# Moving Beyond Policy on Digital Transformation: Perceptions of Digital Transformation of Teaching by Academic Staff and Students

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## Introduction

In recent years, the Norwegian government has played an active role in promoting the digital transformation of higher education institutions (HEI). Expectations of increased digitalisation have been included in national strategies and action plans, in the steering and funding of HEIs as well as through the establishment of new agencies that provide various

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types of support and coordination. HEIs, on their side, have launched institutional digitalisation strategies or added ICT perspectives in their overall strategies and plans. Academic leaders and faculty staff are thus expected to enhance their use of digital technology as part of their quality work (Tømte et al., 2019; Børte et al., 2020). Despite this increased strategic awareness, studies have demonstrated that there might be a gap, or at least a considerable delay, between national ambitions and the take-up of digital technology in teaching and learning practices (Fossland & Tømte, 2020).

The outbreak of the COVID-19 pandemic introduced a shock to the HEI system and at the same time a forced opportunity to put plans and ambitions for digitalisation into action. After two years of repeated lockdowns and ad hoc solutions, the HEI system has gained extensive experience in various forms of digital teaching and work forms. However, the question remains whether this will be a one-off effort related to the COVID-19 situation, or a more fundamental digitalisation that can improve the quality of higher education in the long run (Farnell et al., 2021).

In this chapter, we exploit data from a large-scale survey among students and academic staff to explore further the nature of the digital transformation of teaching and learning in Norwegian HEIs during the COVID-19 pandemic. More specifically, we focus on the following three questions:

- How did the academic staff develop their digital competencies during the first phase of the pandemic?
- How did students and academic staff perceive the online teaching during this period?
- What are the future perspectives among students and academic staff regarding higher education in the "post-COVID-19" era?

Finally, we discuss our findings and relate them to the ongoing policy debates on the future "post-COVID" direction of digital higher education in Norway.

## BACKGROUND

Before we move to the findings, we give a brief overview of the Norwegian higher education system and present our conceptual framework and empirical background.

### The Norwegian Higher Education Landscape

The Norwegian higher education sector (HEI) includes roughly 300 000 students and consumes more than one-third of total R & D expenditure in Norway. Following a structural reform from 2016, the sector has shifted from a highly dispersed landscape to a structure dominated by 10 universities and an equal number of smaller and more specialised university colleges. The HEI landscape also includes a variety of private institutions, but they account for a small share of students (RCN, 2021).

The new landscape, with fewer and larger institutions, is first and foremost an *organisational* concentration, where the number and geographical distribution of campuses has (so far) been rather untouched. Hence, at the outbreak of COVID-19, many Norwegian universities were multi-campus and cross-regional institutions. On the one hand, this implied an additional challenge in tackling different local contamination rules and restrictions. On the other hand, several institutions were already experienced with online communication and teaching, due to their need to operate across campuses within the new organisation.

The 21 public HEIs offer (in practice) tuition-free higher education and receive on average almost 80 per cent of total funding from direct public grants. Hence, from an economic perspective, Norwegian HEIs have been rather sheltered from immediate budget cuts due to the COVID-19 pandemic.

### Preliminary Implications of COVID-19

At the outset, several key output indicators indicate remarkably high activity during the "corona year" 2020. For instance, the HEI sector in total produced record levels of both student uptake and completion rates. The number of awarded PhDs and published scientific articles has also been at an all-time high (Sarpebakken & Steine, 2021).

However, behind these apparently impressive output indicators, the COVID-19 pandemic has deeply affected all aspects of higher education and introduced a "game-changer" for the uptake of digital teaching practices in Norwegian higher education. Our survey data show that the share of staff with no experience in teaching with digital resources fell from 64 per cent prior to the pandemic to 6 per cent in the fall of 2020. A similar shift was reported by students. We also observe that two-thirds of HEI teachers report that they had to make substantial changes in their original

teaching schemes to switch to online teaching during the spring semester of 2020 (Solberg et al., 2021).

One key question in our analysis is how academic staff accessed and made use of digital learning sources when confronted with a sudden and unexpected need to transform all forms of physical teaching to a digital format.

## CONCEPTUAL FRAMEWORK

Technology use in higher education implies several modes and tempus of teaching and learning, including pure online and distance-based teaching and learning, blended settings involving all sorts of learning management systems, new presentation tools as well as a wide range of incremental digital resources. More recently, researchers have introduced a new concept of teaching with technology, namely *Emergency remote teaching*, which differs from traditional online and campus-based classroom teaching, but with some characteristics from both strands (Hodges et al., 2020; García-Morales et al., 2021).

### *Emergency Remote Teaching and Learning*

An initial observation from the early days of the COVID-19 pandemic teaching internationally was that all teaching and learning activities outside the campus were likely to be labelled as 'online teaching and learning' (Hodges & Fowler, 2020) and/or 'digital teaching' (Kundu & Bej, 2021). The term "online teaching" can have different meanings and may include considerable variations across modes, paces, student-instruction-ratio, pedagogy, and feedback and assessment practices (Bates, 2019; Means et al., 2010; Means et al., 2014). Nevertheless, proponents of conventional campus-based teaching offerings have often labelled online learning in singular and considered it to provide poorer teaching and learning quality than campus-based offerings (Hodges & Fowler, 2020). Thus, to label the transfer from campus-based teaching to online offerings may cause at least two possible misinterpretations.

Firstly, if online learning is framed as a single pedagogical approach, it may reveal unawareness—and perhaps also ignorance of acknowledged quality in online teaching and learning offerings prior to the pandemic. As mentioned, online teaching and learning may include many different pedagogical approaches, which calls for distinct quality measurements, different from campus-based offerings.

Secondly, research on, and the practice of university teaching and learning pedagogics on campus and outside campus, are often performed by different academic staff and within different research traditions. For example, research that explores the potential of digital technology in campus-based contexts is more likely to use concepts such as 'technology enhanced learning', TEL, computer-supported collaborative learning, CSCL, and ICT-supported teaching and learning (Damşa et al., 2015). On the other hand, research that addresses various forms of online offerings is more likely to be oriented towards lifelong learning, adult learning and continuing education (ibid.).

We observe that all these concepts appear and were at play when a newer concept framed as "emergency remote online teaching" emerged (Bond et al., 2021; Hodges et al., 2020).

While the concept is still new and is still developing according to the COVID-19 pandemic, there have been some attempts to frame the concept and to illustrate how higher education institutions have responded to the demands for new modes and contexts for teaching and learning. Here, four phases have been suggested.

The first phase was observed in the initial days of the campus close downs, from about February–March 2020, where there was a rapid transition to remote teaching and learning. Here, institutions often introduced synchronous video, and faculty staff taught classes in a remote online manner, trying to connect face to face with students in one way or another with the support of technology. This first phase has also been phrased as 'Put everything on Zoom and worry about details later' (Barbour et al., 2020, p. 3).

The second phase has been framed as (re)adding basics and refers to the period from about April to June 2020, when institutions got more involved in adding basics into emergency course transitions such as course navigation, equitable access to technical infrastructure (including both hardware and software for academic staff), providing support for students and securing academic integrity.

During the third phase, from about August to December 2020, the HEIs prepared to support students for a full term, and for various forms of online delivery, even if returning to campus teaching. The fourth phase, starting from 2021, suggests encompassing unknown levels of online learning adoption, yet probably more online solutions than prior to the pandemic (Barbour et al., 2020). These phases serve as useful framings when analysing the data from our study.

## Empirical Background: Surveys of Faculty Staff and Students at Norwegian HEIs

Our analysis is based on data stemming from two recent and concurrent surveys on the consequences of the COVID-19 pandemic for Norwegian HEIs. The student survey included answers from approximately 22 000 students (43 per cent response rate), and the survey among academic staff included more than 4000 answers (51 per cent response rate). Both surveys encompassed all HEI institutions in Norway and included several batteries of similar questions addressed to both students and academic staff. In addition, the survey among academic staff included several open questions, which generated more than 1700 open reflections and experiences, thus supplementing the survey data with valuable information. Both surveys were conducted in October–November 2020, but the questionnaire addressed the initial phase of the pandemic, from about mid-March to June 2020. Furthermore, a series of 33 in-depth interviews were carried out during early 2021 with management and academic staff representing three case institutions, covering one large university, one specialised university college and one recently merged multi-campus university.

## Findings

The following sections outline findings on the efforts taken to meet the new teaching and learning situation caused by the COVID–19 pandemic. We focus on the following three aspects: (i) how faculty staff and students managed to adopt new skills and competences for teaching and learning; (ii) how they perceived the quality of teaching and learning in these new remote and digital environments; and (iii) how they foresee the future of higher education after the pandemic.

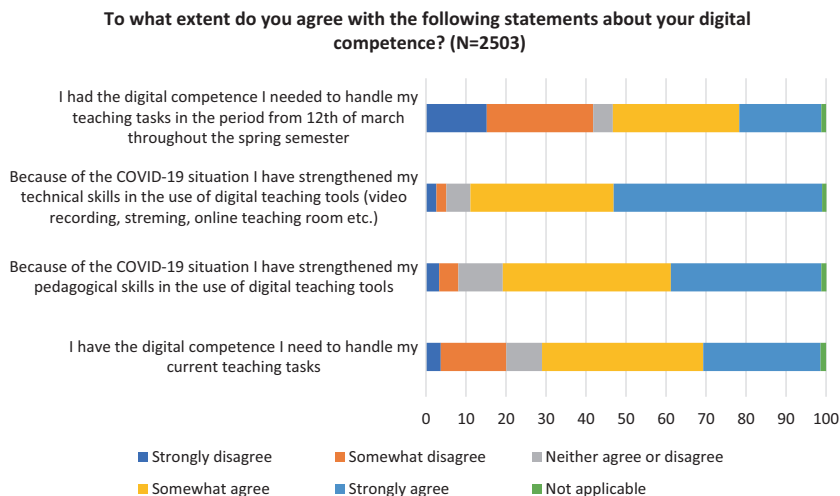### *Digital Resources and Strategies for Digital Teaching*

The transition to online teaching and working methods constituted a significant change for both staff and students within HEIs, and the situation constantly changed during the pandemic. This called for frequent and rapid shifts in academic activities as well as for the administration and management of HEIs. At the same time, the situation enabled new ways of learning, knowledge sharing and new solutions.

The survey data revealed that the HEIs provided their employees both freedom and various forms of support for reorganising their teaching, although not always with clear expectations. The employees seem to have had a good overview of current available resources for teaching. However, challenges related to research and the working environment seem to have been poorly addressed. The answers may also reflect the autonomy that characterises academia, in the sense that faculty staff have been given great freedom to handle the situation as they see fit, but with less support for the actual handling of the core tasks. Several informants emphasise that short digital information meetings and their own "corona web pages" have been successfully used to reach out with information to the entire organisation. In this sense, digital communication seems to have worked well. The survey also revealed gender differences, where women reported less satisfaction with their institution's efforts in taking care of the working environment.

The notion 'Instructional Mac Gyvers' was suggested by Barbour and colleagues in their analysis of the Canadian education sector's response to the pandemic (Barbour et al., 2020). By using this reference from a popular TV series where the hero improvised with technology to solve critical problems, the researchers illustrated how teachers had to improvise new solutions in difficult and unexpected circumstances, including a lot of stress. The shift from campus-based teaching to various forms of online and remote offerings forced teachers to use both new technology and new pedagogical approaches in their teaching, and for many of them, without prior experience.

As shown in Fig. 14.1, more than 40 per cent of staff reported that they had insufficient digital competencies to handle the digital challenges that arose during the first phase of the pandemic in the spring of 2020. In the same fall, when the survey was conducted, this share had decreased to 20 per cent. The results also indicate that the corona situation has improved both pedagogical and technical skills related to digital teaching.

The survey confirms that faculty staff had a steep learning curve and switched to various forms of online teaching overnight. As shown by Fig. 14.1, 80 per cent report that they had strengthened their pedagogical digital skills, while 90 per cent had improved their technical skills. However, interviews and open responses gathered in parallel with the survey indicate that their learning process was dominated by "low hanging fruit" such as increased awareness of existing digital resources and experiencing which types of teaching formats might be appropriate for plenary lectures versus breakout sessions and discussion groups. Much of the

**To what extent do you agree with the following statements about your digital competence? (N=2503)**



**Fig. 14.1** Reported changes in digital competence among academic staff in Norwegian HEIs 2020. Source: NIFU/COVID-19 survey to academic staff 2020 (Solberg et al., 2021)

digitalisation, especially in the first period, seems to have been characterised by emergency online teaching where the teaching planned for campus was switched into a digital, online and remote mode, and to a lesser extent teaching that was planned and designed for an appropriate online format.

Furthermore, teachers report that most of their new knowledge on teaching with the support of digital technology was acquired from a trial-and-error approach and with support from colleagues, and less from formal institutional support organised by the institution. The following quotes from the open responses are representative for most experiences shared related to this part of the survey (translated from Norwegian):

We switched from working mostly in groups to screen sharing lessons with the use of some kind of digital whiteboard. This meant listening, but not seeing, each other, which I think put a dampener on people's engagement.
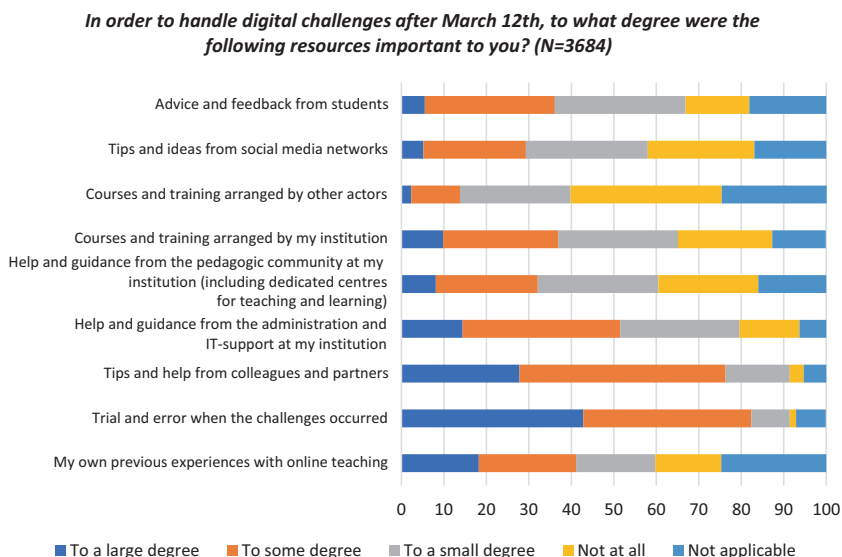
Teaching is about communication. Ninety per cent of the communication disappears in the digital format. For pure instruction or "one-man shows", the digital format works excellently.

Hybrid lessons with some people in the classroom and some at Zoom was the worst experience. Recorded videos work well for pure one-way lectures. Live-Zoom teaching works well for groups and discussions. But it's difficult to give lectures live on Zoom.

The survey also addressed how academic staff acquired new digital skills that they considered necessary to cope with the corona situation (Fig. 14.2).

Again, the results indicate that the transfer to various forms of online teaching was dominated by solutions and immediate measures to make teaching planned for a physical format available online. Hence, much of the digitalisation processes in the higher education sector during the first year of the pandemic demonstrate the first two phases of emergency online remote teaching and learning described above. These findings are also to some extent in line with another study conducted in early spring 2020 in Norwegian HEIs. Here, the researchers found that academic staff sought to solve their new teaching challenges on their own and/or with support



**In order to handle digital challenges after March 12th, to what degree were the following resources important to you? (N=3684)**

**Fig. 14.2** Reported learning strategies among academic staff in Norwegian HEIs 2020. Source: NIFU/COVID-19 survey to academic staff 2020 (Solberg et al., 2021)

from colleagues and within their own networks. Some also reported insufficient digital competence to master this new teaching contexts, and some suffered from inadequate institutional support (Damşa et al., 2021).

## *Perceived Quality of Online Teaching Reported During the COVID-19 Pandemic*

How did students and higher education teachers perceive the online teaching during the first phase of the pandemic? This overall question was operationalised in a set of harmonised sub-questions addressed to both students and teachers in the respective surveys to these two groups (Fig. 14.3).

As the data show, a large majority of both students and faculty staff think that the learning outcome would have been better with traditional campus-based teaching during the period in question. At the same time, we observe that teachers and students in general have different opinions regarding the quality and outcome of the online teaching. While two-thirds of teachers consider that the courses and arrangements worked well, this applies to less than half the students. Moreover, online discussions appear to have been more difficult to integrate in the teaching arrangements. In general, we find that academic staff were more positive towards their online teaching efforts than the students. Students, on the other hand, had a more positive impression of their own engagement during the pandemic. There is reason to assume that practising the emergency mode of teaching, in most cases without any prior knowledge to online teaching, may have caused a lot of stress and time-consuming tasks related to mastering the diverse digital technology needed for this new mode of teaching. The following statements describe some of the challenges faced by academic staff in this period:

> *There was a lot of improvisation in the period after March 12. Some things worked well, while other things didn't quite work out so well. I took a course in pedagogy during this period, but I don't really feel that it was a big help. The most important thing in the spring semester was to adapt quickly, start using Zoom and making videos (...)*
>
> *The problem is that we did not have time for competence building, the handling of the situation was more about crisis management. However, I see that some digital teaching can work and also provides opportunities for more international cooperation in teaching.*
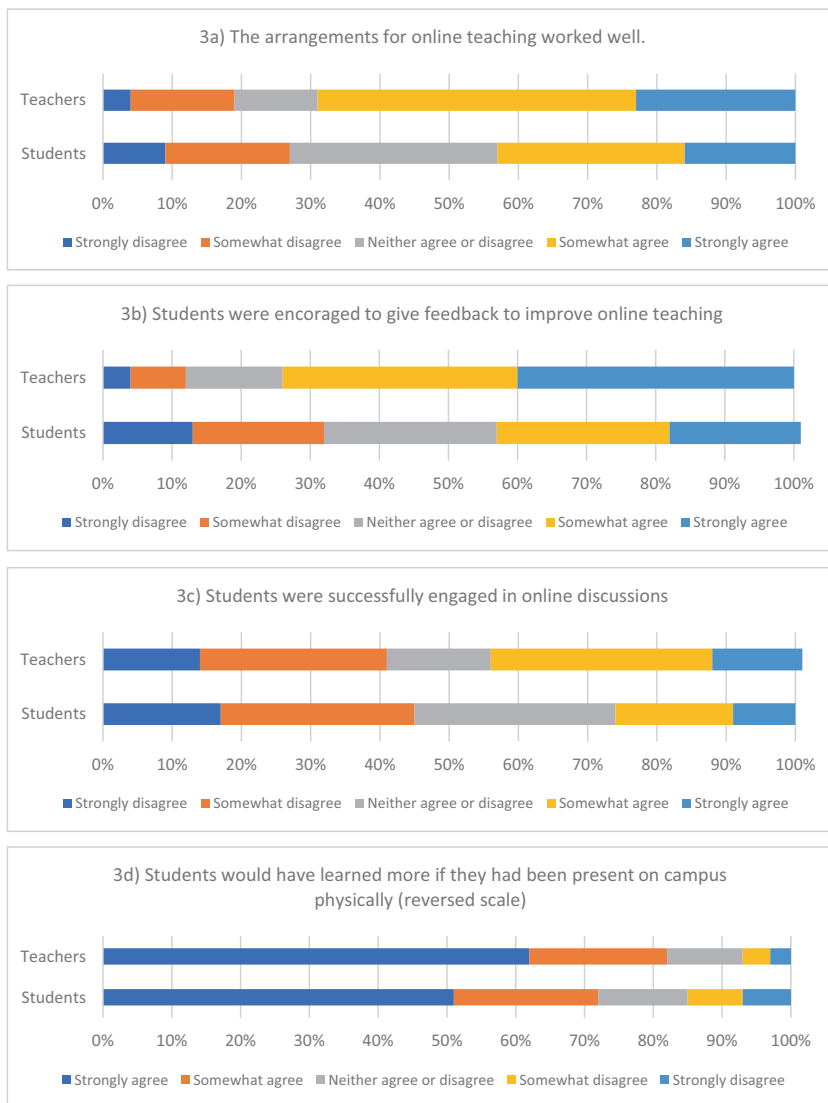
**Fig. 14.3** a-d Reported perceptions of online teaching among students and academic staff in Norwegian HEIs 2020. Source: NIFU/COVID-19 survey to academic staff and students 2020 (Solberg et al., 2021)

> *It was generally challenging to offer teaching (and to work at all) in the spring semester due to poor working conditions in the Home Office. Another important shortage was the lack of contact with colleagues (...).*
>
> *It was uncomfortable to give lectures digitally from home at the same time as the rest of the family was at home, since students recorded the lectures, including all background noise (from my children etc.) (...).*

When it comes to online supervision and tutoring, students held diverse opinions regarding the quality, while academic staff were significantly more positive. The picture looks different when it comes to online exams, where students were more positive than academic staff. Academic staff, on the other hand, were uncertain about whether they managed to develop appropriate exercises in the rapid changeover, and whether the changed forms of exams included sufficient and adequate review procedures. Another concern from the academic staff was that digital exams increased the risk of cheating, as illustrated by the following open comments from the survey (translated from Norwegian):

> *We should have had a lot more training in changing to the home exams. In retrospect, I see that we have given school exams as home exams. The rate of failure drops dramatically because the level is apparently higher. We haven't been able to adapt to home exams within my subject.*
>
> *It is natural to suspect the students of cheating and collaborating, but we have no means to possibly control this to the extent that it is important. Oral exams via Zoom lose several dimensions that are important for students in order to show what they can.*

As observed here, the emergency character of faculty staff's teaching and evaluation processes demonstrates their unawareness of possible online solutions for assignment, assessments and exams from research-based conventional online teaching and learning. Yet, during their trial-and-error experiences, we also witnessed new and innovative approaches to these activities.

### *Future Perspectives Seen from Students and Academic Staff*

So, what about the future perspectives of higher education after the pandemic? As suggested by Barbour et al. (2020), the fourth phase of the pandemic is expected to include more online solutions compared to the situation before the pandemic. In the long run, however, it is uncertain to
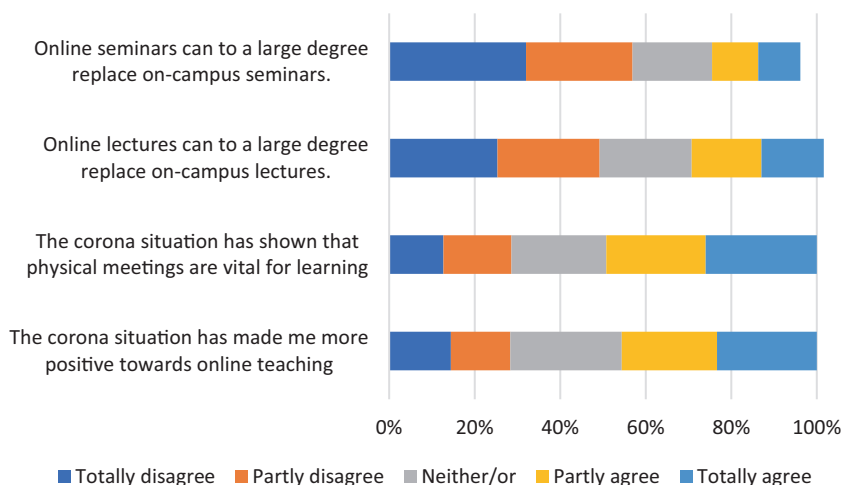
**Fig. 14.4** Statements regarding Norwegian students' future perspectives of digital higher education. Source: NIFU/COVID-19 survey to academic staff and students 2020 (Solberg et al., 2021)

what extent the online solutions will be used, in which contexts and for what purpose. The survey among Norwegian students and staff included questions on future perspectives that give some indications of possible directions for higher education in the post-COVID era, as illustrated by Fig. 14.4.

We see that 50–60 per cent of students strongly or partly disagree with the statement that online seminars and lectures can replace the campus-based formats. When it comes to the necessity of physical encounters for learning, the picture is rather mixed. Furthermore, almost half of the respondents say that the pandemic has made them more positive towards online teaching, while less than 30 per cent seem to have developed a more negative attitude. The data indicate that the idea of replacing physical campus-teaching with online teaching has little support, while there seems to be rather fertile ground for combining more digital teaching and learning forms with traditional campus-based teaching formats.

At the same time, it is important to note that the student population is heterogeneous and that the attitude towards various modes of online teaching differs between the respondents' fields of study, age and level of education. In particular, the data reveal that bachelor students and

students in early phases are less positive towards online learning and correspondingly more concerned with the physical aspects of learning. This indicates that the physical meetings and learning are more important when students enter and strive to "find their place" in higher education, while various online formats seem more acceptable and perhaps also practical for master's students and "mature" students.

The academic staff was asked a more direct question concerning their preferences for teaching after the pandemic. In Fig. 14.5 a (left), we see the distribution for all respondents on each alternative, while Fig. 14.5 b (right) shows the distribution according to academic fields (using the colours from 5a).

Firstly, we observe that very few respondents (in total 5 per cent) prefer to have only or mainly online teaching in a future normal situation. Furthermore, 12 per cent foresee a balanced mix of online and campus-based teaching, while the vast majority envisage "elements of online teaching methods, but with an emphasis on campus-based methods" (55 per cent). The next largest group prefers "campus-based teaching methods
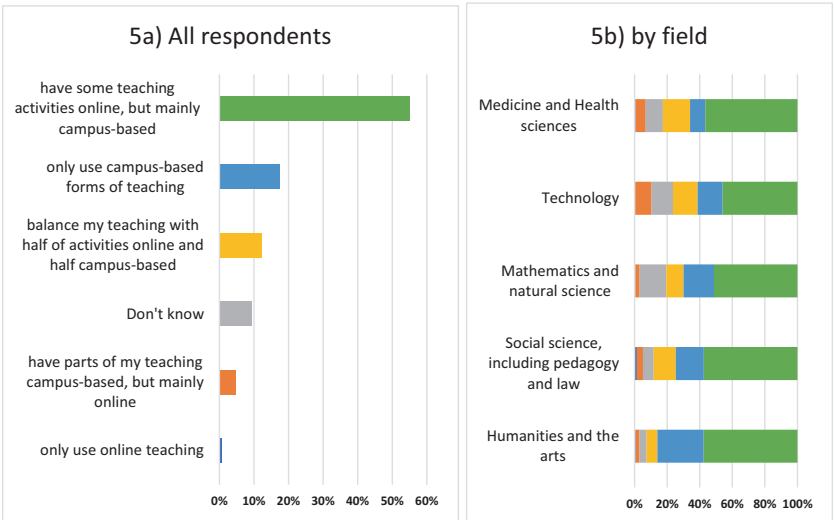


**Fig. 14.5** a & b Preferences for teaching among academic staff after COVID-19. When the COVID-19 situation is over, I prefer to... Source: NIFU/COVID-19 survey to academic staff and students 2020 (Solberg et al., 2021)

only" (18 per cent). The latter option is most common among teachers within humanities, and less common in medicine and health. This is somewhat surprising, as subjects within humanities are often less dependent on laboratories, equipment and practical exercises than medicine and health. On the other hand, our interviews reveal that teaching within humanities often relies on discussions and group sessions that have proved to be less successful in the improvised formats that emerged in response to the emergency caused by COVID-19.

All in all, this means that three-quarters of academic staff prefer to put the emphasis on campus-based teaching when society returns to normal. At the same time, these answers could also be influenced by the general feeling of "COVID fatigue" that characterised higher education at the time when the survey and the interviews were conducted (fall 2020). Whether the pandemic will generate a move "back to basics" or a continuous learning and development process remains to be seen.

## Conclusion: Where to Go from Emergency Remote Teaching?

In this chapter, we have showed how faculty staff/ teachers and students in the Norwegian higher education institutions moved from campus-based teaching to various forms of remote, online teaching. In an international context, as demonstrated, this has been framed as "emergency online remote teaching" and includes elements from classroom/campus teaching and online teaching but does not equate with any of them. Findings from the growing body of research literature on this new teaching offerings may help us to illuminate our findings on how teachers and students handled these new teaching and learning contexts, and their perceptions of them. For example, Scherer and colleagues suggest that teachers' readiness for emergency remote online teaching is influenced by three core components: technological-pedagogical and discipline-specific (content) self-efficacy; perceived institutional support; and perceived online presence (Scherer et al., 2021). All these dimensions may impact how academic staff manage and perceive their ability for teaching during the pandemic. Moreover, as academic staff are heterogeneous, so is their readiness for this new way of teaching.

Another observation is that the uptake of the concept (emergency remote teaching) has not yet been translated into the Norwegian language. This means that we so far do not have a shared understanding, or

ways of labelling the teaching and learning that happened during the pandemic. The characteristics of teaching practices during the pandemic include a mix of different labels, such as "digital teaching and learning" and "online teaching and learning" (Damşa et al., 2021; Solberg et al., 2021). Another observation is that these labels have different stakeholders, for example, there seems to be a trend that researchers prefer "online teaching and learning", while policymakers are more into "digital teaching and learning". We will argue that if there is no unified understanding of the type of teaching that has been practised during the pandemic, it may also be difficult to develop a mutual understanding of a "what" and from "where" to develop future university teaching practices that include good and innovative examples from the pandemic.

If we use the label "online teaching and learning" in the singular, there is also a risk that we will not get a clear understanding of what the pandemic teaching was all about, and how parts of it may connect to the diversity of established online teaching methods practised prior to the pandemic, and what elements are most likely to be considered as merely improvisations and responses to the lack of access to a university campus. There is also a risk that quality indicators designed for campus-based teaching are transferred to online teaching, which again will not necessarily provide insights into the distinct characteristics of good and/or innovative online teaching. If we use the label "digital teaching", there is a risk that the "digital" dimension of the teaching becomes blurred, since it may refer to digital resources used both in campus-based teaching and in remote online teaching contexts.

Our findings from the surveys do not elaborate in detail on the pedagogical strategies that have been developed, nor to what extent we are witnessing fundamentally new and innovative ways of teaching. A more systematic overview on these matters might allow institutions and academic staff further development in innovative and flexible teaching. As demonstrated here, much of the teaching in these new remote online contexts has been developed as individual trial-and-error approaches among academic staff, and from a bottom-up approach, more than through administrative and /or technically led developments. Even if academic staff have had access to some institutional support from their departments and faculties, together with support from central agencies with expertise in technology and pedagogics, it remains unclear if any of these bodies

have made (or intend to make) any systematic reviews of the characteristics the emerging new emergency remote online teaching will have within their institutions. In this sense, Norwegian HEIs have largely practised a form of "learning by doing", with high degrees of trial and error and transfer of tacit knowledge. Given the range and nature of the COVID-19 crisis, it is not surprising that both solutions and learning processes were rather unorganised and informal in the first phase of the pandemic. On the other hand, one might expect that institutions with in-house formal expertise in both pedagogical and technical aspects of online teaching would have been better prepared for both handling the unexpected situation and organising common approaches to teaching. In the aftermath of the crisis, there is a need for better and more targeted use of pedagogical knowledge and experience in developing future digital teaching practices.

We believe that collecting and systematising "best practices" and establishing good arenas for sharing within departments and faculties might serve as new ways of peer learning among faculty staff within the disciplines, instead of more generic approaches towards technology-supported teaching that is often provided by centralised support services within the HEIs.

Although both students and academic staff seem to foresee an increased use of digital resources in the aftermath of COVID-19, data from our survey and interviews indicate that the pandemic has left a general recognition of physical on-campus learning and an equal scepticism towards the digital transformation of higher education.

However, we consider it unwise and perhaps also unfair to judge the strengths and weaknesses of digitalisation in higher education based on experiences drawn from the exceptional situation during the COVID-19 pandemic. Emergencies may both trigger and drive systemic changes, but they are seldom appropriate references for shaping teaching and learning practices in the long run. Instead of debating whether various types of online teaching and learning should *replace* traditional and campus-based teaching, the discussion should rather address how digitalisation of higher education could improve the overall quality of teaching and learning.

## References

Barbour, M. K., LaBonte, R., Kelly, K., Hodges, C., Moore, S., Lockee, B., ... & Hill, P. (2020). Understanding pandemic pedagogy: Differences between emergency remote, remote, and online teaching. Canadian eLearning Network. Retrieved May 2022, from https://k12sotn.ca/wp-content/uploads/2020/12/understanding-pandemic-pedagogy.pdf.

Bates, T. (2019). *Teaching in a digital age* (2nd ed.). BC Campus Open Publishing. https://open.umn.edu/opentextbooks/textbooks/221 Accessed 2 May 2022

Bond, M., Bedenlier, S., Marín, V. I., & Händel, M. (2021). Emergency remote teaching in higher education: Mapping the first global online semester. *International Journal of Educational Technology in Higher Education, 18*(1), 1–24.

Børte, K., Nesje, K., & Lillejord, S. (2020). Barriers to student active learning in higher education. *Teaching in Higher Education, 1*, 1–19.

Damşa, C., de Lange, T., Elken, M., Esterhazy, R., Fossland, T., Frølich, N., ... & Aamodt, P. O. (2015). Quality in Norwegian Higher Education: A review of research on aspects affecting student learning. Retrieved May 2022, from https://www.nifu.no/publications/1288405/

Damşa, C., Langford, M., Uehara, D., & Scherer, R. (2021). Teachers' agency and online education in times of crisis. *Computers in Human Behavior, 121*, 106793.

Farnell, T., Skledar Matijević, A., & Šćukanec Schmidt, N. (2021). 'The impact of COVID-19 on higher education: a review of emerging evidence', NESET report, Luxembourg: Publications Office of the European Union. doi: https://doi.org/10.2766/069216.

Fossland, T., & Tømte, C. E. (2020). Technology as quality work? educational leaders and teachers' use of digital technology. In Elken et al. (Eds.), *Quality work in higher education* (pp. 57–77). Springer.

García-Morales, V. J., Garrido-Moreno, A., & Martín-Rojas, R. (2021). The transformation of higher education after the COVID disruption: Emerging challenges in an online learning scenario. *Frontiers in psychology, 12*, 616059.

Hodges, C. B., & Fowler, D. J. (2020). The COVID-19 Crisis and Faculty Members in Higher Education: From Emergency Remote Teaching to Better Teaching through Reflection. *International Journal of Multidisciplinary Perspectives in Higher Education, 5*(1), 118–122.

Hodges, C., Moore, S., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *EDUCAUSE Review, 2020*, 1.

Kundu, A., & Bej, T. (2021). COVID-19 response: Students' readiness for shifting classes online. *Corporate Governance: The International Journal of Business in Society, 21*(6), 1250–1270.

Means, B., Bakia, M., & Murphy, R. (2014). *Learning online: What research tells us about whether, when and how*. Routledge.

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2010). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. U.S. Department of Education.

RCN. (2021). *Science & Technology Indicators for Norway 2021*. The Research Council of Norway (RCN). 2021.

Sarpebakken, B., & Steine, F. (2021). Ny årsrekord – over 1 600 tok doktorgrad i 2020. NIFU-*Policy Briefs*. 2021

Scherer, R., Howard, S. K., Tondeur, J., & Siddiq, F. (2021). Profiling teachers' readiness for online teaching and learning in higher education: Who's ready? *Computers in Human Behavior, 118*, 106675.

Solberg, E., Hovdhaugen, E., Gulbrandsen, M., Scordato, L., Svartefos, L., & Eide, T. (2021) *Et akademisk annerledesår. Konsekvenser og håndtering av koronapandemien ved norske universiteter og høgskoler*. NIFU-rapport 2021:9. NIFU, Oslo. 2021. Retrieved May 2, 2022, from https://www.nifu.no/publications/1903811/

Tømte, C. E., Fossland, T., Aamodt, P. O., & Degn, L. (2019). Digitalisation in higher education: Mapping institutional approaches for teaching and learning. *Quality in Higher Education, 25*(1), 98–114.