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Planned online learning vs. Emergency remote teaching implemented during COVID-19 in higher education: lessons learned

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Planned online learning vs. Emergency remote teaching implemented during COVID-19 in higher education: lessons learned

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ABOUT NESET

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Table of contents

Introduction.....	6
Chapter 1. Planned online learning: an overview of pre-pandemic studies.....	9
Chapter 2. Emergency remote teaching: an overview of studies before and during the pandemic	15
Chapter 3. Discussion.....	20
Chapter 4. Conclusions and recommendations.....	23
References.....	26

Introduction

Context

The COVID-19 pandemic has significantly affected higher education. Remote teaching/learning, which was introduced under emergency conditions, has been placed in the spotlight and has become a topic of interest for higher education institutions (HEIs), higher education systems and higher education policy makers.

However, the concept of remote teaching/learning is far from new. Even before the pandemic, remote teaching/learning had been developed and implemented since the late 1990s, with an expansion of interest in both theory and practice in the 2000s. At that time, a theoretical framework was developed around instructional design models such as ADDIE, or the Dick and Carey or Kemp models (comp. Kurt, S., 2015, 2016, 2017). These are sets of rules and guidelines that help in creating a pedagogical structure and developing and organising instructional materials in a way that facilitates learning in an online learning environment. Instructional design models are at the foundations of online teaching/learning and remain in use today. When implemented coherently, in accordance with one of these instructional design models, remote teaching/learning has proven to be an effective and successful way of teaching and learning. There is evidence of good results in higher education, and in adult education, both formal and informal. Gaebel et al. (2021) compared the results of a 2020 survey carried out by the European University Association (EUA) among 368 institutions from EHEA countries with those of a similar survey from 2014 (also conducted by the EUA). They found that “the vast majority of institutions is confidently positive about the benefits DELT (digitally enhanced learning and teaching) brings to students and, generally, the transformation of learning and teaching” (Gaebel et al., 2021).

Planned remote teaching/learning should not, however, be confused with emergency remote teaching/learning such as that carried out during the COVID-19 pandemic. Significant and substantial differences exist between the two, which derive from the differing contexts in which they are implemented, and the needs they are intended to serve. The crisis response to COVID-19, which included the implementation of emergency remote teaching in higher education during lockdown, is not representative of planned online teaching/learning primarily due to the lack of time for preparation. Most HEIs were not prepared for the sudden shift to emergency remote teaching/learning. According to Singh et al., “transition or change requires organizations to invest in professional development opportunities, research and data collection, capacity building, and measures to reduce resistance to change initiatives.” (Singh et al., 2021:151). However, the circumstances of the pandemic did not allow much time for this transition. Singh et al. also point out that “most of these changes were happening at the same time when students and instructors were worried about their own health and well-being and safety of their near and dear ones. This resulted in increased psychosocial stress, which was further aggravated by loss of human connection as classes were now delivered online” (Singh et al., 2021:151).

This is probably the reason why many generalisations were made in the public discourse regarding the negative effects of remote teaching/learning, and the advantages of face-to-face teaching and learning. For instance, as indicated in two NESET reports ([The impact of COVID-19 on higher education: a review of emerging evidence](#) and [Distance learning from a student perspective](#)), students’ satisfaction with emergency remote teaching was rather low because they were faced with numerous challenges, ranging from technology issues to emotional well-being issues and learning losses. For these reasons, the remote

teaching/learning implemented has stereotypically been perceived by both students and academic staff in higher education as a lesser form of teaching delivery.

The lessons learned from the emergency implementation of remote teaching/learning during the COVID-19 pandemic need to be integrated into a comprehensive body of knowledge concerning the value and limitations of online teaching/learning. With this in mind, this report presents systematised evidence from studies carried out before and during the pandemic with regard to the efficiency of planned online teaching/learning on the one hand, and emergency remote teaching on the other. The aim of this report is to explore the differences between the two, and to find out whether most of the negative effects attributed to emergency remote teaching during the COVID-19 pandemic were caused by the online delivery itself, or by the fact that such online delivery was not based on comprehensive planning since it was a quick response to a pandemic.

Defining the terms

The EU Digital Education Action Plan 2021-2027 states that “there are many terms used to describe online learning including ICT-based learning, distance learning, virtual learning and e-learning” (EC, 2020). According to Phipps and Merisotis, there has been “a relaxed use of the terminology” (Phipps and Merisotis, 1999) when it comes to remote teaching/learning. Bates concurs that “the terminology often struggles to keep up with the reality of what is happening” (Bates, 2008).

Since various terms are used to describe different variations of the concept of digital education, it is important to define the two key terms used in this report: *planned online learning* and *emergency remote teaching*.

- **Planned online learning**

One of the earliest terms used to designate *planned remote teaching/learning* was *e-learning*, while the terms most frequently used in literature are *online learning* or *online education*. Although they are distinguished by subtle differences in meaning, all of these terms refer to the same type of teaching/learning defined by Bates (2008) as “a form of distance education where the primary delivery mechanism is via the internet and where a course or program is intentionally designed in advance to be delivered fully online. Faculty use pedagogical strategies for instruction, student engagement, and assessment that are specific to learning in a virtual environment.” This definition is in line with the definition given in the glossary of the EU Digital Education Action Plan 2021-2027, which describes online learning as “a methodology involving the use of information and communication technologies (ICTs) to support both teaching and learning. The term may refer to the use of various technologies and tools to support learning in different contexts...” (EC, 2020). According to Moore (2010), connectivity, flexibility and the ability to promote varied interactions should also be emphasised. According to Hodges et al. (2020), the main characteristic of this type of teaching/learning which occurs in an online learning environment is that it “results from careful instructional design and planning, using a systematic model for design and development.” Means et al. (2014) identify the following nine dimensions which need to be considered during the online course planning and design process: modality, pacing, student-instructor ratio, pedagogy, the instructor’s role online, the role of the student online, online communication synchrony, the role of online assessments, and the source of feedback. All of the definitions created by the research above indicate that there are three key elements to student-

centred online teaching/learning: planning, designing in advance, and remote online delivery.

- **Emergency remote teaching**

Emergency remote teaching, such as that implemented during the lockdowns imposed due to the COVID-19 pandemic, focuses on delivering teaching under exceptional circumstances. It is primarily an ad hoc response to a crisis and a temporary solution, with the clear intention of returning to the original format (face-to-face, on-site) once the crisis or emergency that has caused the shift no longer presents a threat. According to Hodges et al., “the primary objective in these circumstances is not to re-create a robust educational ecosystem but rather to provide temporary access to instruction and instructional supports in a manner that is quick to set up and is reliably available during an emergency or crisis.” (Hodges et al., 2020). Similarly, Gatti et al. (2020) state that “by *emergency remote teaching* we mean streaming of lectures and using technology to replicate classroom lectures rather than planned online learning, that is courses conceived and built with virtual delivery from the outset, using consistent course design and deeply integrated student support, and delivered by instructors with meaningful training in online pedagogy.” (Gatti et al., 2020).

Several other similar and/or connected terms are frequently used. These need to be disambiguated, as they are not interchangeable and refer to distinct concepts:

- **Distance or remote education**

This broad term refers to teaching and learning that occurs when educators and learners are not in the same physical location at the same time, “with educators and learners using different means to connect and engage with a programme, course or educational activity” (EC, 2020). The *different means* mentioned in this definition suggest, according to Moore (2010), that ‘varying forms of instructional materials’ are used. These can include online tools, but also radio, TV or other media.

- **Digital education**

This umbrella term refers to the use of digital technologies to support and enhance teaching, learning and assessment (EC, 2020) – in other words, to provide digital access or “the ability to participate in learning through digital means” (QAA, 2020). It refers to digitally enhanced learning and teaching, and encompasses online, blended and remote teaching and learning, but can also refer to other uses of digital tools. *Digital learning* is proposed as a more neutral form than online learning because it “could give providers a greater opportunity to go further than just using the term and articulate what a digital learning approach would look like for their students” (QAA, 2020).

- **Blended learning**

This term refers to contexts in which multiple approaches to the learning process are combined by “blending school site and other physical environments away from the school site”. The Council Recommendation on blended learning approaches for high-quality and inclusive primary and secondary education refers to “blending different learning tools that can be digital (including online learning) and nondigital” (EC, 2021). According to Bates (2008), *blended learning* can take various forms, depending on the ratio of online and face-to-face components. Sometimes, blended courses are also referred to as ‘hybrid’ courses.

- **Synchronous vs. asynchronous (digital) teaching/learning**

These two modalities are “differentiated in terms of the time [...], but also available tools, instructional practices, number of people involved and social mode of communication” (EC, 2020). “Synchronous learning [...] takes place with participants all engaging with material in real time, although not necessarily in the same place” (QAA, 2020). Asynchronous learning, conversely, can take place “at any time, individually or in group, with interaction and communication spanning across time” (EC, 2020), while enabling students to “learn at their own pace in their own time” (QAA, 2020). Although it is not necessarily the case in all contexts, both terms implicitly refer to online/digital teaching and learning.

The terms most frequently used in this report will be used in line with the definitions above. However, it should be kept in mind that as both the concept and the technology supporting it develop, new terms will be coined, and the meanings of existing terms will be modified.

Chapter 1. Planned online learning: an overview of pre-pandemic studies

All definitions of planned online learning concur that its key element is planning and preparation, i.e. that its instructional design should be based on an analysis of the students’ needs and learning styles, and that the results of this analysis should guide the decisions made as to which methods and tools will be most effective in helping students to achieve the intended learning outcomes. According to Hodges et al. (2020), between six and nine months of planning, preparation and development is required before a fully online course is delivered, as this needs to include not only the creation of teaching/learning content, but also the process of determining the learners’ needs, defining the learning outcomes, and planning assessment.

A brief history of instructional design models

According to Reiser (2001), instructional design “encompasses the analysis of learning and performance problems, and the design, development, implementation, evaluation and management of instructional and noninstructional processes and resources intended to improve learning and performance in a variety of settings, particularly educational institutions and the workplace”. The first instructional design models were developed long before the onset of planned online learning, and were focused on creating efficient and systematic approaches to learning (e.g., Gagne, 1965). The online/digital element was incorporated later, in the late 1990s, with the development of the internet and educational technologies. According to Moore et al. (2010), “the design of different types of learning environments can depend on the learning objective, target audience, access (physical, virtual and/or both), and type of content”. The most common instructional design models implemented are ADDIE, PIE, Dick and Carey, and Kemp. These instructional design models were developed specifically for teaching and learning in (at the time) emerging online learning environments, and present the basis of the theoretical framework. Despite significant technological advances, this framework remains applicable today, because instructional design models focus on the process of establishing online learning environments that foster interactions between the students and the content, and compensate for the absence of face-to-face interactions with the instructor and other students, regardless of the technology used to support these processes.

ADDIE, the most common model, stands for analysis, design, development, implementation and evaluation – the steps in the process of instructional design, which, according to Dousey (2018) is simultaneously the underlying process and a framework for

all instructional design models. The analysis stage refers to identifying who the learners are, what they already know, and what they should know after completing the course. It also encompasses defining the learning outcomes. According to Kurt (2018), the design stage, focuses on content, lesson planning, assessment instruments and media selection. The development stage focuses on drafting, producing and evaluating the learning resources. The implementation stage includes preparing the learning environment and engaging the students, while carefully monitoring both their progress and the learning resources. Lastly, the evaluation stage focuses on assessing “the quality of the instructional products and processes, both before and after implementation” (Dousey, 2018). This is an iterative, cyclical process, which in practice means that the lessons learned in one iteration of a course are implemented in the iteration that follows.

The Plan, Implement, Evaluate (PIE) model was developed in 1996 by Newby, Stepich, Lehman and Russell, and is derived from the ADDIE process. PIE condenses the first three steps of ADDIE (analysis, design and development) into a single phase – Plan, followed by Implementation and Evaluation. The Dick and Carey or systems approach model was also developed in 1996. It too follows the ADDIE logic, but breaks it down further into nine stages: (1) identifying instructional goal(s); (2) conducting instructional analysis; (3) analysing learners and contexts, and writing performance objectives; (4) developing assessment instruments; (5) developing instructional strategy, in terms of pre-instructional activities, content presentation, learner participation and assessment; (6) developing and selecting instructional materials; (7) designing and conducting formative evaluation; (8) revising instruction; (9) designing and conducting summative evaluation. This model is also iterative, with the lessons learned being implemented in successive cycles. The Kemp model, also known as the Morrison, Ross, and Kemp Model (MRK), developed in 2004, takes into consideration the learner, the objectives, the methods, and evaluation. It too encompasses the ADDIE logic, but is predominantly student-centric. It has a circular structure that allows some of its nine core elements to be implemented simultaneously, with some elements being omitted if they are not required.

Regardless of the instructional design model implemented, online course planning and instructional design should be conducted according to a set of principles that enhance learning in a virtual learning environment. It should take into account the fact that in most cases, the student will be the one dictating the pace and/or taking charge of their own learning curve, at least partially, and that this process should be facilitated by preparing the learning environment and the teaching materials in a way that enhances learning. According to Clark (2002) six principles of effective e-learning must be observed in order to enhance learning: (1) the multimedia principle, which means that adding graphics and/or visuals can improve learning; (2) the contiguity principle, which says that placing text near to graphics and/or visuals improves learning; (3) the modality principle, which states that explaining graphics using audio improves learning; (4) the redundancy principle, which means that explaining graphics using audio and redundant text can harm learning; (5) the coherence principle, which says that the gratuitous use of visuals, text, and sounds can harm learning; and (6) the personalisation principle, which says that using a conversational tone and pedagogical agents can improve learning. Even though significant technological advances have been made since this theoretical framework was initially devised, its instructional design models and principles still apply in the new contexts. Recent literature has therefore focused on adapting these models and principles to the new paradigms of ed-tech – namely, incorporating the myriad of new possibilities that have arisen from massive technological advances. According to Ilie (2022), the theoretical framework is still used as a set of guidelines, but changes have been made in line with new pedagogical approaches, and an “instructional design process appropriate to the use of new technologies is now emerging as a process based on the teachers’ awareness of the content resources they offer the students to explore, the learning tasks

that incorporate cognitive strategies and sharing evidence on completing the learning tasks with the others” (Ilie, 2022:100).

As mentioned previously, online teaching/learning is not a new phenomenon, and all of the instructional design models include an evaluation step and emphasise the importance of assessing the design of the course through monitoring and evaluating the learning process – especially in an online context, where the lack of face-to-face interaction has always been a concern. As a result, there is a wealth of studies, analyses and data that can provide insights into the effectiveness of planned online learning in both fully online and blended modes.

Key takeaways from the findings of pre-pandemic studies

Pre-pandemic studies mostly focused on comparing planned online learning with face-to-face teaching and learning in terms of achieving the intended learning outcomes. Although these studies come from global sources, they are also applicable to the European context, because their national contexts do not impact the findings (comp. Rahman and Ilıc [2018]) from Australia, the US and the EU).

Table 1. Overview of pre-pandemic studies

AUTHORS / YEAR	TITLE	SAMPLE	LOCATION
Hrastinski (2008)	Asynchronous and synchronous e-learning	27 students	Sweden
Paechter and Meier (2010)	Online or face-to-face? Students’ experiences and preferences in e-learning.	2,196 students from 16 universities and 13 universities of applied science	Austria
Cavanaugh and Jacquemi (2015)	A Large Sample Comparison of Grade Based Student Learning Outcomes in Online vs. Face-to-Face Courses	40,444 students enrolled in 6,012 courses between 2010 and 2013	USA
Nandi and Hamilton. (2015)	What Factors Impact Student – Content Interaction in Fully Online Courses.	73 students	Australia
Kyei-Blankson et al. (2016)	Establishing the Importance of Interaction and Presence to Student Learning in Online Environments	n/a – all students enrolled in sections of online courses from summer 2013 to summer 2014	USA
Malkin (2018)	An Investigation of the Efficacy of Asynchronous Discussion on Students’ Performance in an Online Research Method Course	25 Master’s students	USA
Müller et al. (2018)	Learning Effectiveness and Students’ Perceptions in a Flexible Learning Course	989 students	Germany

The key indicators of the efficiency of planned online learning can be observed in the selected studies through the prism of student satisfaction with course design, interaction with the tutor/instructor, interaction with peer students, individual learning processes, and learning outcomes.

- **Course design**

Course design that offers a clear structure increases students’ satisfaction with an online course. According to Nandi et al., a “well-organized and content-rich design can assist student-content interaction” (Nandi et al., 2015:29). The majority of respondents emphasised the importance of structure and indicated that a lack of structure results in an ‘unsatisfactory

learning experience' (Nandi et al., 2015:31). The selected studies show that students are satisfied with this aspect of planned online courses. Thus, Müller et al. (2018) find in their study of students' perceptions of a blended course format that "the learning environment was felt to be well structured and coherent, and especially the usability was evaluated in a positive way". The dimensions Müller et al. explored were structure (a total of 59 % of respondents agreed or strongly agreed it was good), coherence (34.6 % of respondents agreed or strongly agreed it was good) and usability (72.2 % of respondents agreed or strongly agreed it was good). The students' perceptions of the blended format were positive, while their final test results were similar to those achieved by students attending the same course in a traditional face-to-face format, despite classroom learning time being reduced by a half for those taking the course in a blended format. This is in line with Paechter and Meier's earlier research, which found that "students reported a high degree of satisfaction with their course and gave favorable evaluations of e-learning in their universities." (Paechter and Meier, 2010:295). However, they state that factors other than course design (i.e. the clear and coherent structure) also contribute to student satisfaction, such as the instructor's expertise and the support they provide, the study materials and other resources.

- **Interaction with the tutor/instructor**

Interaction between students and instructors is essential to the efficiency of planned online learning. Students' preferences indicate that it should be both synchronous and asynchronous, depending on the type of activity.

Hrastinski argues that "communication related to the course content is essential for learning" (Hrastinski, 2008:52). According to Kyei-Blankson et al., "Transactional Distance theory postulates that online learning is most effective when the perceived pedagogical distance between the instructor and students in the course is minimized with increased interaction" (Kyei-Blankson et al., 2016:49), while "the collaborative process and the nature and level of interactions are both important for successful and significant learning to occur" (Kyei-Blankson et al., 2016:55). Müller et al. (2018) explored the dimension of guidance and found that 50 % of students either agreed or strongly agreed that this dimension was positive in the blended course. According to Paechter and Meier (2010), students find the communication with their instructor important, and "prefer online contact when a fast exchange between students and the instructor or between peer learners is important" (Paechter and Meier, 2010:296). However, students preferred face-to-face contact in "situations with a high degree of cognitive presence", such as when they are exploring, constructing, and confirming their understanding of the content through collaboration and reflection, as well as in "situations with a high degree of social presence", such as establishing relationships and group cohesion. In practice, this means that in situations that require students to learn through communication and collaboration with other students, such as discussions, they prefer to have face-to-face contact with the teacher because this significantly facilitates the process in comparison to asynchronous online communication (e.g. e-mail or asynchronous messaging). However, even in an asynchronous online learning environment, interactions between students and teachers can be encouraged. According to Malkin et al. (2018), students in an online course which implemented asynchronous moderated discussion reported feeling part of the learning community, and felt that the online environment was conducive to learning. The authors concluded that this derived from the fact that the course implemented an active learning pedagogy (such as

asynchronous moderated discussions) that is more efficient than a passive learning pedagogy such as lectures. Hrastinski (2008) concludes that instructors should provide opportunities for both synchronous and asynchronous communication, depending on the type of activity, and thus allow “learners and teachers to exchange information, collaborate on work and get to know each other” (Hrastinski, 2008:55). Hrastinski states that instructors should also “express companionship, emotional support, or advice” (Hrastinski, 2008:52). Nandi et al. (2015), conclude that students prefer the asynchronous mode for interactions while learning the content, while the synchronous mode is better suited to “instant question and answer through text chat and problem solving through audio and video demonstration” (Nandi et al., 2015:32).

- **Interaction with student peers**

Instructors should create a learning environment that encourages student interactions, and should actively facilitate this.

According to Hrastinski (2008), instructors should facilitate peer-to-peer communication and create an atmosphere that fosters collaborative learning (Hrastinski, 2008:52). However, according to Silva Quiroz (2008), mere participation should be differentiated from interactions. Müller et al. (2018) found that 17% of respondents reported missing direct interaction with lecturers and/or other students, while Paechter and Meier (2010) found that face-to-face communication was preferred in situations “in which the interaction goes beyond the mere dissemination of information, such as when learners have to agree on a shared meaning and/or to come up with a joint solution, or when social relations with other course participants are established” (Paechter and Meier, 2010:296). According to Kaufmann, the “lack of community and technical problems were most challenging for online learners” (Kaufmann, 2015). It is evident that students’ previous experiences of using online learning platforms and their level of their digital communication skills are important factors in shaping their perceptions of learning and their satisfaction with it (Aydin, 2013).

- **Individual learning processes**

With online teaching, students have a higher level of autonomy over organising their learning, and therefore a higher level of responsibility. However, for such learning to be successful, they need a set of skills such as time management and task management.

Müller et al. (2018) explored the dimensions of interest and enjoyment, which were viewed positively by a total of 40 % of respondents. They also looked at the dimension of motivation, which was seen as positive by 59 % of the students who responded. Although 48 % of the students considered having the flexibility to organise one’s own learning time to be positive, 22 % reported having some problems engaging in self-regulated learning. The findings of Paechter and Meier (2010) are similar – in this study, students found that “the acquisition of skills in self-regulated learning can be better supported in planned online learning than in face-to-face learning sessions” (Paechter and Meier, 2010:296). Furthermore, they appreciated the opportunity to apply “metacognitive self-regulation strategies such as monitoring one’s learning progress” (Paechter and Meier, 2010:296). In other words, the students were critical of planned online learning when it concerned “the acquisition of conceptual and methodical knowledge” (Paechter and Meier, 2010:296); however, they preferred online learning components when acquiring skills. According to Kaufmann, the “results

indicated that course design and time management were crucial components to successful online learning” (Kaufmann, 2015).

- **Learning outcomes**

No significant difference can be seen in learning outcomes between students in well-designed and planned online formats, and students in a face-to-face format.

According to Kaufmann (2015:3), the findings of a meta-analysis conducted by the US Department of Education on 45 controlled design category 1 (entirely online versus classroom) and 2 (blended versus classroom) studies published between 1996 and 2008 indicated that the learning outcomes measured by grades, scores on midterm/final exams, etc. are similar for students in planned online learning and in traditional face-to-face classes. This is in line with the findings of Müller et al., who found that “students achieved equivalent final exam results compared with students enrolled in the control group, a conventional face-to-face format of the same pilot course” (Müller et al., 2018:51). Bowen et al. (2014) confirmed these findings by comparing learning outcomes using two indicators – completion of the course and pass rates – and found no significant difference. The pass rate for the student group that undertook a blended course format was 80 %, while the pass rate for those students who attended the traditional course format was 76 %. According to Cavanaugh and Jacquemi (2015), most studies found no significant difference “in grade-based student learning outcomes between modes of instruction” (Cavanaugh and Jacquemi, 2015:1). They give the examples of Ashby et al. (2011), who found no statistical difference in student grades in a developmental maths course; Larson (2009), who found no statistical difference in the grades of students taking an introductory management course; and McLaren (2004), who found no statistical difference between the grades of online students in a business statistics course compared with the same course delivered face-to-face. “These results indicate that, given the large-scale university level, multi course, and student framework of the current study, there is little to no difference in grade-based student performance between instructional modes for courses where both modes are applicable” (Cavanaugh and Jacquemi, 2015:1).

To sum up: pre-pandemic studies of planned online learning focused on comparing it with face-to face learning to determine whether or not it was as efficient. The studies selected above indicate that it was indeed efficient. They also indicate that three factors contribute to the efficiency of teaching and learning in an online setting: course design, interactions, and student autonomy. A clearly defined course structure increases learning efficiency and student satisfaction. If a course design model is implemented and all of the processes are well planned, no significant difference would be expected in learning outcomes between students using online formats and students in a face-to-face format. Online formats require careful planning and a firm theoretical basis in pedagogical methods and course design principles to create an efficient planned online learning environment. Following on from this, both synchronous and asynchronous interactions should be encouraged, depending on the type of activity involved. Instructors should encourage, facilitate and monitor interactions, because social interactions (student-student and student-instructor) are essential for efficient learning. Lastly, students should be encouraged to take a higher level of responsibility for their learning. For this learning to be successful, however, they require a set of skills including digital, time management and task management skills.

Chapter 2. Emergency remote teaching: an overview of studies before and during the pandemic

In March 2020, in response to the outbreak of the COVID-19 pandemic, “most educational institutions around the world cancelled in-person instruction and moved to remote learning and teaching” (Di Pietro et al., 2020). This simultaneous global shift to emergency remote teaching was unprecedented. According to Aristovnik, “as of 1 April 2020, the number of learners required to stay at home due to the closure of their educational institution on all levels reached a peak of 1.598 billion from 194 countries” (Aristovnik, 2020:2). Hodges argues that the focus of education became delivery, in the context of “rapidly changing needs and limitations in resources, such as faculty support and training” (Hodges, 2020). Under such crisis circumstances, Fabrizi states that “a broad variety of synchronous and asynchronous online settings of teaching and learning” were provided (Fabrizi, 2021). These included settings that featured a balance of synchronous and asynchronous interactions, as well as those that were either predominantly synchronous or predominantly asynchronous. According to Farnell et al. (2021), most HEIs were faced with challenges to their capacity for online teaching. However, these were later resolved, and most institutions were successful in making the transition to emergency remote teaching. Most HEIs provided some sort of support to the teaching and learning process, and teaching staff were able to adapt the teaching material developed for in-person teaching to work with online formats; however, the HEIs’ readiness for the switch to emergency remote teaching varied. Likewise, students’ capacity for online learning was diverse in terms of their digital competences, with a significant portion of students (29 % of age groups 16–24-year-olds and 25–29-year-olds) having below a basic level of digital skills (comp. Eurostat, 2021) In addition, there were challenges in terms of technology access for both teaching staff and students (Farnell et al., 2021).

Key takeaways from the findings of studies carried out during and after the pandemic

Numerous studies have explored the effects of the emergency remote teaching implemented during the pandemic. The selection of studies presented in the table below also includes global research, since the pandemic and post-pandemic trends in Europe reflect global trends in higher education.

Table 2. Overview of studies carried out during and after the pandemic

AUTHORS / YEAR	TITLE	SAMPLE	LOCATION
Doolan et al. (2021)	Student life during the COVID-19 pandemic lockdown: Europe-wide insights	17,116 respondents (students)	41 European countries
Aristovnik et al. (2020)	Impacts of the COVID-19 Pandemic on Life of Higher Education Students: A Global Perspective	31,212 respondents (students)	133 countries across six continents
Nguyen et al. (2021)	Insights Into Students’ Experiences and Perceptions of Remote Learning Methods: From the COVID-19 Pandemic to Best Practice for the Future	4,789 respondents (undergraduate students)	95 countries worldwide
Fabrizi (2021)	Impact of Synchronous and Asynchronous Settings of Online Teaching and Learning in Higher Education on Students’ Learning Experience During COVID-19	3,452 respondents (3,056 students and 396 teachers)	Germany
Coimbra Group (2021)	Universities’ response to the Covid-19 crisis: What have we learnt so far?	31 Coimbra Group universities	Europe
Reisinger Walker et al. (2021)	Comparing Student Learning, Satisfaction, and Experiences Between Hybrid and In-Person Course Modalities: A Comprehensive, Mixed-Methods Evaluation of Five Public Health Courses.	Pre-course survey: 850 respondents (students) Post-course survey: 404 respondents (students)	USA

The effect of a similar set of factors to those presented in Chapter 1 with regard to planned online learning (course design, interaction with the tutor/instructor, interaction with peer students, individual learning processes and learning outcomes) can be observed in terms of student satisfaction. Some factors relating to the specific pandemic-time context have also been observed, such as mode of delivery and digital skills.

- **Mode of delivery and course design**

The preferred mode of delivery was synchronous because of the real-time contact with the instructor. Well-organised course content contributes to student satisfaction.

Aristovnik et al. (2020) found that the most frequent format for course delivery (according to 59.4 % of respondents) was real-time video conferences, followed by asynchronous formats (presentations and pre-recorded videos). Their results show that students were most satisfied with real-time video conferences and videos. The authors conclude that "on the global level, students were quite satisfied with the organisation of all three segments of the pedagogical process: lectures, tutorials/seminars, and mentorships" (Aristovnik et al., 2020:18). Fabriz et al. (2021) also found that the most common modes of delivery were lectures and presentations, delivered "live via videoconferencing for the mostly synchronous groups" and through "discussions via chat tools or breakout rooms" (Fabriz et al., 2021:7). Doolan et al. report similar results, showing that the most frequent format for emergency remote teaching was "online with the lecturer lecturing in real time (74.61 %), followed by lecturers sending their presentations to students (44.51 %)" (Doolan et al., 2021:3). Synchronous video conferences were the preferred mode of delivery for most students (57.43 %), who preferred "to have face-to-face teacher-student interaction" (Doolan et al., 2021:14) in all forms of teaching (lectures and seminars). Similarly, Nguyen et al. (2021) found that students preferred a synchronous mode of delivery because it motivated and engaged them more. The authors conclude that "students benefit from classes that make use of multiple different techniques, possibly invoking a combination of passive and active methods" (Nguyen et al., 2021:7). Reisinger Walker et al. concur that course design "should follow instructional design standards to ensure high quality of instruction and student engagement" (Reisinger Walker et al., 2021:36).

- **Interaction with the tutor/instructor and peer students**

Regular synchronous (i.e. live) interaction with the instructor and timely feedback contributes to student satisfaction because it reduces the feeling of social isolation, which was a primary consequence of the pandemic.

Singh et al. argue that "feeling connected is an essential component of student satisfaction and participation, especially in the online medium of instruction where students complete most of their learning in an asynchronous form. Failure to incorporate social connectedness can lead students to feel lonely, isolated, and disconnected from their peers, and instructors" (Singh et al., 2021:154). Nguyen et al. emphasise the importance of social connections in learning, and agree that in the situations of social isolation that resulted from COVID-19 lockdowns, "the importance of social presence in courses, including live interactions that build social connections with classmates and with instructors, may be increased" (Nguyen et al., 2021:7). This is confirmed by the findings of Aristovnik et al. (2020), which indicate that "teaching and support staff have played a key role in maintaining students' satisfaction with the university, as established by the highest positive and highly significant coefficients for satisfaction with

the teaching staff". Students also reported that the lecturers were open to communication and provided timely feedback. Similarly, Doolan et al. found that "students agreed that their lecturers had provided course assignments on a regular basis, responded to their questions in a timely manner and students' suggestions and adjustments of online classes" (Doolan et al., 2021:4). Most communication occurred via email, while the preferred method of communication with instructors for most students (34.11 %) was via video-call. Other aspects explored include the impact of synchronous vs. asynchronous content delivery on social interactions, with Fabriz et al. (2021) concluding that although both modes of delivery include methods to facilitate interactions, synchronous activities offer greater potential to support social interactions compared with asynchronous activities, and result in higher student satisfaction. Reisinger Walker et al. (2021) conclude that, regardless of the mode of delivery, it is highly important to clearly communicate to the students the specific expectations for the course. The authors also suggest using discussion boards and breakout rooms, minimising testing and quizzing, and addressing accessibility issues, to increase levels of interaction.

According to Doolan et al. (2021) students reported having weekly communication with colleagues from their course and lecturers, while Aristovnik et al. conclude that "the loss of one's usual daily routine as well as reduced social and physical contact with others (including the social distancing measures) trigger numerous negative emotions like frustration, boredom, anxiety, confusion, anger, etc." (Aristovnik et al., 2020:10). However, these feelings are not primarily the result of emergency remote teaching, but rather a consequence of the pandemic (i.e. of the lockdown).

- **Individual circumstances and learning processes**

Individual factors, such as a student's level of digital skills or access to digital infrastructure, as well as their level of self-discipline or motivation and individual accessibility needs, influence the student's learning processes.

"Studying from home commonly requires greater self-discipline and motivation to follow through online lessons, particularly in the earlier period when students are getting used to the new system, which might affect the feeling of an increase in study obligations." (Aristovnik et al., 2020:9). According to Aristovnik et al. (2020), most students reported a perceived increase in workload (a total of 42.6 % of respondents reported it being larger or significantly larger (than during pre-pandemic face-to-face teaching and learning). This is also confirmed by the findings of Doolan et al. (2021); namely that 50,74 % of students reported having a higher perceived study workload compared with pre-pandemic times. The students also said that the reason for this perceived increase in student workload is as compensation for the lack of on-site classes through additional assignments.

Individual circumstances have a great influence on a student's learning processes. Doolan et al. point to "the possibility that studying from home without family members' interruptions can be a challenge" (Doolan et al., 2021:29), and observe that "only a third of students reported that they always have access to course study materials" (Doolan et al., 2021:4). Aristovnik et al. state that "a good internet connection as a key element in efficient online learning was available to just 60 % of the respondents" (Aristovnik et al., 2020:19).

Digital skills are another important factor influencing students' learning processes. Doolan et al. argue that students with higher levels of digital skills are also "more likely to cope better with unforeseen challenges when

presented with an environment of online lectures and seminars” (Doolan et al., 2021:26). Aristovnik et al. (2021) found that students were most confident about using online communication platforms, while their least developed skills were those relating to the advanced settings of certain software and the use of online teaching platforms, which could also influence the learning experience. According to Fabriz et al., greater fulfilment of psychological needs and higher levels of acceptance of online tools contribute to a more positive learning experience (Fabriz et al., 2021:11). The Coimbra Group 2021 report also emphasises the importance of addressing and accommodating the diverse needs of students.

- **Learning outcomes**

Most students report that academic performance was worse overall during the pandemic, although some skills such as autonomous learning or methodological skills improved.

According to Donnelly and Patrinos (2021), seven out of eight studies analysed in their systematic review found evidence of student learning loss. Students’ perceptions of learning loss are similar between studies. Doolan et al. (2021) state that almost half of students reported their performance as having changed for the worse. The findings of Aristovnik et al. (2021) confirm this result, despite students simultaneously reporting that they felt well adapted to the new circumstances. This could be explained by the reported difficulty of focusing during online teaching in comparison to face-to-face classes.

Rahman (2021) focused on comparing students’ test results in 2020 and 2021 to measure the difference in learning outcomes, and finds that test results decreased by approximately 10 percentage points in 2021 compared with 2020 (Rahman, 2021). These findings are confirmed by the World Bank’s analysis of recorded learning losses in the two-year period between March 2020 and March 2022. According to the majority of the 36 studies analysed at all levels of education, learning losses are on average “equivalent to roughly a one-half year’s worth of learning” (World Bank, 2022). Both sources imply that there was a lack of motivation caused by the circumstances of the pandemic.

In relation to the synchronicity of teaching and learning activities, Fabriz et al. (2021) found that this is not a factor that significantly impacts students’ self-reported learning gains. However, most students did report that their digital skills had improved. Unsurprisingly, students who participated in asynchronous teaching and learning reported increased autonomous learning skills, whereas students in mostly synchronous settings reported higher gains in methodological skills and greater interest in course content.

However, because emergency remote teaching was implemented during prolonged periods of lockdown, which resulted in significantly reduced levels of social interactions, the selected studies also explored student well-being and mental health. Students reported general health and mental health concerns due to the impact of the pandemic on their academic and personal lives. Nguyen argues that “perceptions of remote learning may be clouded by complications of the pandemic which has increased social, mental, and financial stresses globally” (Nguyen et al., 2021:7). The Coimbra Group report states that “beyond the direct effects on teaching and learning, the severe social distancing measures during the pandemic affected all the members of the academic communities” (Coimbra, 2021:10). The findings of all studies confirm this and indicate that students’ well-being, especially their mental health, was threatened during the period in which emergency remote teaching was implemented. According to research, students “experienced unbearable psychological pressure, especially due to the pandemic’s impacts on daily life, the economic effects, and

the delays in academic activities” (Aristovnik et al., 2020:12), and were “worried about their health most or all of the time” (Doolan et al., 2021:5). The perceived increase in workload caused by the need to find alternative solutions to replace face-to-face contact, together with screen fatigue and the risk of burnout, as well as issues concerning inclusion, also contributed to these feelings (Coimbra, 2021).

Another issue specific to emergency remote teaching and learning was assessment. According to Gaebel et al. (2021), HEIs were not well prepared, and concerns were raised with regard to possible cheating and plagiarism during online examinations. One approach to prevent cheating included specialised proctoring software; another included shortened exam times. However, according to Salmi (2020), there were challenges involved with regard to internet access and connection stability. In addition, these approaches were not entirely effective, since there have still been reports of cheating. Many HEIs resorted to “calling students back to campus, which bore health risks, or calling off exams, replacing them by other means or just trusting their students” (Gaebel et al., 2021:26). Research emphasises that those higher education institutions which already had experience with formative assessment were faced with less of a challenge.

In summary, studies of emergency remote teaching have focused on the effects on students, academic staff and the teaching and learning process in general, of the sudden shift to online teaching delivery in the context of the COVID-19 pandemic and prolonged periods of lockdown. A set of factors can be observed that are similar to those seen in pre-pandemic studies, which provide insights regarding the reduced efficiency of teaching and learning. Although it is known that well-organised course content contributes to the efficiency of learning and student satisfaction, in most cases the teaching methodologies implemented were not in line with those employed by planned online learning methods, because there was no time to plan and implement a course design model or prepare appropriate learning materials. Assessment also presented a challenge. In addition, some teaching staff lacked sufficient training and support, especially during the early days. This may have resulted in a higher workload for both teaching staff and students, as well as contributing to lower levels of student satisfaction and lower perceived levels of academic performance.

Synchronous methods were preferred for the implementation of emergency remote teaching during the pandemic, which enabled real-time student-instructor and student-student interactions. This preference can be explained by students’ need for more social interactions during long periods of lockdown, to reduce the feelings of isolation that resulted from a lack of face-to-face contact. However, Singh et al. warn that while “video conferencing is a very successful method to connect with students, one must also not ignore associated health risks and psychological fatigue. Intense close up eye contact, reduction in mobility, and higher cognitive load noises” (Singh et al., 2021). Such issues may have also influenced students’ perceptions of online classes in a negative way.

In the context of the pandemic, individual factors also need to be considered. Personal circumstances significantly impacted students’ learning experiences, such as access to digital infrastructure, living arrangements, health issues (especially mental health), level of digital skills, individual accessibility needs and so on. Also significant is the fact that an online learning environment calls for higher levels of student autonomy and self-discipline.

Chapter 3. Discussion

Research into pre-pandemic planned online learning and the delivery of emergency remote teaching during the pandemic clearly reveals significant differences between these two approaches to the implementation of remote teaching/learning and their respective quality. These differences, derived from the findings of pre-pandemic studies of online learning and studies of emergency remote learning carried out during and after the pandemic, can be observed through a set of factors that determine the implementation of remote teaching/learning in any context: course design, interactions, student autonomy, learning outcomes and individual factors, some of which include subcategories. All of these are presented in Table 3.

Table 3. Differences between planned online learning and emergency remote teaching

FACTORS	PRE-PANDEMIC ONLINE LEARNING		EMERGENCY REMOTE TEACHING	
COURSE DESIGN	Implementation	Carefully planned and prepared online learning environment resulting from the implementation of an instructional design model.	Implementation	Ad-hoc implementation due to the lack of time to plan and implement a course design model. Unclear how long the implementation will last (i.e. whether it will cover the entire course, or just a part of it).
	Teaching and learning materials	Teaching and learning materials are prepared in advance.	Teaching and learning materials	Lack of time to prepare teaching materials. Makeshift learning materials are adapted on the go, transferred from print format into a digital format, with minimal use of the possibilities offered by digital technologies.
	Assessment and student requirements	Assessment method is transparent and student requirements are clearly presented at the beginning of the course.	Assessment and student requirements	Assessment is a challenge. New tools and methods are developed on the go. There is a higher risk of cheating. Student requirements are sometimes not clear at the beginning of the implementation.

INTERACTIONS	<p>A balance of synchronous and asynchronous interactions, based on the nature of the activities concerned. Teaching staff act as facilitators and intervene when necessary, depending on the type of content.</p> <p>No issues regarding a lack of interaction are reported.</p>		<p>Synchronous formats are mostly used, which enable real-time student-instructor and student-student interactions. External factors, such as pandemic-induced lockdowns, self-isolation and social distancing measures, result in a general lack of social interactions, which therefore affects teaching and learning.</p>	
STUDENT AUTONOMY	Workload	<p>Workload is planned and known in advance.</p>	Workload	<p>Higher perceived workload resulting from the need to compensate for a lack of face-to-face interactions.</p>
	Autonomy	<p>Students have a higher level of autonomy and can decide the pace of their own learning.</p>	Autonomy	<p>Students are expected to take responsibility for their own learning; however, in a predominantly synchronous online environment they cannot influence the pace since there is a real-time schedule of activities they need to follow.</p>
	Support system	<p>A support system is in place at the beginning of the course.</p>	Support system	<p>At the beginning of implementation, the support system is rudimentary or non-existent and is developed on the go.</p>
LEARNING OUTCOMES	<p>No significant differences in learning outcomes compared with traditional face-to-face teaching/learning.</p>		<p>Perceived learning losses are reported by students.</p>	
INDIVIDUAL FACTORS	Participation	<p>Both teaching staff and students are well-informed and willing to participate in an online course.</p>	Participation	<p>Implementation is imposed in response to a crisis.</p>
	Training	<p>Teaching staff have received training prior to the beginning of the course being prepared.</p>	Training	<p>Levels of digital skills vary among both teaching staff and students, but the lack of training is evident due to the sudden onset of implementation.</p>

				<p>Personal circumstances vary, with socio-economic factors having a huge influence on individual experiences. The emergency that caused the implementation of emergency remote teaching influences the daily lives of both teaching staff and students, and therefore influences their capacity to participate in the remote teaching/learning process.</p>
		<p>Students are informed about technology requirements prior to the beginning of the course. They are prepared and have made the necessary adjustments.</p>		

When observing and comparing the factors in the table above, it can be concluded that the findings of the pre-pandemic studies regarding the effectiveness of online learning still apply - planned online learning is effective if an instructional design model is implemented, if interactions are encouraged in a balanced way combining both synchronous and asynchronous approaches, and if access and accessibility issues are addressed. These requirements were not fulfilled when emergency remote teaching was implemented during the COVID-19 pandemic, primarily due to objective external emergency factors influencing the organisation and delivery of remote teaching in a negative way. Emergency remote teaching was not just one of the options offered to students to choose from, as was the case with pre-pandemic planned online learning. Rather, it was the only possible option, imposed by the reality of the COVID-19 pandemic. Another cause of negative perceptions and reactions to emergency remote teaching lies outside the realm of the online teaching and learning process, and can be found in the physical and social distancing and (self)isolation periods that formed part of the anti-COVID measures implemented worldwide. These distancing measures had a negative impact on overall social interactions, beyond the context of education. Such circumstances did, however, influence students' experiences of emergency remote teaching, resulting in generally negative perceptions.

Other concerns that emerged during the implementation of emergency remote teaching and which were tackled by HEIs include mobility and internationalisation, assessment and inclusion issues. Mobility and internationalisation were severely affected (reduced and and/or suspended for a long period), and digital assessment opened the doors to the possibility of exam fraud. Meanwhile, the pandemic disproportionately affected groups with diverse needs. According to Farnell et al. (2021), underrepresented, vulnerable and disadvantaged groups were more likely to be subject to perceived learning losses, financial concerns and lower levels of mental health and well-being.

However, these challenges were addressed through the creation of new modalities that were adapted to the so-called 'new normal', such as virtual mobility "enabling teachers and students to interact in virtual multicultural classrooms, without walls and with common learning aims" (Coimbra Group, 2021:10). Assessment methods were also redesigned in such a way that "traditional closed-book exams and written tests have been replaced with assessment methods reducing stress and anxiety, e.g. open-book exams with a longer time, digital tests conducted using learning management systems, e-portfolios and e-projects" (Coimbra group, 2021:13). Similar findings are reported in the case of the EUA

survey (Gaebel et al., 2021), which involved 368 HEIs from 48 countries of the European Higher Education Area (EHEA). Lastly, “inclusionary practices, not only for people with disabilities but in deeply intersectional ways” (Coimbra group, 2021:70) were explored and developed in answer to new inclusion issues, as well as existing ones that were previously not sufficiently visible. For instance, Reisinger Walker et al. (2021) issue a reminder that traditional face-to-face classrooms suffer shortcomings such as large class sizes, which do not support student participation. These authors emphasise that online course delivery allows students to set their own pace.

One pre-pandemic study recognised the diversity of students, and therefore the diversity of their needs, which “reflecting their life context and study skills” (Müller et al., 2018:50). A more diverse offer of higher education formats will therefore resonate with the many different needs and preferences that need to be appropriately addressed. The lessons learned from the implementation of emergency remote teaching during the pandemic indicate that, while there remains room for improvement, remote teaching/learning can be part of the solution. Singh et al. state that “blended and hybrid learning seem to be the future of higher education and instructors are making efforts to learn, develop, and manage this form of learning during the pandemic and beyond” (Singh et al., 2021:158). This is especially important in terms of designing well-organised and logically structured learning units and assignments along the lines of fostering cognitive presence, as defined by Garrison et al., whereby “the professor and the students are able to construct and confirm meaning through sustained discourse in a community of inquiry” (Garrison et al., 2001:11). The Coimbra Group suggests that it “would be useful to capitalise on the most successful experiences and sharing of good online and remote teaching, learning and assessment practices” (Coimbra group, 2021:15). The Group note, however, that HEIs should be the ones to decide which practices they will keep and develop, and which they will discard. It predicts that post-pandemic higher education will be ‘a carefully balanced mix’ (Coimbra Group, 2021:15).

Chapter 4. Conclusions and recommendations

The lessons learned from the implementation of emergency remote teaching during the COVID-19 pandemic have been added to the experience higher education institutions already had with regard to developing online learning in many forms long before the pandemic emerged to create a new paradigm for higher education.

Remote teaching/learning has demonstrated that it is a tool for strengthening the resilience of higher education during crisis situations. However, remote teaching and learning is also relevant beyond the context of responding to a crisis that makes on-site teaching/learning impossible. New developments in teaching methodologies, as well as the educational and collaboration software that resulted from teaching and learning experiences during the pandemic have shown themselves to be useful in innovating and improving the teaching and learning process. This period of emergency remote teaching provides many takeaways which, in addition to prior experience and expertise in implementing various formats of online classes, can contribute to innovating, improving and reimagining higher education to make it more flexible and more inclusive.

It is therefore evident that remote teaching and learning could become one of the tools used to expand and diversify the higher education offer, making European higher education more accessible to a broader student population, and more inclusive. Both access and accessibility issues can be addressed, and academic mobility can be redesigned and facilitated. For instance, due to the technological possibilities of implementing universal design, accessibility issues with regard to study resources can be addressed more

efficiently. Meanwhile, virtual mobility can be available to more students and academic staff due to reduced costs.

Planned remote teaching/learning will remain in use as a format, and will continue to develop in order to adapt to the existing and emerging needs of the diverse student body and academic staff. This calls for further research and discussion, not only with regard to teaching and learning, but also assessment, teacher and student workload, quality assurance, and diversity issues.

General recommendations

Based on the review of studies carried out before, during and after the pandemic, the following general recommendations for policy makers can be made with regard to remote teaching and learning, with the aim of improving the quality of digital education in line with Priority 1 of the EU Digital Education Action Plan (EC, 2020) - Fostering the development of a high-performing digital education ecosystem:

- Funding should be secured to create the preconditions for the successful implementation of digital education:
 - digital infrastructure (hardware, software, internet connection)
 - digital learning resources (implementing the principles of universal design for greater accessibility)
 - technical and pedagogical support (for both students and academic staff)
 - supporting the well-being of both students and academic staff
- Assessment methods should be developed and redesigned (taking into account access and accessibility issues)
- Student and teacher workload should be evaluated and balanced with respect to in-person and remote teaching/learning.
- The diversity of needs of both students and academic staff should be recognised and addressed
- All of the above points should be included in quality assurance procedures.

Digital skills recommendations

Specific recommendations regarding the development of digital skills can be singled out and emphasised, since both pre-pandemic and pandemic-time studies indicate that improving the digital skills of students and teaching staff alike is a prerequisite for the implementation of planned remote teaching/learning, and can be crucial to its success. Based on the findings of the studies reviewed, it is recommended that resources be directed towards:

- **Professional development for academic staff**, focused on:
 - The theoretical framework of remote teaching and learning (online pedagogies and teaching strategies, instructional design, remote teaching and learning environments)
 - The use of online teaching and learning platforms (learning management systems)
 - Developing teaching and learning materials for a remote teaching and learning environment (including the use of multimedia and content creation tools)
 - Assessment in the context of remote teaching and learning
 - Fostering interactions in the context of remote teaching and learning (including the use of online communication platforms, the sharing of

teaching and learning materials, and the use of collaborative software)

- **Improving students' digital skills**, with a focus on:
 - The use of online teaching and learning platforms (learning management systems)
 - The use of online communication platforms, collaborative software and sharing platforms
 - Time management in the context of remote teaching and learning
 - Task management in the context of remote teaching and learning

These recommendations are in line with the EU Digital Education Action Plan, which recognises the need for “digitally competent and confident teachers and education and training staff” (EC, 2020). By implementing them, policy makers would improve the future experience of planned remote teaching and learning.

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