning. For instance, they did not have opportunities to meet for a group and they found very artificial find them across the Wi-Fi. And sometimes it was not possible because failure Wi-Fi. They still did not understand why in schools' meetings were possible and not in universities.

> … now imagine that I'm at home three or four times and then I have to talk and turn on the microphone and then someone on the other side shouts and I don't know what, but it's a bit difficult to do lessons at home when all the family members are at home. Because I'm not the only one at home, my parents were also suddenly in home office and then had to stay at home for a while. Then it can get pretty noisy. [HI_FG_1]

PR14/ Communication challenges between teachers and students on the digital scenario

> Yes, a kind of had the feeling that it wouldn't be that spectacular, so I have to be honest and say that after how many semesters? Three or four semesters, so only online. I still have the feeling that I'm not really prepared, that I haven't really taken anything away from the courses or lectures, precisely because I lacked the presence of the lecturers. I think it's completely different when a lecturer gives you something really personal and stands in front of you and explains it, than when you hear something in a screencast. [HI_FG_2]

> … it was noticeable that you were still missing the lecturer, the lecturers, who stood in front of you and told you in person, because maybe you had a question at that moment and wanted to ask questions, but you couldn't through this online teaching and it was completely different in a classroom setting. [HI_FG_2]

PR15/ Lack of on time feedback from teachers when requested

The usual way some teachers organized the move to the online mode was to record videos or podcast, in order later the student could contact the professors by e-mail or by telephone to solve doubts on that materials. To this matter students have complained that some professors lasted to too many days, even weeks, to answer them. Some students said that was difficult to get in touch with professors. Since, they have emailed them and answers where not held into a reasonable time. With their peers they observed that answers could be randomly answered.

> And I also found that the lecturers sometimes didn't answer at all because of the many messages or emails they received. And you really didn't know any more. Okay, what should I do now if the lecturer doesn't answer me? What do I do now? And because of that, you couldn't reach them any more either, except for the e-mail address,… I didn't want to call them personally, because some lecturers have already given their number. You can theoretically still reach them on the phone, but I thought, I thought okay, that's not necessary, to call them personally on, to call them or something. Unless you offered it to me, in an e-mail for example. Yes, it was just that this possibility was no longer there. And also with the fellow students it was so strange, because you wrote a message and you waited and it could be that this person wouldn't answer you in two days or in a minute. [HI_FG_2]

PR16/ Sociability issues

Hildesheim students especially remarked diminished sociability activity as central problem. This question about sociability is present in both focus groups performed and mentioned in different ways. Lack of sociability is one of the most important issues indicated by the students. In relation to sociability, students prefer face-to-face courses in certain aspects. For instance for teamworking.

> I have the same problem, motivation and so on, everything just went down. Because the daily structure was really destroyed, because in the past, when we had two hours between lectures at the university, we couldn't go home, because we all commuted, we did something in the library for the university. So we didn't really sit around for two hours or we were talking about something or anything and now all that is missing. [HI_FG_1]

> So for me, in any case, the lack of interaction with other fellow students and first of all, I'll just say, the private chatting, that you somehow talk for a few minutes before the seminar starts or afterwards or have lunch together or whatever. You always have to make arrangements for that [with the remote learning]. But before that, things just happened automatically, that you somehow spent time with other people, and otherwise I think it's just exhausting to sit in front of the computer for so many hours a day. And even if other leisure activities are now allowed, that's a bit better. But in the beginning it was really the case that you only met for a private Zoom Call and then you really

> felt like you were sitting in front of a screen the whole day, and I just found that exhausting. [HI_FG_2]

In this sense, it is interesting to see the blended models for the seminars with alternate attendance mentioned by this student as a way to cover the covid-19 protection measures requirements.

> Okay, exactly, so either that or that the concept would have been adopted by the schools with this alternating teaching, because I found the seminars, which were usually relatively small anyway, there were almost never more than 20 people in them, less than in a normal school class, and if ten people had always gone every fortnight and the other week would have been online, that would have been something. That would have been better than having everything online. That you at least have a bit of contact, get out a bit, have a bit of structure. Because I completely missed that. [HI_FG_1]

PR21/ Weakening of students' self-discipline and routines for carrying out activities

Students found that they had to adapt their schedules and routines to the new situation. Students considered it a problem because they were habituated to a regular schedule for so long during their experience as students. They also emphasised that having clear milestones for their assignments help them to move forward.

> [Speaker 2] And then we got all the extensions for the assignments and that really took a lot of stress out of it. So let's say the beginning was really good. But it would have been cool if, as you said, half of the semester would have been online and the rest back in attendance.[…] [Speaker 1] Now that she mentions the homework. For me, for example, it wasn't cool at all because I'm a human being, I work under time pressure and if the deadline is suspended, then I don't do anything for it. That's why I gave it up. For me, it was a complete disaster. [HI_FG_1]

> Before that, when I found out that there would be online teaching, I don't think I really had any problems, but at the beginning I quickly noticed that I found it seriously difficult when I had to structure the whole day myself, so to speak. Especially when you had a lot of things asynchronic … [HI_FG_2]

> … when it was asynchrone, it was always just like a side line activity and I tidied up or cooked on the side and that didn't work like that at live events. So actually the live events were better. [HI_FG_1]

Looking ahead. Advantages (AV)

AV01/ Time savings and more freedom to use it (less travel time, self-paced learning, students/teachers ubiquity, etc.)

Students found that distance provides flexibility to them. It saves time using public transportation and also allow them to be into another country.

> I also found it really good that you can do it from almost anywhere. So in between, when it was going really well, I wasn't at home during the week either, but somehow also maybe with relatives or friends or something. And then I went [virtually] to university from there, and otherwise I wouldn't have had that opportunity. [HI_FG_2]

> I also found it really good that you can do it from almost anywhere. So in between, when it was going really well, I wasn't at home during the week either, but somehow also maybe with relatives or friends or something. And then I went to university from there, and otherwise I wouldn't have had that opportunity. [HI_FG_2]

> Once I was on holiday and at the same time I had a blog lecture that I could simply do from my holiday and I found that practical, that you just sat down for half an hour every day and looked at it. But you were still on holiday and I was really happy about the online teaching. [HI_FG_2]

AV02/ Convenience for those who study and work (or are in internships or mobility agreements) at the same time

In addition to students who have a job, we have to take into consideration those who are doing internships in institutions and companies. It is important to note that this ubiquity of access to remote classes is very convenient for all of them, either as employees or as trainees.

> Yes, I also found it easier to combine that with my work. So it was just much easier to combine, because I mean, I was doing an internship and then I could just say somehow, okay, I'll watch the lecture somehow after work. Otherwise it wouldn't have been possible. So then I probably wouldn't have been able to do the internship at all if I had. If I had just said, "Oh no, I have to go to university now," and then I would have to drive two hours there and two hours back and still have two hours. So that's not possible somehow. But that's how I found it worked. And as I said, that's something that you can still keep in the future, when the whole thing is over. [HI_FG_1]

Looking ahead. Lessons learned (LL)

LL06/ Students' shift concerning digital skills

They also considered that they have acquired better digital habits with new tools and the use of information.

> So I think there have been improvements, also for me. […] And of course, one has also become more accustomed to dealing with technology, to using more and new tools, to that extent. [HI_FG_2]

> I somehow remembered that I used to get a lot of things printed out in seminars and that in the last semesters I no longer had a folder for sheets of paper or something, because everything was simply saved on the PC and organised somehow. And then you had to somehow adapt yourself, somehow restructure yourself and maybe use some online tools to organise yourself a bit more. [HI_FG_2]

Looking ahead. Good practices (GP)

GP10/ Hybrid synchronous alternative for lectures, seminars,…

Some students considered the hybrid synchronous model (with face-to-face students in the classroom and online students) as a good practice for certain activities. Moreover, it seems that internships and international mobility are an important element among them, so combining such stays away from the campus with the follow-up of some subjects seems interesting to them.

> [Speaker 2] Somehow be able to do polls like that. Who wants to go back to the university? And depending on the outcome, they could have said okay, if only 30 or 40 people want to go and the event is being held live anyway, then it can take place at the university and the few people who want to go will go and for the rest it will be broadcast online, but that wasn't the case. [Speaker 1] Leibniz University did this to some extent. Not during the pandemic, but even before the pandemic, people went to the lectures and shared them live at the same time. So they can't say that they don't have the resources for it, because if Leibniz University can do it, why can't Hildesheim University? Although they already did it before the pandemic. [HI_FG_1]

IM02/ Flexible organization of the time tables, calendars, activities and mode of teaching delivery

In relation to improvements, they exposed examples from other universities where students had a choice to attend on site face-to-face or in distance mode. They argued that they do not had this choice and it should be considered. As an example of the flexibility that the asynchronous model allows, they mentioned that having recorded lectures was interesting to them. The reason is because they could review them before exams and not only as a remedy for lectures they have been absent.

> I would rather do seminars in person. Simply because the exchange is much more fluid and somehow it's more fun when you can simply exchange ideas live. But you can really do lectures online or something. Whether 300 people are sitting there and not listening or in front of the computer, it makes no difference. [HI_FG_1]

Given the possibilities opened up by digital education, in its different modalities and approaches, some students even suggested something akin to "a la carte" learning, which can undoubtedly be very convenient for them, but which poses organisational challenges for the centre and workload for the teaching staff. In any case, their words highlight the fact that the experience gained during Covid-19 should be used to consolidate options that have been found to be appropriate.

> … we have now tried online, it has worked quite well, so we just leave it as it is, without somehow questioning it again, whether it might not be possible to somehow integrate other systems. Yes, other systems could somehow be integrated or it could be done in such a way that each student can implement it individually in the way that best suits him or her and his or her circumstances. [HI_FG_1]

5.3. University of Osijek report

The students and teachers that participated in the study were members of the Faculty of Humanities and Social Sciences linked to different educational programs from the area of library and information science.

5.3.1. Teachers

Context, attitudes and expectations

The attitude from Osijek professors in relation to the pandemic was quite positive in relation to the online environment. All professors had some prior experience on the online teaching environment because they have been working for years before the pandemic in a blended approach having Moodle and activity tools there as a framework for their courses.

> What we normally use at the department, is LMS Moodle. This is something that we faithfully and daily use to set tasks, activities, homework, presentations and everything else… [OJ_1]

But anyway, despite that positive attitude to online teaching activities, what emerges from the interviews is that some teachers majorly prefer face-to-face lectures with a combination of some activities done online like seminars or exercises.

> So I wouldn't like to do online teaching anymore, if I don't have to. I think everyone was missing some human contact at the time, and then so did I. I don't like to do technology if I don't need it. So if every meeting is online, not in person, it bothers me. That every class is online, not live, if it can be held live, bothers me. I don't want to spend too much time at the computer, more than I have to. [OJ_2]

> My position is that no. Immediate classes are better, definitely. […] However, what can affect the change in my opinion are the generations that come. Perhaps online classes will already be so inherent in them that it will be strange if you insisted that classes be held in physical form. [OJ_8]

The faculty adapted very fast to the online environment as all professors have mentioned in one way or another along the interviews. In relation to expectations, those who were not familiar with online teaching as a part of the educational system were not aware that this situation could happen. But previous experience and the personal profile more familiar with the online environment, or a step by step experience during the first weeks of the pandemic, help most of them to be more comfortable with the situation, technical glitches aside.

> I never imagined I'd keep teaching to students in virtual classrooms. It was some model that seemed pretty distant to me. […] To me personally, it seemed like something perfectly normal considering I'd heard colleagues from the abroad working so long ago. My attitude was that I wouldn't have a problem with it, but it's also not like I craved it. Not that I really wanted to teach like that. [OJ_2]

> I didn't think that would be a problem. Then I thought there would be problems of a more technical nature. Let's say the Internet, internet access, that not everyone will have computer equipment, cameras, microphone. [OJ_3]

> I didn't think I could teach online classes […] And now that I've had to teach online, I've done it with no problem. I absolutely changed my attitude and now it seems to me that what seemed to be a big problem, that's not the case at all. Of course, when there's physical contact there's that, when I see how students react then I can adapt better. It's definitely something that's better in person, but the difference isn't so big compared to having nothing. If you have to, this works. [OJ_7]

AD01/ Approaches to emergency remote teaching

The abrupt and precipitous change conditioned the outcome of the adaptation of curricula to the emergency remote teaching model. As the name "emergency" suggests, such an adaptation is done under the philosophy of "damage control", seeking the best solution but aware of the limitations. Having experience using Moodle at the broad majority of subjects even before the pandemic, a good number of teachers took advantage of their experience to provide their Moodle teaching spaces with more interactivity and options.

> […] We've introduced Plickers quizzes, … For a brief testing, yes. Actually, five-minute quizzes. So we always used something. Some kind of video, so they can watch something, so they can do something on their own. For example, we often use certain computer software to preservation of digital data, sometimes something that is also available online. For example, tree decisions that can be used interactively. So it seems to me that not only in our courses but in general in the department that we basically use some other forms. [OJ_1]

The priority was to keep the teaching going remotely, but then a dilemma came up: whether it was better to do it with a rather asynchronous approach based mainly on self-paced activities and teacher consultations, or a synchronous online model that kept as much as possible to the class schedules of the subjects as they were planned for the face-to-face model. In relation to this dilemma, it is interesting to note at this point that some students complained with radical shift to self-paced learning.

> So, from the beginning when we started, the first two weeks, it seemed to me that it would be simpler for students to have more independent tasks because it seemed to me that somehow it would be easier to work if they would manage their own time. So I wouldn't lecture them, I'd give them a text to read. And then through online consultations we should comment on that text. Which turned out to be a completely wrong assumption, because students literally wanted online classes. They wanted to go into online classes that were really no different from contact classes in the classroom. [OJ_9]

Anyway, depending of the kind of subject they teach, their teaching style and the educational tools they have on their personal portfolio of resources, some teachers bid for keeping that kind of self-paced approach. Most of them were happy with that approach, even some said the learning outcomes were very positive; so were their students. It is therefore clear that the students' assessment of one or the other approach depended very much on the specific approach of each teacher, the characteristics of the subject, and last but not least, the type and maturity of students.

> I did not record exercises since all the materials were available to them on Moodle in terms of different manuals, tools and explanations. And they knew they could contact me. They [students] really liked that way, they gave me feedback very quickly. They said it was different from other professors, who required them to sit in these virtual classrooms for hours. […] They preferred the option where they could actually learn something on their own and think about a problem, and talk to me about it, than to have a lecture virtually for an hour on a topic. And they found that very interesting. They did everything on time. Much better than they normally do in classrooms. They were very good, even more active. We worked very well together. It's a graduate program and it was the fourth and fifth years, but I can say that was great for me. And their feedback was excellent. For some things, I found it strange to go back to the classroom afterwards. [OJ_2]

AD02/ LMS, videoconference and virtual classroom tools for online teaching

All the interviewed teachers from Osijek pointed out that their faculty was fast adapted to the situation using the Big Blue Button application for synchronous lectures and Moodle for the other activities and resources. Big Blue Button allowed to organise the complete faculty in virtual classrooms.

> When the recommendations from university came that classes could be held in real time, synchronously, I watched all these educational videos that we got about teaching through BigBlueButton. So when I looked at it, it helped me a lot. And after that I was teaching according to a fixed schedule. And then I tried to involve students more actively in that real time, to participate in teaching. [OJ_3]

> I mostly use Moodle as learning management system, but we used it also before lockdown. Also the only difference was now that we used BigBlueButton, first integrated as a feature of Moodle and then we had online virtual classrooms, set up by our faculty. So then we moved to that space. So that is mobile, online virtual classrooms and BigBlueButton. I also use GT or Zoom or MS Teams or Skype. We needed when we had some problems with BigBlueButton or online virtual classrooms [OJ_6]

AD03/ Adapting previous materials with features to enhance their use in the new emergency context

Most of them indicated that they had to adapt their educational materials, adding some features for a better fit with the online teaching environment.

> [a colleague suggested to me]: " let's adjust everything now, as much as possible to be receptive to a student who will listen to it online". And we adapted all the materials we had that way. The presentation is a presentation, but let's say some things have been adjusted. The additional activities that we would put in, we had to make sure that we had this interaction, that they needed to say something and respond that way. Quizzes that we organized through this Plickers, where we have to be physically present. After a while, that service also gave the opportunity to do it online, and we took advantage of the quizzes given by Moodle. [OJ_1]

> The content of the presentations stayed as it was. However, I expanded presentations a little. While we were working in a virtual classroom sometimes I asked them something, e.g. to solve the task, so I had to expand those presentations a little bit. In the sense of adding another or two empty slides where I can write. In this sense, there was a change in presentations. [OJ_4]

> So I actually tried to help them cover the materials that I lectured and I actually started offering them extremely large database of questions for self study. This is something that I started doing during the pandemic and I continued to do so. Because it really helps them and this is a really big database and many of those questions are later repeated in some exams. [OJ_5]

AD05/ Looking for new educational resources and use of OER

Looking for new educational resources to enhance their remote emergency teaching solution was a regular activity among most teachers. However, the specific focus on searching for OER, or the manifestation of having used them, was minimal. Some teachers indicated that they did not use OER for a wide variety of reasons. For example, it's very time consuming to look for them and later adapt them, but they did not found appropriates OER.

> I didn't even look for them [OER], and I didn't run into materials like that. [OJ_2]

> I don't know why I didn't find them. I think the problem lies in the content of our courses from traditional preservation to cultural heritage management. I think we should definitely encompass and do one OER in which then there would be if nothing else that review of the basic definitions, some short vocabulary, concepts, some exercises that can be done, preservation plans. [OJ_1]

> Well, I didn't [search OER]. I didn't even think of anyone having courses like mine, to be honest. I was trying to fit into what I was doing, how I normally do it, so possibly if something is missing to find some way of it and then replace that lack of content. But I didn't watch the syllabuses and the programs of others. [OJ_3]

The majority of teachers do not express an awareness of how to search for "canonical" OER in specialised sources such as repositories or directories. If they do so, they do not find the results obtained satisfactory. However, a good number of teachers use YouTube as a key source for locating videos for use in their lessons and activities, which demonstrates the importance of the effectiveness of discovery mechanisms in teachers' behaviour. Something is wrong with the specialised sources for locating "canonical" OER.

> No, they weren't OER, they weren't exactly for [my subject], when I looked there wasn't much OER in this area. Most of them were websites of some libraries abroad or they were some kind of websites of an association for the much of any kind. Where then you could find any, say, complete textbooks that are already online, along with some exercises that students can do. So there's that on that side, but just some kind of course, not really now. Possibly on YouTube when you can find exposure, then I used to use it too. [OJ_1]

> … in some courses I included some of the YouTube video clips that I thought might help them clarify some of the areas that we covered or offer some additional knowledge. [OJ_5]

> I think we don't use it [OER] enough in general, not just in our Department, but in general. […] There is actually lack of awareness of the role and the impact that open education resources could have on education, especially in crisis situations. I use mostly video materials because I think they were already reading enough written texts, so I wanted something more relaxed so they could just sit and listen to it. So I would use mostly video lectures that were in public domain or available on different channels like Stanford, YouTube channel [OJ_6]

Personal knowledge of an OER source, through involvement in an OER creation project or friendship with the creators, makes it easier for some teachers to take them into account. This is the case of one teacher who said that he was very used to OER and indicated that he/she shared with their students OER materials from European Project EINFOSE (which had been led by Osijek years earlier).

> I must say that I am using some of them…. I'm using now one of the materials that were created …in our project EINFOSE. ….And if I give it to students, this is additional information that you can study. They will not. But then I use it and I take what I find useful and then include and then I refer to this source as a source and they can check it there [OJ_5]

AD07/ Recording videos of live lectures for deferred distribution

In relation to recording lectures they majorly didn't say if they did record the lectures, but could be because the recording option was mostly disabled at one point of the time by the managers of Osijek Big Blue Button (BBB) managers because of the issues with data traffic, i.e. data storage. Some of the teachers said they didn't, maybe before the managers disabled BBB, but reasoning why he did not record the live streaming.

> I did not. Because I thought if I did that, they wouldn't be particularly engaged at a time when classes took place. I preferred that they were there, that they were listening, so who has something to ask, let them ask me late. [OJ_4]

AD11/ Enhanced directions for students' tasks, exercises, self-paced study, etc.

> They additionally received a document where it was explained to them exactly for each class, what is expected of them. For example, for presentation number 5 you have to read this, think about this, look at this term, give an example, explain something, make a mind map. They knew exactly what they had to do. Of course, I asked them to comment every time if they had enough time to do the task, was it too demanding etc. [OJ_4]

AD12/ Student communications (LMS forums, teachers' feedback and mentoring, e-mail, messaging systems, videoconference, …)

> It's a strange thing to say, but we communicated a lot more when we were online than when we were live. When we're all in the building, it was handled in class or in the regular one hour of consultation. During lockdown we had consultations whenever anyone had time, for example in the dead of night on a Saturday. When it suited students, we could connect through virtual classrooms, by email or otherwise. So we communicated a lot more than before. [OJ_4]

AD13/ Exams, assessments and grading

In the interviews, a good number of comments were made about the adaptations needed to be able to do online exams, or to look for alternative assessment methods that were more appropriate to the crisis situation. As could not be otherwise, there is a great diversity of solutions depending on the type of subject or the philosophy that each teacher holds about students assessment and grading. In short, the crisis situation did nothing more than push a classic debate in education, which has not always been resolved, to its limits.

> We organized the exams completely online. We didn't come to college at all. … I have built a base, and I dare say of almost 500-600 questions. We did what Moodle offers. For example, the correct answer, multiple choice, open questions, essay questions, supplement the word and we would insert the questions for each course into the base. And then we'd let randomly select questions from a particular category. We tried to estimate how long it takes exactly for a particular question. […] The results were no different than they would have been in person. Actually, it was all the same. [...]… there was no cheating. That's why we made so many questions. So, each student had a different exam. And oral exams were the same in virtual classrooms. With, of course, a camera and headphones. There was a teacher and me present, and at least two other students to ensure the public. [OJ_1]

> I changed my exams completely in a way that I didn't use yes/no questions, because it seemed too much to me to watch for cheating, like something I couldn't manage in a digital environment. Then I decided that in essay form I would give them exams. I did all my exams online in terms of essays that were written, and I did oral exams in these virtual classrooms. [OJ_2]

> I had to make another type of assignment that they had to combine things, explain actually high level of assignments and more difficult. One part of exercises were drawn from this huge database of questions where they could practise on and one part of the side questions where they had no prior access to and those exercises had higher weight. It did work well. I know that online environment helps students pass my exams easier than in real time but that was the situation and I accepted it. [OJ_5]

AD14/ Ad hoc training courses and directions to support teachers in emergency online teaching

One remarkable thing repeated constantly by teachers is that the centre moved fast to support the training and guidelines needs of teachers to teach online, for instance using Big Blue Button.

> The college responded very well, I have to admit. It wasn't ready, but no one was ready. But they got up and everything was running very quickly in a week or two. That, to me, is a relatively good time in which college has trained. Because when I look at it, I teach at other universities as well, and they are not even close, not even close to that what our faculty did. And it should be noted, all was done on its own infrastructure. Which is important, too. [OJ_8]

Problems (PR)

PR01/ Online replication of normal face-to face teaching

As we have seen in the section "AD01/ Approaches to emergency remote teaching", either at the request of the students, or as a decision of each individual teacher, in a significant number of cases it was decided to make the minimum of changes in the teaching planning and simply substitute the meeting in a physical classroom for the meeting in a virtual room in BigBlueBotton. Considering that the aim was to provide a rapid response to the move to "emergency remote teaching", the replication of teaching in the digital environment cannot be seen as a problem in this context, but it is a problem in terms of identifying the weaknesses of this approach for the future. This was highlighted by a number of teachers in their interviews.

> There can be no equal amount of hours and lectures in a virtual environment and a realistic [on-site] one. Students can't keep up. To me, first we need to completely adapt the classes to the online environment. It's not adapted now. It is now adapted to live classes. So there's some different form of work to be offered. Some kind of project work, some discussions, discussions, where they participate actively in virtual classrooms. Then it makes sense. If we keep them as some kind of robots that just listen to lectures, it doesn't make any sense. It seems to me that the biggest drawback of online teaching in our country is that we are replicating real [face-to-face] teaching in an online environment just to be able to say that we have held it. That doesn't make any sense. If I held a class for an hour, it doesn't mean anything if you talked an hour into the wind and they were asleep. So any other form of group work, in smaller groups, in an online environment makes sense, if it makes real expectations of the course. I'd replace that completely, too. [OJ_2]

PR04/ Teachers overloaded with work

> There was a lot more effort at first. Now I have further clarified and simplified for myself, how to find some additional materials which will be of higher quality and more interesting to them. I can say that somehow I got to know these students a little better. Well, then I know what might work a little better in the form of some tasks, as far as they're concerned. So initially online classes certainly required more time and effort absolutely than physical classes. [OJ_1]

PR09/ Difficulties keeping students' attention, participation and focus

Another issue was the effect of the black camera/black screen situation where students do not turn their cameras on. For professors this situation supposed a problem because they did not know if students were attending the lectures or not.

> Here, the worst thing I've had is absolutely everyone turning off the cameras. I'm talking and I'm looking at the wall behind me right now and wondering if they're listening to something. There are people in class who don't listen. Then maybe you go to that side a little bit more and get their attention. When someone responds to class, then they want to participate actively. [OJ_8]

Nevertheless, professors have emphasized that, in some cases, students used the chat intensively. So that, this textual communication channel was a good remedy to the problem of participation. Actually, some teachers said the participation was higher that before the pandemic, but it seems most of the cases of increased participation were from more mature students, like those at master programs.

> They rarely use their mics when they have an interaction. We have interaction through chat. [OJ_5]

> Something surprised me. In the four years I've been teaching, there's never been as many nice discussions in the classroom as there have been through chats and virtual classrooms. I believe there wasn't some kind of barrier. Everyone was home alone and they were just free. They wrote in the chat and I couldn't stop them. That was great! [OJ_1]

But anyway, majorly teachers said that the online environment generate a lack of communication and sociability with students and among students. For this reason, professors prefer also face-to-face courses.

> Well, maybe the biggest problem was that communication with the students, their inactivity, because they didn't follow enough. I was telling them what to do. But then they sent e-mails afterwards and asked for explanation of what they needed to do. So, they didn't listen to me as I spoke. It was an indication that they weren't listening or were just doing something else. Here it is, that communication I think one of the biggest problems is that it wasn't as it would be in person. [OJ_3]

> So I can't count on discussion as a way of teaching. because students don't have the will to get involved in discussion, or it's always two, three students. I can't, like in class, laugh, and say "good, say what you think, so I don't expect you to know that, but let's discuss it now". That was it. [OJ_9]

PR10/ Exams not well adapted to remote emergency digital education

> I was surprised. I can say in a negative sense, because the results were actually bad; grades were worse online than in physical environment. They said they had enough time and I saw that they were actually submitting their test before the time was out but they weren't written so well as before. So this was a surprise for me. I was expecting the opposite. I think that the biggest problem for me was this evaluation, assessment, exams… and we had good support in the form of tutorials, how to use BigBlueButton, how to create tests, how to use different features in Moodle. But I think there was a lack of instruction and tutorials on how to do the assessment part and to create the exam. But the other thing is how to evaluate, how much time should you give, depending on the type of the questions. [OJ_6]

PR11/ Lack of appropriate equipment and connectivity issues

Connectivity problems were linked to the fact that in their homes there was the complete family using internet at the same time and they had to organise themselves to have a better connection while they were working.

> I locked myself in my eldest daughter's room and the others had to be quiet in other rooms. I have children aged five and six. They weren't allowed to watch HBO cartoons, Netflix, movies, nobody. Because it consumes the Internet. Students tell me their network is weak. I say: Tell all the other housemates not to watch Netflix, not to download or watch movies. But literally at that time of class it was not allowed to happen in our flat. It may sound a little strict, but I had to create working conditions at the time so that no one would disturb me. [OJ_8]

PR12/ Lack of adequate home space for teaching/learning

Not every professor had a separated room to work at home. Also having children at home at the same they were teaching was not easy to deal with.

> Since it was done at a time when we were all at home and the children and my husband and I, it was difficult to organize live classes in a virtual classroom, given that I have a small child. [OJ_2]

> I thought, "well OK, I do most of it online, it's not much of a problem." My only problem was to give a real-time lecture with the kids at home, so to be alone in some corner to give a quality lecture and in a way that no one bothers me. That was the only problem. None of us have that extra room for that. OJ_2

PR14/ Communication challenges between teachers and students on the digital scenario

They consider that the relation with the students and communication with them is much more better than online. First, the lack of communication with students, also socialization when turning face-to-face teaching to online teaching environment. Students interact less and when they do is through the chat and this non-verbal communication is less spontaneous and vibrant.

> In a physical classroom, working with students is one story, because you can show them different things, go from one thing to the next. Watch at what stage they are on computers with some exercise, even help if something gets stuck. They're freer to ask when they need something. So communication is simpler with them here. [OJ_2]

> I think I was better at face to face teaching because of this interaction and non-verbal part, especially in the courses in the field of XXXX, especially there where you have to see the feedback to students. You have to see their non-verbal communication, you have to see their faces. [OJ_6]

Even, to be a "TV anchor" in front of the camera without good student's feedback has been a problem for some teachers.

> It was really unusual at first. Especially over that at BigBlueButton, since I'm sitting in front of the computer monitor, and you feel like you're talking into the void. It kind of seemed unusual and unrealistic to me at first. I had no problem with the equipment and space. I've had that before. So, cameras, microphone and laptop. It is strange to look at yourself and your face all the time. You only look at students names on the list, you do not see their faces, and you don't feel like it's class. [OJ_3]

PR16/ Sociability issues

In the end, from the point of view of overall performance, the technological problems were more or less solved. But it is commonplace for some teachers to mention "human factors" related to problems of student socialisation, problems which undoubtedly had a major impact on the development of teaching activities during the various stages of the pandemic.

> This lack of social interaction and social aspects should be highlighted as a disadvantage, where neither they met with each other nor we as teachers. I think that's a very big drawback. [OJ_3]

PR17/ Psychological and health issues

By definition a crisis situation is a period of stress in which psychological problems become more prevalent because of the isolation. The fact is that some teachers indicated the appearance of diverse situations linked to those problems.

> As for these problems, I noticed that I faced these psychological difficulties. In terms of fatigue, lack of concentration. So I was really overwhelmed by the unpleasant feeling from time to time. Because when we were in that Lockdown, we had to do everything. The uncertainty is about whether you get infected with the disease, you can't go anywhere. It was hard to actually deal with these feelings. I felt like I couldn't relax at all. […] I felt that my physical health was affected. Headaches were frequent, lack of concentration, fatigue…. Prolonged exposure to stress. [OJ_3]

PR18/ Students overloaded with work

Most of the students complained that homework and group work assignments experimented a surge. They interpreted that teachers overreacted to the crisis with the idea to keep the learning alive, but the outcome was quit the contrary.

> One of the complaints of the students, when we switched to online mode, I mean, not me, but the whole institution, was that many of the professors or teachers introduced some additional, new activities and that they were burdened. I think that students liked, what happened in my courses, that nothing really changed. What I envisioned from the beginning of the course was what I delivered and what I had to do. No new obligatory activities were introduced. Anything that I actually offered was only voluntary. And it's mainly those activities that help them, that were meant to help them, to understand the material. [OJ_5]

PR21/ Weakening of students' self-discipline and routines for carrying out activities

> The only thing I've noticed is that student motivation is much more important than it was before. Students who are motivated they didn't really have any major problems with following classes. Those who were not motivated, they could log in and not listen or log in not to be present at all. Some seemed to log in and leave and disappear without me knowing it. But those who are motivated they, as a rule, did not have problems. Those with whom motivation is a problem, they had problems with monitoring and later missed it. It's up to the students again. They're grown men and women. [OJ_7]

Looking ahead. Advantages (AV)

AV01/ Time savings and more freedom to use it (less travel time, self-paced learning, students/teachers ubiquity, etc.)

> Yes, definitely. I mean, the positive. Yes. Of course, we would sit in our Pyjamas and just put like the top and makeup. And I know the students also like this. They can listen to classes from their beds and they did not have to get up too early. So this is all a positive thing. But the thing is the lack of interaction, the lack of communication. [OJ_5]

But now sometimes it seems to me that in some situations even online classes are better. I can examine them, call them, ask them and see who's doing what. So there they are. We're kind of closer. Not always, not all, but we're closer. Sometimes it's because of, say, the weather, that day would be simpler, if there's a storm going, to do everything from home than to come in the rain, lightning and thunder. That's purely why. And because of the time saving. [OJ_4]

AV03/ Self-paced learning and flexible asynchronous interaction beyond the class time

A few professors indicated that students communicate themselves more than in face-to-face courses, because the time frame for interaction could be expanded beyond the time allocated for face-to-face classes.

It's a strange thing to say, but we communicated a lot more when we were online than when we were live. When we're all in the building, it was handled in class or in the regular one hour of consultation. During lockdown we had consultations whenever anyone had time, for example in the dead of night on a Saturday. When it suited students, we could connect through virtual classrooms, by email or otherwise. So we communicated a lot more than before. [OJ_4]

AV04/ Promotion of the creation and reuse of educational resources

Also, returning to normality professors also use these materials done before for students who are unable to come to class. Some experiences and resources used during the crisis stimulated the creation of materials, some of which may continue to be useful in the return to more normal situation, but still with Covid-19 cases.

I kept all the materials somewhere in my archive, so in case we had to do it online some time, then I would pull it back. Or what I did do, actually the only change is that if someone tests positive for Corona or in isolation they can't come, they can join us in a virtual classroom while I'm in a normal classroom with the other students. [OJ_4]

Looking ahead. Lessons learned (LL)

LL02/ Pandemic has been a catalyst for digital transformation

I don't think distance teaching compares to live classes in any way. As much quality as there is, there is a lack of this social aspect that not everything can be done as it could be done when we are all physically present. But what was useful to me, let's say, is in a way to find some new methods and strategies and see maybe how to encourage them more to get active. I found additional sources, videos that later served me. Those were some examples. [OJ_3]

LL04/ Blended and hybrid learning modes are potential game changers for the future of traditional face-to-face universities

Finally, what especially emerges from the interviews is the hybrid mode (i.e. some students on-site, some on-line, during the same activity). Some teachers in Osijek consider that hybrid teaching can be a solution for some seminars or courses, but also for some students who do not live in Osijek or are in isolation for Corona.

if someone tests positive for Corona or in isolation they can't come, they can join us in a virtual classroom while I'm in a normal classroom with the other students. And praise for the college and

> there because now there is an opportunity to join the virtual classroom so that those who listen at home, immediately listen as if they are there. That would be the only change I kept. This possibility of hybrid teaching. That I and most students are in the classroom, and those who really can't attend, for a legitimate reason can virtually join. It's the only thing that's been changed. [OJ_4]

Nevertheless, it need to be considered that term hybrid is also understood as blended. In overall, what professors are saying is that a change in some part of the educational system can be considered.

Looking ahead. Good practices (GP)

GP04/ Online oral exams through videoconference tools

> The oral exam is easiest to do online. I'm asking him to turn on the camera and see what he's doing and it's over. If we were physical or in front of the cameras, there's almost no difference. And as for other technical courses, where they have tasks. I give them colloquiums anyway, and they can use any materials they want. Because they have a task to solve. [OJ_7]

GP05/ Short quick quizzes

> Short three minute quiz and of course during the pandemic though, those quizzes were moved to online environment so they always had six questions randomly chosen. So there was a database that I made six questions, three minutes. Those were really factual questions when they had to supply answer that was really short because they had a limited time and it was okay. And now I realised that I am using this type of quizzes now, in real time. At the beginning of the semester I tested it. I made a test quiz for them because they are using their mobile phones. They cannot use mobile first for writing examination but for quizzes, I tested and it worked excellently at all my classes and courses. So now we are doing that now. When they come to the classroom I say okay now approach to the quiz and those that are working from home, if they have quarantine or something, then they can approach a quiz from home. [OJ_5]

GP09/ Virtualization of project-based learning and gamification activities

The online environment can help the development of project-based learning activities: students projects could be developed in a virtual setting with role-playing and gamification functionalities.

> And as for the advantages, I would mention these projects with students, we just had to tailor them to online circumstances. Although we couldn't go to some bookstore, a publishing house to do a practical project. So then we actually developed some virtual projects that are very good. For example, a virtual museum of students and their works in publishing, where they were in fact very engaged. We met in a virtual classroom on a weekly basis, talking about this project all year round and they did it. Some things turned out to be good, nice for them. I tried to make some sense of what they were doing. So when the course is over, they can have some result, something they can say 'I did it'. [OJ_2]

GP13/ Just-in-time shift to online live lectures if the teacher has to be away

> I also think that we should keep these virtual classrooms. Sometimes it's more convenient, because at some point we can meet with each other, with students. We know that students will certainly be able to access them from their cell phones and from their computer. And in the case of missed classes e.g. due to travels and conferences, classes can be held online, in this way because we know it works. Maybe in that ratio, 20 percent of online classes, 80% live. Or if the teacher is on a journey. Why don't he teach in that term he has so he doesn't have to teach later. So it seems to me that we shouldn't just throw it away even though lockdowns ended. I think this option should be open all the time. [OJ_1]

Looking ahead. Improvements (IM)

IM02/ Flexible organization of the time tables, calendars, activities and mode of teaching delivery

The avalanche of experiences, lessons learned, good practices cannot easily be translated into rigid teaching guidelines and planning. The testimonies observed are diverse and sometimes contradictory, so that what might be necessary to implement in the future for some teachers might not be for others. However, from all this variety, what can be concluded as a common element is the need for greater flexibility, open-mindedness, in the way teaching is organised in terms of timetables, calendars, synchronous activities combined with asynchronous ones, etc. The commitment to a mix of teaching approaches, even within the same subject, seems to be a line of work into the future.

> Increasingly, it seems to me to be the best combination. We work live, but if anything happens at any time, and someone has to switch online, then we can teach hybrid. So a little bit live, a little bit online. A combination. The best thing to do is to adapt to the moment. [OJ_4]

> Especially those study programs that have a lot of hours of classes. Maybe reduce the number of hours [teacher talks]. So yes, it needs to be adjusted. It's the same goal, but in a different way. It takes a lot of thought. How to organize classes to achieve this goal. So if I go online, I'm not going to teach that class for maybe two hours, but I'm going to say the basics in half an hour and then we're going to talk further. So they get involved, not just listen to me. And I should direct them, if they say something wrong, so that together we come to conclusions instead of just listening. [OJ_4]

IM03/ Promotion and support for improving OER use and creation

> I don't know why I didn't find them [OER]. I think the problem lies in the content of our courses from traditional preservation to cultural heritage management. I think we should definitely encompass and do one OER in which then there would be if nothing else that review of the basic definitions, some short vocabulary, concepts, some exercises that can be done, preservation plans. Just like from start to finish, to include maybe a little bit of that digital preservation at the very end. I think it would definitely be good. [OJ_1]

> … we should work more on building awareness around open educational resources. Because, I think it's a general problem, as I mentioned before, so people aren't producing them enough and people aren't using them enough. So I also have problems finding some of the materials and resources that I could use […] I think we should have more repositories of open education resources and different digital materials that are available to use so they are more in public domain or licenced through Open Licencing by Creative Commons. And I think we ourselves should be more open to share. We maybe

talk about open science and open education, but in practice we don't see it so much. So we should also share more, maybe also publish our presentations [OJ_6]

IM05/ Teacher training and mindset change

Professor's training for digital transformation of the university is also another topic emerged as a key improvement. As far as some solutions used by some teachers during pandemic as experimental approach have worked well, and can be used in some way for normal teaching, now it's time to plan teachers training in a consistent way.

> Yes. New competencies are needed by everyone. So teachers' competencies are very low. We can't just give students something if it's available and easy to use [OJ_2]

> Now, we definitely need this education in terms of how to make some questions and student evaluation. Perhaps it would not be a bad idea to offer some kind of education in general regarding the production of new teaching materials. So that each teacher can choose what suits him. [OJ_1]

> … it would not be bad to get even some kind of education related to this method of teaching. Maybe even meetings in terms of exchanging experiences. Let's sit down and talk. If you had such a problem, how did you solve it? So if you've encountered some kind of difficulty that you've managed to overcome? I think it might be like some support groups. Even online. All for the purpose of exchanging experiences. We also had meetings in the department where we exchanged experiences. However, one cannot go into any details at these meetings. That's why I think it would be good to organize thematic meetings that are generally related to the conduct of online classes. [OJ_3]

IM09/ Blended teaching to improve face-to-face teaching

> I think we could think more about keeping some of the aspects of online learning, maybe go more towards blended learning whether there is a crisis situation or not, I think we could go more towards blended learning and keep the best of both and combine it and as you said we have all the tools, all the materials, all the infrastructure. [OJ_6]

IM19/ Promote the use of digital credentials

A teacher from Osijek raised the issue of authentication of students' digital identities as a requirement to ensure the integrity of the official academic certification process (leading to students being able to hold a recognised diploma). The whole discussion on control of exams and assessment activities remains a challenge both in a classical teaching environment and in new digital environments. This original and unique proposal among the participants in the study opens the door to sensitive debates on privacy, digitisation, etc., but is worth exploring.

> So if online learning will become mainstream type of learning from time to time, I think we should think more about this issue of digital credentials. I think this is not a problem just for us. I think this is on an international level. This is quite a huge problem of digital credentials and I don't do any practical work in other institutions like apprenticeship. But I think this is also a part that should be discussed more and maybe have better strategy framework how to do it. [OJ_6]

5.3.2. Students

Along the transcript some students emphasize that, in their opinion, lectures need to be face-to-face and seminars and exercises better online. But there are different points of view depending on the type of learner and the study programme he/she is enrolled in. For others before the pandemic, the online option was not even imaginable and their perspective on the issue is under review.

> When it comes to classes and activities it depends on the concept of the class. I think the lectures are better face-to-face because it's easier to focus, but seminars and exercises are better online. [OJ_FG_1]

> I honestly didn't have an opinion on online teaching before the covid-19 started and I didn't think it would ever happen to us. [OJ_FG_1]

However, those who had had previous experience with e-learning expressed an open and positive attitude towards it.

> Yes, we had Information retrieval course with prof. XXXX. It was in collaboration with Hildesheim University and prof. XXXX. We also had Moodle like now. We had recorded lectures, each lesson, and we had one homework every week. Consultations were always available but I personally never needed them. I have a feeling it was easier for us because we could listen to lecture multiple times and you could do the homework at your own pace. That was the only experience I had before the pandemic. [OJ_FG_1]

> I see that I can find some lectures online and start learning online again, which we are used to. And I think that's why such easier learning can be turned into lifelong learning. [OJ_FG_1]

In relation to what they expected, opinions are diverse. But we can highlight that they could get technical problems, such the internet connection. Anyway, as most of the students in Europe, their expectations during the first days were quit optimistic in the sense that the problem would soon be solved and normality would be restored without having to change the way courses are followed.

> I expected it all to be over in two weeks (laughs). I was thinking, great I will take a break from everyone and have a free Easter". But that did not happen, pandemic took a long time. [OJ_FG_1]

Students found that in comparison to other faculties of the same university, their faculty, Information Science, was pretty well organised.

> I would just add that in comparison to other faculties ours was pretty well organized. It was well organized when during the first semester of the pandemic. The organization was really good compared to other faculties, so our classes were just improved during the next, winter semester, when we were the third year undergraduate. [OJ_FG_1]

AD01/ Approaches to emergency remote teaching

Especially the first weeks of the 2020 confinement plunged many students into uncertainty. Although over time things became more normal, there was always a lack of a specific horizon from semester to semester.

> [Speaker 1] I was scared at one moment when someone started talking about how we'll have to repeat this academic year. There were all kinds of stories. [Speaker 2] There were a lot of disinformation. [Speaker 5] I would listen to news constantly – what will happen and will they say that tomorrow we go back at faculty. [OJ_FG_1]

AD02/ LMS, videoconference and virtual classroom tools for online teaching

In the case of the students of Osijek we perceive that only two platforms were mentioned for synchronous lectures, Moodle and Big Blue Button. In regard to use the platforms, students found that the guides on how to use the platform such a Big Blue Button was useful for them.

> Prof. XXXX, and I think other professors, prepared tutorial (short notes) on how to use Big Blue Button. We had everything prepared in advance. [OJ_FG_1]

AD04/ Supplementary materials provided by teachers

In relation to educational materials, students found that professors were aware of the situation, and they provided more educational material. For instance, as the library was closed and they could not go, they appreciated the support teachers offered to them on this issue. Moodle's role as a repository of materials was fundamental to this, so the strong tradition of use of the tool among teachers and students was a strong point to build on.

> I would say that teacher provided even more materials and resources than before because they were aware of the situation we were in. [OJ_FG_1]

> We actually saw that all the teachers just put all their materials online. [OJ_FG_1]

AD08/ Production of videos or voice clips other than recorded live lectures

> Prof. XXXX [pre-recorded] her lectures which enabled us to listen to it whenever possible. The great thing about it is that you can go back to it and listen to the lecture as much as you want, e.g. if you missed something the first time or something wasn't clear enough. [OJ_FG_1]

AD15/ University teaching support services (e-learning unit, library, TIC unit,...)

> We could look for some articles in the beginning if we couldn't access them from our devices from home and we could scan them. However, to do so you had to call, make an appointment and then you leave and they leave it at library window. However, I personally did not use the library services at all during the whole time of the lockdown because everything we needed we either got through Moodle from the professor or we found ourselves in the online databases. [OJ_FG_1]

> I remember that literature from one course, I think there were 70 pages of it, and the library had a rule that, for example, one student could ask for a maximum of 10 pages scanned. So, then I thought,

"what am I going to do now? Take 10 people with me and then one of them will scan from pages 1 to 10, the other from pages 11 to 20 and so on?" (laughs). But then in the end, that professor removed that literature from the list, so they help us a lot. [OJ_FG_1]

Yes, for library materials it was a problem because library was closed, but for databases we had access enabled whether we were at home or accessing from somewhere else. [OJ_FG_1]

I didn't have any problems because professors gave us everything what was in the bibliography. And what was available only in library they removed from the bibliography, and to be honest I didn't have too much desire to read it also. [OJ_FG_1]

Problems (PR)

PR09/ Difficulties keeping students' attention, participation and focus

One of problems that students observed is that in face-to-face lectures the interaction with professors is higher. In online it was exceptional the interaction with the rest of the class or with the professor. It seems that they considered when using Big Blue Button in synchronous classes everything was more formal.

I think we were under the impressions that if we wanted to communicate and say something on Big Blue Button we really had to have a strong reason. We comment more freely face-to-face. [OJ_FG_1]

Students acknowledged that whether for technical, motivational or privacy reasons, many had their cameras turned off and a low participation attitude in the dialogues and consultations in the synchronous online classes.

I agree there weren't many problems but I think we would communicate more face-to-face than online. For instance, when the teacher tries to make us communicate through chat in Big Blue Button and almost nobody wants to answer, sometimes someone answers. But when we're face-to-face, there's more interaction and communication. [OJ_FG_1]

We almost never used camera because it was always the issue of data traffic and quality of internet connection. [OJ_FG_1]

Yes, if it was ex cathedra kind of lectures, I would share the screen (and I bought another screen after a while, as well as a colleague), and my BBB is on and I'm listening to lectures, but at the same time I'm doing something on the side, I'm writing some review or assignment not to waste time and to have at least an hour or two later for some sort of walk. I think most of us managed to balance some kind of multitasking and in a way it became an "ace up my sleeve" for me. [OJ_FG_1]

… you don't have as many distractions in a live classroom as you do at home. [OJ_FG_1]

PR10/ Exams not well adapted to remote emergency digital education

Time restrictions and the rigid flow of the exam items was a problem. They had the sensation to have less time than usual. In online exams in addition to the problem, they found that had more questions than usual having no time to finish exams.

We had some quizzes within couple of courses, but it was a different concept than during the pandemic. We would take the quiz in the classroom and the conditions were the same as when we would do a written exam. The time constrictions were the same. But when we did online test during the pandemic we had so little time, much shorter, we couldn't go back to questions. [OJ_FG_1]

> Lack of time was a big problem. Too many questions, too little time. Even if we were to cheat or if person new all the answers, there wasn't enough time to answer them all. [OJ_FG_1]

> I would usually say that it was actually a test of our typing skills than our knowledge. I sincerely think so. I understand the reason behind the decision to restrict time, but still … the exams were sometimes just meaningless with all that lack of time. [OJ_FG_1]

> For me even bigger problem than time was the issue of not being able to return to the previous question. I would loose the perception of how much time I really have for each question, I couldn't make a time plan because I didn't know what to expect in the next questions – was it a multiple choice or an essay question. […] I know that many colleagues weren't happy with her exam because of it. [OJ_FG_1]

PR11/ Lack of appropriate equipment and connectivity issues

Similar to other partners, students also had problems with internet connection and they had to turn the cameras off to optimize their Internet bandwidth. This situation was in all courses unless when having online exams.

> We almost never used camera because it was always the issue of data traffic and quality of internet connection. [OJ_FG_1]

Another problem is frustration when any element of the computer did not such as the microphone, the camera or the sound.

> The weak point is these technological problems, for example a lot of frustration would be when the microphone would not work, when the computer would shut down and so on. [OJ_FG_1]

However, one of the most important elements for efficient work in online classes is undoubtedly the availability of two screens, both for teachers and students. Those who did have them emphasise how necessary it is to have such equipment in order to be able to follow the practical activities online in a synchronous way.

> I would just add that those of us who had more screens at home, like two screens, it was easier to follow the classes and do the work, like taking notes. [OJ_FG_1]

> I also bought a new additional screen. But I would have bought it even if there was no pandemic. [OJ_FG_1]

PR12/ Lack of adequate home space for teaching/learning

Other recurrent problem was home space. First, having this space at home and, second, using the same for all activities all day long since the beginning to the end of the day.

> For me the biggest problems was that the same space I was working in was also my space for rest, fun and sleep. [OJ_FG_1]

PR14/ Communication challenges between teachers and students on the digital scenario

Some students in the focus group pointed out that interaction and communication with peers and professors was missing.

> I still think it's better to be physically present because there's more to it than just attending classes and that is interaction and communication with my colleagues and teachers. That's why I prefer face-to-face classes. Exercises could be online, I don't mind that. But seminars should also be face-to-face because of the interaction aspect. [OJ_FG_1]

PR16/ Sociability issues

It is commonplace for all students to mention "human factors" related to problems of student socialisation, problems which undoubtedly had a major impact on the development of teaching activities during the various stages of the pandemic. Undermining motivation is one of the consequences of this problem.

> I would say that classes face-to-face are much better. As we mentioned before, even though exercises could be better online and there are ex cathedra lectures which are also the same online as face-to-face, I still think it's better to be physically present because there's more to it than just attending classes and that is interaction and communication with my colleagues and teachers. That's why I prefer face-to-face classes. Exercises could be online, I don't mind that. But seminars should also be face-to-face because of the interaction aspect. [OJ_FG_1]

> As for communication and relationships, we lost almost any communication with people we didn't communicate so much before because now we didn't even have those casual conversation or small talk in the hallway or during the break. So I would say I had less or no communication with colleagues I'm not so close with. [OJ_FG_1]

PR17/ Psychological and health issues

> I know people who went to university psychological counselling and it was because of Covid-19 that a lot of people had problems. [OJ_FG_1]

PR18/ Students overloaded with work

A common element that can be observed in the statements of the students participating in the focus groups was work overload. It does not seem to be a problem of perception based on a personal experience conditioned by a possible reduction in the ability to concentrate and work as a result of the effects of the students' own confinement. Surely, a certain determination on the part of the teaching staff to give a committed response to the crisis led them to think of activities as a way of overcoming the non face-to-face nature of teaching.

> During online classes, until recently, we had more obligations than before, more tasks, homework, writing papers. One of the problems were quizzes and exams on Moodle, there was a time problem, someone would have internet connection problems. Some of the things were more complicated" [OJ_FG_1]

> Yes, teachers had to make sure we covered everything in the curriculum and they had to have some sort of control – did students read and heard everything, did they learn everything, did they do all the tasks. So they used this additional tasks and obligations. [OJ_FG_1]

> I can say one more general problem, and that is our class schedule, and it is like this forever. Because there were days when we literally sat from half past 9 in the morning to 6 in the evening and then you have a quiz at 8 pm, have to write two or three quizzes by midnight and then get ready for class the next day. I think I got the impression then (during pandemic) how awful our schedule really is because it's not the same for me to sit at the computer all day and to be there live. [OJ_FG_1]

AV01/ Time savings and more freedom to use it (less travel time, self-paced learning, students/teachers ubiquity, etc.)

Saving time in transportation such as in the rest of the partners is a recurrent topic. However, this advantage they point out is contradicted by the fact that most of them value the personal encounter in the classroom with teachers and classmates as more successful. It is therefore an advantage expressed in a decontextualized, objective way, but without taking into account that it is not possible to have everything.

> … when we would attend classes online, as soon as they finish we could start going over what we did, we didn't have to catch the bus or train and go home, and all the stuff before we would start going through the notes. [OJ_FG_1]

> As for teaching activities, I think online is better when it comes to exercises and some lectures that are more ex cathedra. Online was better for me because we don't waste time coming to the faculty, we had less unused time between the classes like the big breaks where we can't make it home but have to wait at the faculty. At home we could use that time better. [OJ_FG_1]

> I would say that the strong point is saving time because I also managed to have three hobbies. And I didn't have to waste time traveling and I was able to use time in some more productive way. [OJ_FG_1]

AV03/ Self-paced learning and flexible asynchronous interaction beyond the class time

Students found that online environment solve certain barriers when doing some exercises. Some professors pre-recorded their presentations and they found them useful.

> We had exercises with prof. XXXX in a way that we could listen to her pre-recorded presentations whenever we wanted and we had online quizzes. Sometimes we had to do a certain task and submit it on Moodle instead of having a real time exercises. [OJ_FG_1]

LL06/ Students' shift concerning digital skills

The heavy and forced use of digital tools resulted in the improvement of learners' digital competences, especially in terms of communication and group work in a digital environment.

> I used to love to work with print materials more, but now after the pandemic I rather study using my laptop and digital materials. [OJ_FG_1]

LL07/ Students' shift concerning self-organization skills

In regard to lessons learned, students indicated that the experience of lockdown online remote learning have been a boost to their self-organization skill, to improve their organizational habits.

> I would say that online classes contribute quite a lot to my organizational skills, either in regards to everyday life or student life. In order to be able to attend all the classes and do all the work I had to have a weekly and daily plan of my activities and duties. … I had to change a lot of personal habits. I

would say that online classes helped me in my everyday life in ways that I would never thought it would. [OJ_FG_1]

<div style="border:1px solid #000; padding:4px;">Looking ahead. Good practices (GP)</div>

GP03/ Better organization for the deadlines of assignments

They also found that deadlines were better organised and easy to follow. As online teaching need a better planification, deadlines and milestones in the pace of learning use to be more settled.

> In online classes, knowing that each week at the certain time there's a quiz or that we have a certain deadline was much easier. Everything was synchronous with defined schedule. [OJ_FG_1]

GP07/ Recording of lectures for further clarification and reuse

As an improvement in the teaching life they consider that recorded lectures need to be maintained. In terms of providing resources to students there was an improvement itself.

> Recorded lectures should definitely be introduced. [OJ_FG_1]

In fact, some students explained that they captured screenshots and recorded on their own streaming of synchronous sessions in order to have a record of what was given in class in cases where the recording was not offered by the teacher.

> I'm not sure if we were allowed to do that, but I screenshotted what I didn't understand and then I would explain it to myself, write it down and go back to look. I had an app, I don't know what it's called now anymore, but while the professor is talking I type everything and then I literally transcribe what the professor is talking about and then revise it later. And that helped me a lot, that application and then I add those screen shots and then I follow what the professor said. [OJ_FG_1]

> Yes, and we would record a lecture through these applications. I used that in this one course because the professor did not explicitly say whether it would be in the exam or not. And then I recorded it, so if it happens, if it doesn't, it doesn't matter (laughs). But it was useful for me because I would have to write it all down if it was live session and then nothing will end up in the exam (laughs). [OJ_FG_1]

GP11/ Sharing students' screens in practical exercises

They found that some courses from specific teachers were much better online than in face-to-face. Especially those who were very technical such as IT courses. The reason seems that all of them had the same screen at the same, especially in those exercises that need to be done step by step. This has mostly to do with saving time, i.e. the teacher didn't have to lose time by going from student to student (like in physical classroom going from desk to desk) checking their screens and whether they're doing everything right, but students could just share their screens online and the teacher would check and say if something was wrong. So some exercises were better online in regards to organization and time management.

> In face-to-face classes teachers would usually use presentations to show us and guide us through the exercise while we are at our computers. While now, online, we all see the same screen in the same way. There were no problems like before, e.g. can I see the presentation and everything it is written on it if I'm in the back row. With exercises online we all saw the same thing in the same way […] Also, teacher had better control over what we were doing during exercises because it was easier

for him or her to see what we are doing and overlook our actions. Sometime someone would share their screen just to check what he or she was doing, while before [the pandemic] the teacher had to go around the classroom and check everyone's computer screen. I think we were all more engaged […] And one more thing was that every time someone shared their screen we could all see what they were doing. [OJ_FG_1]

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Looking ahead. Improvements (IM)

IM02/ Flexible organization of the time tables, calendars, activities and mode of teaching delivery

…we realized that some things could definitely be completely online. For example, some exercises or some seminars or something that is not, let's just say, it is not necessary to sit together for three hours. I think that there should be an option that regardless of all the recommendations and rules and everything else, that professors, or those who decide on it, should be a little more flexible that there are some options – online or live. For example, that there is an option that who wants to come, to come or to be a hybrid lecture, and that some things are really allowed to be completely online. I think that in that case it would be easier for both students and professors. [OJ_FG_1]

5.4. University of Library Studies and Information Technologies (Sofia) report

All teachers interviewed and all students participating at FG were linked to one of the programs from the areas of library and information science at the centre.

5.4.1. Teachers

Context, attitudes and expectations

Professors indicated that they considered themselves linked to traditional way of teaching, with a preference for face-to-face teaching. Nevertheless, they considered online teaching as an opportunity to test their pedagogical model and knowledge. They indicated that online learning is not equal to on site face-to-face teaching and they were aware that some changes need to be done when transforming the on site classroom teaching to online teaching. The following extract illustrate the feelings of professors:

> [Before] I used to accept it as an alternative, as an opportunity if I have no other option, but I did not prefer it. I admit to myself the live contact, face-to-face communication is very valuable, because communication with people is one of the main reasons why I continue to teach for so many years and to be in this field for 20 years. […][Now] …I know that this is a successful and working option, with all its pros and cons, and it is a form that gives freedom to me as a teacher and my students and allows more people to be constantly engaged in what is happening in the learning process. [SO_1]

In relation to online teaching, they answered that it can complement and help to focus the on site face-to-face teaching, but they are not in favour to shift to distance learning entirely. One the arguments are because live interaction is missing.

> My opinion and attitude towards distance and blended learning then, before the pandemic, may have been much more positive than it is now. I thought that such training would complement and help the real training. [SO_8]

When the pandemic came up and triggered the lockdown measures, teachers thought it would be a disaster. To this matter, the topic that most emerges from their answers is that it was going to be very difficult to engage students in the online environment because of the diverse personal situation of anyone. For instance, if students felt fear, they would probably lose interest in the teaching content, among other distractive factors.

> The word that comes to mind is "chaos." Chaos and then normalization. Chaos caused by people being scared and every action was dictated by this fear, but the university, the university management and the head of our department managed to create order in this chaos in a very short time. [SO_1]

On other side, there were positive expectations in relation to online teaching considering distance learning as an "opportunity" or "an alternative" to introduce students from another point of view

trying to achieve quality in education despite the situation. However, this change from on-site teaching to online teaching would have required more intensive teacher training actions.

> So I've always thought that distance learning is an alternative. In this case, it is a decision in extraordinary circumstances. This is how I perceived it as something new and innovative, but extraordinary. And of course, tied to a process of preparation for quality training, not just automatic switching [SO_7]

Also, it is necessary to state that the Sofia centre is a LIS specialized college, and that from the analysis of the interviews it seems that they got a very specific and timely support from their institution. To this matter the library created educational material only to LIS because is a specialised centre. Professors in general also felt supported by their centre.

> I think the University is responding quickly. They tried to give instructions in the most effective way possible and to suggest alternatives for the work of the teachers. So, we worked well with the management of our faculty. Trainings on the use of platforms at the university level were also immediately offered, and at one point we felt the presence of our university library and it actually started to work very actively and offer services and resources that it had not provided so far. [SO_6]

> The first thing I thought was that we would have no problems. Quite frankly, since we know our students, we have very close contact with all our students. We have very close contact with all members of the department, with the management of the department and with the management of the university. There was no part of the whole process that bothered me because I know there was someone to rely on. The team we have created and in which we work gives this security. [SO_1]

Adaptations (AD)

AD01/ Approaches to emergency remote teaching

> It all happened so fast that I can't single out anything concrete now. Maybe the supportive fact is that the colleagues taught a short course for lecturers - how to use Google Meet or Moodle. The Rector's Board gave us variability, freedom of choice how to organize distance learning with students. [SO_2]

AD02/ LMS, videoconference and virtual classroom tools for online teaching

The platform more prevalent for teaching activities was Google Meet and, in some cases, using it combined with Google Classroom platform and other applications from the Google suite. The centre corporative platform for students and teachers e-mail and other applications is Google, and it was the logical and most suitable choice. The use of Moodle was also reported, but it seems the use was uneven. Two professors mentioned to have used ZOOM.

> …at the third moment I started to use these platforms very intensively for video meetings, video lessons, conferences – via Google Meet and ZOOM [SO_11]

In addition to these platforms two other professors also indicated that they have also used Social Networking Sites (SNS) such as Viber as an instant message application but also Twitter or Facebook. Anyway, it's very important to underline the fact that Google applications were an

institutional choice before even the pandemic. So that Google Meet is recognizable to students, as far as ULSIT students' emails are synchronized with Google.

> Basically at our university, the distance learning we have used so far has been with the ILIAS platform. When the pandemic occurred, we were given the freedom to choose how to learn in an electronic environment, so I had the opportunity to use the MOODLE platform. But my preference was for using Google Meet. Through Google Meet, I conducted classes with students in order to explain the specifics of the discipline. I sent the students a package of study materials, then we discussed them online and all the consultations were through Google Meet. We created a separate Viber group, which created conditions for additional communication. [SO_7]

> During the pandemic, I generally worked in different forms, but I focused mainly on using Google Meet. I have used ZOOM, but much less often because students work much easier with Google Meet. It is recognizable to them, and each of our students upon entering the university receives a work email that is synchronized with Google, so this feature is the easiest for them to use. Otherwise, with my students in general, I have not used online broadcasting of lectures before. [SO_1]

The fact that Moodle, or ILIAS, was not established as a default space for all subjects before the pandemic limited its use as a basis for repository of materials and space for asynchronous interactions with students. Some teachers acknowledged that after a first approach, they decided no to use Moodle as it was difficult to overcome the learning curve quickly at the critical moment of the pandemic. Indeed, among students, the use of Moodle, or an equivalent LMS, does not appear to be standardised either; indeed, Google Drive is mentioned as a way of receiving students' assignments and work submissions, consistent with the majority use of Google Meet and Google Classroom as reported by the teachers interviewed. But among some teachers, it was noted that students had an additional problem with the dispersion of platforms they had to access depending on the individual teacher.

> I tried to work with the Moodle educational platform. Then ULSIT proposed and conducted trainings to work with Moodle. I started a course with Moodle, but it seemed very time consuming. Because the way materials are created in Moodle is technologically very slow over time. Secondly, I had not worked with this platform so far and I was not convinced that I was ready. That's why I preferred the direct version via Google Meet, e-mails and all kinds of social networks where I have an account. […] And this was my other methodological approach in working with students, through which I showed them that interesting and meaningful media content can be created on social networks and it can be used. [SO_5]

> Because the students had a concern about educational platforms, they had no experience with them. That's why we created a shared space on Google Drive, and students uploaded their work there. At Google Drive, students also worked together on group assignments. […] As a problem I highlight the fact that teachers use different tools in the learning process. And this is the biggest problem and challenge for students. They share it, they tell us: "We work with the first, second, third, fourth ..." - each teacher chooses a different tool and the adaptation of students is difficult. [SO_6]

AD03/ Adapting previous materials with features to enhance their use in the new emergency context

Teachers adapted previous materials to the online environment. While they considered themselves as a traditional teachers in the sense of on site face-to-face teaching, they were really aware of changing their mind and adapt their teaching materials to the online teaching process. For instance,

they adapted their presentations or created new presentations. Moreover, they also recorded videos from their lectures or prepared materials with links to online resources with the possibility to used it later.

> I developed presentations, especially for online learning, in which I put links to access various interactive applications as additional materials for open access. As a matter of fact, I have not tracked whether the resources are licensed or open for use, but after they were uploaded for free access on the Internet, I assumed that training resources were open. [SO_8]

> I duplicated the teaching materials in electronic form, right, in the sense of seeing a lesson or as separate lectures, I made or expanded my presentations. […] Because I had some textbooks with some presentations, which I included, as an aid to the oral lecture in the traditional way of teaching, but then I realized that this does not work or is not necessary, that is, I reviewed everything there is and had to update it and expand it. That is, I think the change was for the better in my work as a teacher. It was as if I systematized and enriched my things a bit, as well as with some video tutorials, then the presentations were a little fuller and more up-to-date, the textbook - I divided it into some chapters that I presented to students, otherwise it worked in general , that is, I developed certain tasks on each topic and made video tutorials. [SO_11]

AD04/ Supplementary materials provided by teachers

In general, there was a tendency to offer an environment of supplementary resources related to the subjects, both linked to specific tasks in each of them, and so that students who wanted to expand could do so. Given the uncertainty of the new environment, it was thought that bringing together materials that had not been used in the face-to-face environment, and fostering a culture of exploration and self-learning among the students, was a good option.

> … I provided students to watch various videos, videos and recordings. I gave them various forms of extracurricular and classroom work, which, however, became richer during the pandemic. I emphasized open access resources, databases in which our students can work, as they are library and information specialists, and during the pandemic, most databases opened an option to access materials completely free of charge. [SO_1]

Professors also provided access to resources which were not always Open Access. For instance, some licensed databases which at this exceptional moment where free to use.

> Because knowledge exists to spread. I also put links to materials and resources provided by various Bulgarian institutions - libraries, archives, museums, etc., as well as promoted access to the digital library of the University, which we created in connection with the pandemic and its consequences [SO_8]

In relation to provide open access materials there are different approaches from professors. In some cases, they indicated they checked the status of the material:

> I approach such resources very carefully, because, for example, the Bulgarian Portal for Open Science has recently started for us. Officially, we can upload our texts and research in it. I avoid using resources directly without checking the status of the material. For my disciplines, I already have published textbooks and teaching aids or a scroll of lectures, unpublished materials, which I provide to students. [SO_7]

AD05/ Looking for new educational resources and use of OER

Some professors indicated that they checked for open digital materials from all over the world, but the overall content of the interviews give us a picture of a the lack of clear reference points for OER repositories and directories at national or international level. These were not very concrete remarks about their search and use; they were rather mentions of the philosophy of OER but without specifying their use. Furthermore, no mention was made of internal OER resource sharing mechanisms within the institution itself.

> The main advantage of the digital materials (OER) that I would point out is the fast access. The easy change in open learning resources - I can cut something, I can add, enrich, adapt the resource. They are available from anywhere at any time, so this is one of the main advantages … [SO_1]

It is interesting to note the comment from other teachers, who link the search for videos on YouTube, or TED, from key authors whose books and articles they have included in the subject bibliography they recommends and comment. This evidence reinforces that the main source for finding OER-type resources in video format is undoubtedly YouTube.

> Personally, I am helped by video lessons of some teachers for whom, for example, I have textbooks, I know that they are authorities in this field. Let's say in the field now for the next semester I will lead a discipline "Data Science" - and I have included the professional qualities of specialists in the field of data processing. So I am currently preparing, for the first time I will lead this discipline. I listen to such video lessons of Russian colleagues, as well as American ones for which I have their books - I have freely downloaded them, free access, but I saw that they also have such video lessons. So they are available on YouTube - 10 minute video tutorials that are useful for me as a teacher as they enrich, upgrade my competencies, knowledge and skills. So I would recommend them to my students after judging that one of them is worth it. [SO_11]

> The specificity of some disciplines implies the use of videos, demonstrations of professionals from practice. I use open access platforms such as TED and YouTube, where the authors have voluntarily provided their materials for free use. I especially warn my students to be very careful when using Internet resources and direct them to verified sources. I advise them to use the opportunities of libraries and museums, which offer including virtual tours, digital collections and online information services. [SO_7]

Anyway, as is the case with many teachers in other centres included in this study, there is no clear awareness of whether the educational resources located on the Internet during the pandemic were OER in the canonical sense of the word or not. This evidence highlights one of the current weaknesses of "canonical" OER, which is none other than their absence from the mental framework of teachers, the lack of knowledge among teachers of their distinctive characteristics or the repertoires in which to locate them and how to evaluate them.

> I probably used it [OER]. Yes, when I used them I was interested, but at the moment I can't say anything specific, who exactly and with what access it was. [SO_2]

AD07/ Recording videos of live lectures for deferred distribution

The interviews conducted give a mixed picture regarding the recording of synchronous online lectures and their subsequent distribution for later consultation by students. However, a good number of teachers mention this practice and some highlighted that they discovered this as an opportunity for maximum sustainability of teaching in any situation. Others explained that

recording of lectures was taken at the request of the students. Work was mainly done with the Google Meet recording option.

> … I also started using this "Record" option and the generation of a video tutorial after our meeting. I learned how to share, i.e. to share with the audience and I started to do it very intensively after the second or third meeting of the classes. […] When I looked at them, I saw some flaws on my part, like "Uh, uh," in the sense of body language, scratching, pushing, which wasn't very good. Later I realized that if I had the camera on, I should have had a slightly more formal stern expression. In the beginning I didn't have that culture of communication in an online environment, I just thought I was talking to myself, but in fact I had people watching me. [SO_11]

> I made recordings of the lectures I gave at Google Meet. Then I sent these records to the students so that they could access them at any time. Because some students, due to being at work or due to personal or health commitment, could not get involved in the learning process. [SO_8]

> In general, I did not intend to record my lectures, but the students asked me to do so. So that they could then hear the presentation of the lecture material once more, and there were also colleagues who did not always have the opportunity to attend. We all feel that we are working in a more difficult situation and we were available, so after receiving such a request, I started recording and distributing a recording of the lectures in the study group of students. [SO_6]

AD09/ Task-oriented activities and workgroup

In an emergency remote digital learning environment, task-oriented activities with a centre-of-interest or problem-based learning approach are very interesting to motivate learners. It give them meaning and purpose to their independent work of reading and exploring materials.

> [teaching at an intellectual property course] The great challenge then was how to engage the attention of these frightened people, because at that moment everyone was in fear of the unknown, of the miracle that had be fallen us. Then I decided that the approach is through art, because art is what has saved the world for centuries. I changed my methodology of teaching all the exercises and somehow subordinated them to connections with art, books, literature, music and movies. I began to use art examples in my exercises. Of course, this was very rewarding for me, because "intellectual property" is actually exactly the property we have as artists. I started for each class with the specific group with which I had exercises, to prepare with specific tasks. Tasks purposefully prepared for the specific discipline and for the specific group of students. [SO_5]

Along these lines, one can also cite the "game-based" approaches.

> I introduced a smooth game-based approach. Although it is a game, students have their pressures, because it is an educational game - it has rules and requires knowledge. I carefully encouraged them to take advantage of this new learning opportunity. [SO_6]

AD12/ Student communications (LMS forums, teachers' feedback and mentoring, e-mail, messaging systems, videoconference, …)

Adapting their working style was also another emergent topic. For example, using all possible channel of communication with students or adding different devices to their workflow. Another question which seems to be a problem was e-mail. It was handled with different approaches. For example, limiting to one teacher's email per week with precise data, directions and new task to not to overwhelm the students.

> ….I told them that I would not send them more than one email a week. An email with a specific date for the new task. The task for the lesson is set, then they think and consult, but the date of implementation is fixed postponed. [SO_5]

AD13/ Exams, assessments and grading

In relation to the students, some professors indicated that they adapted assessments and also exams to the crisis context, despite some of them (mostly those who use test as form of exam) answered that the only change was that the students did the exam online in distance mode but with the same format. Anyway, an important distinctive trend for the period was to explain how the exams and the assessment would be performed, because students were worried about how they could be evaluated.

> [I didn't change the exam format]. I use tests. In general, I know that the tests are not the ideal form for the student's assessment, that there are still a lot of disadvantages, but in reality this is the most objective, at least for me, … I am a fan of closed tests, but during exercises, during lectures, during classes - there the student has the opportunity to be creative. Accordingly, this work will bring him bonuses on the exam itself. The exam itself, as a process for me - is usually a test with a term paper. [SO_4]

In any case, the adaptations, as expected, were very diverse depending on the teacher, the teaching style, the type of subject, the usual way of assessing before the pandemic, and so on. The common elements in all these cases had to do with how to ensure the integrity and veracity of the students' answers in the exams given. This was particularly critical in certain subjects where problem solving, or the demonstration of specific objective knowledge, was considered essential. There is certainly a problem not fully resolved with the invigilation of examinations to prevent cheating and to ensure the identity of the students taking them.

> I say again - in case of hesitation in the assessment, in case of any ambiguities or just a desire on my part, this person to defend his thesis. So I am sending a link for a video connection and, accordingly, through the technologically mediated communication so that we can still make a live connection. [SO_11]

AD14/ Ad hoc training courses and directions to support teachers in emergency online teaching

Another topic that emerged was the fast adaption from the university to the situation sending instructions and also offering training to professors that could adapt themselves to online teaching.

> Well, I think the University is responding quickly. They tried to give instructions in the most effective way possible and to suggest alternatives for the work of the teachers. So, we worked well with the management of our faculty. Trainings on the use of platforms at the university level were also immediately offered, and at one point we felt the presence of our university library and it actually started to work very actively and offer services and resources that it had not provided so far…. [SO_6]

> I went through three different trainings, which were offered by the management and colleagues from the university, so that I could use more platforms for working with students. I learned things that when using the program are a kind of subtleties that improve my work. [SO_1]

AD15/ University teaching support services (e-learning unit, library, TIC unit,...)

> From the university library, all colleagues received support in terms of providing us with all the resources we needed. With a request to colleagues, I received scanned parts of the documents I needed. I know that this is how we worked with the students and provided them with access to various resources. As well as the opportunity to deliver books through a request for Biblio Car. Daily consultations were provided as needed. The head of the department regularly sent letters with current information and instructions so that we could be as expeditious as possible, to be in close communication and to be aware of everything that was happening. [SO_1]

Problems (PR)

PR07/ Lack of OER other than foreign language resources (English)

It is not the same having open educational resources in Bulgarian than in other languages. It is a limitation for the students because not all students fluent in English.

> The problem is that most of these resources really have a lot of relevant videos on YouTube, for example - video resources for different archive buildings, for different repositories. The problem, however, is that they are in English. This is a problem for most students. There is a lot to be desired for our students in terms of foreign language training. Yes, there are opportunities for automatic translation, but the quality is not satisfactory. A bigger problem with my disciplines is that, unfortunately, there are no similar videos and materials for the Bulgarian archival institutions. [SO_4]

PR09/ Difficulties keeping students' attention, participation and focus

The lack of fluent communication, and consequently the decline in socialisation activities among students and professors, is a topic that has also emerged among other partners. Difficulties in reaching students by emails, interactions in class in the online environment or the effect of the black camera, students attending online lectures with their cameras off, were probably the major problems in relation to communication. For professors it supposed a limitation to reach the students and to stimulate their engagement.

> …great challenge then was how to engage the attention of these frightened people, because at that moment everyone was in fear of the unknown, of the miracle that had be fallen us. [SO_5]

> The first thing I found to be a problem was the motivation of the students. They share it themselves; I always give them time for feedback. Intellectually, it is not a problem for them to perceive the material through distance learning. But in the absence of communication with their colleagues, their motivation is not at the previous level. [SO_7]

> Much of the living connection is lost, of what you perceive through verbal and non-verbal communication. Much smaller are the levers you can rely on to deduce how and to what extent the other person perceives the information you are trying to convey to him. [SO_8]

> But everything else that concerns interactive work, opportunities for communication and non-verbal communication - did not materialize. Because I have no practice of obliging students to turn on cameras, except when we are in a situation of testing their knowledge - in a test or exam. In other cases, when I give lectures with them, I do not oblige them to play cameras. Because of their request. This sometimes happens, because students participate in distance learning from their homes and they may not want others to see the situation around them. [SO_7]

Furthermore, some students were also working during the pandemics at the same time they were attending online classes; that meant that in some cases they were at the same time working and "attending" the online class. This was a limitation for students who could neither pay attention to the class nor participate in it properly.

> For me, standing in front of a computer - looking at the monitor - is strange to me. While entering the audience, you see faces opposite you. You see, these faces look at you for a while, then they start to get distracted. You feel that they are distracted or they start to lose interest and change the line of presentation, or you let them in for a few minutes, or you tell something interesting, you point to an example from the literature that is appropriate for the specific situation. It is easy to provoke them to distract themselves from what they have become bored with, and to switch their thinking in another direction and to engage the content again. While in an online meeting, you look at some pictures because students tell you "I'm on the mobile internet", "I don't have internet!" Or "I'm at work". [SO_5]

The high use of screens, with long hours standing in front of computers, can create health problems. Professors were aware that they were not ready to distance learning, not just because problems with of digital skills or pedagogical skills, but also because at synchronous online classes students cannot pay attention to sessions in full, one after another.

> "Because there may be options, but they are not the ones we used. Obviously, we are not ready for distance learning. It is not just a technological problem. For me, standing in front of a computer - looking at the monitor - is strange to me. While entering the audience, you see faces opposite you. You see, these faces look at you for a while, then they start to get distracted." [SO_5]

PR11/ Lack of appropriate equipment and connectivity issues

As a common problem emerges the failure of the internet connection, but also power failure issues. Professors realised how important electricity is in distance teaching/learning. In fact, the digital/equipment breach can be considered also a problem of communication. Some students live under economical unfavourable situations, or they live in small villages without internet connection.

In some cases, professors observed that not all students had the same economic or living conditions and COVID-19 increased the digital breach for most of them. For instance, students who lived in small villages who had no internet connection. In some cases, also the lack of the adequate equipment at home.

> The problem is the lack of ICT and digital literacy of students, the lack of equipment - not everyone has a computer with the necessary characteristics. Because you don't just need a computer, but a computer with a microphone, with a camera, with good enough hardware to maintain the level of information, you need a good enough connection to the Internet. The same applies to the technical security of teachers. Some of the students took part in distance learning from small towns where the internet connection is lost. I also live outside Sofia. With us in storms and bad weather - the Internet just disappears, there is no stable coverage. [SO_8]

PR14/ Communication challenges between teachers and students on the digital scenario

Professors indicated that in an online environment communication between students-students and students-professors is lost. The main disadvantage to students in an online environment or distance learning is sociability which is difficult or impossible. In addition, something which is missing that

also emerged in other partners is the body language or the expressions when students and professors talk in front of a camera.

> Gestures, body language, free expression, we have such a technological barrier, from which I say I do not feel effective communication, which teaching as communication in a natural environment. Yes, there is a real process going on, a communication process of transmitting some information with form and content. Accordingly, there is an opportunity for questions and answers from the outside, but it seems that there are no living people against me. [SO_11]

PR16/ Sociability issues

> But, on the other hand, there are negatives for the students themselves. They are more affected by the whole pandemic situation than teachers. The students lost more or less their studentship, i.e. when you are a student - it is not just to study, to go to university. This is very important, it's great, but there are some personal, upgraded elements - after lectures to go to coffee with colleagues, to have fun at a party, to like each other - not to like, to fall in love, to fall out of love .... These are things that this pandemic more or less took away from them, i.e. they stay at home, in their own world to say the least, which is not good for young people. [SO_4]

> … they told me: "We are worried, we are not feeling well! We are worried because we do not know each other. " In fact, one of my subjects was with first-year students. That is why I have a vivid memory of how they shared: "We have not yet formed as a study group. Suddenly we find ourselves in this situation and we are worried - how will we manage to work together?" [SO_6]

PR18/ Students overloaded with work
Professors also observed that students had a lot of tasks to perform and received comments and complains about that. It seems to be that students were overwhelmed.

> The truth is that at one point all our students complained that they were overwhelmed by the teachers with assignments for written work. At the time, that was really a problem. They were also overwhelmed with many emails, with various instructions, which at one point confused them. […] When students complained that they were overwhelmed with written work, I realized that we teachers could not coordinate it, to comply with it, because we did not have direct contact - and this was one of the problems for both students and teachers. [SO_5]

PR19/ Decline in attendance at live sessions when a recording is available

> However, what I see as a disadvantage is that there is a problem with the second year, regular form of education, that they rely on me to send something, that is, I will send them the video tutorial, I will send them materials, tasks and instructions and not present in person when I lead the video tutorial itself. That is, when out of 40 people I have only 5 who are present, it is important for them to be present because I am so inspired, they ask questions, we have exercises and discussions. Since they rely on me to send something they are not present, so out of 40 people I lead to 5, then I told them that I will not send my video tutorials as I am recording, […] I want them to attend and to really see what they understand and what they don't understand from this thing. [SO_11]

PR23/ On-site field visits are difficult to replace online

Not having the possibility to do on-site field visits to institutions of the GLAM sector was a concern for some teachers. Despite online teaching offers good opportunities to have invited guest from far away, teachers commented that students loosing the opportunity to visit the GLAM sector (galleries, libraries, archives and museums) was a problems, as far those places are future spaces where they may work.

> Another thing that was related to the changes and how these changes affected me was that I really missed the visits to cultural institutions and the exercises. Our specialties are very much related to practical classes in a real work environment, with the creation of practical skills and the relationships that the management of the department has established over the years with leading cultural, educational and scientific institutions. They allow our students during their studies to enter this real work environment, to contact and work with practitioners. I missed that. I missed being able to take them there, to be able to make an impression. Unfortunately, a whole class, in fact the students are currently second year - for four semesters they do not have this opportunity, because at the moment we are still in distance learning. In reality, this is a change that I currently assess as negative for me and the students. [SO_1]

Looking ahead. Advantages (AV)

AV01/ Time savings and more freedom to use it (less travel time, self-paced learning, students/teachers ubiquity, etc.)

The online learning environment allow to save time in transportation for students as well as for professors.

> For students, distance learning is easier. It is more convenient for them: to get up in the morning, to have a coffee, to go to the kitchen and start listening to a lecture there. They don't waste time traveling, getting dressed, going to the classroom, etc., it's a bit easier for them, but it's also a bit easier for me. [SO_4]

Looking ahead. Lessons learned (LL)

LL02/ Pandemic has been a catalyst for digital transformation

Digital educational resources and materials are available 24/7 and are very convenient for their electronic distribution to students. Just the pandemic experience with digital remote emergency teaching have been an opportunity to foster the use of those resources in a more intense way that previously.

> … during the pandemic, in support of education, there were many opportunities for free access to resources, applications, materials with a scientific or game-based approach, which allowed students to practice the theory of lectures. The advantage of these resources is that they are available 24/7. You are not bound by a specific time in which to use them. Most of these resources are freely available either with a minimum wage or with a subscription. I am FOR the use of applications, games, additional online resources, but as an ancillary form, not as a main source of learning. [SO_8]

LL05/ Teachers' shift concerning digital skills

> We all had to work remotely, using a variety of online resources for teaching purposes. This has a positive effect on both the digital skills and competencies of teachers and this set of skills in students. They feel very comfortable already. I continue to work with similar approaches and methodologies with colleagues who were first year and are now third year, and in fact I see how advanced they are and how confident and calm they feel now. They know the tools, they know the resources, they know where to look for additional materials. [SO_6]

Looking ahead. Good practices (GP)

GP01/ Videoconferencing as the new normal way for meetings with students and mentoring

Providing fast consultations was also an advantage to some professors. For example, when organising an online meeting with students who live far from the faculty or with foreign students

> This type of individual consultation with some kind of video conferencing actually does a very, very good job. That is, they become in response to the students. Additionally, I'm clarifying some of the things, I see what's bothering them, so I plan to continue, just instead of not only having time at the university, as they come to me as a consultation, but to have one such online consultation, say Thursday of 10 am to 11 am in which my students can benefit. This is something that I really, really like and will continue as a practice. [SO_11]

> I like to give online individual consultations and I do it and I think it works because our students turned out to be not only from all over the country, but we also have foreign students, especially in the master's form of education. I currently have 5 students from Germany in the distance. So when they need some advice, I quickly generate a link for the meeting and there is actually fast communication. [SO_11]

GP06/ More holistic ways to assess students

> In the period of online training about student's assessment, I proceed in the same way. During the lectures I gave them tasks, which if my lectures are on Wednesday, then until next Wednesday they have a deadline to complete a certain task that I can review and now working in an online environment is much easier, giving them tasks - they to find time, to find the materials and to close this process completely. So, I gave them current grades, then for the exams I gave them a more practical task and the tests I give in person - now dropped out because I found other forms in which to test them without using tests. We had interviews, discussions, working in a whole group at the same time, presenting each self-created material. Colleagues present to the other members of the course in such a way that assessment has been enriched so much for me as an opportunity for another form of testing that I intend to keep in the future and proceed from now on because I think it is working and productive. [SO_1]

GP12/ Inviting guests to class from any place of the country and abroad

The online teaching environment offers the opportunity to invite someone as a guest speaker from any part of the world for a virtual participation in class. The reason is because sometimes invited people cannot attend physically to the university because of their duties or because they live in another country or continent. Having those invited promotes the learning process and the

exchange of information with them gives to students and professors the feeling of being part of a knowledge community.

> The only plus I notice from this pandemic time and distance learning is the ease of participation of guest speakers - ours and foreigners in the learning process. That's great! So, at the moment we can invite any expert - even those who are not in our time zone, to meet with students. From Asia and America, anyone we want is welcome, he can participate. This is the only benefit for me. [SO_5]

> … in online discussions and meetings with students we can invite for virtual participation colleagues from practice to acquaint them with issues of the real work environment. In-person training, these professionals are not always able to respond and come to the meeting place with students. While in online lectures, you can invite for virtual participation, for example, the Director of the Museum of XXXX - to get involved and share something with students of "Archival and Documentary", or the Director of the Library of XXXX to meet with students studying and information management " etc. [SO_8]

> We did this meetings online. We could do it again, even when we return in person. We could invite practitioners in the classroom or online to meet with students. This gives students a different perspective so that they can feel like future professionals in our field of library and information technology. [SO_6]

GP15/ Internal digital information systems for teachers

Professors consider that their teaching life has considerably changed during the pandemic. For example, electronic teaching reports that before the pandemic were handled in paper shifted to digital form, or the improved electronic internal communication at the university. They felt that they are more and better informed than before the pandemic.

> Another new thing was that orders and instructions began to be received electronically on a regular basis, which is good for me, because you have access to information from anywhere and at any time. You read what is new, what guidelines for development are given. Electronic communication at the university has improved. [SO_4]

Looking ahead. Improvements (IM)

IM02/ Flexible organization of the time tables, calendars, activities and mode of teaching delivery

Hybrid learning should be explored as very convenient for some situations in which it is desirable that the students attend in-site face-to-face to some part of the course and also work in an online environment with a recorded lecture. However, this require good institutional coordination inside the centre.

> One of the changes I plan to make is to combine, to create so-called "hybrid learning". One lecture to be present, then to have a presentation of a recorded lecture, then to have work in an online environment, then to return to the traditional way of teaching so that I can maintain the level of their attention, which is extremely important to complete the process. [SO_1]

IM03/ Promotion and support for improving OER use and creation

> Yes, I would definitely do it. I have always believed that what I develop for the purposes of my courses should be accessible to a wider range of users, so - yes, always, this was my attitude. And

now the pandemic has actually intensified this feeling and I would work towards creating open educational resources in Bulgarian. [SO_6]

… another thing I think is good to work on improving the contact network, because if we work with a smaller group of students, there are colleagues who work with much larger flows and maybe we should think about how fully create more resources. It is important to create more open access resources in Bulgarian, in library and information sciences, as these resources are extremely few and can not fully ensure the interests of students and be sufficient for a full-fledged learning process. [SO_1]

IM04/ Coordination and cooperation among teachers

Reusing educational material but having checked the status and quality of the material from a teaching team. For instance, the evaluation on the reliability of OER or the setting of criteria to select those learning resources should be considered by a committee/team and not individually by each professors. This teamwork could improve the creation of materials in Bulgarian on LIS.

My second proposal is to expand the forms of sharing experiences, consultations and communication between the teaching community. So far, everyone is doing it on their own, seeking support from the computer lab or other ICT colleagues. […] My third proposal is related to the system of criteria for selecting resources for the learning process. Currently, the selection and evaluation of resources is done individually by teachers. The study of foreign experience is needed to be studied to enrich the experience of how to evaluate educational resources. [SO_7]

IM06/ Standards and guidelines to guarantee the quality of online education

In relation to that question, professors also indicated that there should be some standards to guarantee the quality of the online training.

I believe that the first thing we need to think about is setting standards for the quality of training in critical, atypical situations. Because so far, we have had some rules that we have been working on, but obviously now we have to rework them, because the criteria are not effective. However, with this endless pandemic, we have no horizon. The horizon is not clear, what future are we talking about - will we prepare for a year, a month or a decade? There is no idea and we are talking about it worldwide. No one can determine the horizon so that we can take some steps to determine the "new normal" or whether it is abnormal - I do not know. We long for a return to face-to-face learning, but not just learning, but to face-to-face interaction and relationships. [SO_5]

IM09/ Blended teaching to improve face-to-face teaching

The consideration of this good practice fits in well with equivalent proposals for improvement put forward by teachers from other schools participating in this study: the experience of working with certain activities and digital resources to make teaching more attractive and interactive can be used to improve face-to-face teaching. It is a matter of contemplating "blending" elements that complement the face-to-face encounter in the classroom. Note in this quote the presence of the terminological problem between "Hybrid learning" and "Blended learning".

Yes, one of the changes I plan to make is to combine, to create so-called "hybrid learning". One lecture to be present, then to have a presentation of a recorded lecture, then to have work in an online environment, then to return to the traditional way of teaching so that I can maintain the level of their attention, which is extremely important to complete the process. [SO_1]

IM15/ Strengthening the role and resources of libraries and support services for teachers

It should be consolidated a further permanent access to resources beyond temporary granted access because the pandemic. Professors just discovered so many new resources because of the pandemic, some open and some temporarily opened, that should be considered for the future no matter teaching is online or face to face.

> I believe that the online services provided by the library and information centre of the university should be increased. They are currently working in this field and I hope that their digital library will be as complete as possible and that there will be more teaching materials in it. [SO_1]

IM16/ Better integration of tools and resources into unified platforms for the online environment

Something to improve is the use of a unified environment for working with students. In addition, the use of virtual classroom or a similar space where it was possible to watch all students; also to have enhanced socialization spaces for students between them. A similar comment emerged in other partner members with the proposal of the potential of Second Life like platforms.

> I think we need to unify a little bit the tools we use for teaching when working in an electronic environment. For example, to adopt a platform and use it actively. Or, for example, to use Google Meet mainly or to have some institutional access to ZOOM, but just to know that these are the tools that are mainly used. Because my impressions of contacts with professors from universities in Europe show that they actually work that way. Universities have identified their tools and teachers are supported by a quality e-learning distance learning environment in the difficult pandemic situation. [SO_6]

> … in the absence of communication with their colleagues, [students] motivation is not at the previous level. Here my proposal is to enrich the methods and opportunities for more active interaction in the online environment. Using more functionalities on platforms, virtual classrooms, avatars, we are already talking about a meta universe. [SO_7]

> First of all, in my opinion, there should be a unified environment (online) for working with students, i.e. the creation and use of virtual classrooms that mimic real classrooms. To have greater access to applications through which students can practice and upgrade the theoretical experience and knowledge we give them. [SO_8]

IM18/ Partnerships with national information and documentation centres to create videos and teaching materials about their services

> A bigger problem with my disciplines is that, unfortunately, there are no similar videos and materials for the Bulgarian archival institutions. This is a need that emerged during the pandemic and is a recommendation to colleagues from the archives. I will share my ideas with them. A database with video resources from various archival institutions in Bulgaria needs to be created. It would be a very useful initiative that will also help to promote the activities of these institutions. [SO_4]

5.4.2. Students

As almost was the case for the students at the other centres, Sofia students experienced the onset of the pandemic with surprise and uncertainty. They had a mixture of sensations, but they majorly indicated that they did not foresee what could happen with pandemic situation; that lead them to have a sense of fear and confusion.

> It was a little stressful for me at first, because ignorance always scares you. How will it happen? How will it be held? But I think that later, when we saw how things happened through these platforms, there was no need for this fear and anxiety. [SO_FG_2]

> I would say that as an emotion I felt a kind of rising panic, which was probably influenced by the hourly broadcast of extremely negative news on public media. For online learning - we still had to overcome various challenges. This new way of communicating in learning. Because, it is one thing to talk online with friends and be in an informal environment and another - to be online to receive adequate training in an unfamiliar environment. [SO_FG_1]

Most of them prefer face-to-face courses because of the connection with their peers in class and especially because it is a better option for sociability and personal communication. Nevertheless, there is an emerging side which is the educational materials and there is discussion along the transcriptions among having digital or in paper.

> I personally share the opinion of the other private individual. Definitely in-person training is much better, because in this way there is a living connection with the person. You look each other in the eye, you have a kind of conversation and there is this thing that cannot be found in online learning. It is definitely better to be present, but when it comes to printed and electronic materials, it is definitely good to have electronic ones in addition to printed materials, because they help our learning and so we, even when we are at home and do not have printed materials, we have the electronic ones that help us to perceive the material more easily and to be able to enter the environment around us more easily. [SO_FG_3]

> In general, in-person training is more comfortable in any case, because this personal communication with people is much more pleasant and easier to perceive than in an electronic environment. [SO_FG_3]

But some also realized they enjoyed the experience; it was an interesting new experience for them, despite there are different opinions about distance learning among students.

> It was interesting to work through the virtual classrooms. Something that had never happened to me before. So it was something new to experience and experiment with. [SO_FG_2]

> My attitude has certainly changed. I was very sceptical at first about distance learning, because literally no one knew how it would happen. But during the training during the pandemic years we got used to distance learning - it is no longer foreign to me, and I prefer online learning materials. [SO_FG_4]

> I think differently. I think attending is a much better form of learning. Because when you are online, when you are at home, you do not pay as much attention to the things that are said and in fact the material is not learned as well as when you are present at lectures and exercises. In the classroom you are more involved in the learning process and everything happens easier to master the material. I don't have a good opinion about online learning. [SO_FG_4]

AD02/ LMS, videoconference and virtual classroom tools for online teaching

In Sofia, four focus groups were carried out with students from a wide range of backgrounds. It is interesting to note how the technological tools used varied according to the degree course studied, or their length of study. Even within the same degree and depending on the teacher, differences were observed; this is the case of the students of "Information Technologies and Computer Sciences". It is therefore pertinent to reflect on the lack of standardisation of the tools used, which causes problems of sustainability due to the profusion of the use of different platforms with similar functions, as well as problems of learning effort for an efficient and advanced use among students.

> The learning process was conducted through Google Meet and Big Blue Button. Training materials were uploaded to Moodle. We also used Google Drive, Google Class room, but in general during the semester in which we found the Corona virus - we had problems with access through Moodle, because there were a lot of live connections, very difficult, in minutes you attach a homework file, but Moodle's problems have improved over the months, and it's working fine. But it is a fact that the pandemic found the Moodle platform at our Faculty in a state of slow action. [SO_FG_4]

> The lectures are mainly held in online classrooms, such as Google Meet. The teachers provide us with a lot of material - from this point of view we manage to cover things. Everything is on disk or sent by e-mail. Also, some of the teachers prefer to work through the Moodle platform. Honestly, it's convenient for us there as well, because everything is published in one place. Accordingly, if we have set tasks, they must also be handed over there. But, mainly were through Google Meet online classrooms, all the material was taught to us - be it purely theoretical or through dialogical forms of learning. [SO_FG_1]

AD04/ Supplementary materials provided by teachers

In relation to training materials, students had the sensation that ULIST was prepared and provided them with appropriate material; actually more material than previous face-to-face courses.

> In remote form we receive more materials as well as electronic materials. We are provided with more training materials than in-person training. [SO_FG_2]

They found that professors made an effort to contribute to the transmission of the knowledge in an online scenario. They agreed that they had more resources in the online environment than in face-to-face courses and they think this benefited then when they had to study or to deliver task. Students we specially satisfied with the digital educational materials they received from their professors

> I think that absolutely all the teachers contributed to the faster understanding and faster entry into the platforms and to the way of transmitting the lecture material and the exercises. Without their help, I think it would have been much harder for us to adapt to this way of learning and to overcome exactly the fear we were experiencing. In the beginning, we did not expect that through online lectures we would be able to understand the lecture material so well without having real physical communication and attending. [SO_FG_2]

The provision of these materials highlights a desire to minimise the disappearance of the face-to-face class, but in fact it is contradictory since the face-to-face class did not have them before the

pandemic. Arguably, if they were useful or necessary, it would have made sense to offer them both face-to-face and online. This shows that the Covid-19 crisis situation was a catalyst for teachers to take a proactive stance.

> We were given access to the electronic library of the university, which is definitely a great convenience. Of course, if there is a need for materials or part of a textbook or book to be consulted by the students, the teachers reacted quite quickly, scanned the material and provided it to us in electronic format. [SO_FG_1]

> …we were constantly sent materials by different teachers. Materials that we can hardly get on the Internet because they are not there. This is information that only they have or only the library has, and we did not have access to it for one reason or another. Accordingly, the teachers constantly tried to offer us materials, give us materials and use these materials in the form of assignments during the lectures, giving us assignments to read the material, to make an analysis whether textual or oral. There were different species, so this was definitely of great benefit to us. [SO_FG_3]

AD07/ Recording videos of live lectures for deferred distribution

Face-to-face courses were replicated and some lectures recorded. Students said that having videos of lectures was beneficial for them.

> It was easy for me. There was an option to record the lectures, which was very convenient for people who could not attend at all times, and I think the training was very good. [SO_FG_2]

> In the beginning, we had the opportunity provided by Google Meet to record the lectures. But later this service was terminated, and we were deprived of this opportunity. This made it very difficult for us, because it is very difficult to make a pure transcript of the lectures. [SO_FG_1]

> Yes, many teachers presented the lecture as if we were face to face. We recorded many lectures. Colleagues who failed to attend received these lectures, which are and were quite interesting, in fact. [SO_FG_3]

AD10/ Strategies for more dynamic synchronous sessions

> For me personally, the most interesting way to deliver information is through dialogue with us most of the time. Because when a lecturer joins in and recites to us all his information, project or task / topic - a person loses interest, turns off and can not listen all the time, he is distracted. So for me, some lecturers had to make a change, like getting involved online, giving assignments, making the subject interesting, while others definitely did more than very well. [SO_FG_3]

AD12/ Student communications (LMS forums, teachers' feedback and mentoring, e-mail, messaging systems, videoconference, …)

Students were aware that they had no physical contact, but they created different communication networks to be in touch among themselves.

> We organized specifically, the last thing you said was the course. We started to communicate in different groups, in different networks. We had no personal contact, but we did not stop communicating. During the learning process, the ways in which we studied and connected with the teachers also changed a lot. [SO_FG_2]

AD13/ Exams, assessments and grading

> In the pandemic situation, the exams were mostly in the form of preparing term papers on time and passing them. And that was enough to get an assessment. […] Some teachers practiced a slightly more broken version of the exam, such as debates, such as personal conversations. They were carried out through Viber, MS Teams, Google Meet - with included cameras as a prerequisite for video connection. So, both they and we could follow the facial expressions and everything that happens. This method of testing is most reliable in a remote format, because teachers can monitor the student's performance and make sure that they are not misled by some kind of help that uses the student further beyond their knowledge. [SO_FG_1]

> Now for student assessment: maybe with one idea easier, there is no higher assessment in online learning. Maybe teachers give a higher tolerance [SO_FG_2]

> There were many different requirements. The teachers themselves, for example, demanded that a test be written and sent to the teacher concerned. The others required term papers, various tests, presentations and additional assignments to the specific subject being taught. [SO_FG_3]

AD15/ University teaching support services (e-learning unit, library, TIC unit,...)

University library did an effort to cope with the new context of their users. For instance adding more new digital content or offering a service of home delivery of library materials.

> Yes, the library gave us access to many platforms and databases. In addition, what impressed me personally was the idea of the library to provide library materials to the students' homes by car - a library bus, which was provided by the University. [SO_FG_2]

> Especially in our library, there was a bibliobus that I think was a library bus. An application had to be submitted, which application should be sent to the library and we, respectively, from the library, the colleague who wants any book, because then it was not possible to enter the university. I also think the library made a digital connection with us. [SO_FG_3]

Problems (PR)

PR09/ Difficulties keeping students' attention, participation and focus

> I personally felt better in the present training. It was better for me, it was easier for me to communicate. Personally, I felt calmer in the audience, because I can immediately ask a question, while online communication has a different label. We have to wait, turn off the microphones, turn off the cameras, in general, the conversation is very different. In my opinion, this hinders the easier rapprochement between people. [SO_FG_1]

> [in face-to-face on-site] training we feel freer, because then you have time to accept the question you are asked, except that you are in this environment, you do not think about anything else. You pay attention to the question you are asked, you begin to analyse the situation and answer the questions you are asked. While in e-learning there is always some silence. One wonders now what to answer, how to react in a given situation. Don't think about it, think about 100 other different things, which makes the situation quite tense and thus the others are also silent, they also don't take a stand and there is a big misunderstanding where the teachers are certainly not happy with the whole situation. [SO_FG_3]

> it would be good if more teachers have an attitude towards the students themselves and not so much oblige them to participate, but it would be good if they themselves make specific teachers, more effort to raise students' interest in the specific subject, because in relation to the teacher you

> lose interest in the subject itself. You have no desire and in the end you stop entering online lectures in which you just have to log in and do nothing more. Even the students and my colleagues refused to do it, simply because they were not interested in any way or lost any motivation to try, and in the end they just tried to save the semester, as long as they didn't stay on the mend. [SO_FG_3]

PR11/ Lack of appropriate equipment and connectivity issues

They indicated that most of them and some of their colleagues did not have the right equipment at home or even they did not have internet connection at the beginning of the lockdown and supposed them a problem to follow the courses regularly. Actually, among the biggest problems highlighted by students is that not everyone had good access to computers, home Internet connection, cameras or microphones. Then, it could be assumed a digital breach at the beginning of the lockdown and probably later.

> …it is convenient, but still not everyone has the opportunity to have a computer, to have a microphone, to have a camera. Some of the lecturers demanded to have cameras and microphones, to have participation, which may be a little depressing for me, depressing to have a camera at home with other colleagues or lecturers. [SO_FG_3]

They said that in the online learning environment is necessary to have a minimum equipment.

> It was fun, but I think that if it was crime, it would be even more fun because they don't have a remote camera connection. after all, there was this talking to the man in front of you. but live visually is much better and much more fun to work in a team with someone". [SO_FG_3]

Other question is the failure of the electricity system who is also recurrent in transcriptions. when one student could not attend the lectures considering the infrastructure problems they had in some cases.

> …maybe at one point there really were some problems like the fact that sometimes there was a power outage, we didn't have internet, the teacher didn't have the connection, there were interruptions, but then we found other ways of communication. If the connection to see and listen to each other remotely did not happen today, then we were sent an email with what we had said, but in reality we had not heard. Things were getting better. There is no way to fix it in any way for electricity and the Internet. Yes, you will call, you will ask, but there is no way to fix it for this day. But I already think that was one of the big problems we had. [SO_FG_3]

Anyway, it can be said that the digital breach was in some way solved along the pandemic; the pandemic acted as an accelerator factor for the digitalisation among students. So was for the institution.

PR12/ Lack of adequate home space for teaching/learning

A common problem was no having a good space at home to study, to take an exam or to attend a lecture. Having those good conditions was not the norm for many students.

> The most difficult thing was to be able to definitely adapt, to be able to negotiate with your family when you need a free room, when you need this computer, because in some families there is only one computer. That was the hardest part. The easiest thing for me was - here I am getting involved in lectures to communicate, to keep in touch with my colleagues. For me, it was actually the most

interesting and the easiest, but definitely the other things were more like that. They are not so difficult, but they require some sacrifice on your part and on the part of your family. [SO_FG_3]

The change was to readjust. Because my home is my environment for relaxation and rest, and when it suddenly had to become an environment as a main workplace and place for learning - the attitude is different and therefore you are not one hundred percent productive. Not the best option for concentration and performance, definitely. [SO_FG_1]

The most difficult thing was to be able to definitely adapt, to be able to negotiate with your family when you need a free room, when you need this computer, because in some families there is only one computer. That was the hardest part. [SO_FG_3]

PR15/ Lack of on time feedback from teachers when requested

Maybe the way of communication should be reworked, because as we mentioned earlier, some teachers didn't even have voice communication. We communicated with them only by e-mail, and we also did not have feedback, which made the process very difficult. And this is also something that should be emphasized, at least to have voice communication with teachers, because this is important for us and in this way the information is transmitted to us. Not to read it, but to hear it aloud and to develop it in our head and to make sense of it. [SO_FG_3]

PR16/ Sociability issues

It is commonplace for all students to mention "human factors" related to problems of student socialisation, problems which undoubtedly had a major impact on the development of teaching activities during the various stages of the pandemic. Undermining motivation is one of the consequences of this problem.

… the electronic environment did not really give us the opportunity to get to know our colleagues enough, and in reality, for example, in these issues, group work that we did and had conversations. In fact, the work between us was more difficult, because when we are in face-to-face lectures, face-to-face work, we have the opportunity to get to know each other, to talk - even after lectures to spend time together and actually the work we have to do as a group. University becomes much easier, much faster. In the digital environment there is no opportunity to see, we do not have the desire to communicate with each other, which is becoming very complicated for me personally, this is the most important thing. [SO_FG_3]

PR18/ Students overloaded with work

Students also said that they were flooded with exercises and tasks. Mainly, students who were full-time students considered that they were overloaded with exercises and homework.

Each teacher gave his best to be able to inform us in the best way, but it seemed to come to us more. There were a lot of tasks and at one point we confused things a bit. It was my personal opinion that at one point there really was a lot of information. [SO_FG_3]

AV01/ Time savings and more freedom to use it (less travel time, self-paced learning, students/teachers ubiquity, etc.)

> For me personally, it was that we could react very quickly from home. Otherwise you need more time to get from point A to point B, you travel, which is a real waste of time. The convenience, the speed you have in literally seconds to react, to join the lecture - this is very convenient. I got used to it the fastest. This speed and ability to manage my time during the day. [SO_FG_1]

> The advantage is that we have the opportunity to gather more people in one place. For me, this is the biggest plus that as many people as possible can touch the lecture. Wherever they are physically - there is no problem for everyone to attend and listen to the lecture material. [SO_FG_2]

AV02/ Convenience for those who study and work (or are in internships or mobility agreements) at the same time

> In certain situations, online learning definitely provides advantages such as the opportunity for working people to get involved in the learning process. For example, I have experience in enrolling in various courses, but not on the part of the university. They were usually in the evening and I wouldn't be able to take part in such trainings without the online option. [SO_FG_1]

Looking ahead. Lessons learned (LL)

LL06/ Students' shift concerning digital skills

They mentioned online learning and digital materials empowered them to develop their own capacities, such as searching information and selecting it.

> Definitely the positive aspects of distance learning are that in some way they drive you alone, even when they are sent by a teacher some sources, to find information yourself, to search for yourself, to be interested… [SO_FG_3]

> We saw that thanks to them in this period, we were able to get all the information and everything we needed, which was very useful and definitely learning in electronic form is the future. [SO_FG_3]

LL07/ Students' shift concerning self-organization skills

> During this period we developed qualities for managing our own time, another word at the risk of using a foreigner - "Multitasking", the ability to be a participant in the work process and to be active in lectures. We have developed our ability to listen, to comply with our surroundings, to balance the relationships in our family. [SO_FG_1]

GP01/ Videoconferencing as the new normal way for meetings with students and mentoring

The way to deliver the training was fruitful because professors tried to have also personal dialogs online with students.

> For me personally, the most interesting way to deliver information is through [teacher] dialogue with us most of the time. [SO_FG_3]

> Well, it would be good to emphasize the communication between teachers and students so as not to lose the connection, right. To try to somehow return the interest of the students themselves to learning, to the need for knowledge and to be able to move forward. To have an interest in what is being studied and whether it makes sense for the thing itself and maybe make some additional consultations or some meetings again virtual, additional, in addition to those that are mandatory to make it easier to accept what is learned or to support us students who need more time. For example, students with special needs who find it difficult to attend the lectures themselves, let alone online when they feel completely isolated from it. [SO_FG_3]

GP07/ Recording of lectures for further clarification and reuse

As is to be expected, throughout the various focus groups carried out in all the centres, contradictions were observed that are inherent to the fact that the different teaching methods logically have their pros and cons. As we have seen in previous notes, one of the most controversial issues is the recording of classes for later consultation, that in absence of face-to-face teaching is a practices praised by the students.

> An advantage of online training is the ability to have a recording of lectures. Before the exam, you can listen to the recording of the lecture again. While when you are in the classroom, you hear things once. In terms of information reuse, online learning has advantages because you have more ways to store and reuse information. However, face-to-face training is certainly a better idea. [SO_FG_4]

GP12/ Inviting guests to class from any place of the country and abroad

Students have observed that in two subjects they had guest speaker and the online environment facilitates this situation. Sofia professors and students seems to have had very good experience on that during the pandemic, because this idea was highlighted several times by more than one teacher and more than one student.

> …. in two of the subjects we had professionals from libraries who were invited by the lecturers who explained to us how things happen in the real working process. We could ask questions that were interesting to us, they were answered accordingly and it was much more interesting because that's how you see a person who is really there, he does it all the time and can answer your question quite honestly. And that was really interesting. [SO_FG_3]

Looking ahead. Improvements (IM)

IM02/ Flexible organization of the time tables, calendars, activities and mode of teaching delivery

the ideal situation we would like to have the theory maybe online, and the practice to be something that is present, taking place in different institutions, organizations or somewhere where it is related to the profession we have as striving as a desire for your future. There are definitely subjects and disciplines in which we could have more success in mastering the material, but in other disciplines that are newer, more innovative, such as web design and this type of discipline, I think they are really suitable to be taught online because it is much easier for the teacher to see the students' screens. [SO_FG_1]

For me, hybrid learning is a good idea. For example, some lectures should be online and the exercises should be present. It is a good idea to keep this opportunity and in some way to have some of the training online in the future. Especially in the upper courses, when students have started working. It will be useful to be able to provide them with a recording of the lectures. But it is a fact that in the initial courses of study at universities, the basics are very difficult to learn online. We experienced it. But these opportunities for online live connections to classrooms must remain in some way in the future so that more students can benefit, incl. when combining work with learning. [SO_FG_4]

IM05/ Teacher training and mindset change

… training teachers to work with new technologies would help a lot, because some teachers still can't work so well with computers, which sometimes hinders the process. [SO_FG_3]

5.5. University of Zagreb report

The Students and teachers from the area of library and information science that have participated as informants were affiliated at the Faculty of Humanities and Social Sciences.

5.5.1. Teachers

Context, attitudes and expectations

In the case of Zagreb we can observe that the earthquake played an important role added to the pandemic situation because it is mentioned in all interviews. The earthquake destroyed part of the library; also affected to some students and teachers because they have to move in the middle of the lockdown to relatives' houses or to other places. To this matter, all professors related their difficulties to adapt themselves to the situation.

All professors in Zagreb had their normal activity prior to the pandemics mostly in face-to-face teaching. However, professors were familiar with e-learning by different reasons. They had previous experiences and had a positive attitude. For instance, most of them have been working with blended learning components in their face-to-face teaching for long time before pandemic.

> I mean, everything was online, I had blended learning, so most normally all the materials were always on Omega, sometimes more sometimes less, and that base was built from year to year even before covid... [ZA_4]

> My first impression wasn't really that terrible, just because I used those online materials regularly, and somehow I thought, okay, I have the materials, now we need to record those lectures, we're going to do the lectures and it's going to be okay. [ZA_1]

Despite that, some professors had initially a mix of emotions between positive and negative at the same time. They indicated that students were very confused about the situation, and they had lots of questions without an answer. But anyway, most of them also were quite positive confronting the situation as far as they have been using digital educational resources and tools in normal face-to-face teaching.

> It means that we expect that this will not end so quickly, that we will not return to the classroom so quickly and that we will try to get the most out of everything. [ZA_2]

Adaptations (AD)

AD01/ Approaches to emergency remote teaching

It is interesting to note how the changes made were adjusted as they went along. Initially, they worked on the basis of an optimistic forecast, which envisaged that the duration of the restrictions due to the pandemic could expire in a relatively short time. For this reason, during the first few weeks, most of the teachers relied on asynchronous self-paced teaching strategies based on the materials and activities they already had in the spaces for each subject within the virtual campus in Moodle, without making the leap to a model with synchronous online activities.

> Some teachers started relatively late with this online teaching because they thought, "well, it will take two to three weeks as they said, lockdown is two weeks", after two weeks, then we come back

> in three weeks and then in a month... Well, in the end, we were not coming back any time soon. So the information that came not only to us but also to the students was terribly confusing. […] Maybe it would be simply easier to say and more fair to say at the start that the classes will be like that until the end of the year or until the end of the semester, and not to go with some kind of half- information that it will be like this, it will be like that, it simply created big problems, primarily for students because they were very confused… About what will this exam look like and they were afraid of some technical, some practical situations. [ZA_2]

However, as the forecast of restrictions became more durable, and with no short-term end in sight, a commitment was made to offer a plan for the whole semester in which synchronous and asynchronous elements were combined, with a high degree of flexibility, as an emergency response to remotely deliver the teaching. This discussion on the balance between synchronous and asynchronous activities, as well as the difference between fully online teaching established under planning and emergency remote teaching was very much present in the interviews with the Zagreb teachers.

> I had blended learning, so most normally all the materials were always on Omega, sometimes more sometimes less, and that base was built from year to year even before covid… […] When you have things prepared in this way, I think it is easy to adjust from one day to another. Of course it's not all ideal and I think that e-learning, I mean what we had was not e-learning, that was it, emergency remote teaching, and it can never be called e-learning, especially when synchronous teaching is expected . But well. Now let's say that this is e-learning, so e-learning must be planned as such and performed entirely that way. But if a person already has materials, has some opportunity for blended learning, it will not be the same for students as in classical and classroom in classical teaching, I think there is on my part I think there was more stress and more emphasis on them, how that they solve it, rather than on my part. I saw through the work that they need this joint work in the exercises and then I sacrificed in the sense I said, there are recorded lectures, this is what we need but let's prefer this part live which is some kind of interaction and what we have to resolve and give them some hints that you can only give again when you get their answer. [ZA_4]

AD02/ LMS, videoconference and virtual classroom tools for online teaching

To this matter they have used mainly the same tools, such as Big Blue Button (BBB) for class sessions or Moodle as a framework platform acting as general repository and asynchronous interaction space from exercises to course administration. In some cases, they have mentioned the use of other tools such as Screencast-o-matic to lecture recording or Padlet perform an activity during an online session. The institution organized the integration of BBB into Moodle, but there were problems of scalability to cope with the huge demand of computer resources when a lot of users were at the same time using BBB.

> These LMS [Omega built with Moodle] are very interesting to me. I wanted to use that, not only as a teaching tool but also as a course administration tool, because it seems to me that this is one place where a student can get all the information at once, so they have, in a way, interested me for a long time. The experience I had as a student, I wasn't exactly absolutely satisfied (laughs) with how much the potential of these systems has been used, so in my own teaching practice, I wanted to change that, to use more of these contents and these tools and features through Moodle. [ZA_1]

> When we were in a situation where we had to abruptly switch to online form of teaching, we were already very familiar with these digital materials and resources and how these materials are set up [on Moodle], how exams are designed and tasks and surveys... So we have already had the opportunity to try it much, much earlier. So I think that this pandemic may have accelerated some processes for us in some way, but generally speaking, this was not a big problem […] … the biggest challenge was actually holding these live lectures and live exercises, since I have to admit, they didn't

have the right tools in faculty, let's say, to make it possible. We had some free solutions, it was called Big Blue Button. […]…it's actually integrated as part of our Moodle.[…] However, of course it was a big problem when a lot of us teachers from the Faculty of Philosophy connected at the same time. […] So a large number of teachers, including me, then at one point decided to simply use their own funds for some kind of license, Zoom i.e., so that the teaching could be done in a better way, because there were a lot of headaches with our system and it was less trouble to buy the license independently, without institutional support in that sense, and to do the teaching, in order to make this whole strange form of teaching easier for ourselves and the students. [ZA_2]

AD03/ Adapting previous materials with features to enhance their use in the new emergency context

That's right, most of the time I spent on making PowerPoint presentations, like I said, at first I was not used to speaking with PowerPoint presentations, but here I was forced to make one PPT presentation for each unit, it was 40 to 60 slides, which took me a lot of time. Let's say the preparations themselves, where I would then summarize in some way what was in class. Again, some theoretical part, some examples of tasks and so on, so these PowerPoint presentations followed what I said live through these video and conference technologies of ours, so I actually introduced them to these teaching materials that they used to study and to prepare for the oral part or the written part of the exam, but it required an awful lot of working hours. [ZA_2]

AD05/ Looking for new educational resources and use of OER
Professors are not quite aware of open educational resources and where to find them.

Well, regarding the open ones, I have to admit that in fact ... If I were to call the resources I use open educational content, and have download them from a digital library that stores such content… I would say I didn't. And so I was thinking about why I didn't (laughs) ... Probably the first thing that came to my mind was that I probably didn't even think that there could be anything relevant to my course, since the topic is quite specific, I do not know... [ZA_1]

[looking for OER] I say, maybe some video, or some TED talk that I later asked the students to comment on or I would ask them questions related to that, for that lecture let's say which they would listen to, or some round table discussion, I would ask questions, ask for their opinion on it. That was one thing, otherwise I would not say that I went to fill the course itself with some added materials. Simply this is what the syllabus demands and demands as in previous years. So I didn't add anything special. [ZA_5]

AD07/ Recording videos of live lectures for deferred distribution

What is an advantage for me is that again, on the other hand, if there is a recording of my lecture, students can watch as many times as they want, and not have to pay divided attention to my lecture but they can see it later in the recording in case they have missed something. From the logs of my class, I know that often they would watch it a few days later, some part of the lecture, but not the whole lecture, especially because Big Blue Button has the ability to speed up the recording, which means they do not watch but listen, more or less, you can speed it up to twice, so that the 40-minute lecture becomes a 20-minute lecture, so it's much faster, they can rewind, they can do it on their cell phones, while riding in a tram or somewhere, a bus. And then it's good. It is teaching material that does not exist otherwise. I will continue. once the pandemic is over. I will continue to record my lectures in each classroom. [ZA_3]

AD08/ Production of videos or voice clips other than recorded live lectures

Most of the teachers did not record live streaming lectures, but provided students different educational material in video. For instance, 3 to 15 minutes of previously recorded video, just for the students work in asynchronous mode before the live lecture.

> But these were shots of three to five minutes, some mp4 files and part I recorded with this previously mentioned Screencast-o-matic, it's software that actually captures the look of the screen or makes video screenshots, so to speak, and this tool served me the most to show how something is done on a computer or in a program, as instructions to students, let's say, shorter instructions. [ZA_3]

> Oh, here's an interesting thing ... Of course the time I invested when I was recording the lectures, it took me more time to prepare the material, especially the first materials because I had the impression that it ... By the way, I'm a perfectionist, so I like everything to be perfect, and therefore when I hear that I said something somewhere that doesn't sound good or the wrong accent or anything ... Then I go and change it, so I cut, so I connected, so I recorded again ... Or, that first time that I tried to record the whole lecture in one take… It was a disaster, so I segmented it to make it easier. I somehow relied on my computer skills regarding that matter, used tools I don't really know the name of anymore, probably some freeware, where I put everything together, did some final mashup of my lectures, and over time…I got a little better at it. [ZA_1]

AD09/ Task-oriented activities and workgroup

> … for my students, it's something we've never had before, students did these video testimonials, we started with them in the XXXX course to actually make videos about some kind of experience, information interactions, information experience during a pandemic, so we asked for critical reflection. […] These are some activities that we have not done before or we have done partially, but then here it took this new form. [ZA_5]

AD12/ Student communications (LMS forums, teachers' feedback and mentoring, e-mail, messaging systems, videoconference, …)

Some activities that were already taking place before the pandemic took on renewed value in the context of the crisis. Some professors highlighted the importance of the virtual campus forums as a mechanism to enhance asynchronous student participation.

> I used it, there was definitely reading of the material paired with forum activities, so they would read first and then they would have to discuss. Well now, those forum activities have varied, given what I asked of them. Although the form was a forum, sometimes I asked them to discuss with each other, and sometimes I asked everyone to submit first and then let them see the answers provided by others. Also, there was the task for which everyone had to watch a documentary or a debate, some video, a recorded debate concerning the issue, and then, again in the form of forum activities, they were asked to submit their reviews. I didn't want them just to submit it to me as a task, so it was also a forum activity because I wanted to encourage them to actually see the answers submitted by their colleagues and to discuss beyond the task. [ZA_1]

Technology linked to online teaching facilitates the speed of communication to clarify doubts or questions, sending a video o audio clip, a link or reference to a student is clearly an advantage. Another example could be making a simple poll to have some interaction with students.

> Yeah, well, it helps me the most at the level of the administration of the course. Things like a simple poll, you ask a question, poll, let's say I used it and it was sometimes very useful in the classroom

when I wanted to hear their opinions, and I didn't want the awkward silence of waiting for them all to respond individually, it was very useful. Whether it was in the webinar systems, or in the LMS, it was useful ... It is interesting that in online teaching you can have a conversation with students individually while something is happening simultaneously in the virtual classroom. Let's say I used that, it's an advantage you can't have in a classic classroom. I would point that out. I don't know, I can't think of anything else. [ZA_1]

AD13/ Exams, assessments and grading

Among the teachers interviewed, the challenge of remote examinations was confronted by giving more importance to continuous assessment and, where possible, with examination formats in which copying did not make sense. In general, there is a conceptual reflection on overcoming the problems of remote and invasive invigilation to avoid cheating. In any case, approaches to the type of adaptation of final semester tests in the form of validation depended very much on the type of subject, what the exam was intended to assess and the way in which each teacher was willing to do the " video surveillance " of its development.

I changed the way of examining, I used more things that I could be sure that in some way the student approached with integrity and I increased the role of evaluation of student papers, and the role of evaluation, and the importance of all activities that are done during the semester. In the final grade and the final assessment, some sort of final evaluation of student work. I reinforced that, as before the pandemic, that written exam was the main thing that counts in the end. Now that ratio might be a little, a little different. [ZA_1]

Now, when you ask me about testing, yes, I have already planned a different way of testing in advance, that was within a week, and that was to have these short tasks, discussions, activities, and in that way students are then valued. So the last test was actually a kind of confirmation of all that was done and it didn't play as much of a role for me as I'm going to test it now. I immediately told the students that it will be done during the semester and explained to them the tasks they have to do that are part of their evaluation system. So in the end, it was just a confirmation and it turned out to be realistic. [...] My questions are such that you can't have a cheat sheet that will answer that question, you really have to do it all so that you can give that answer in the end. I say again it is an adaptation of the material, it is not repetitive knowledge that you have to give. [ZA_4]

AD15/ University teaching support services (e-learning unit, library, TIC unit,...)

They felt supported by the university, especially on the ICT area. They also indicated that the SRCE played an important role helping to switch face-to-face courses to online course.

So, the help provided by colleagues from the E-learning support centre should certainly be pointed out. During the pandemic period, they did regular webinars, they were regularly available with numerous materials that explained all aspects of our LMS and especially those that they probably estimated that people have problems with, because I'm sure they follow these queries statistics when people seek help. [ZA_1]

We can't complain in any way about that part when we talk about technical support, it was at a really very high level. [ZA_2]

Yes, there were opportunities, in our E-learning Support Center, which wrote, I should now look up how many manuals and the webinars, they were up to date and every step, every problem was solved with the webinar, transcriptions also existed, so from that side, the support was assured. I must also add that SRCE was also up-to-date and as always, because these things have worked before but perhaps they were more prominent now because more teachers recognized it as their need. [ZA_4]

Problems (PR)

PR01/ Online replication of normal face-to face teaching

> I think in this pandemic period the work we've done in terms of adapting and moving to online teaching is that in some ways we haven't actually improved at all in that regard. Precisely because of this elemental moment, I do not guarantee that this is the maximum of what I could have produced if I had really produced content for online teaching outside of these crisis conditions. This is somehow the biggest problem for me in this whole situation, which seemed to me that we are not working digitally, but digitizing. In the sense that we have just translated what we would normally do in a traditional classroom environment, but now just doing that online, which in my opinion is not necessarily the idea of online teaching and e-learning. [ZA_1]

PR02/ Dysfunctions of the hybrid mode

Among the many solutions explored in European universities from the 2020-2021 academic year onwards (when it was assumed that distances had to be kept but that lectures could be given with face masks), the so-called "hybrid" solution with part of the students in class and part connected online stands out. This is purely a mitigation approach, not a strategy whereby each student attends in the mode that is most convenient for them. This was the institutional policy that was established in many universities with mixed results according to some accounts.

> I think is most unfavourable, is the combination where you have half the students in the classroom and half online. There is no interaction here, it is the most painful for me. Because you're trying to actually meet the needs of both, and that's almost impossible there's always someone suffering from the students. If you always dedicate yourself to those who have questions online, then those who sit in the classroom don't really know what's going on. I would say that is perhaps the most ungrateful part, in my opinion. [ZA_4]

PR03/ Lack of directions/regulations from the university on online teaching and evaluation

Some teachers said they did not receive precise instructions in regards how to teach online or how to evaluate, in view of the crisis situation. The problem was most acute during the first weeks of the lockdown.

> … the instructions we were receiving were not entirely clear. At one point it was expected to mean that we are only available live for students once a week, and then that some teaching materials are put in writing. Then this and then, so that some tasks are set and all students get individualized answers to those tasks, etc. So there were different instructions that changed over time and expectations changed, both students, teachers and administration, so let's just say it was a bit of a problem at first, until they actually realized that it would actually be good to start teaching right away as if we were keeping it practically physical in the classroom. [ZA_2]

PR04/ Teachers overloaded with work

Not having experience in online/remote teaching was a challenge because it caused a tougher learning curve at the same time they were setting up the courses and educational material. Altogether caused a work overload and they lived in a high demanding in time.

> It is certainly still a challenge when we do what we have experience in, and it is a demanding job for us, and when we need to put it in a format in which we have no experience, it is logical for me to

expect that we will need even more time. Especially because when you look at the level of evaluation, it is quite problematic for me… [ZA_1]

PR06/ Not a good time to create new, purposely designed, material from scratch

Professors made additional adaptations of their teaching materials to the situation. However, they indicated that they were under overwhelming situation because they had to do it every week because their teaching materials were prepared to be shown on site at the classroom.

> Something in between. In fact, I had some materials that were usable in this form, in a format but they were not completely, so to say, carved, so I finished them to adapt them... But not did I do some brand new materials, I think not, I may have adapted some of the existing materials a bit. [ZA_1]

PR09/ Difficulties keeping students' attention, participation and focus

Other questions common to other partners is the effect of the black camera, this is when students did not their cameras on. Nevertheless, professors indicated that it was perfectly compressible for different reasons. One of them was the earthquake and students had to move to relatives houses until their situation was safer and also because they did not have the most adequate space at home.

> These are parts of the story that you don't normally have in a seminar when people come into the classroom, the classroom was cleaned by someone else, you just need to dress as decently as possible. They also have to tidy up their house, and in my opinion it is a big problem when we tell them that they have to turn on the cameras. [ZA_3]

Professors indicated they were sympathetic with the students' overall situation. Black cameras solution was a challenge for them and they tried to cope with it. One the topics that emerged was how to engage the students, how to find ways to motivate them.

> I was actually often looking for some ways to involve the students more. How to get them to say something... Because it would always be reduced in the end if you said after that teaching unit 'are there any questions that remained unresolved, is everything clear to everyone' and it is clear to everyone, all clear, of course, and this is always the case because students want to run away, go to their other commitments, which is completely understandable. But how to motivate them further in the digital environment, that they are involved during classes. [ZA_2]

> …when I know that I'm holding a discussion course, I make it very clear, and when students enter the Big Blue Button, they can choose at the beginning whether to join with a microphone or just headphones, just to listen, right ... And we hold seminar classes where the discussion is a very important segment, but everyone logs in listening mode... So, what should I conclude from that? No one is ready to debate, or what? And my natural reaction, which I'm not sure is the reaction of others, I immediately problematized it, it was important to me, I immediately asked them what was the matter (laughs) and asked them to log in again with microphones. [ZA_1]

> I have to admit that I expected that communication would be much smoother and that students who are digital natives would function much easier than they are in this form of teaching. It was a new realization for me, and a takeaway from these two or three semesters, I don't know how many there were exactly… And my willingness to communicate also, because for me, it's my job and I have to do it, but there was some initial delay. And then I was surprised that the students were less keen, they approached the process somewhat cautiously, they did get more relaxed later, but it still seems to me that this communication is quite problematic still. [ZA_1]

PR11/ Lack of appropriate equipment and connectivity issues

Different problems emerged from the interviews but especially problems with the infrastructure of the university because of the earthquake. Also, at the beginning of the lockdown the university computers system and network were not enough stable.

> So at faculty, we have super fast internet, but even today, in the building where I live I don't have high speed Internet, it is simply not available to me and then the camera is bad and the sound is maybe a little late. Then I have to be careful that no one else connects to the internet at that time, issues you don't bother with when you're physically in the classroom. [ZA_2]

PR12/ Lack of adequate home space for teaching/learning

Teachers also indicated that they had problems adapting their home spaces which were not in all cases in optimal conditions. Other questions emerged are the situation of the students at their homes. While they adapted their teaching style to the situation, they found that students did not have the adequate space at home, especially when there was the earthquake. Not all professors have the same personal situation in their private life. For example, some of them cannot have a space to teach at home; they do not have the necessary equipment or they do not have enough digital skills to teach online or to deal with different platforms.

> Schools are closed, kindergartens are closed, faculties, you don't have your own office, so you have to stream from your bedroom for example, because other rooms may be occupied. I speak hypothetically. And that, for example, was also a problem, where you try to reconcile that business and family life in one space that may not be adequate for both at the same time […]. Well, I think it's all wonderful, but classes are held in the classroom, not in the living room either in the kitchen or in the dining room. [ZA_2]

> What's also technically big issue, it's that these students may not actually have privacy in their room, meaning if they are in a dorm, then two of them have online classes at the same time. Yes, everyone has headphones, but it's not like you're alone in your room, in the classroom, or some space for yourself, regardless of the headphones. So it creates a problem, even though the internet connection at the dorm works perfectly, they are still in some, let's say, environment in which not everything around them should be seen. [ZA_3]

PR13/ Too many different video conferencing applications

> And what I think is actually perhaps the biggest problem that students themselves point out, is that jumping from platform to platform. Getting to know each platform, how it works, how to do something that they have to do, to them actually I think it takes a lot more time to master that technical part than the content. […] I think that using too many tools is not always good, we have to choose one or two, which we will do during our classes and then implement different methods of interactivity through these tools because otherwise the focus is on the tools and not the content we transmit. [ZA_4]

PR14/ Communication challenges between teachers and students on the digital scenario

> So all communication before this story with pandemic was mostly reduced to live consultations that took place on a regular basis every week or after classes. […] So it all came down exclusively to emails, to a lot of typing or possibly those video consultations. Yet most of the correspondence went in

writing which again takes an awful lot. Because one thing is when you say ten sentences and if you want to type it takes an awful lot of time, and then students maybe have a few more sub-questions so then it actually looks like we're in a chat but via email … […] Students always have a large number of different questions and then when you want to convey it only in that written form, it is very demanding. In any case, I am always for video and audio some form of communication. [ZA_2]

PR16/ Sociability issues

Teachers highlighted the challenge posed by the lack of socialisation among students for the normal development of learning at university level

… a lot of students were at that point, spring 2020, we were all stressed and anxious, but a lot of them still have this component, that if we would have classes fully online, they would need to return to their hometown, because they may not have the money to stay in Zagreb. And again, because of some socializing opportunities, you can't just say "go home, it will be equally good for you". [ZA_3]

PR17/ Psychological and health issues

At the same time, there was an earthquake in Zagreb, and after that we had that unfortunate earthquake in Petrinja and the whole Banovina, which was badly damaged. And we have a large number of students who come from that area, so we were faced with these big psychological problems, where people were constantly in fear and they told me that openly, for example in consultations where we had open communication... That they have sleep problems, that they can't concentrate, that they are evicted and that they are no longer in their home than that they are temporarily housed with relatives or some other facilities, that it makes them uncomfortable, that they can't focus and dedicate themselves to teaching ... So at some point you become a therapist. [ZA_2]

PR19/ Decline in attendance at live sessions when a recording is available

No, I didn't record the lectures. Since day one, classes were held in full in the regular term of classes. So if it lasted four school hours, it would be held for four hours, only through video, online environments and such. So I didn't record. I always encouraged students if something is not clear to contact me later and so on, because I thought that if everything is served to them on a plate and so on, then they have no motivation at all to attend classes. Because if you know that you can watch at any time, this is what happens... If you put everything, let's say, on a platter, then they might overestimate themselves in some segments and say that it doesn't matter, they will compensate three teaching weeks by one weekend, and that's not enough. You have to work regularly and so on, and then it's kind of, I won't say coercion, but it still motivates them to be in class every week and take notes… [ZA_2]

Looking ahead. Advantages (AV)

AV01/ Time savings and more freedom to use it (less travel time, self-paced learning, students/teachers ubiquity, etc.)

With distance learning there is no need teachers or students travel to the college. It's for sure an advantage that comes with "cons" already highlighted before in the "Problem" section on communication, participation or socialization issues.

> I know it was a big plus at some point for the students as well because when they reconciled at one point that classes would be online, it was easy for them to be in their parental home, share practical expenses, have no extra financial expenses. In a way, it was a little more comfortable for us from that situation, because you don't have, say, the costs of transportation, travel, you don`t waste time in traffic, or I don't know rush to somewhere in a hurry, you don't run late... From that perspective, that are some advantages, that one more comfortable perhaps approach to that teaching but as I said it is, it is one temporary solution. Teaching cannot be in that form, it is simply not possible, I am extremely sceptical about it because the biggest problem is this lack of communication. You can't replace that. Not at all. You need to have feedback from the people you teach. [ZA_2]

AV05/ Better engagement with flipped classroom

One professor indicated that flipped classroom worked really good in a e-learning environment, even better than in the case of on-site classroom: students were much more willing to read in advance and having questions during the session (no matter it could be online synchronous or on site face-to-face).

> Let's say, flipped classroom worked much worse in classical conditions than in e-learning. Here, the students were much more willing to read the literature in advance, on which they had questions, and then solve those questions in order to have something that is a start, that we can discuss during the seminar. Here they were even better than in traditional classes. Somehow they feel that they have to give their input as well, in comparison with when you come to a classroom and ask about their reading or ask questions about the literature, so they start excusing. [ZA_4]

Looking ahead. Lessons learned (LL)

LL02/ Pandemic has been a catalyst for digital transformation

> … our head of the Center for e-learning sends "you have this, you have that opportunity" and then you see, that would really be convenient, so some kind of stimulating environment is actually more inspiring, I would say, gives me more inspiration, yeah, maybe I could use it this way ... [ZA_5]

> We are now of course after those year and a half or two years almost, we started the traditional classes because we had to, right. Our part-time students rebelled against it actually, they wrote petitions. So, part-time students wanted distance learning, which is logical because they have classes on Saturdays, they come from all over Croatia from Istria and from Dalmatia and Slavonia. They have to travel and this would just means to them that they can actually participate in classes from home, and that we can do the seminars this way. So they just insisted that we go back to online teaching. [ZA_5]

LL04/ Blended and hybrid learning modes are potential game changers for the future of traditional face-to-face universities

In opinion of some professors teaching style should tend to be a mix of modes of delivery in most of the cases, but having in mind the diversity of students enrolled. This means a kind of combination of online courses and on site courses, or online and on site activities on a same course, thinking especially on those students who live far from the faculty.

> Traditional teaching, I would definitely like it to be more hybrid, I have already said that, because exclusively traditional teaching, I don't think it works anymore and students are asking for a lot more than that. Especially some categories of students, especially part-time or postgraduate students, so

there is no need to bring them back and force them into something that actually suits them less. [ZA_5]

LL05/ Teachers' shift concerning digital skills

Professors indicated that their teaching style will suffer changes in positive. One of the reasons are the high number of applications they discovered they could use, but they emphasized that not all professors have the same needs and this depends in the field of teaching and in some cases also in subject. For example, teaching online mathematics to undergraduate students is completely different to teach information retrieval.

> I learned a lot about how to configure these tools and cameras, how to record video, how to make GIF animations and how to process these images. How to organize these kind of circular mails as they are sent, how to communicate and so on. I think it can be used in the future, for example, to send various notifications and so on, whether we are in the classroom or not. [ZA_2]

LL08/ Concept clarification about what is hybrid, blended and online learning is needed

Another essential question that emerges from the interviews and in different passages is that they had the opportunity to perform hybrid teaching in Zagreb. This is because some students could attend class while others could be online. At this point is interesting to consider what is considered by hybrid education. While the mentioned situation is viewed as a hybrid, in other partners, this concept changes as it emerged from the students and focus groups in Hildesheim. For example, some lectures are online, but the whole class group and some face-to-face courses.

> … we have started the blended mode, as the Ministry called it, in fact in the part where half of the students are there, half is at home, which is not a hybrid, but let's ignore it…[ZA_3]

Looking ahead. Good practices (GP)

GP02/ Asynchronous development of some interactive activities over the LMS

> The lesson was that some of the tasks I normally preferred to do live with students were actually better online because students had more time to solve them, so some of the tasks I used before, I now realize that in this asynchronous model I get better results and that students have time to get interested, and to dedicate themselves to the task, and understand the task, and complete it in a better way than before when we were in the classroom. So, I gave up some live discussions in favour of the tasks they do through LMS, it was one lesson learned, but for some tasks, not for all. [ZA_1]

> Well, my attitude has always been quite positive. I thought it would be good to say that 20-30% of these classic courses can be held online. Because you can really do some things in that virtual story where you give them some tasks and then maybe half an hour or an hour they can make something on their own, and I'm only there when needed. So if they need me, they can ask me, I can connect to their computer, say remote connect to a remote computer, I can see where they are stuck, etc. Let's say it's also an interesting aspect of teaching, I think it's a good complement to this classic teaching but it can in no way replace it, in any way. One smaller part yes, 20-30%, maybe up to a third but no more than that. [ZA_2]

GP07/ Recording of lectures for further clarification and reuse

> I will continue to record my lectures in each classroom. There are about 70 classrooms at FFZG, 5 of which are computer rooms, but in each one, regardless of configuration, you have a camera, webcam and speakers, which means I can hear them if someone is away from me. And if someone says he can't come to the lecture, I'd rather want that he listen to me somewhere, either live or in that recording, without attending it in classroom, not to bother about it. [ZA_3]

Looking ahead. Improvements (IM)

IM01/ E-learning/e-teaching should be based on a detailed planning

E-learning, event face-to-face learning with some components of e-leaning, must be carefully planned because everything changed in each mix of modes of teaching delivery: assessment, pedagogic foundations or technological foundations. In all cases, teachers considered that they were doing emergency remote teaching and not e-learning.

> …. e-learning must be planned as such and performed entirely that way. But if a person already has materials, has some opportunity for blended learning, it will not be the same for students as in classical and classroom in classical teaching. [ZA_4]

> And to give us enough time to try to prepare courses that are exclusively online in some way, to imagine online teaching as a whole, because the preparation of courses takes a very, very long time from my experience. For example, I am currently preparing some courses and have been preparing it for three years. I haven't held it yet and I won't hold it for at least another two years. So really, to do it well, it really takes a lot of time and there are a lot of elements to consider. Especially when you think about the whole thing ... When you look at the teaching process as a whole, from what it is, how it fits into the study program, what learning outcomes must be achieved as these learning outcomes match the program itself. How they are translated into activities, what are the activities, what are the formats of the activities, how are these activities evaluated ... Knowing that this is a lot of work that needs to be very well done, […] It is certainly still a challenge when we do what we have experience in, and it is a demanding job for us, and when we need to put it in a format in which we have no experience, it is logical for me to expect that we will need even more time. [ZA_1]

IM03/ Promotion and support for improving OER use and creation

Other emerging topic is the need of open educational materials that fits well at the teaching planification. This means materials almost ready for teaching with little or not adaptations at all. This question also emerged in other partners considering that it is difficult to find fit for purpose open educational materials ready for teaching, because the necessities of the teacher are not always covered. In addition, another problem is that in most of the cases possible OER that fit for the purpose of a course are not in the language of the course.

> [we need] more open educational content, which is something that is missing, that should be there. So, these that are adapted for teaching, I do not mean these academic sources and articles, but open educational materials" [ZA_5]

> And then when we look at open educational sources, I think that in our country it has not actually reached the level of human awareness that it is necessary to give different sources out for use. So in a system where students pay high tuition fees for both textbooks and tuition, so where there is some kind of tuition fee, teachers are much more turned to open sources, to open publishing, etc. [ZA_4]

On the other hand, greater teacher cooperation. I have said this a lot before, each of us is working on materials and leaving them in their course, meaning tests, units and recorded lectures. It should be in shared repositories, it should be something that librarians would index and give, in fact, they would not give it away for usage, but they would take care of the database. […] There is actually the Dabar project in Croatia, that does not work as it should for educational sources, it is not a criticism of them (laughs). Good foundations have been laid for repository of digital theses and articles, it`s working, but let's say that these educational content do not quite. I know that there are a lot of people in Croatia who have been involved in e-learning, who have a lot of these various materials and that they are unfortunately stored with them only. It is, of course, a question of copyright, exchange, motivation, but I think that this should be done especially in the context of open educational sources, … And then when we look at open educational sources, I think that in our country it has not actually reached the level of human awareness that it is necessary to give different sources out for use. [ZA_4]

IM05/ Teacher training and mindset change

Someone can only give you tools, methods that you can apply, but you still have to think. And here it is seen that this lack of pedagogical psychological elements becomes crucial. How to get teachers to go to education. I think that's a big problem. Why this is such a big problem, lifelong learning and further education, I do not know, but it is missing. I would say that this is the first and most important thing that I would like to point out. [ZA_4]

IM08/ Improvement of the students' workload estimation when courses are planned

… the reorganization of the entire educational process means that we need to see how much time the students need for certain content. I am an advocate of even trimester classes or four-course classes in which students will ultimately be preoccupied with some two topics or two classes in a short time and will move on,… […]. Now we need a reorganization of both the curriculum and the workload. [ZA_4]

IM11/ Every course/class has to have an e-course component at the university's LMS

… all classes should have their own e-course component, meaning that there is an obligation of the teacher that if it is enrolled in ISVU, the class he must have its own online component. And then we come to that part, which component, only a link to an empty e-course or should there actually be an e-course that is at least level 2. So, university level 2, according to the Senate of the University of Zagreb. Before this, until the spring of 2020, I believed that I would not see a large number of level 3 courses, that would include webinars and everything else, except for a few teachers who really tried and liked to edit it technically. [ZA_3]

IM16/ Better integration of tools and resources into unified platforms for the online environment
One professor, the specialist in virtual worlds, suggested that it could be an idea to use virtual world with students to reach more integrated and immersive learning environments.

What intrigues me is Gather Town, or Gather, which allows you to create a kind of virtual classroom, a virtual classroom. The problem is of course that it requires payment, I would be overjoyed if we had some licenses covered, although of course for smaller groups of students it is possible. Now I'm thinking, actually the challenge for me is how to adapt the materials in such virtual classroom to have

5.5.2. Students

Context, attitudes and expectations

Generally speaking, University of Zagreb students had the feeling that online education/teaching was adequate to them, but just as an alternative option and as way out for emergency situations, because their preference is face-to-face learning. This opinion relies also in the sociability and motivation issues that can compromise the lessons' follow-up and the self-discipline in the completion of the assignments. Face-to-face classes allow them to have more connections with their peers, creating future networks and distance online teaching does not offer this possibility to avoid the feeling of isolation. So that, despite as the times went by the teachers and the university improved the ways for emergency remote teaching, some students recognized their initial feelings and expectations changed because some pandemic fatigue.

> At the beginning, for me personally, it was even great for a while. Maybe it was up to those professors, professors who taught us then in that semester when it all happened, but at the beginning I even had a lot of motivation to learn and study and work and I followed those online lectures and all, before I knew how long it would all last. So the first two or three months it went great and then later it was somehow harder to maintain that motivation. [ZA_FG_1]

All of them were very sympathetic to the exceptionality of the situation and to the efforts of the teachers, as they understood that no one was prepared for something like what happened.

> Well it was surreal. For me. I couldn't believe at all that we lived in a time when something like this was happening. Although, from time to time there is a pandemic and from time to time there is a war, but again, when it starts happening, you can't believe it's happening to you, it was just very strange to me. [ZA_FG_1]

Despite that, they said that they adapted better than expected, thanks to the fact that they already had a well-established tradition of working with Omega, the University of Zagreb's virtual campus running on Moodle. In any case, they consider the new emergency situation required a kind of step forward because the requirements of fully online teaching in terms of the materials that should be uploaded to the campus and interactivity.

> I didn't even think about online classes before the lockdown happened. I mean, of course, the professors have used Omega before and they used to put some articles for us, literature, presentations and all that. I think it's like that for everyone. But now there is some additional content. It was something completely new. But I think it's definitely better to have live classes. As far as that digital content is concerned I think it's good to leave it in some way. Especially, I don't know, if it happens that we can't participate in a lecture or a seminar that we have, it would be good to have something like a recording, that we can be up to date. [ZA_FG_1]

AD01/ Approaches to emergency remote teaching

In general, the majority of teachers opted for online remote maintenance of activities in synchronous mode, but there was a wide variety of situations depending on the profile of each teacher and the nature of each subject. Certainly, in the majority of cases, there was a transfer from face-to-face to synchronous remote dynamics (with very different nuances in terms of asynchronous activities depending on the individual teacher) as the solution that implied the lowest cost of reformulating the course planning.

> For me, almost everything was in real time. Maybe it was one or two courses that the professors put materials and documents or a recording of the lecture and then we would read it or listen to it later. There were maybe one or two courses like that, and everything else was in real time. [ZA_FG_1]

> For me, there was a big difference between the study groups. In the [subject X], for example, professors most often left a recorded lecture that we could listen to later. Or they would have a live lecture, but they would also record it and leave the recorded version for us to view and listen later. In the case of the [subject Y], for example, classes were held in real time and some would even objected a lot if they left us recordings. [ZA_FG_1]

> In my case it was the same, from lectures and exercises to seminars, everything was online all year and all my exams were just online. Actually, last year I didn't have to come to faculty once. [ZA_FG_1]

In any case, students perceived an improvement and consolidation of the solutions adopted for emergency remote teaching between the first semester of the pandemic and the second semester.

> For me, everything was online. Some professors immediately made recordings of lectures, while some just shared presentations that most of us had to read so .. some still did not cope, but then next year everything was online, recordings and their lecture. The exams were also online. [ZA_FG_1]

> Yes, well it was much better. Everybody knew how to use the online system better and the professors were better organized. And I know that in the summer I only had one professor who kept live lectures, with the with the option for those who are not from the city or who don't want to come for health reasons, they could join the online class. [ZA_FG_1]

AD02/ LMS, videoconference and virtual classroom tools for online teaching

The regular use of the Omega online campus (Moodle) prior to the pandemic was a very important element in providing security for students at the time of confinement. In contrast, the tools for holding virtual class sessions with videoconferencing software were a sticking point for many students, largely because the institutional solution, Big Blue Button, hosted on the university's own servers, depended on the university's IT support and resources, which were not up to the high demands placed on them. This led many individual lecturers to use other solutions with external service providers such as Zoom, Google Meet, etc.; in some cases even paying for the subscription out of pocket. This mix of video conferencing platforms as a result of the lack of capacity of the official Big Blue Button solution was perceived as a problem by the student body.

> Yes, we also used a mix of all those platforms, but I think it was mostly Big Blue Button. And I know that there were often technical difficulties with Big Blue Button, so sometimes we were running late and had a shorter lecture. [ZA_FG_1]

> It was a mixture of everything because our faculty officially used Big Blue Button used and Omega, but some professors preferred Zoom, so then they would be on Zoom. I know that some used

> Microsoft Teams, but I honestly didn't. So I just used BigBlueButton and Zoom, that was mostly it. [ZA_FG_1]

> With the Big Blue Button there was a problem with using camera when professors wanted us to make as much contact as possible and then we switched to Meet or Zoom with those professors. [ZA_FG_1]

> Interactively, it was a little harder to interact on the Big Blue Button, because somehow you turn on the sound and then the sound is late and then at the same time or in a few seconds of difference someone else joins and then we interrupt each other and then we all stop, wait to see who was next and then while the professor organizes things, 3 or 4 minutes pass in vain. [ZA_FG_1]

In some cases, we can speak of a certain "rediscovery" or enhancement of tools such as the asynchronous forums of the Omega virtual campus.

> We had lectures, more or less, at the Big Blue Button, but a couple of professors decided to hold seminars in the winter semester using forums. They asked a question and we all have to answer them because they understood that absolutely no one will get involved if it's live online, because no one wants to talk or we don't listen, and this was the way to force us to participate. [ZA_FG_1]

AD04/ Supplementary materials provided by teachers

While it is difficult to generalise a similar pattern for all teachers, students observed an effort on the part of their teachers in the matter of supplementary materials or adaptations of those previously used in normal teaching.

> Yes, we also had a situation where there were only presentations and a bunch of articles, there was not a single moment where the professor spoke about something, a topic or whatever, so yeah. We were also left to our own in some situations, but I think that most of them even tried to prepare additional content themselves. [ZA_FG_1]

AD05/ Looking for new educational resources and use of OER

As observed in most of the HEI analysed in this study in the four participating countries, students did not perceive a planned and systematic penetration of new, specially developed digital materials such as OER or similar. Rather, as mentioned above, they worked with adaptations of materials that were already in use prior to the pandemic, without a systematic process of finding solutions in terms of genuinely digital teaching resources.

> Apart from googling and searching for materials when we need to find additional information or clarify something we didn't understand, I haven't used any special tools like this [OER], except for normal databases, articles and similar things. Or if there is a presentation shared publicly where some topic is clarified and it is just what we needed, but nothing else. [ZA_FG_1]

AD07/ Recording videos of live lectures for deferred distribution

In some subjects, teachers did opt to record live lectures for later viewing. There was a wide variety of situations, which is logical in an emergency environment in which, in the end, the adaptation of teaching was basically the individual responsibility of the teacher. It seems pretty clear that it was not the time to define a common policy for the faculty, but rather, as in most of the HEI analysed,

various alternatives were offered which each teacher, depending on his or her circumstances, configured according to his or her own needs.

> Yes. Sometimes they would have it live, so in real time, and they would record that lecture and then upload it to Omega for later. And sometimes they would just record it and then put it for us to listen and watch whenever. But it depends on the professor. Sometimes we had access and sometimes we didn't. [ZA_FG_1]

It is interesting to note how some students, for their own private use, decided to capture live what was coming to their computer in synchronous online classes. That is, the option of generating the recording at the user's point of reception was on the table for students with a certain technical capacity.

> The definite advantage was that you could watch it or record it, you record your screen even if the professor is not recording and you can watch it at a moment when you have more concentration or when you can concentrate better, whatever. [ZA_FG_1]

AD10/ Strategies for more dynamic synchronous sessions

As would be expected in an emergency situation, teachers' strategies varied in terms of how to get students to participate and get involved. The students' testimonies highlight the existence of more or less incisive teaching approaches to participation, with different results depending on the teacher's approach to the class.

> I was a little more stressed online. It was easier for me in the sense that I could work and I didn't have to travel back and forth, and that was great for me. But I was more stressed because the professors insisted more on the interaction online. They were afraid it would all fall apart if we didn't interact so then the they called out for us, i.e. they asked us to be on camera. You can't eat breakfast now (laughs), and I've often done that too. When there is no camera, of course you drink coffee and you carry your mobile phone with you around the apartment, you make coffee, hot dogs, and so on. But most of them were actually looking for interactivity and when I compare it to the previous phase of studying it was much more dynamic. Not in all courses, but in most. I felt I have to be called out now, I have to prepare better, I have to report here and there, I need extra points on exams, and so on. [ZA_FG_1]

> I think we had more interaction when we had exercises. For example, for [subject Z] and [subject W], then the professor would call our names, she used Zoom whiteboard, so we all wrote on it and solved tasks, so it turned out that we followed up the lectures quite ok. [ZA_FG_1]

AD12/ Student communications (LMS forums, teachers' feedback and mentoring, e-mail, messaging systems, videoconference, …)

The experience of the pandemic seems to have encouraged students to make individual enquiries to their teachers and peers, something they could also do before, but which in the new digital and crisis environment became more necessary and more available to them in terms of how to interact with the teacher, or with other peers, to resolve queries.

> I didn't understand something I could send them an e-mail or we would talk via Skype and they would explained it to me. Otherwise, if those were regular consultations, we would have to wait for a week to get the term, when it suits the professor. [ZA_FG_1]

> I think because everything was online, because we couldn't communicate face-to-face, I consulted a lot more with some colleagues regarding the materials for learning and experiences related to taking

exams. More than before. And as for the professor, I was personally encouraged to change because I always had that fear of contacting the professors by email. But now it was necessary and that somehow helped me to break that fear of communication. [ZA_FG_1]

AD13/ Exams, assessments and grading

The students perceived the different strategies used by the teachers, which were of course very diverse. Both the nature of each subject and the way in which each teacher developed the syllabus conditioned the form of examination. Moreover, as this was an unplanned process of switching to the remote digital environment, it does not appear that institutional policies and support were put in place to address the issue of online assessment tests and exams. Similar solutions were adopted as in many other HEI during the pandemic, whether it was conditioning the way tests were invigilated to make cheating more difficult, the configuration of the platforms on which the exams were taken (e.g. response times and non-return in the flow of question submission), or the question formats to make the answers less based on rote learning with a greater requirement for personal elaboration on the part of the student.

… there were, for example, exams where you cannot go back to another question. [ZA_FG_1]

They somehow required a lot more critical thinking and analysis. [ZA_FG_1]

It was a shorter test, perhaps, meaning fewer questions, but perhaps you needed to write more. So that it can be seen that you understood, and not that you copied answers. So when you fill it out, you go to the next one, you can't go back, check it or correct it. Then it's a bit of additional stress because you have little time and then you now have one chance to solve that question. So, I knew that I had to solve it on time, and fill in everything and make sure it's written correctly, so there are no mistakes. [ZA_FG_1]

For me, most of them were live or if it was online, they were verbal exams, because I think they wanted to reduce the possibility of cheating, and in the case when they were written online there were much more difficult tasks. They deliberately made it difficult for us... [ZA_FG_1]

I know that for the written exams, the biggest problem was that, I guess, in fear of cheating, they would ask a lot of questions and the time was too short to answer it. And the verbal exams, it was the same, there were a couple of situations where me and my colleagues were answering, and internet connection was bad, then the professor was frustrated during that online answering. And then I know that there were a couple of unfair situations. Also there was one very funny- when we signed up for the verbal exam, we had to show our student cards to the camera so that the professor could check if it's really us. [ZA_FG_1]

AD15/ University teaching support services (e-learning unit, library, TIC unit,...)

The circumstances of library closures and reduced mobility intensified the change in reading habits, with a loss of prominence of the library in general and of print resources in particular. While the tendency to prioritise convenience over relevance of information resources was a fact before the pandemic, the Covid-19 crisis situation has intensified this process. The pandemic habits represents a major challenge in terms of students' perceptions of the library and the appropriateness of using formal information resources.

I think that I used to look for printed sources in the library a bit more often and then, during the lockdown, while we used digital content more and more, I guess it just got into my habit to use literature on the internet more often than in the library. [ZA_FG_1]

Well, I definitely think that digital materials that we use a lot now, especially those articles that we can find in databases, they somehow reduce the need to go to the library because you can actually find a lot of content online, for seminars and other things. I think that very often, before and during the pandemic, when I had seminars or presentations, I mostly looked for online sources instead of going to the library. And now I'm even looking for a book or something online, so I mostly use digital materials. [ZA_FG_1]

Yes, I have always been averse to digital materials. That is, I'm more like an old-fashioned guy, I don't know about you, but, like, give me a book so I can smell it and go through the pages and I'm really tired, i.e. I'm scared of the digital age and how fast we are advancing in that direction. But even before the pandemic, I used non-digital material more often. I see now, I think we have all figured it out how much it is actually needed in this modern age and how much it can make life easier to use digital materials. So today I have a slightly different attitude about it, more positive. [ZA_FG_1]

Problems (PR)

PR01/ Online replication of normal face-to face teaching

They felt that most of the professors did not do substantial changes in the way of teaching; only a minority of them performed important changes to have the course adapted to the online situation.

I haven't noticed any big difference in teaching. I mean, it's actually medium that was different. Maybe someone tried a little harder to be more interesting and to engage students more, but mostly it was the same principle – they have a presentation, they teach and then it depends if there are any exercises, seminars etc., but for the most part it was all the same. [ZA_FG_1]

I think that it is possible that some professors changed their methods, that it motivated them in terms of making more effort. They may have even realized that it is worth of trying because of some individuals who also try. It all depends on what the course was like, what the students were like, and so on. It was not the same in all courses. [ZA_FG_1]

PR02/ Dysfunctions of the hybrid mode

As the University of Zagreb teachers said in the interviews, from the 2020-2021 academic year onwards (when it was assumed that distances had to be kept but that lectures could be given with face masks) the university bid for the so-called "hybrid" solution with part of the students in class and part connected online stands out. In general, the students complained on that solution because the organizational problems.

It was problematic, at least for me, when part of the teaching was online and part live. For example, I had the teaching at the faculty from one course and then after that there are online classes in different course in which I have to participate. […] I remember that once I literally sat outside on a bench and that I took my cell phone because the laptop didn't work and used my cell phone to connect to the class and to the camera. Then I got tired of sitting on the bench and it was even quite cold, it was early spring in summer semester and then I went somewhere for a coffee just to sit down because I didn't know where to go at that hour. It was that pretty weird. So I think it should have been organized better between online and live classes […] I have classes in the morning today, then a huge break and some classes in the afternoon and then classes again in the evening. [ZA_FG_1]

I don't think the hybrid class in our college really worked. Especially because some people had difficulties reconciling the two. It was a chaos. [ZA_FG_1]

It was better to do it either fully online or fully on site. [ZA_FG_1]

PR09/ Difficulties keeping students' attention, participation and focus

The technical solvency of some platforms compared to others (or rather the more robust solutions in terms of IT because they are managed by a company and not by the university services themselves) meant that the teaching staff could demand more active participation, which is undoubtedly linked to an attitude of paying more attention on the part of the students.

> … our common experience is that we had lectures on the Big Blue Button and it mostly meant that professor shared the presentation and talked, the cameras were not turned on and it just means you sit and listen. Even if you are bored, you do what you want, you don't listen to the presentation because you can and you are alone and don't feel uncomfortable because someone sees you on your cell phone or something. On the Zoom, on the other hand, it was different because there was not so much traffic, so it could be that the professor wants us to turn on the cameras, and then immediately you have to follow the lecture. [ZA_FG_1]

> For me maybe some things changed, yes. I didn't have that feeling that I should try too hard, because it was more casual and you are in your room and you are listening to a lecture and you are more relaxed because you don't have to turn on the camera. Anyway, I was more relaxed with lectures and later with learning for the exams. I didn't try as hard as I would have if I had live classes and live exams. So yes, it was different for me. [ZA_FG_1]

> Yeah, I had a similar situation. Lecture in the morning at eight, and then of course I'm in the bed sometimes. Then suddenly professor said: hey colleagues, turn on the camera so I can see, let's see you for a while. Nothing, I would get up quickly, stand in front of some white wall because I can't if I say I won't, he will figure out that I'm in bed and not listening. [ZA_FG_1]

> Some professors really insisted on the camera and sound, and that's how it had to be, but the students resisted as long as they could. So, in some courses where there was not enough insistence, as if they were now answering by voice, the professor would say, for example: „come on, join in by voice, come on". And they still type and it was terribly funny, because the man was also probably uncomfortable because he was talking to himself. It's different in person- we're all sitting here now, you see people's reactions to what you say, people nod their heads, look at each other. Online classes don't really have that. [ZA_FG_1]

PR11/ Lack of appropriate equipment and connectivity issues

The need to improve computer equipment was a common feature of those months, an improvement that not all students were able to carry out at the times when the equipment was most needed. Together with the improvement of domestic Internet bandwidth, having a computer with good performance and two screens to be able to follow the classes in a participatory way, were aspirations that for economic reasons or due to stock shortages in the market were not always possible.

> I also had to buy a new laptop because there were three of us in the house who had online classes. [ZA_FG_1]

> I couldn't afford new equipment at the time, so it was a big complication for me. Let's just say I've been able to adjust to the situation, in the end. That was an awkward time for me. It wasn't until later that I got a new laptop, after online classes ended. [ZA_FG_1]

> Yes, I also had to take a new laptop at that time. I mean it was the same thing, my laptop was old and it was already very slow, camera didn't work either. For a while I didn't know what I was going to do, especially in regards to online exams with camera. So yeah, I really had to take a new one in the end. [ZA_FG_1]

> I had similar situation. I took an old laptop from someone from my family who didn't need it anymore, not a laptop but a monitor, sorry. Uhh, so I plugged it in my laptop because it was easier

for me to read on monitor when we had one course where we had exercises. Then the professor would start explaining and he would split his screen, and we were supposed to do an exercise on our own at the same time. You can't do that on one screen, so it was easier if I had a laptop and second monitor. Until I had that monitor I would even connect to a TV with HDMI, and then 'I would have a lecture on TV while I was working on the laptop. [ZA_FG_1]

PR12/ Lack of adequate home space for teaching/learning

Coexistence with the other members of the household was a common challenge that to a greater or lesser extent conditioned the comfort and security with which the students "attended" the synchronous classes.

> I know that at the beginning it was stressful for me to go to the Big Blue Button and then 5 times to check if I was "muted" or not so not to accidentally do or say something, because I lived with family and I had a little nephew who is not very quiet and then I was always afraid that something would be heard from my side. [ZA_FG_1]

PR16/ Sociability issues

The problems related with student socialisation had undoubtedly a major impact on the development of learning during the various stages of the pandemic. Undermining motivation is one of the consequences of this problem. Also the reduced networking among colleagues for those fresh students that entered the programmes just during the pandemic.

> Yes, I think that the first year students were in the most vulnerable position, poor things, neither 'going out' for coffee nor to get to know each other. The rest of us knew each other to some extent at least. [ZA_FG_1]

> So the only way that we would get to know each other is if we had something in the seminar together, as a group, then we would have to do it together. We would hear each other through Facebook or WhatsApp or something else. That's how we communicated. This was definitely harder for the first year students who might have come to college without knowing anyone. If they needed something they didn't know who to contact. Sometimes, if you remember a name from a lecture, you search them on Facebook or somewhere, contact them through a message. [ZA_FG_1]

> For me, personally, it was the hardest was the fact that I didn't really have physical contact with anything, the faculty, other colleagues and professors. […] I just noticed, the more time passed, the longer it took, the less motivation I had, so that was definitely the hardest thing for me in the end. [ZA_FG_1]

> But for me again it's like.. I think no matter how hard it was, somehow it became for me that over time I felt like I stopped being a student. That part was for me the worst part of everything. [ZA_FG_1]

PR17/ Psychological and health issues

Among other problems, students reported eye strain from continuous exposure to screens and a sense of isolation during confinement. Certainly, reduced mobility at certain times during the pandemic, especially when living conditions and space in the home were not good, had important consequences on students' day-to-day lives.

> It should definitely be adjusted how technology is used. My eyesight has been damaged, I would stare at the screen at my job, and then again during online classes. As much as it made it easier for

me to go to work, sitting all day in front of the screen, reading, straining my eyes, … so yes, it was hard in that sense. [ZA_FG_1]

The thing from the beginning was stress mainly related to the use of the online system. But some psychological ones, the ones due to the isolation I didn't have because I could go for a walk and other things. I think it was more difficult for people who had small apartments and could not go out anywhere. [ZA_FG_1]

It was more psychological for me, as I already mentioned. Not at the beginning, but later as it all went on, definitely. It got worse with learning. [ZA_FG_1]

PR18/ Students overloaded with work

The students' perception was of a certain overload of work, both because of the teachers' desire to "maintain" the activity by offering different options, and because of the additional effort that the new environment put on students who had to change their study routines and strategies.

We had a lot more activities to do at home than before. […] that year, they insisted a lot on additional tasks. There was also literature reading and checking in class if we read it. It was not like that in all of the courses, but in most. [ZA_FG_1]

I had one course where the professor asked us to read a few articles every week and then send a short paper to her. [ZA_FG_1]

PR21/ Weakening of students' self-discipline and routines for carrying out activities

After the first few weeks of voluntarism and a positive attitude to overcome an unforeseen crisis, pandemic fatigue and problems linked to a certain personal isolation had a negative impact on motivation and commitment levels.

I think that I maybe neglected a little during the online classes and now when we started live last semester, I had that feeling that I have to follow and then I followed the lectures a lot more and was more organized and solved tasks on time, not at the last minute. [ZA_FG_1]

I think that at the beginning I was extremely organized and that I followed everything, but that last summer online semester there was a lecture at eight in the morning that I simply could not listen to because I was really very bored, then I would put my cell phone down, turn on the recorder and go to sleep to listen to it later because I knew that I wouldn't have the concentration to listen to it in person because it is actually more complex, so I would do it myself when I felt like it actually. [ZA_FG_1]

At the beginning, for me personally, it was even great for a while. Maybe it was up to those professors, professors who taught us then in that semester when it all happened, but at the beginning I even had a lot of motivation to learn and study and work and I followed those online lectures and all, before I knew how long it would all last. So the first two or three months it went great and then later it was somehow harder to maintain that motivation. [ZA_FG_1]

AV01/ Time savings and more freedom to use it (less travel time, self-paced learning, students/teachers ubiquity, etc.)

The convenience of not having to travel to attend classes, together with the possibility of carrying out certain asynchronous activities when it is most convenient for the student, is constantly repeated in the different centres analysed.

> Well, I mean, personally, it helped a lot that I didn't waste time on transportation. I simply have more time spent on transportation, so I can, I don't know, finish something that I started on to that lecture, or homework or something, and for me personally it is great. [ZA_FG_1]

> Yes, some kind of organization of life and it becomes a little easier because you don't have to go to college and then you spend an hour and a half there, then you return home or go to work and so on. It was like you can organize your time more easily. [ZA_FG_1]

LL03/ Recognition of the unique properties of face-to-face teaching contact in the case of certain activities

The remote learning experience has allowed us to highlight what was common before the pandemic and what was not valued as normal. By not having an interpersonal experience with teachers and peers for several months, the students have perhaps now been able to better perceive the need to attend certain face-to-face activities.

> I had no opinion about it at all before the pandemic. I never imagined how the online teaching would be. So it was a whole new experience for me, but I think online teaching should always be there as an option, in case live teaching is not possible. I think it's far better when interacting face-to-face, when you look at people's facial expressions and gestures, it is far better than online. Better quality. It may not always be better, but it can definitely be. It has more potential to be better. [ZA_FG_1]

> So I definitely had less motivation to follow online classes and it's simply harder for me to follow, because I don't have that feeling that I'm in the classroom now, that I'm following the lessons, but I'm at home and sitting at my desk, even if I don't have a camera. I wander off without a problem, I take my cell phone and check it every five minutes, I end up on my cell phone for about 10 minutes. [ZA_FG_1]

LL07/ Students' shift concerning self-organization skills

Students indicated that the experience of lockdown online remote learning have been a boost to their self-organization skill, to improve their organizational habits.

> I'm a used to it now and maybe organize my time a little better. [ZA_FG_1]

> Yes, as far as the learning process itself - definitely the fact that maybe we have become a little more resourceful and creative, so a lot more of some kind of alternative sources than before. [ZA_FG_1]

GP07/ Recording of lectures for further clarification and reuse

They consider that recorded lectures need to be maintained. In terms of providing resources to students there was an improvement itself.

> This way or if they are sharing professor's recordings, then you choose the moment of the day when it suits you, you don't need to listen to it right now at that moment, you are not limited, if you had other obligations. That was definitely an advantage. [ZA_FG_1]

> Yes, absolutely. I think I already said that. I'm saying in case you can't come to the lecture, you get sick for example, it's always good to be able to listen to it at home to stay up to date with the material and everything that's being done. As I've already said, personally it was easier for me to take notes during the pandemic. It's much easier when you know that you can organize your own time so that you don't have to listen to someone at that specific time, but when you can. So definitely, a good thing. [ZA_FG_1]

IM01/ E-learning/e-teaching should be based on a detailed planification

The planning of technological resources should be seen as a further dimension of educational planning in the remote digital environment. For the future, it is therefore very important to clarify the technological requirements and to plan how to meet them if online teaching is to be offered.

> I think realistically, not everyone has the same opportunities. If online teaching is something that is set as a rule, then maybe the institution should provide people with equipment and good internet and so on and all sorts of things and so on. I think it's a problem at some higher level. [ZA_FG_1]

> The same and maybe at the level of several faculties- lack of organization. They said that Big Blue Button was used, and when there was a problem with it. Everyone used platform they preferred and then it was a bit chaotic. Some teachers bought a Zoom subscription to be able to hold a lecture, because Big Blue Button didn't work as it should, and yet if you take the free version of Zoom, then it has the limitation so it's tricky.. uh, so I think that at the college level it could be done better maybe.. I mean, I know that situation started suddenly, but last year it was all still online and it was possible.. they could have arranged something to make it simpler. [ZA_FG_1]

> To better organize everything- that means at the level of colleges, universities, whatever. To ensure that if a tool is chosen, to stick to it, to get everything necessary for it, to pay subscriptions, whatever. And then enable professors and students to know how to use it. [ZA_FG_1]

IM02/ Flexible organization of the time tables, calendars, activities and mode of teaching delivery

Promoting asynchronous activities as a way of facilitating students' agendas and timetables also stands out as an option for the future, as long as those synchronous activities that have been developed as a priority face-to-face are maintained. All this entails an effort to improve the organisation of academic calendars, dates for handing in assignments, days for face-to-face meetings, etc.

Well, the fact that it can be accessed anytime, anywhere, that's for sure. So whenever you need something, even if it's in the middle of the night, you're studying something or you want to check it during a lecture, you can access it at any time and look at it. [ZA_FG_1]

Yes, we also mentioned that [digital online education], it is quite flexible, accessible, but I say again, as a kind of supplement, but never as a total replacement of live teaching. [ZA_FG_1]

6. Main findings and takeaways

In addition to the fact that we have worked with five different institutions in four countries, the great diversity of profiles, backgrounds and contexts makes it difficult to draw conclusions that are valid for the whole group. The perspective of master's students is not the same as that of bachelor degree students, and the outlook of novice lecturers, professionals who collaborate part-time without being fully integrated into the "academy", is different to that of veteran lecturers. Regardless of their academic profile, the range of the subjects taught is also very diverse, which implies very different levels of integration into the digital world, or very different conditions in terms of the type of teaching required for their subjects.

The wide range of actions, problems and views that emerge from the analysis of the data captured offers a very diverse picture. In the description of the complete panorama of all partners, the reader of this document can observe that there are some findings that are common to all situations and universities, but also very specific aspects that only occur within one of the partner countries.

Therefore, this section highlights the most prevalent elements most common to all the centres, based on the frequency of occurrence of the different analysis codes traced throughout the transcriptions (ranked below in Tables 2 to 7). These codes are used in the Section 5 reports to label the insights and quotations from the transcriptions. It is therefore also recommended to read the individual reports prepared for each centre analysed (Section 5): specific interpretation keys can be obtained to answer the research questions on a centre-by-centre basis.

In any case, the greater or lesser frequency of appearance of a given code provides an insight into the importance of certain aspects or the diversity of them, taking the five centres as a whole (Tables 2 to 7). It is important to enumerate all codes, some of which occur only three times or less, because all of them represent an inventory of meaningful ideas, analyses and proposals that justify looking deeply for them in the report of the specific HEI in which they have been captured.

Table 2. Traced occurrences for "Adaptations (AD)" codes (by decreasing frequency of appearance)

AD01/ Approaches to emergency remote teaching (8)
AD02/ LMS, videoconference and virtual classroom tools for online teaching (8)
AD12/ Student communications (LMS forums, teachers' feedback and mentoring, e-mail, messaging systems, videoconference, …) (8)
AD05/ Looking for new educational resources and use of OER (7)
AD07/ Recording videos of live lectures for deferred distribution (7)
AD13/ Exams, assessments and grading (7)
AD04/ Supplementary materials provided by teachers (5)
AD08/ Production of videos or voice clips other than recorded live lectures (5)
AD15/ University teaching support services (e-learning unit, library, TIC unit, …) (5)
AD03/ Adapting previous materials with features to enhance their use in the new emergency context (3)
AD09/ Task-oriented activities and workgroup (3)
AD10/ Strategies for more dynamic synchronous sessions (3)
AD14/ Ad hoc training courses and directions to support teachers in emergency online teaching (3)

AD11/ Enhanced directions for students' tasks, exercises, self-paced study, etc. (2)
AD06/ Creation of OER (1)

Table 3. Traced occurrences for "Problems (PR)" codes (by decreasing frequency of appearance)

PR09/ Difficulties keeping students' attention, participation and focus (10)
PR11/ Lack of appropriate equipment and connectivity issues (10)
PR16/ Sociability issues (10)
PR12/ Lack of adequate home space for teaching/learning (8)
PR18/ Students overloaded with work (6)
PR01/ Online replication of normal face-to face teaching (5)
PR14/ Communication challenges between teachers and students on the digital scenario (5)
PR17/ Psychological and health issues (5)
PR04/ Teachers overloaded with work (4)
PR10/ Exams not well adapted to remote emergency digital education (4)
PR19/ Decline in attendance at live sessions when a recording is available (3)
PR21/ Weakening of students' self-discipline and routines for carrying out activities (3)
PR02/ Dysfunctions of the hybrid mode when used to cope with COVID-19 mitigation rules (2)
PR03/ Lack of directions/regulations from the university on online teaching and evaluation (2)
PR06/ Not a good time to create new, purposely designed, material from scratch (2)
PR13/ Too many different video conferencing applications (2)
PR15/ Lack of on time feedback from teachers when requested (2)
PR23/ On-site field visits are difficult to replace online (2)
PR05/ Teachers' lack of knowledge about advanced use of digital platforms and tools (1)
PR07/ Lack of OER other than foreign language resources (English) (1)
PR08/ Access to library resources and copyright problems (1)
PR20/ Decline in students' academic performance (1)
PR22/ Students leaving (1)

Table 4. Traced occurrences for "Advantages (AV)" codes (by decreasing frequency of appearance)

AV01/ Time savings and more freedom to use it (less travel time, self-paced learning, students/teachers ubiquity, etc.) (10)
AV02/ Convenience for those who study and work (or are in internships or mobility agreements) at the same time (4)
AV04/ Promotion of the creation and reuse of educational resources (3)
AV03/ Self-paced learning and flexible asynchronous interaction beyond the class time (2)
AV05/ Better engagement with flipped classroom (1)

Table 5. Traced occurrences for "Lessons learned (LL)" codes (by decreasing frequency of appearance)

LL06/ Students' shift concerning digital skills (4)
LL03/ Recognition of the unique properties of face-to-face teaching contact in the case of certain activities (3)
LL05/ Teachers' shift concerning digital skills (3)
LL07/ Students' shift concerning self-organization skills (3)
LL02/ Pandemic has been a catalyst for digital transformation (3)
LL04/ Blended and hybrid learning modes are potential game changers for the future of traditional face-to-face universities (2)
LL08/ Concept clarification about what is hybrid, blended and online learning is needed (2)
LL01/ Entering university life has essential extra-academic components of a social nature (1)

Table 6. Traced occurrences for "Good practices (GP)" codes (by decreasing frequency of appearance)

GP01/ Videoconferencing as the new normal way for meetings with students and mentoring (4)
GP07/ Recording of lectures for further clarification and reuse (4)
GP08/ Videos and podcasts to facilitate the flipped classroom (2)
GP12/ Inviting guests to class from any place of the country and abroad (2)
GP02/ Asynchronous development of some interactive activities over the LMS (1)
GP03/ Better organization for the deadlines of assignments (1)
GP04/ Online oral exams through videoconference tools (1)
GP05/ Short quick quizzes (1)
GP06/ More holistic ways to assess students (1)
GP09/ Virtualization of project-based learning and gamification activities (1)
GP10/ Hybrid synchronous alternative for lectures, seminars, … (1)
GP11/ Sharing students' screens in practical exercises (1)
GP13/ Just-in-time shift to online live lectures if the teacher has to be away (1)
GP14/ Extended scope of what is meant by recommended bibliography (1)
GP15/ Internal digital information systems for teachers (1)

Table 7. Traced occurrences for "Improvements (IM)" codes (by decreasing frequency of appearance)

IM02/ Flexible organization of the timetables, calendars, activities and mode of teaching delivery (8)
IM03/ Promotion and support for improving OER use and creation (5)
IM05/ Teacher training and mindset change (5)
IM16/ Better integration of tools and resources into unified platforms for the online environment (3)
IM01/ E-learning/e-teaching should be based on a detailed planification (2)
IM04/ Coordination and cooperation among teachers (2)
IM08/ Improvement of the students' workload estimation when courses are planned (2)
IM09/ Blended teaching to improve face-to-face teaching (2)
IM15/ Strengthening the role and resources of libraries and support services for teachers (2)
IM06/ Standards and guidelines to guarantee the quality of online education (1)

IM07/ Differentiated teaching strategies according to the students' seniority (1)
IM10/ Asynchronous self-paced activities should have an essential share in online learning (1)
IM11/ Every course/class has to have an e-course component at the university's LMS (1)
IM12/ Guidelines for a better UX and content selection at the LMS virtual campus (1)
IM13/ Exams designed to assess competences, not just memory skills (1)
IM14/ Policies and guidelines for streaming and recording online live lectures (1)
IM17/ Transfer of credits earned in online courses outside the university where the student is enrolled (1)
IM18/ Partnerships with national information and documentation centres to create videos and teaching materials about their services (1)
IM19/ Promote the use of digital credentials (1)

Due to the qualitative approach of this study, the evidence obtained from the trends and opinions that occur most is important, but the full inventory of issues that the diversity of centres and people has allowed us to bring to light is also valuable. All the aspects and issues listed in the inventory as a whole are intended to support reflection on the conditions of university education in a digital environment, whether it is face-to-face, blended, remote online or hybrid teaching; whether in crisis situations or not. In this reflection, we also have to consider the contradictions that can be observed between the manifestations of one and the other (especially between students and teachers), as this demonstrates the difficulty of obtaining uniform solutions for such varied situations and actors, as well as the uncertainties about the future of university education, which already existed before the pandemic but which the Covid-19 crisis has only exacerbated. We can speak of the pandemic as a crisis within a more general crisis that was already being experienced by universities, which in many respects operate traditionally without radically taking on board what the penetration of the Internet and digital technology represents in society, and particularly among the young people who come to the university for their education.

6.1. The response to the pandemic

It seems clear that nobody was ready for the pandemic; however, in the different countries to which each HEI belongs the situation was treated differently, as we could observe in the data analysis. Each country had their own prevention measures, and each HEI even took specific directions from the general national health guidelines for education institutions. For instance, access to the HEI campus was completely restricted in some cases during long periods of time, while in other cases the situation was more relaxed after the first weeks of the pandemic outbreak. In those cases there was the option to do exams or practical classes on campus while keeping appropriate distances and wearing masks.

It is important to take into consideration that the topics covered during the interviews and the FG were very much focused on what happened in the first months of the confinement. That is, from March 2020 until July 2020 when the course finished with large limitations for doing exams and face-to-face evaluation tests. However, as the participants were interviewed during the first trimester of 2022, their responses include reflections on what happened in the second full academic year during the pandemic (September 2020-July 2021), which involved less severe but more diverse restrictions depending on the country and the types of subjects. However, the situation was still not normal in that full academic year in many of the centres analysed: although

some aspects detected during March-July 2020 could be solved, the belief in July 2020 that the following academic year would be almost normal came up against a stubborn reality, as it was far from normal and was experienced with great uncertainty among the teaching staff who had to prepare plan A and plan B for their courses. The return to situations of lockdown and restrictions in the new waves of the pandemic in the autumn of 2020 (after a summer that had suggested a return to normality) generated confusion, fatigue and pessimism among all the actors involved.

6.1.1. Context, attitudes and expectations

Facing the uncertainty of the situation with perplexity and pragmatism

- The word "rush" very accurately describes the process of switching all teaching to the emergency remote digital format. Indeed, there was no pause for teachers and students to re-establish themselves in the new teaching model, nor was the duration and extent of what was called lockdown clear. The harshness and duration of the confinement in most countries exceeded expectations and made it difficult to plan teaching alternatives logically and systemically. A break of a few days to adjust all the elements and actions would have been very useful. In fact, many of the interviewees questioned the non-modification of timetables and calendars in the remote teaching offer, which in the online format continued with what was already foreseen in face-to-face teaching.

- The situation oscillated between the "excitement" at the individual level of some engaged and creative teachers, and the shock that students experienced as part of societies that were also in shock, in which institutional responses (starting with the academic authorities and support services themselves) were also conditioned by uncertainty and lack of experience in organizing mass online education alternatives for the whole student body. The inertia of doing "business as usual" but remotely with a certain regularity and normality cannot be criticized without understanding the magnitude of the crisis situation experienced. In itself, the fact of continuing with certain teaching routines, in some cases with innovative initiatives of an individual nature developed by each teacher, must be seen as a success in terms of the resilience of the educational institution. In short, teachers felt that disaster was averted, although students expressed a more critical view.

Previous experience with blended learning or with LMS platforms for face-to-face teaching made the difference

- No doubt, previous experience in blended learning[4] in the case of a significant number of teachers (or even in full online remote teaching in a very few cases) helped them to deal

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[4] We use the term "blended teaching" for a model that requires the physical presence of both teacher and student at certain times, combined with online educational materials for self-paced, asynchronous activities and opportunities for interaction online.

with the shift to online remote emergency teaching. However, blended teaching is not equivalent to full remote online teaching; there is a face-to-face component in blended learning that was absent in the remote emergency teaching. Actually, this was a very prominent aspect of the problems experienced during the pandemic: the lack of direct contact at certain times between teachers and pupils, and between pupils themselves.

- Students in almost all centres had some kind of digital support in the form of a virtual campus to support face-to-face teaching. This means that the range of previous experiences with digital learning resources and asynchronous online dynamics is very varied, depending on the type of subject, the teacher, the degree, etc. In fact, a large part of the remote emergency teaching solutions started from this initial base. That is, that many subjects had spaces within LMS such as Moodle, while other teachers were introduced to Moodle more intensively as a result of the circumstances. In cases of teachers who followed institutional guidelines of compulsory creation of this digital space as a complement to face-to-face teaching, everything was easier, both for the teachers and students.

- The comments made by many of the teachers and students suggest that these previous experiences made the difference in terms of the effectiveness and smooth running of the alternative offered as emergency remote education. In any case, greater consistency was observed in those centres in which the experiences of blended or online teaching, as well as the use of LMS, responded to institutional policies and not only to the individual decisions of teachers.

Opinion on online teaching/learning

- Although teachers and students were asked about their opinion and attitude towards online teaching before the pandemic, their answers were mostly contaminated because the main experience from which they formed their criteria was during the pandemic. As we have said, it was an emergency solution that didn't allow them to gain a complete idea of what online teaching is, which would have allowed us to obtain more balanced opinions. In any case, we can affirm that the majority of students and teachers expressed a general preference for face-to-face teaching, although they were positive about the incorporation of some remote digital elements into face-to-face teaching.

6.1.2. Adaptations

Diversity of pedagogical approaches for the adaptations

- The solutions were very diverse, as was to be expected, since there were also diverse teaching strategies in the normal pre-pandemic situation. We can distinguish three strategies in the configuration of the emergency remote teaching to cover the class hours that were usually given in the planned face-to-face model. However, over the four

semesters for which information was received in the interviews and focus groups, it is possible that there was a transition between these three models for the same class-group or for the same subject, as well as solutions at intermediate points between these three situations:

- o Exact replication in synchronous online format of the previous face-to-face class timetable and activities.
- o 50% synchronous and 50% asynchronous allocation of time, with a symmetrical flipped classroom approach.
- o A mainly self-paced asynchronous model, with a few synchronous spaces (in groups or in person) for resolving queries.

- The need to adapt or create certain materials was evident in many cases, although as discussed in point 6.3 below, the presence of OER was minimal. Many efforts were made to modify and adapt materials, but this was at the level of the individual teacher/subject. Interviews with teachers show that many emergency adaptations were made, but due to their very nature of being an urgent response to an unforeseen crisis, they were made without a clear approach to group work and a vision of a future use of these new materials adapted to the crisis situation in a scenario of a return to normality. It was necessary to respond immediately in the best possible way, it was necessary to get out of the blockage of teaching routines caused by the confinement. In a crisis situation such as the one we experienced, cooperative planning does not seem to have been possible.

Between synchronous and asynchronous teaching: not an easy choice during the pandemic

- It is interesting to note that in centres where asynchronous activities, which required students to have more self-discipline, were emphasized to a greater extent, students reported problems of "procrastination" or lack of dedication. On the other hand, in centres where the emergency solution was approached with a greater volume of synchronous activities replicating the rhythm of pre-pandemic classes, students said that an asynchronous approach combined with flipped classrooms would have been better. In short, beyond technical solutions or pedagogical approaches, in the end what is essential for achieving meaningful learning is the students' capacity for self-organization, their maturity, their willingness to learn, and their self-discipline. The quality of the resources, the tools, the teaching organization and the attitude of the teaching staff are also important, but learning has to become a reality in the actual student, who is responsible for their own process. However, this is not easy, as one student said, "I don't like these online things at all. I think it's much better to actually go to the university. Because then you are more forced to kind of listen, to do something" […]"The daily structure was really destroyed. In the past, when we had two hours between lectures, we couldn't go home so we went to the library". But at the same time, another student expressed their satisfaction with the self-paced asynchronous model: "The flexibility is one of the biggest advantages". A fine-tuned and appropriate teaching strategy adjusted to each circumstance is a major challenge. It is possible that the solution for this is related to the learner's willingness to learn.

- What the comments in some cases highlight is that as much as we have talked for years about the potential of combining the flipped classroom model in normal situations, once the pandemic hit, it turned out that students and teachers had little experience in harnessing the potential of combining synchronous online teaching with self-paced learning using digital teaching resources (content, activities, etc.) that can form the basis for the much discussed "flipped classroom". At least the comments showed that this was not a problem in itself of emergency remote teaching, but rather a lack of acquired routines to make the flipped classroom experience really efficient. It is a potentially very positive model, but one that requires a lot of planning from the teacher and a lot of commitment from the students, a commitment that in the pandemic environment was diluted by a major problem of motivation and effective student-student, student-teacher interaction.

- No model appears to be perfect: teachers and students with "self-paced asynchronous learning" activities complained, as did those with "scheduled synchronous learning" activities. Motivation, engagement, instructions, and planning could explain the problems in the two models, and maybe should open the discussion about the need for a mixed approach.

Software to create the digital spaces (LMS and videoconference software)

- As mentioned above, LMS played a key role in the migration to remote emergency teaching. Moodle was the most widely used programme, which undoubtedly played a key role in the response that universities had to provide in the form of "remote emergency teaching". Many lecturers were already using Moodle to support their face-to-face teaching, so there was a starting point for activating the campus as a substitute teaching space for the physical classroom. It was also a key solution for conducting activities, including quizzes, or for integrating online video conferencing sessions and derived recordings managed with software such as BigBlueButton, BB Collaborate, Zoom, etc.

- Beyond the cases where there was a consolidated use of an LMS, HEI were not ready with the required technological infrastructure for the shift to "all activity online", that is, including teachers, students, general staff, etc. However, the shift to online activities could be considered as fast rather than slow, taking into account that the kernel of these institutions is face-to-face teaching. HEI acquired software such as (SaaS) service licences or equipment to deal with the situation sooner rather than later. The high demand for videoconferencing put into crisis models such as BigBlueButton hosted on the university's own servers, which could not keep up with the demand. In this sense, universities that opted to outsource this service with SaaS licences generally had fewer service availability problems, despite it being much more expensive.

- In cases where there was no solid support for videoconferencing solutions for teaching, or where the existing solution hosted on the university's servers was overwhelmed by demand, each teacher made individual decisions on the software to be used; some even

personally funded subscriptions to Zoom, for example. This led to a recurrent problem expressed by the students, as they had to become familiar with different platforms/tools (Skype, Zoom, Google Meet, Teams, BigBlueButton, etc.) for the same function depending on the subject/teacher they were involved in.

Student communications (LMS forums, teachers' feedback and mentoring, e-mail, messaging systems, videoconference, …)

- There was an increase in the volume of messages exchanged between teachers and students (e-mails, forum messages, feedback on assignments). What in principle should be seen as a positive response from teaching staff to communicate with their students (although they did not all respond/interact quickly), actually became a problem as students complained about having too many messages. While face-to-face classes generate a temporal space for this communication, the circulation of messages from each of the subjects at any time during the day generated a certain confusion and saturation.

The controversy about recording live synchronous sessions for deferred distribution

- To record or not to record live classes was a very present dilemma throughout many of the interviews with teachers. The debate was kept alive when there was no longer confinement, but there were still some students who had to miss classes as they had tested positive for COVID-19.

- Most of the teachers interviewed started to record their live lectures, but expressed concerns about the use of recording the synchronous lectures for deferred distribution. Some of them kept the recording of their live lectures during the lockdown period, as some students requested them and it was an option that the centre suggested to help students. However, some teachers were sceptical about the real need and usefulness of uploading the recordings of the lectures, and some others said they decided not to record the classes to avoid the risk of attendance and participation decreasing in classes.

Exams, assessments and grading

- Exam adaptations ranged from keeping the exam format (as it would have been in a face-to-face mode) but activating remote surveillance measures as much as possible, to changing the exam model (to test-type with progress and time control, to essay-type or online oral exam) to avoid or limit invasive monitoring control systems. In a significant number of cases, the final exam was replaced by continuous assessment tests or coursework. As we will see later in the section on problems, a large number of objections from the students were related to this issue. Many students felt that the forms of assessment did not consider the emergency situation experienced.

6.1.3. Problems

- Without being able to generalize, in many cases emergency remote teaching was organized as a kind of replica of classic face-to-face teaching, but without the relational and communicative properties of this digital environment. It can be seen that despite various innovations, what occurred was a substitution of the normal classroom for videoconferencing software, with which the traditional experience and dynamics were replicated. In this decision, the assessment made by teachers, and some students, of the need to maintain the rhythm and obligations of the students temporarily set by the calendar/class timetable played an important role.

- However, some students complained about teaching styles that were not adapted to the new situation, and perhaps they were not always sympathetic to the challenges teachers had to face because of the pandemic. Certainly, to better balance opinions, we should keep in mind that it was necessary to act "reactively" and not proactively in the face of the emergency situation. It was a "survival teaching mode" situation that largely avoided disaster, but it cannot be taken as a reference for what a well-planned remote digital teaching offer can be.

Difficulties keeping students' attention, participation and focus

- Teachers and students commented extensively on the issue of the degree of interaction in synchronous classes, i.e. the usefulness and rationale of being all together for the same period of time in a common specific place (physical or virtual). In cases where the classic face-to-face classroom model was replicated digitally, there was a perception among teachers and students that participation decreased and became less spontaneous, or at least less efficient, although there were exceptions where teachers perceived even greater participation.

- The black camera mode on the students' side triggered a kind of "feedback blackout". The lack of clear feedback from the students, especially through spontaneous verbal and non-verbal communication like in the face-to-face classes, was an important conditioning factor for the teachers' actions. The constraints of unclear academic and legal regulations made many teachers doubt whether they could force students to be connected with audio and video. In addition to this, the problems that students state for not being connected are recurrent in many of the FG analysed: privacy, insufficient bandwidth, problems with audio and video peripherals, etc.

- Teachers highlighted the difficulty of maintaining students' attention, and some of them identified a key issue: it is very tiring to be "active" in front of the camera after long hours watching a screen without any social interaction. This situation resulted in less and less

interactive and engaging class sessions for the students, less involvement and more demotivation. In any case, some problems observed during the pandemic are the same as those that existed before under normal conditions, but the pandemic and remote teaching clearly aggravated them.

Work overload of students and teachers

- A common element that can be observed in the statements of the students participating in the focus groups concerned work overload. In a considerable majority, we can say that students perceived that the workload increased. They had the perception that they were asked for "more homework", "more reading", "more work" ..... It does not seem to be a problem of perception based on a personal experience conditioned by a possible reduction in concentration and work capacity resulting from the effects of the confinement itself on the students. It is true that a certain determination of the teaching staff to give a committed response to the crisis led them to consider activities to be a way of overcoming the lack of face-to-face teaching. The lack of time for analysing and adjusting workloads in new or adapted activities, as well as the decline in performance among students as a result of the confinement itself with its severe emotional effects, were factors that we can see clearly now but which were not considered at that time. On the other hand, this overload of activities could sometimes be linked to an attempt to replace traditional examinations with a higher number of continuous assessment activities. However, there was a consolidated opinion among students that lecturers miscalculated the workload (with the excuse "you are at home" or "you have nothing to do later").

- The teachers also had a stress situation with a large work overload in most of the cases. Not having experience in online/remote teaching was a challenge because it caused a tougher learning curve during the same time that they were setting up the courses and educational material for classes every day without a break. Preparing materials for online work and also adapting themselves to the online teaching was a challenge because of the work overload, for instance creating new materials like canned video lectures. Altogether this caused a work overload and a large demand on their time accompanied by the feeling that they didn't receive enough institutional support.

Socialization, psychological and health issues

- Human problems (socialization, communication, health, etc.) were a more important key factor than others, such as technological ones. In the end, from the point of view of overall performance, technological or pedagogical problems were solved more or less, but if one thing is common throughout the interviews and focus groups, it is that "human" factors related to interpersonal communication, health, preservation of home privacy, etc., influenced the students' and teachers' psychological state. This undoubtedly had an impact on the development of teaching activities during the various stages of the pandemic.

- Students said that their relationship with their peers and teachers was very detached. They added that the online system did not allow sociability as in face-to-face classes, and not everybody was prepared to attend online teaching. Socialization activities were very compromised by the lockdown and other protection measures for coping with the pandemic. It was a very problematic situation especially for students because young people need these spaces and activities to develop their relational skills. It was especially critical for first year students at the university who did not have a network of new acquaintances among their classmates. Experienced students had more social contact with their peers because they had made working groups or social groups in the previous academic years, which was not the case for new students. The social and initiatory function of the culture and university life was completely missing at the organizational level.

- Our data analysis highlights the concern of some lecturers in different centres about the loss of social contact, a core element in face-to-face universities at the beginning of the student's degree. Teachers tried to avoid that students became isolated and tried to accompany students in their learning process. Some teachers' strategies for supporting student socialization included setting up some task-oriented activities in groups and giving room to informal chatting during live online classes.

- Home lockdown at the strictest times meant not going out at all to go for walks, see friends, or go to the university campus. This exacerbated all sorts of emotional and mental health problems and conditions that normally occur among the students. Under normal conditions, interacting with classmates and faculty has a positive effect on the life of the troubled student. However, with less visual/spatial interaction, the implicit support provided by personal relationships became very difficult to obtain away from the routines and socializing opportunities of academic life.

- Problems related to the physiological dimension of learning were also raised. For instance, "How many hours in a row can a person spend in front of a screen?" And also how long should a class session last? and is the break time between classes necessary? In any case, being limited to one screen (or hopefully two) as a mediation for "being" in class, and the physiology of limits of perception challenged by being focused on a computer screen (not always of large dimensions) was indicated as an added factor for causing fatigue in paying attention and effectively following the "relayed" classes.

Lack of appropriate equipment or work spaces at home

- Many of the students who were living out of home had to come back to their parent's house to continue their academic life. Similarly to those who were living with their parents at the time, they all had to deal with a variety of situations such as sharing a computer with the rest of the family, and sharing studying spaces and Internet bandwidth connectivity, which made the learning process more difficult than usual. A significant number of students

commented that the situation meant that they had to buy updated equipment, computers, cameras, screens, etc. or to hire more bandwidth.

- An important issue was the absence of reserved spaces to work without interruptions, with privacy and with a good Internet connection (because during lockdown most people were sharing everything with their families). In the end, it is undeniable that it is necessary to have adequate devices, connections and spaces to be "visible" and participative, and to be able to focus on following the class.

- At different levels, some teachers have also had these problems, but they were more common among students. Lecturers also had to use the equipment they had at home, which was not always optimal. Space and family conciliation was also an issue to solve.

Exams not well adapted to remote emergency digital education

- Assessing, monitoring and grading in remote teaching was one of the main concerns that emerged during the pandemic period. The contrast between the teacher experience and the student's expectation and experience is very interesting. In general, students expected a more tailored assessment. For them, the exams were very similar to the usual ones, but conducted online with a series of complex mechanisms to ensure that they did not copy. In the students' words, the concern about establishing systems to control cheating and the identity of the person taking the exam has a lot to do with the fact that a part of teaching is still focused on memorizing information rather than on learning.

Students' academic performance was compromised

- In general, teachers said that the exceptionality of the situation affected academic performance and learning levels, although in some very specific and minority subjects, performance was assessed as even better than in the normal situation immediately before. However, in general, the impression obtained from reading all the transcripts is that there was a "lowering" of the thresholds so that students could pass the subjects and that teachers adapted the assessment to the precarious circumstances of the teaching provided. Some students, especially those in the final years, were also concerned about the lowering of learning standards and what this might mean for their integration into the labour market.

Gaps in digital competences

- Another issue to highlight is the gaps in the teachers' digital competences, which were difficult to solve during the pandemic. In most cases, it appears that only a few teachers had the adequate skills to be ready for online teaching during the lockdown.

- Furthermore, it can be seen that students also have shortcomings in their digital competences considering some difficulties identified by themselves and their teachers. The nickname of "digital natives" addressed to students, and likely to some younger teachers, seems to be questionable considering the answers of the students and teachers. Students had issues solving their digital skills and competencies, but, in some cases, they also had the same inadequacies as teachers in relation to digital skills. Moreover, students needed to learn about issues like how to behave in class in relation to engagement, participation, and time management of their tasks.

6.2. Looking ahead: reflection on the digital transformation of HEI education

It is important to bear in mind that the process of reflection that we are carrying out based on the experience of the pandemic is conditioned by a multitude of factors inherent to the crisis experienced and by the indisputable fact that in reality all teachers in all centres, with greater or lesser success or intensity, transferred their usual teaching to emergency remote teaching. We cannot draw generalizable conclusions about digital online education because it cannot be said that what was done was to apply a comprehensive, canonical model of what experts in online education define as such.

Moreover, many of the things that are mentioned as good practices, as lessons learned or as things that need to be improved have to do with teaching in general, and are not necessarily linked to a particular event like the pandemic. If we had carried out an equivalent study before the pandemic on how lecturers view their teaching performance, or students their learning, and how we should approach improving university teaching quality in the near future (without the pandemic crisis having happened), we believe these issues would have appeared just the same.

6.2.1. Advantages

Time savings and more freedom to organize one's personal agenda

- One of the great advantages of remote online education is the freedom to be anywhere while taking the courses and savings in time and money for transportation. Certainly, saving travel time and being able to be wherever you want is convenient (for both teachers or students) and there is a large consensus among the teachers and students interviewed that it is one of the advantages of remote digital teaching. However, at the same time, some students emphasize that the routine of going to the university, of disconnecting from the family or home environment to connect with a different environment in which there is greater socialization with classmates and teachers face-to-face is fundamental and positive. This reflection leads to the question of when and why the synchrony of being all together at the same time (face-to-face or remotely) is necessary. There are contradictory opinions regarding the advantages of face-to-face/non-face classes, which should be analysed in the

context of the debate on when synchrony is necessary and when asynchrony is necessary in learning activities.

- Therefore, reconciling the principle that personal contact is a strong point of face-to-face teaching with the perceived convenience of the online mode in terms of travel savings seems a difficult challenge to solve. In any case, it is necessary to demonstrate that when a face-to-face class is held, the results are sufficiently satisfactory to compensate for the effort of travel. In any case, after the experience during the pandemic, the return to "normality" will make it important to better justify the "return of investment" when travelling to attend a class in person in the classrooms of the university campus. It is very interesting to note some indications of the effect of the online experience on the return to the "normality" of face-to-face classes. Some teachers note a change in mind-set among students who, during the pandemic, experienced the relaxation of attendance control and now do not appreciate the usefulness of attending certain classes.

Convenience for those who study and work (or are in internships or mobility agreements) at the same time

- In the case of the last year of bachelor degree courses or master's programmes, it has been seen that the online modality allowed more students to attend the sessions than the face-to-face classes did. Since most of these students work at the same time as they study, or some are in internships linked to their degree, they can access the classes from their workplaces or homes, while face-to-face work makes it impossible for them to be in two places at the same time, or prevents attendance because of long distances and not having enough time to travel to the class.

Promotion of the creation and reuse of educational resources

- Although the pandemic situation has not been the ideal setting for the well-planned creation of resources, the teachers' reflection on these issues is that digital-oriented education, whether it was mainly face- to-face, blended or fully online, fosters the creation and control of access to new education resources and this results in a democratization of knowledge. The use of digital tools encourages sharing open resources and everybody can use these resources.

6.2.2. Lessons learned and good practices

Online remote teaching/learning requires planning and an institutional framework

- There are some reflections to consider in the shift to a digital transformation. A digital transformation does not only consist in buying SaaS licences to make, create or generate videoconferences, video lectures or educational materials, HEI institutions and their staff need to go beyond this. First, the national level of every country's policy should include the digital competencies and digital pedagogy of HEI teachers. Furthermore, agencies of quality accreditation have to set guidelines for evaluating the educational programmes.

- During the pandemic, full online universities made recommendations on how to work/teach online, but they did not take into account that their inner structure is different from face-to-face HEI and their students are used to learning online. Therefore, best practices for digital transformation should be a combination of recommendations from online universities but also best practices extracted from face-to-face HEI. Centres that teach mainly in a face-to-face mode need to reflect on the purpose of their future endeavours in digital education, both blended and fully online. They need to answer the questions of how this shift would be possible to fit in their strategic planning and what mix of remote and face-to-face activity they should have.

Properties and requirements of each mode of teaching/learning should be balanced in a fit for purpose analysis

- Many of the things that are consigned to "good practice" among the reports for each centre analysed are applicable to a broad range of situations, whether in face-to-face, online or hybrid models. In the end, the pandemic has accelerated the adoption of solutions that are useful for any teaching model and for all kinds of situations. Some initiatives of online digital education during the pandemic at those HEI who have traditionally offered the face-to-face mode of education are worth assessing to extract good practices even as a complement for face-to-face courses. However, it should be made clear that those HEI students who attend face-to-face lectures expect a personal experience that is connected to a social dimension of learning.

- It is indisputable that the teachers' complex experiences teaching during the pandemic with "emergency remote teaching" has had a profound effect on them. Almost all of them, in a very large majority, are happy that face-to-face teaching has returned; however, they say that it is now complemented by activities that they have experienced in the digital environment. Many are committed to a flexible combination of activities under what is known as blended learning. For example, for Master's students, a reduction in face-to-face attendance combined with synchronous and asynchronous digital elements can be very beneficial because most master's students work and study, or are geographically further away from the university that offers the training programme they are interested in. For

undergraduates, especially in the first two years of their degree programme, it is not at all appropriate to consider giving up face-to-face learning.

Videoconferencing as the new normal for meetings with students and mentoring

- Surprisingly, the pandemic has helped us discover tools that we already had but surprisingly did not use much. This is the case of the personal meetings with students to solve doubts of mentoring work in progress. After the pandemic experience, institutional videoconferencing tools (like Teams or Zoom) have remained very common tools that are used every day because they are very convenient for holding student mentoring meetings and organizational meetings with other teachers. Videoconferencing is now the new normal for ordinary meetings because it is convenient and facilitates the setting of meetings regardless of where the participants are located. Now it is less complicated to set appointments for meetings.

The crisis situation boosted a digital skills shift among students and teachers

- Working remotely, using a variety of online resources for teaching/learning purposes, has had a positive effect on the digital skills of students. The intense period during the pandemic, with sudden and forced use of digital tools, has led to an improvement in students' digital skills, especially in terms of communication and group work in a digital environment. They also considered that they have acquired better digital habits with new tools and ways of using information.

- Some teachers commented that they were forced to quickly acquire a lot of useful digital knowledge and skills that otherwise they would not have obtained due to lack of time. All the research the teachers carried out on the features of the institutional platforms the university offers, and all the experiences they had with them based on trial and error, have accelerated their acquisition of knowledge about digital skills and their more normal use outside the acute pandemic period. Despite a return to normal face-to-face teaching, some tools and strategies have been refocused in the light of the experience during the pandemic.

Video recordings and interactive tutorials have been rediscovered… Are they here to stay?

- Some teachers recorded podcasts in audio format or video recordings of the lectures to offer a support to self-study, as well as readings in a kind of "flipped-classroom". Students said it was a good practice for a smooth preparation of the face-to-face classes. This is an example of asynchronous teaching during the lockdown that could be replicated in the shift to normal times. Some students considered these materials to be very convenient and positive for self-paced learning; however, other students, as we have seen before, were

reluctant to give up the regular timetable replacing them with all or some classes in a asynchronous way. So that these good practices for flipped classroom present risks for students with weak self-organizing habits, as has already been noted in previous comments. A balanced assessment should be made because producing those materials is time-consuming, especially in single-teacher subject environments with practical content that changes continuously over time.

6.2.3. Improvements

Most of the possible improvements for the future are implicit in certain findings related to "Problems" and "Lessons learned". In the section of "Improvements" for all the centres, the teachers' and students' comments were more dispersed, as can be seen in Table 7. Some of the most prevalent comments are linked to the promotion of OER and are summarized in Section 6.3 below.

Flexible organization of timetables, calendars, activities and modes of teaching

- In the case of a possible future crisis, but also for improving the traditional face-to-face teaching, it would be good to have more freedom and flexibility to organize teaching activities beyond the traditional weekly timetable. There were also some ideas on reducing some time slots allocated for synchronous classes to be able to split class times in half, for instance because, as happened in front of the screen during the pandemic, students cannot maintain their attention sitting in the classrooms for quite so many hours. This idea is linked with boosting asynchronous operation so that everyone can keep up with class work at their own rhythm. It could be a kind of "reinvention" of face-to-face teaching with activities that don't require bringing all the students of a group together in a specific physical space. That is, reproducing old face-to-face trends in online digital teaching should be avoided, and, most importantly, it is necessary to take a fresh look at how to teach face-to-face.

Integration of digital educational strategies and resources into teachers' continuous professional training

- As the future of university education could become more and more a mix of face-to-face, blended and online education, teachers need to be trained well in each mode of teaching. However, the digital context of education is evolving so quickly that universities are facing a huge challenge. This new panorama needs university teachers to apply a systematic approach to their continuous professional training.

- An important issue that is not solved as yet is equipment. Since in the HEI there are students from a wide range of social and economic situations, those who have economic problems need to be helped to reach the online environment by any means. Even in the future, with possible new developments like virtual and augmented reality or the metaverse, having the needed state-of-the-art hardware and software for teaching will be a challenge that should be addressed with prospective task forces inside each HEI. It may be necessary to lend/lease equipment to students under a social approach, and to provide integral financial support for grants for enrolment.

Strengthening the role and resources of libraries and support services for teachers' educational tasks

- Teachers and students both had the perception of a lack of institutional support, regardless of what the institutions tried to offer. Possibly they were not aware of the efforts of these services, as there were also some good experiences of that support. However, the teachers' comments suggest that in most cases they believe the support services had a limited capacity and a reactive approach that was not proactive enough. For instance, based on teachers' comments, there was no significant evidence that the role of the library during the pandemic in any of the centres was perceived as a "game changer", providing emergency blended learning resources together with other university units devoted to teaching support.

6.3 Takeaways on OER creation and improvements in use

The DECriS project aims to create a framework for proper adoption of OER in general, and in crisis situations in particular, to improve the quality of the DE and expand the possibilities for collaboration and knowledge sharing. Therefore, analysing what teachers and students said about their experience with educational resources during the pandemic could help to identify barriers and enable levers for creating and using OER.

Thus, in this section, we first present a synthesis and commentary on what we observed among teachers and students regarding the use of OER in the context of the educational resources that have been discussed in the interviews and focus groups. Second, we detail reflections and lines of work for promoting the knowledge, use and production of OER. A series of forward-looking proposals have been formulated based on the analysis of the teaching practices and problems observed during the pandemic in the centres studied, and taking into consideration what the participants proposed as lines for future work.

The overview and the statements we make here are the result of fieldwork with LIS teachers and students from five HEI in four countries (Germany, Bulgaria, Croatia and Spain). Therefore, it should be considered as a new partial contribution to the study of the penetration of OER. This limitation implies that the findings reported cannot be generalized to a worldwide level or to any thematic area of university education. The penetration and vitality of OER is certainly very varied, as there

are different contexts in which different adoption speeds are observed, and in which the results would certainly be more positive. There are some geographies, disciplines and institutions that are much more advanced in terms of OER and others that are at a similar stage to the one described in this report, or even worse.

6.3.1. Use and creation of OER during the pandemic

The Covid-19 pandemic did not encourage HEI to increase the use of OER

- It is in everything related to OER use and creation where a higher degree of coincidence has been observed among the items raised at the interviews and focus groups from the five centres. We can affirm that OER are largely unknown or ignored in the practice of most of the teachers interviewed. In the case of those teachers who are aware of OER they say that they did not find what they needed for their classes. Therefore, this overall view of OER use and creation based on the comments of teachers and students participating in the IO2 study is a kind of confirmation of what DECriS IO1 pointed out. Furthermore, in DECriS IO1 the answers were provided by deans, directors and programme coordinators; however, the reported 50% OER use in IO1 seems a little too optimistic as an overall estimation, as it contrasts sharply with the much lower use of OER among the actual teachers interviewed in the IO2 study.

- It needs to be understood that we are talking about OER considered as a well-defined typology of educational resource with some distinctive characteristics (UNESCO, 2019) that differentiate them from the multitude of resources freely available on the Internet that can have a didactic application. As an example of those resources not considered OER, it can be said that a good number of teachers reported the recurrent use of YouTube and some other video portals to obtain resources to support their teaching. While some videos on YouTube may be the result of projects consciously carried out as OER in their canonical definition, and may be shared with the corresponding use notes and educational scope, the large majority would not correspond, in either the type of licence or the type of pedagogical contextualization, to a good "canonical" practice in the creation of OER.

- References to OER in the students' focus groups were minimal when OER were explicitly mentioned in the context of the materials proposed by the lecturers for following the subjects. In those cases, where the subject did come up, it was clear that the students were unaware of what was being referred to, which is normal for students in other degree programmes, but more surprising considering the courses these students were studying. Students did not have the perception that they had used OER provided by teachers. When they did talk about that, their knowledge was blurred between open access academic papers and books, OER and free resources of any kind on the Internet. As future librarians, and as information science specialists are one of the leading advocates for OER, it is a bit disappointing to see such low awareness about OER. This is indicative of the necessity to include the issue of OER and free resources in LIS educational programmes (in certain courses).

- This low permeation of OER among the participants in our study is consistent with the data obtained in DECriS IO1, according to which 2/3 of the responding institutions did not have an institutional policy on OER. In fact, we could say that, of the five centres considered in the study, only two of them referred in the interviews to teaching support structures with a certain capacity for structural support for the creation of materials.

- There was interesting evidence of educational resources being produced and made openly available, although not under a fully canonical model of what is meant by OER, for instance their incorporation into an OER repository or directory. Teachers endorse the OER philosophy, but their productions are not conceived as such under this label and with these characteristics. Actually, during the emergency remote teaching, lecturers had to tailor their previous materials and create some new ones for distance teaching, but they did so without the OER requirements and practices in mind. Certainly, some teachers made selections of new material; however, they mainly updated, removed and replaced resources previously used in face-to-face classes based on quality, specifications and utility in the light of the new emergency situation. Few teachers used OER, at least with the teachers being aware that the resources they used could be defined as OER, and that they were consciously using that kind of educational resource.

Constraints of time, exception and uncertainty

- The emphasis of the teachers' answers was on the actions for adapting the sessions and the activities, which in most cases were carried out with a short horizon of time ahead for planning because most teachers did it on a week by week basis (even day by day). The complexity and uncertainty of the moment did not promote the thoughtful and planned process that the creation or adaptation of OER requires.

- The reason for this low level of use during the pandemic is partly explainable if we take into consideration that to a large extent, in all centres, the transformation of teaching was carried out from one week to the next. A provisional and emergency approach was used and it was the individual responsibility of each teacher. Thus, teachers mainly used the same materials and the teaching plan that he/she had already prepared with some adaptations. Although there were exceptions, adaptations that did not start from teachers' prior use and knowledge of OER did not take these resources into consideration. The process of localization, adaptation and implementation in the teaching plan of a subject was sufficiently difficult and time-consuming for teachers. This explains why OER in their "canonical definition" were largely absent in the emergency teaching that was carried out. The lack of information on OER, the dispersion of OER in very different places, with inefficient directories or repositories, the lack of OER in the teacher's own language, and the irregular quality of the OER, are elements that have been identified as possible explanations for this situation.

- In a crisis situation such as the one we experienced, cooperative planning was not very feasible. Moreover, if we analyse the way in which many university lecturers work,

pressured by many factors that compete with teaching activities such as research and the evaluation processes for promotion and tenure, it can be asserted that teaching continues to have a high component of personal and hands-on elaboration, especially in bachelor and masters' degrees where the number of students and groups for the same course is not very high, as is the case for LIS programmes. In this sense, we understood that the teachers participating in the study did not mention OER as a key part of their answers because integrating these resources into teaching routines, whether as creators or as adopters, would involve a large learning curve, as well as an effort for searching, planning and cooperation, which even in "normal" teaching situations is not usually undertaken due to the intensity of the teachers' day-to-day work. When teachers worked in an artisanal way, preparing the next classes "on the fly" because of the conditions caused by the pandemic, it was even more difficult to integrate most of the OER available because the resources do not often work as an out-of-the-box solution. In many cases, for good use, it is necessary to make adaptations to establish links with the specific syllabus and teaching plan of the course. It is also often necessary to translate the resources into the national language.

- Our DECriS project assumes that OER in crisis situations would be a key resource for materials for online teaching. However, the question arises as to whether this starting point is correct. That is, if OER are not even minimally present in the mental framework or current routines of teachers in normal situations (as direct users, recyclers or creators) OER are unlikely to be taken into account in crisis situations. As demonstrated in both the IO1 survey and the IO2 qualitative study, the presence of OER has been very low (testimonial, one might say) in the solutions adopted in response to the shift to various forms of online or hybrid teaching due to the pandemic. In short, OER are not a magic "pill" to lower the fever, they require exploration, evaluation, adaptation and a final fitting to the subject, tasks that were impossible to carry out due to the rush of the first lockdown and the uncertainty of the following semesters.

Reasons for not using OER

- It is interesting to see that some reasons for not using OER expressed in the IO1 survey can also be observed in the teachers interviewed, such as: the belief that the use of OER is an individual choice, that the teachers are not familiar with the OER concept, and that the teachers cannot find OER coverage for a specific course, there is no OER in the national language, they do not trust the quality of OER, and they do not have the tools for locating OER, among others.

- Looking for new educational resources to enhance their remote emergency teaching solution was a regular activity among most teachers. However, there was very little specific focus on searching for OER or using them. Some teachers indicated that they did not use OER for a wide variety of reasons. For example, they stated that it is very time-consuming to look for them and later adapt them, and they did not find appropriates OER.

- However, it is possible they did not use OER because they had a blurred idea of what OER are and where to look for them. In fact, in some cases, the teacher's answer was that they

were not aware of whether they had used them or not. Therefore, maybe there is no clear awareness of whether the educational resources located on the Internet during the pandemic were OER in the canonical sense of the word or not. This evidence highlights one of the current weaknesses of "canonical" OER, which is their absence from teachers' mental framework, and that teachers do not know about their distinctive characteristics or where to locate them and how to evaluate them.

- Another emerging topic is the need for open educational materials that fit well into the teaching planification with not much work, which are ready for teaching with little or no adaptations at all. This issue also emerged in some cases, considering that it is difficult to find open educational materials that are ready for teaching and therefore teachers' requirements are not always covered. In addition, the barriers in relation to language are important because in most of the cases the materials are not in the language of the course, but rather are generally in English.

Teachers' information seeking behaviour and OER discoverability issues

- Problematic key issues for OER use that teachers comment on are discoverability and selection after assessment. However, the majority of teachers do not express an awareness of how to search for "canonical" OER in specialized sources, such as repositories, directories or guides. They state that if they do search for these sources, they do not find the results they obtain satisfactory. Nevertheless, a large number of teachers use YouTube as a key source for locating videos for use in their lessons and activities, which demonstrates the importance of the effectiveness of discovery mechanisms in teachers' behaviour. It is interesting to note that some teachers share the links for videos on YouTube, or TED talks by key authors whose books and articles they have included in the subject bibliography they recommend and comment. This reinforces that the main source for finding OER-type resources in video format is actually YouTube.

- The prevalence of YouTube as the most cited source by teachers and students tells us that something is wrong with the specialized sources for locating "canonical" OER. Further analysis of this problem with factual data from an exhaustive search of the transcripts of the interviews with teachers offers a rather gloomy outlook. Except for OpenHPI in the case of Hildesheim teachers, or the EINFOSE project by Osijek teachers, throughout the interviews of all teachers there was absolutely no mention of specialized OER information sources, be they general or specialized in LIS. Thus, sources such as MERLOT, OER Commons, Open Textbook Library, OpenStax, EBSCO Faculty Select, or similar do not appear at any point. This indicates that maybe we should invest more in promoting and 'marketing' OER sources at HEI, e.g. through the library and faculty web page, official social media pages, etc.

- There is also no relevant mention of OER searches in institutional repositories or in aggregators of these repositories. This evidence contrasts with what the answers to the DECriS IO1 survey revealed: institutional repositories were mentioned by deans, directors and programme coordinators in the survey as sources for locating OER, but knowledge and

use of national or international repositories, specialized in OER in general, or in LIS in particular, were not reported. In the interviews in this study, except in the case of Zagreb, there were no significant mentions of the role of institutional academic repositories for finding OER. Moreover, the mention of Zagreb was about the low presence of OER in the national repository Dabar.

- Searches to locate resources and tools were not focused much on OER, which were searched for and used only in a few very specific cases. Real purposely built OER materials were mostly absent in the teachers' discourses and reflections. In this sense, they did not differentiate between open digital material (books, journal articles, etc.) and the educational resources that would respond strictly to the set of characteristics that define an OER. In some cases, in which OER were specifically mentioned, teachers said the OER they found could never be adapted to what they really needed, beyond tutorials or textbooks in some cases. In any case, the knowledge and use of OER repositories of this type of material is seemingly very low, almost negligible. OER were not on the agenda before the pandemic, nor were they taken into account, as might have been expected, during lockdown.

OER creation/sharing obstacles

- Teachers' reticence to share and self-criticism of the resources they created can be traced in some answers. Some of them fall under the syndrome of "not good enough" or "not completely finished" to share. As was stated in DECriS IO1, the creation and implementation of OER is often the result of an engaged individual. This artisanal and rather individualistic approach means that the creators of educational resources often lack feedback from an objective, external perspective on the relevance and quality of what they create. This contributes to many teachers being self-limiting in terms of sharing these resources in public and open spaces, although they do so among close colleagues in a peer-to-peer model that leaves no public trace for other potential users.

- In addition, there is a kind of fear to offer a decontextualized piece of the set of contents or activities of a subject, which is based on the mistaken premise that if everything created cannot be shared as a well finished and complete set, there is no point in sharing isolated pieces. The fact that some teachers had neither prepared educational resources in an OER form nor used anyone else's before is a clear barrier that needs some kind of accompaniment and advice in order to achieve that "first time" action of sharing.

- To prepare materials so they can be used by others is something that requires a lot of additional work. Therefore, time-consuming work, inertia and the fact that sharing OER does not have a clear reward in the assessment environment of academia, are other important barriers.

- Throughout the interviews there is interesting evidence of educational resources being produced and made openly available, although not under a fully canonical model of what is

meant by OER, for instance their incorporation into an OER repository or directory. Teachers endorse the OER philosophy, but their productions are not conceived as such. Ultimately, the philosophy of sharing is embraced by most of the teachers, but the costs of more elaborate preparation for public presentation of materials and managing the issues of licensing, depositing, indexing, etc. in a formal and canonical OER manner does not seem to be integrated. There are many barriers that teachers perceive as obstacles to the "canonical" creation and sharing of OER.

OER creation: the case of textbooks, courses/lessons, ppt presentations and tutorials

- Textbooks, sets of ppt presentations for lessons and tutorials were, alongside videos of lessons, some of the most prevalent resources the participants reported as materials that teachers created; however, these were shared only within a relatively small sphere of people (the teacher's students and their school colleagues). Even in this case, teachers did not elaborate further on how to promote the use of their new materials created during the pandemic under an OER label and features. Some of them tried to "liberate" some textbooks they had published previously to their students, with an agreement with the publisher, but only due to the special needs during the pandemic. Nevertheless, in the evidence collected there were very few specific details on what open licences they should grant, how the materials should be indexed and where they should be deposited.

OER creation: the case of recorded lessons

- Recorded lessons followed a similar pattern to textbooks and ppt presentations. During the four semesters or so of restrictions on which the study focuses, the creation of videos, or audio files, from live class sessions, or the preparation of canned lectures for asynchronous viewing was an important activity. The volume of videos and voice records made available to students increased significantly compared to pre-pandemic courses. Therefore, we could say that a large number of educational resources with interesting characteristics were produced for consideration as possible OER. However, the conditions of urgency and lack of planning made it impossible for them to make this last necessary effort to put their creation under an OER licence in a repository. There were very few cases, if any, in which these materials were shared under a formula that is more or less compatible with the OER concept.

- Flipped classroom practices were adopted by some teachers so as not to saturate students' attention due to excessive screen time from synchronous online class sessions. To skip some live lectures, some teachers recorded the lectures in voice podcast or video format so the students could read and watch the materials at their own pace. They would then meet with their colleagues and the teacher a week later to ask questions and comment on doubts or issues. Therefore, the flipped classroom was, and could be, a lever to promote the use and creation of OER.

6.3.2. Ideas for placing the use of OER on the teaching agenda

Collaboration and networking

- Collaboration in the creation, assessment and sharing of OER in a school, country or at the international scale should be a key lever in the future to overcome the weaknesses observed between 2020 and 2021 in the schools studied, and which can be extrapolated to many other European centres, as observed in the results of DECriS IO1 and in the literature. Lack of planning, as well as lack of agile creative forms of collaboration at any scale, could be traced to the almost "artisanal" approaches to teaching observed in most of the cases of the teachers in the study. Good, reliable and shareable production of OER needs a collective framework to avoid that "artisanal" approach.

- The evaluation of the reliability of OER or the setting of criteria to select the learning resources should be considered by a committee/team and not individually by each teacher. This teamwork at national level could improve the creation or adaptation of LIS materials in national languages.

Institutional policies, support and human resources for fostering OER creation and use

- The low penetration of OER as a formally established resource suggests that it would be convenient to formulate policies that lead to the design of overall planning regarding the creation, treatment and dissemination of OER for teaching, whether at the national level, by disciplines at the international level or, at the very least, at the level of specific centres. This would solve many of the impediments that have been observed in the data obtained during the IO1 and IO2 studies. Moreover, it would facilitate OER creation, sharing and use in a more collaborative way. In fact, it has been observed that a significant number of teachers create their own material, but many are not aware that what they have created could be an OER: they do not know the concept well and do not relate it to the resources they create. Therefore, if there are institutional policies and guidelines, it might be easier to keep it in mind and create the resources in a more "canonical" way.

- A much more powerful teaching-oriented library team combined with teaching support units from the university is a common improvement highlighted by most of the teachers. The purpose of these services is to accompany and help teachers in educational technology, both from a technological standpoint and from the more pedagogical perspective. They would manage spaces and opportunities of exchange between teachers, institutions and colleagues, sharing materials, tools, problems, ideas and knowledge. In addition, teachers believe better and more results-oriented training should be devoted to OER.

- The creation of repositories, databases and directories of OER emerges consistently among the teachers in all the centres analysed as one of the improvements to be implemented. Teachers know very little about the role of their library in this task, or about the repositories and directories currently available. Moreover, when they are aware of them, their assessment of them is not complete (either in terms of content, subject or geographical scope).

- Beyond repositories and indexing tools for OER, the teachers in the interviews highlighted the need to have a kind of portfolio, a guide inside each centre, listing quality teaching material of the different subjects, as well as material to know how to do things related to technology (videos, subtitles, etc.) and also to look for existing applications suitable for working on concepts related to specific subjects. Investing time in a cooperative way in developing these kinds of guides would have many benefits. Their absence during the crisis situation has demonstrated their great potential for the future. Some teachers said that the library should play a stronger role in these guides and pathfinders.

Framing OER within the Open Science momentum

- The lack of recognition and the high volume of work involved in producing quality OER are a deterrent for teachers to become involved in this area. In this sense, it could be considered that the new models of academic performance evaluation emerging from the Open Science momentum in Europe are a good lever to encourage teachers to dedicate themselves more to this area. If the production of quality OER does not have rewards equivalent to the publication of papers in impact journals, it will be difficult to achieve a real boost in this area.

Incorporation of online and blended elements in face-to-face teaching as a lever for stimulating the production of OER

- The majority of teachers in the five centres imagine that the future of university teaching will tend to incorporate blended learning elements into face-to-face teaching. Some say that the face-to-face classroom cannot be abandoned, as it has unique properties of great educational value that are irreplaceable. However, not everything that is face-to-face needs to be face-to-face in the near future because, in some cases, some asynchronous self-paced learning alternatives may have a better outcome and be a key complement before or after the students meet face-to-face in the classroom. This leads us to see the use or creation of OER not as a goal in itself, but as a tool for the digital transformation of teaching that most see as irreversible since the experience of the pandemic.

A more open-minded approach to the materials that should appear in the recommended bibliographies of course syllabuses

- Traditionally, books are recommended to students. However, some other sorts of educational materials, such as videos, are now more highlighted as part of these recommendations. Therefore, this could lead OER use to have guidelines to include reviewed OER into the syllabuses as much as possible.

Incentives for international subject teams to bid for grants linked to OER creation

- It is easier for some teachers to take OER sources into account when they have personal knowledge about them through involvement in an OER creation project or friendship with the creators. This is the case of one Osijek teacher, who said that he was very used to OER and indicated that he shared OER materials from the European Project EINFOSE (which had been led by Osijek years earlier) with his students.

- Therefore, a more subject-specific approach to these projects would be beneficial. For instance, consortia of teachers and professionals engaged in education on "Information retrieval", "Digital content management", "Digital preservation", etc. could be a very useful driver to produce more and better OER that can be used in regular academic teaching and for continuous training of teachers.

Raise awareness among teachers that databases of test questions and quizzes are a much-needed type of OER

- In their responses on how they had coped with the challenge of online exams, some teachers mentioned as a good practice the creation of large databases of questions and answers in standardized formats for import-export from LMS such as Moodle. Their use is envisaged both to certify learning in examinations and to stimulate learning and self-paced self-assessment with engaging exercises. However, both the creation and the maintenance of these databases entail significant dedication, making them a type of educational resource to be considered as very relevant under the "share" philosophy of OER. Opening the typological range of OER with resources that save teachers' time can be a clear stimulus for their consolidation.

Raise awareness among teachers of the possibilities of the flipped classroom

- One teacher indicated that the flipped classroom worked really well in an e-learning environment, even better than in the case of the on-site classroom: students were much more willing to read in advance and then ask questions during the session (whether it was

online synchronous or on-site face-to-face). During the pandemic it was shown that videos and podcasts could be very useful tools for engaging students in a flipped classroom, and therefore, promoting the flipped classroom will be an incentive to OER creation and use. Nevertheless, no matter the mode of teaching, the commitment and responsibility to work ahead of the next face-to-face class that the flipped classroom demands from students depends more on external and sometimes circumstantial factors that have nothing to do with the teaching materials used. Therefore, the statement we make at this point should be tempered because OER are not a magic solution for ensuring flipped classroom success.

Capacity building

- Finally, we should finish with a cross-cutting idea that is a condition for all that we have mentioned in this section: OER need to be integrated into the continuing education of teachers. One of the main barriers to the knowledge and use of OER is the lack of training in this area. Thus, for example, problems in finding OER, in establishing them as reusable resources, or in the low level of sharing if they have been created, are often a manifestation of not knowing how, or not having the skills, to find, use and create OER.

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8. Annexes

8.1. Guide for teachers' interviews

Step 0. Context and profile of the participant

We want to start the conversation by capturing information related to the context of the participant from March 2020 onwards, not related to one of the 6 specific research objectives of our study, but which can help to better understand the context of the attitudes and expectations. Examples of questions to keep the conversation alive:

1. What is your teaching area? What subjects did you teach last March 2019 when the pandemic was declared? What subjects have you taught since then?
2. Which Learning Management System (LMS) platform do you work with (virtual campus or equivalent)?
3. What remote digital synchronous teaching activities have you done in this time of pandemic? Examples: Kahoot, Mentimeter or similar, class sessions with existing applications (BBC, Zoom, Teams, Jitsi ...), etc. Did you do them before?
4. Did you stream live your lectures that to reproduce what traditionally you use to deliver face-to-faced in the classroom before the pandemic? Did you replicate the classroom model in the form of streaming)? If the classes were recorded, were these videos used (edited or not) as references for activities that were out of sync with the students?
5. What non-face-to-face remote asynchronous teaching activities have you done in this pandemic time? Questionnaires, online tasks, video viewing, digital material readings, simulators, interactive applications, etc. Did you use them before?
6. What kind of digital material did you use in this pandemic time? Examples: videos of master classes, articles, written teaching materials and documents published under a commercial license, articles, written teaching materials and published open access documents such as OER, unpublished material prepared by you, etc. Did you use it before?
7. Have you used self-created materials (educational objects) just to respond to the new situation (videos, presentations, quizzes, etc.)? Why did you do that? Were you unable to use / reuse materials from other times, or from other teachers in your school or around the world?

Information on Objective 1. Attitudes

We want to know how they got into it, with what previous attitude they coped with the emergency remote teaching. It should be clearly distinguished from what they think now, whether they adapt or not, forcing them to remember the first days before and during March 2020 in order they answer in a way as much honest and objective as possible. Examples of questions to keep the conversation alive:

Even if you later change your mind (or not), try to remember before the COVID crisis ...

8. What did you think about online or blended learning before all the COVID crisis was triggered? Had you tried it before? In what kind of courses? If you tried it, did you find it better or worse than face-to-face teaching? Why?

9. Have you used digital teaching materials before? What kind? OER? Which share of use of digital versus analog/paper material do you think describes your profile as teacher? Why?
10. Did you do online teaching activities in face-to-face teaching? What kind? Did you like them? Why?

Information on Objective 2. Expectations

We want to know what they expected to happen, what they thought would happen. We should distinguish it well from what actually happened, inviting them to remember what their first thoughts were, being honest and objectives. Examples of questions to keep the conversation alive:

Regardless of what happened afterwards, how actually everything went at the end, ...

11. What did you expect to happen when you learned that there was confinement and all teaching had to go online?
12. Would you say that you generally took it well or rather badly? How did you get started?
13. Did you think you would have problems? What kind of problems did you think there would be? With teaching materials? With online classes and activities? With assessments, exams, ...? Any other problems?
14. Try to express your expectations at the time when everything changed because of the lockdown... Did you think "this is going to be a disaster" or did you make some other kind of prediction? Which one?

Information on Objective 3. Adaptability

We want to know how and to what extent the participants have adapted themselves to the new situation, what degree of flexibility they have had, what adaptability has been given in their context, what they have adjusted and how they did it. Examples of questions to keep the conversation alive:

I'm sure you had to make adjustments through obligation or by choice, refocusing your mind and routines...

15. Could you identify two or three specific things that you had to change in these different areas, or in some other?
    - Teaching or study material.
    - Applications / software for activities and / or manage materials or information.
    - Physical work space.
    - Devices / hardware to work with.
    - Relationship with other teachers and students.
16. Have you made other changes that may not be so essential? What changes and in which fields? Why?
17. When you made changes, how did you do it? Alone? By agreement and in collaboration with other colleagues? With the help of the teaching institution? ...
18. Did you use third-party materials (found in open internet access or shared with you)? Were these materials openly licensed for reuse?

19. Have you received extraordinary trainning offers from your university to adapt teaching to the new situation?
20. Has the teaching support services (library, computer, ...) offered specific services or adapted the usual ones to your new needs as a teacher?
21. If you had to highlight some few changes ..., what would they be?
    - The hardest to deal with.
    - The ones that were the easiest.
    - The ones that have enhanced your teaching most.
    - Those that have contributed least to your teaching.
22. Are there any changes you would have liked to have made and couldn't? What changes and why couldn't you make them?
23. Are there any compulsory changes you have had to make and would you rather not have made? What were they? Why?
24. [*In case the teacher has said nothing related to the changes in the way he/she use to assess students in the questions above*] How did you have to do the adaptation of the assessments and exams? Did you do it all online or did you call to some exams and assessment tests?

Information on Objective 4. Problems

We want to know what problems teachers have had when working with digital learning activities and materials during the crisis, how they have experienced it and how they have solved it. Examples of questions to keep the conversation alive:

Remember the real and objective problems that have occurred, regardless of what you thought would happen ...

25. Have you had any problems arising from the situation? What kind of problems: technical with computer applications, devices or connections? Lack of knowledge or skills? Psychological, economic? ...
26. How have you tried to solve your problems? Have you asked for help from colleagues, the institution, expert professionals or have you cop with the problems by yourself ...?
27. If you have not been able to solve them satisfactorily ..., why do you think it has been? What would you have needed to solve them and you didn't get?
28. Do you think that the problems correspond to what you previously expected, or did you not imagine that you would have them?

Information on Objective 5. Advantages and disadvantages

At this point in the conversation we want to focus on the time after the "special" period of lockdown that triggered the sudden change to the online/remote model. We want to know the reasons for using or rejecting the some tools that digital education offers, based on the reflections that the lived experience has been able to generate. Examples of questions to keep the conversation alive:

Now that you have experienced what happened, and that the perspective you have makes it easier for you to reflect ...

29. Could you mention some advantages that you already know or have discovered for the use of the applications and materials involved in digital and online teaching?
30. Could you mention some drawbacks that you already know or have discovered for the use of the applications and materials involved in digital and online teaching?
31. Highlight one strong point and one weak point of the online learning activities you have done.
32. Highlight one strong point and one weak point of open access digital material that you have used.
33. Do you think that your previous attitude towards online or blended teaching and open digital materials has changed, or is it reaffirmed with the experience you have lived through?

Information on Objective 6. Improvements, as a result of the lessons learned

We want to invite the participant to think out loud on proposals for improvement (some may already have them in mind, or others may be generated spontaneously at this point in the conversation): we what to know what can be reused in the future, what needs to be improved and how to do it to design a better future either in the return to normal teaching/learning, or in future crisis situations that may occur. Examples of questions to keep the conversation alive:

Many people claim that solutions experienced during the "special period" could be part of new normal of your teaching activity in the future could be used, but actually it's not that easy and some improvements should be made.

34. Between the 2019-2020 academic year and the 2020-2021 academic year, what were the differences in the planning of digital alternatives due to the crisis, and what lessons have been learned from one academic year to the next?
35. What things do you think you have learned/improved in relation to teaching-learning with the experience you have lived?
36. Do you think that some changes, discoveries and lessons learned could be used in "normal" face-to-face teaching?
37. What do you think should be improved with a view to future scenarios? In what specific area (applications, connections, devices, design of learning activities, development of digital and OER material, teacher training, digital competence of students, etc.)?
38. Could you make three proposals for improvement, either for the new normal teaching activity, or for future crisis that could trigger emergency remote teaching?

8.2. Focus groups moderator guide

Step 0. Context and profile of the participant

We want to start the conversation by capturing information related to the context of the participant from March 2020 onwards, not related to one of the 6 specific research objectives of our study, but contextual that can help to better understand the context of the attitudes and expectations. Examples of questions to keep the conversation alive:

1. What degree are you studying? Do you do it full time or do you combine it with some kind of paid job? What percentage of the degree did you pass at the time the pandemic was declared (what course were you in, how many credits did your degree have, and how many did you pass at that time)?
2. Between February 2020 and July 2020, what percentage of teaching have you received in person compared to the volume of completely remote teaching? How did you experience the fist days of lockdown and closing of university?
3. Between September 2020 and July 2021, what percentage of face-to-face normal teaching have you recovered back from the previous academic year? Have you still had many classes entirely in remote/online format? To what extent has this second academic year of the pandemic "returned to the pre-pandemic situation," and to what extent was what you did remotely/online better planned and organized?
4. Do you know with which digital platform (virtual campus or equivalent) you access online learning materials and activities?

What remote synchronous teaching activities have you done in this pandemic time? Examples: class sessions with existing applications (BBC, Zoom, Teams, Jitsi ...), interactive applications, simulators, etc. Did you do some of them before the pandemic period?

5. Have you had synchronous streaming classes in the form of a replica of the traditional digital classroom environment? Were you able to access the videos of the recorded lectures?
6. What non-face-to-face asynchronous learning activities have you done in this time of pandemic? Questionnaires, online tasks, video viewing, reading digital material, etc. Did you do some of them before the pandemic period?
7. What kind of digital material have you been offered in this time of pandemic? Examples: videos of master classes, articles, textual teaching material in digital format, interactive and audio-visual material, ...? Were there enough materials that could be consulted directly on the digital platform (the virtual campus) or were they rather links to external websites?

Information on Objective 1. Attitudes

We want to know how they got into the new situation; what previous attitude they have before the start of the emergency remote teaching. It should be clearly distinguished from what they think now, whether they adapt or not, forcing them to remember the first days before and during March 2020 in order they answer in a way as much honest and objective as possible. Examples of questions to keep the conversation alive:

Even if you later change your mind (or not), try to remember before the COVID crisis ...

8. What did you think about online or blended learning before all the COVID crisis was triggered? Had you tried it before? In what kind of courses? If you tried it, did you find it better or worse than face-to-face teaching? Why?
9. Have you used digital learning materials before? What kind? OER? Which share of use of digital versus analog/paper material do you think describes your previous to pandemic experience?
10. Did you do any online learning activities within your normal courses you followed before the pandemic conceived under the face-to-face teaching model? What kind? Did you like them? What did you think about such online activities inside face-to-face courses?
11. Try to define and concretize your attitude towards the concepts "digital material VS paper", "teaching and online activities VS face-to-face" at that time, before everything changed.
12. In a very simple way: would you say that in general you took it well or rather badly the shift to remote emergency teaching? How did you cope with the changes?

Information on Objective 2. Expectations

We want to know what they expected to happen, what they thought would happen. We should distinguish it well from what actually happened, inviting them to remember what were their first thoughts, being honest and objectives. Examples of questions to keep the conversation alive:

Regardless of what happened afterwards, how actually everything went at the end, ...

13. What did you expect to happen when you learned that there was lockdown and all teaching had to go online?
14. Would you say that you generally took it well or rather badly? How did you get started?
15. Did you think you would have problems? What kind of problems did you think there would be? With learning materials? With online classes and activities? With assessments, exams, ...? Any other problems?
16. Try to express your expectations at the time when everything changed because of the lockdown... Did you think "this is going to be a disaster" or did you make some other kind of prediction? Which one?

Information on Objective 3. Adaptability

We want to know how and to what extent the participants have adapted themselves to the new situation, what degree of flexibility they have had, what adaptability has been given in their context, what they have adjusted and how they did it. Examples of questions to keep the conversation alive:

I'm sure you had to make adjustments through obligation or by choice, to adapt the way you study, refocusing your mind and routines...

17. Could you identify two or three specific things that you had to change in these different areas, or in some other?
    - Learning or study materials.
    - Applications/software for activities and/or manage materials or information.
    - Physical work space.
    - Devices/hardware to work with.

    - Relationship with the teachers and other students.

18. Have you made other changes that may not be so essential? What changes and in which fields? Why?
19. When you have made changes in the way you follow the subjects, in your style of study, in the autonomous learning activities, how have you done it? Alone? By prescription of the teacher in accordance with the emergency modification of the activities initially planned at the official course syllabus? In collaboration with other students from the course?
20. If you had to highlight some few changes ..., what would they be?
    - The hardest to deal with.
    - The ones that were the easiest.
    - The ones that have enhanced most your learning.
    - Those who have contributed less quality to your learning.
21. Have you received extraordinary training offers from your university to adapt your learning style to the new situation?
22. Have there been special loan offers for bibliographic or computer material?
23. Are there changes you think teachers should have done and haven't? What were they? Why?
24. [*In case the student has mentioned nothing about the adaptation in the way his/her learning outcome have been assessed in the questions above*] How did your teachers have adapted the assessments and exams? Did you do all the assessments/exams online or did you have to attend some assessments/exams and face-to-face?

Information on Objective 4. Problems

We want to know what problems teachers and students have had when working with digital learning activities and materials during the crisis, how they have experienced it and how they have solved it. Examples of questions to keep the conversation alive:

Remember the real and objective problems that have occurred, regardless of what you thought would happen ..

25. Have you had any problems arising from the situation? What kind of problems: technical with computer applications, devices or connections? Lack of knowledge or skills? Psychological, economic? ...
26. How have you tried to solve your problems? Have you asked for help from colleagues, the institution, expert professionals or have you cop with the problems by yourself ...?
27. If you have not been able to solve them satisfactorily ..., why do you think it has been? What would you have needed to solve them and you didn't get?
28. Do you think that the problems correspond to what you previously expected, or did you not imagine that you would have them?

Information on Objective 5. Advantages and disadvantages

At this point in the conversation, we want to focus on the time after the "special" period of lockdown that triggered the sudden change to the online/remote model. We want to know the reasons for using or rejecting some tools that digital education offers, based on the reflections that

the lived experience has been able to generate. Examples of questions to keep the conversation alive:

Now that you have experienced what happened, and that the perspective you have makes it easier for you to reflect ...

29. Could you mention some advantages that you already know or have discovered for the use of the applications and materials involved in digital and online learning?
30. Could you mention some drawbacks that you already know or have discovered for the use of the applications and materials involved in digital and online learning?
31. Highlight one strong point and one weak point of the online learning activities you have done.
32. Have you discovered any particularly positive strengths of remote digital teaching in relation to what you have usually done in face-to-face classroom learning?
33. Do you think that your previous attitude towards online or blended teaching has changed, or is it reaffirmed with the experience you have lived through?

Information on Objective 6. Improvements, as a result of the lessons learned

We want to invite the participant to think out loud on proposals for improvement (some may already have them in mind, or others may be generated spontaneously at this point in the conversation): we what to know what can be reused in the future, what needs to be improved and how to do it to design a better future either in the return to normal teaching/learning, or in future crisis situations that may occur. Examples of questions to keep the conversation alive:

Many people claim that solutions experienced during the "special period" could be part of the new normal of your future learning activities, but actually it's not that easy and some improvements should be made …

34. Between the 2019-2020 academic year and the 2020-2021 academic year, what were the differences in the planning of digital alternatives due to the crisis, and what lessons have been learned from one academic year to the next?
35. What things do you think you have learned/improved in relation to teaching-learning with the experience you have lived?
36. Do you think that some changes, discoveries and lessons learned from the experience you have lived could be used to apply them in "normal" face-to-face classroom teaching? Would you keep any kind of pandemic time activity or resource in the future?
37. What things do you think should be improved with a view to future scenarios? In what specific area (applications, connections, devices, design of learning activities, development of digital and OER material, teacher training, digital competence of teachers, etc.)?
38. Could you make three proposals for improvement, either for the new normal teaching activity, or for future crisis that could trigger emergency remote teaching?