

## Teacher educators' experiences when changing to digital teaching during the COVID-19 pandemic in subject Food and Health

Lilja Palovaara Søbørg  
*Inland University of applied sciences, Norway*

Hanne Müller  
*OsloMet–Oslo Metropolitan University, Norway*

### Abstract

*Several Norwegian universities implemented the digitization of all teaching in March 2020 during the COVID-19 pandemic. This study explores teacher educators' experiences when teaching the subject of Food and Health under the pandemic. The data consisted of eight interviews with teacher educators and was thematically analysed.*

*The pandemic has challenged teachers' digital competencies and pedagogical practices in different ways and forced them to work hard to maintain quality in their teaching. The findings indicate it could be possible to conduct innovative teaching in digitized learning environments. Teacher educators spent a lot of time rethinking teaching practices pedagogically and professionally in new digital settings. Digital teaching can be challenging in terms of communication and relationships between teacher educator and students, and between students. Accordingly, it would appear that the underlying challenges have presented the most obstacles to personal and institutional innovation, not the coronavirus crisis itself.*

**KEYWORDS:** COVID-19 PANDEMIC, INTERVIEW STUDY, FOOD AND HEALTH TEACHER EDUCATORS (FHTE), DIGITAL LEARNING ENVIRONMENTS

### Introduction

Student progress and the right to have a high standard of education must be maintained, even during difficult times (Education International, 2020). The first wave of COVID-19 under the global pandemic reached the Norwegian education system in March 2020. This corona crisis has challenged the ability of national and local education institutions to respond urgently with emergency plans (OECD, 2020) for addressing the health risks posed by the virus and for supporting teachers and students in developing digital learning resources and environments on a large scale (Commonwealth of Learning, 2020).

Digital learning environments involve both teachers and students using technologies for educational purposes without place restrictions, whereas face-to-face learning environments require students and teacher educators to be physically present in the same place at the same time (Allen & Seaman, 2013; Bates, 2019). Brown et al. (2005, p. 3) clarifies the concept of educational digital learning environments as “dynamic, interconnected, ever-evolving community of learners, instructors, tools, and content”.

In many countries, such as England (la Vellea et al., 2020) and Portugal (Flores & Gago, 2020), the closing of campuses forced a transformation from traditional face-to-face to more digital learning environments. Several studies have indicated that the increase in digital learning environments

Søbørg, L. P., & Müller, H. (2021). Teacher educators' experiences when changing to digital teaching during the COVID-19 pandemic in subject Food and Health. *International Journal of Home Economics*, 14(2), 123-133.

caused by the COVID-19 pandemic has changed teaching and learning worldwide in different ways (Bozkurt et al., 2020; Ferdig et al., 2020). Further, COVID-19 has provided challenges and opportunities for developing teaching practices (Carrillo & Flores, 2020; Flores & Gago, 2020) and potentially exposing shortcomings and vulnerabilities. Thus, creating an environment for generating innovative pedagogical development ideas but also raising ethical concerns requiring attention. However, students have the right to receive instruction (in terms of teaching), and the duty of teacher educators is to teach. The question as to what extent these rights have been realized during the pandemic is a subject for discussion.

The quality of higher education can be described and measured in multiple ways with complex criteria (Harvey & Green, 1993). For our study, we understand quality as meeting expectations and requirements (Norwegian Ministry of Education, 2016). Therefore, quality is achieved when teaching meets the political expectations of efficiency, professionalism, and variations in teaching methods and learning environments. Additionally, teaching must meet institution leaders, colleagues, and students' expectations in the best possible ways. In Norway, there has been an increasing number of debates on how the pandemic has influenced the quality of education and how COVID-19 will change higher education in different ways (Brökel, 2021). Moreover, the perspectives of teacher educators who teach Food and Health (FH) and other practical and aesthetic subjects have received less attention from researchers. In this study we examine Food and Health teacher educators' (FHTEs) points of view concerning the consequences of the pandemic to their teaching practices. To our knowledge, the effects of the pandemic on FH teacher education have not yet been studied.

## Aim

The aim of this study was to explore the experiences and reflections of teacher educators when teaching Food and Health (FH) during the pandemic, which will be achieved by conducting qualitative interviews.

## Context

The overall context of the study is the period when the global pandemic started to affect Norway in March 2020, which continues to affect teacher educators. The health authorities have introduced national infection control systems that have resulted in the closing of education institutions. However, the political expectations were to maintain student rights to receive teaching and most teaching practice transferred to the digital domain.

FH is one of several academic courses that students can choose in their five years of primary and secondary school teacher education (National Council for Teacher Education, 2016). While most students choose to study 30 ECTS (European Credit Transfer System) credits, it is possible to extend the courses up to 60 ECTS, and in case students do a master's thesis in FH they will need a total of 90 ECTS. In Norway, FH is a compulsory practical-aesthetic subject in the 4th, 6th, and 9th grades in primary and secondary school (Øvrebø, 2008). It is an interdisciplinary subject domain consisting mainly of cooking skills and knowledge of health promotion, food culture, and sustainable food.

Recently, there have been strong political and financial investments in digitising primary and secondary teacher education to strengthen the digital competencies of current and future teachers. Furthermore, as in many other countries, the Professional Digital Competence Framework for Teachers was launched to improve "the quality of teacher education and systematic continuing professional development of teachers" (Arstorp et al., 2017, p. 2). Accordingly, the digitization of teaching in Norway and many other countries were already operative when the lockdown started. However, a documented gap remains in Norway between politics and practices in terms of the digital competencies of both teacher educators and students (Instefjord & Munthe, 2017).

## The conceptual framework

The Norwegian Strategy Plan for Digitizing Higher Education clarifies digitizing as the use of "technology to renew, simplify and improve [and] offer new services that are easy to use, efficient and reliable" (Norwegian Ministry of Education, 2018, p. 1). Further, digital learning environments have been justified by several arguments; they facilitate the use of technological solutions and digital tools to achieve more effective, flexible, and varied learning. In our study, the concept of digitizing

teaching was used to describe the process in which teacher educators transform traditional face-to-face teaching into digitized learning environments during the pandemic.

### Translation and spreading of ideas

Czarniawska and Joerges (1996) provides concepts for understanding teacher educators' experiences and reflections with the phenomenon transforming *teaching practices during the pandemic*. The translation theory (Czarniawska & Joerges, 1996) originates from different organisation theories and is based on the notion of spreading of ideas and practices as *translation*. It focuses on the ways ideas and practices spread in different places with different groups of actors, technologies, tasks, and cultures. Spreading is understood as being a chain process where actors are involved in varying degrees. Actors such as teacher educators can adapt and influence practices and ideas while spreading and translate the practices and ideas. However, the translators can use different intentions, strategies, and modes when implementing these concepts. Such a situation, where new ideas are incorporated into the organisation and are confronted with existing practices, provides teacher educators with an opportunity to reflect on their understanding of teaching and how it could be developed. Moreover, the success of this process depends on which rules and translation modes the teacher educators choose.

### Digitizing teaching practices

The concept of digitizing teaching practice is not new (Bates, 2019). Furthermore, it is one of the hallmarks of a knowledge society, progressed by global political efforts for facilitating effective education for everyone. The technology-based learning model (Bates & Poole, 2003) indicates how different degrees of digitization can influence teaching practice, placed on a scale from traditional face-to-face teaching through mixed-mode teaching to complete e-learning (Figure 1). In our case, the no e-learning method consisted of only face-to-face teaching on campus, while the fully e-learning method consisted of only online Zoom- and/or Teams-teaching. These learning practices can be mixed and are termed blended or distributed learning. A typical use of these practices is when disseminating key knowledge elements and discussions when face-to-face teaching is reduced.

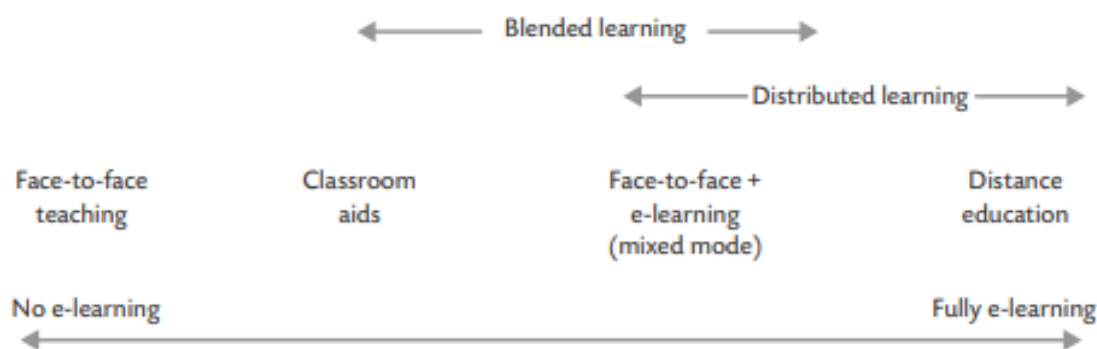


Figure 1 Model for digitized learning environments applied from Bates and Poole (2003) cited in Bates (2019)

Mixed-mode teaching, also known as blended or hybrid teaching (Allen & Seaman, 2013), combines traditional face-to-face teaching and digitalised learning. Within this mode, students can be placed into groups where one group receives traditional face-to-face teaching on campus while the other simultaneously receives distance teaching. In this study, we use some concepts from the translation theory of Czarniawska and Joerges (1996) combined with the model by Bates and Poole (2003) as frameworks for conceptualising the changed learning environments where teacher educators taught during the pandemic.

### Methodology and methods

This qualitative study (Brown & Clarke, 2013) explored FH-teacher educators' experiences and reflections on their own teaching ideas and teaching practices in a pandemic-induced situation where familiar teaching environments had to be increasingly applied to digital teaching environments. Our data consist of eight interviews. We used interviews because our concern was to get "a participant

to talk about *their* experiences and perspectives, and to capture *their* language and concepts" (Brown & Clarke, 2013, p. 77). The participants were chosen using the following four criteria. First, they represent different teacher education institutions from different geographical locations in Norway. Second, they differed both in age and employment time as FH-teacher educators. Third, they have a permanent teaching position within their educational institutions. Finally, they teach FH on Campus at official primary and secondary teacher education institutions, similar to the authors. An email and telephone were used to ask the participants for their willingness to be interviewed.

The interview guide (Silverman, 2013) was based on previous research (Carrillo & Flores, 2020) and our own experiences with the pandemic. The guide consists of 10 open-ended questions. The interactive semi-structured interview data was constructed in professional conversations (Kvale, 2008) in which experiences and reflections of interviewers and interviewees (Gubrium & Holstein, 2012) developed understandings of teaching during the pandemic. Interviews were conducted in December 2020 and early January 2021. Each interview lasted 45-60 mins. Both authors conducted the interviews online and synchronously according to Brown and Clarke's (2013) guidelines through digital devices, Zoom and Skype, or telephone. This enabled time saving and involving the informants from different geographical areas and different teacher education institutions.

Our theoretical thematic analysis (Brown & Clarke, 2013) started during the interviews and was refined several times. The interviews were mainly recorded using video or audio, transcribed, and/or documented by written notes. Recordings and notes were then analysed several times and discussed by both authors to uncover topics relevant to the aim of the study. The complete dataset was initially coded selectively, according to Brown and Clarke (2013), to find descriptive items about teacher educators' experiences during the pandemic. Then, the dataset was examined again and coded completely while searching for specific items concerning the experiences, opportunities, and challenges faced by the teacher educators. The following four final themes were identified: Transformed teaching practice, solutions for surviving the pandemic, communication, and teaching quality.

## Ethical considerations

According to the Norwegian National Research Ethics Committees (2016), this type of study does not require an ethical warrant. It should also be noted that there are few FHTEs in Norway; they are easily recognisable, and for this reason, their education institutions and identities were anonymized in this study. We contacted the participants by email and informed them about the study in advance. Furthermore, we asked for their voluntary participation, reminded them they could withdraw at any time, and data was stored confidentially until the publishing of this article.

In the following section, we present our main findings and discussions by using Brown and Clarke's (2013) interpretive descriptions of data material. We use both the data extracts and theoretical framework to illuminate FHTE's teaching experiences under COVID-19 restrictions. While this contributes to the transparency of our study, the findings are only generalisable in similar contexts.

## Findings and discussion

Four overarching themes were identified in the thematic analysis: Transformed teaching practice, solutions for surviving the pandemic, communication, and teaching quality.

### The transformed teaching practices

This theme illustrates how the FHTEs talked about the changes in their teaching practices during the COVID-19 pandemic. The digitization of teacher education was integrated in teaching practice in some degree before the pandemic. Furthermore, most FHTEs had already met their students in classrooms and teaching kitchens on the campus and knew each other a little by the time of lockdown. Accordingly, the preconditions for transforming teaching practices in FH from face-to-face to fully e-learning were quite favourable.

Some teachers referred to teaching before the pandemic as normal or ordinary teaching in a classroom and kitchen, or campus-based teaching. One FHTE said that then:

[teaching] was conducted in the old way in which I could see what is happening and where it is possible to make eye contact with students and get response from them.

None of the participants foresaw the drastic changes resulting from the pandemic. According to some of our participants, this transformation of teaching practices happened overnight. The participants were personally impacted by the pandemic in different ways. One interviewee noted that:

I experienced it [lock down] as an absurd situation, when we got new framework conditions, I felt that everything was a chaotic mess. Then we were told that these changes would apply to absolutely everyone [...] I knew that I just had to act and do what I could.

According to the participants, the transformation at educational institutions happened with unexpected power. They conveyed how their ordinary life as FHTEs was placed on hold when the government and Norwegian Institute of Public Health closed all non-essential activities on 13th March 2020. Although transforming practices can happen gradually and the spreading force can increase (or decrease) over time (Czarniawska & Joerges, 1996), while this pandemic caused a much faster transformation. FHTEs had to change their teaching practices and immediately start to transform their lectures into a format that could be taught digitally. Participants considered the transition difficult, urgent, and forced, with one stating:

[...] I had to redo everything that I had previously prepared on that Wednesday, because I was told that all teaching was to be done digitally.

The lectures were usually digitized and customized to suit the Zoom platform. Moreover, all participants stated their digital knowledge and skills had increased because reorganising the learning environments forced them to think differently. However, it was apparent that the FHTEs had different competencies in digital knowledge and skills. Preparing lectures takes more time if teacher educators are not familiar with using digital platforms. One teacher educator noted that:

[...] it was time consuming to make PowerPoint with sound. Images and sound required very long upload times in Canvas.

Some teachers recalled how they learned the most fundamental things necessary to prepare a lecture digitally; however, there were differences in how quickly they learned and became confident in using the digital teaching tools. While some of the older teacher educators told:

[...] it was scary to begin with

they still did their best. Several participants became more confident as their digital knowledge increased, while some others had to learn Zoom and other programs from scratch. FHTEs spent a lot of time rethinking teaching practices pedagogically and professionally in this new digital setting during the pandemic.

However, it was not only because of the pandemic that teacher educators reported increased time usage. One participant remarked that:

[...] it's not Corona or the fact that it's digital that has made me spend more time. Because I have spent a lot of time preparing for this autumn, and that is because I am now suddenly working with target group that is completely different, I have had before.

Accordingly, underlying challenges seem to have presented the obstacles to personal and institutional innovation, not only the coronavirus crisis itself.

While the implementation of learning resources and digital learning environments in local teaching practice gradually have become more widespread, the digital skills of teacher educators have been criticized as being inadequate (Instefjord & Munthe, 2017). However, our study does not support such findings. None of the participants were unfamiliar with digital learning environments and all participants emphasised that mastering technical skills should be considered as a prerequisite for successfully mastering digital environments.

### Solutions for surviving the pandemic

According to the translation theory (Czarniawska & Joerges, 1996), the ways of new ideas and practices spread in different places with different groups of actors, technologies, tasks, and cultures. Our results show how FH-teacher educators could conduct innovative theoretical and practical teaching in digitized learning environments. For example, the analysis revealed differences in how the education institutions organised their practical lessons during the lockdown. One university did not have any practical lessons for a period, having several theory lectures instead, although several practical sessions were subsequently offered at a safer time. Further, practical lessons lost most terrain during the campus shutdown and were deemed the most difficult to transform into digital learning environments. The impressions from several participants were that students were less able to maintain focus on the practical side of FH.

Only some FHTEs had experience with all the methods of digitized teaching presented in the model by Bates and Poole (2003). Instead, they implemented teaching in various ways. One FHTE found another learning environment for her students and moved some of the practical lectures outdoors to reduce the risk of infection. Another FHTE did not have many practical lessons delivered digitally, having received special permission to conduct practical lessons on campus. Accordingly, she conducted several hybrid lessons even during the lockout. Several FHTEs prepared theoretical and practical tasks which students could complete at home. The students documented task completion by sending videos or pictures with text, and the FHTEs provided feedback on these tasks. Homework seems to assume that each student has access to sufficient kitchen equipment. This may not always be the case. This evokes a question: Is the equal right to education for all forgotten? This is the ethical concern which some of FHTEs were worried about.

Several participants used a mixture of teaching methods to digitize the practical exercises of cooking different dishes, with one explaining the teaching process as follows:

I did a live demonstration in Zoom, explaining and showing the process of cooking a fish, from removing the intestines through fileting, to plating the finished dish. Then the students were given 90 minutes to prepare a dish of their own at their homes, based on a recipe given to them before the demonstration. The students presented their prepared dish to me in a one-on-one online setting, in which we discussed the process of preparing the fish dish and how they solved their task. This one-on-one conversation was very fulfilling for the students.

This quote serves as an example of how the pandemic provided opportunities for innovative teaching practice. FHTE described one way of successfully digitizing a practical lesson in FH representing fully e-learning (Bates, 2019). She appeared to have carefully considered learning goals, methods of teaching, and the time/schedule for the lesson seem to be time-consuming. However, she told that she did not have contact with students when they worked on their tasks. Out of experience we know that in the face-to-face teaching situations in campus kitchens the interaction between students and FHTE is vivid and FHTE is constantly observing students cooking skills. The teaching method this participant describes seems to refer to student-active learning (Damşa et al., 2018) where the students are responsible for independently conduct the learning task. Furthermore, the students could clarify the criteria for the individual conversation with FHTE which took place after the finished task by bringing up their own descriptions and experiences concerning the practical cooking task. The teacher educator did not have any other data sources than the students' narratives to base the discussion on. This example shows that students' perspectives on a practical teaching event in FH can be reinforced in digitized learning environments. This was the first time this FHTE taught FH in this way and she noted that this method would never have crossed her mind without the pandemic.

### Communication

Most of the FHTEs managed to continue teaching FH by digitizing their teaching despite the pandemic, partly because they had met their students in traditional face to face teaching in classrooms and in teaching kitchens on the campus before the lockdown. Nevertheless, they faced several challenges with information flow. Spreading of information of changers in existing practices can be understood as being a chain process where actors are involved in varying degrees (Czarniawska & Joerges, 1996). While university administration usually ensures that external and internal communication is flowing, the FHTEs experienced the adequate information provided to was variable. One participant described her experience with deficient communication as following:

We are frustrated because we always get information afterwards. We were told that they have shut down [the campus] via the media. This was Friday at 17 pm. We messaged our university and asked what we should do, but there was no answer, so we just decided how to teach on Monday. Once we had made that decision, we planned the coming week during the weekend [...] so [later] we were criticized because we had made those decisions ourselves [...] without involving the management.

This experience illustrates how pre-existing shortcomings in organisation could emerge (or escalate) during a crisis and how information does not always flow well. Some FHTEs took responsibility by reorganising their own teaching practices and working overtime, and two FHTEs were afterwards criticized for acting without approval from leaders. This type of critique can hamper implementing new practices (Czarniawska & Joerges, 1996) and may indicate underlying weaknesses in organisations. However, in some other organisations, FHTEs received praise for their efforts.

All participants stated that the amount of digital teaching increased due to the unexpected shut down of their campuses. Furthermore, teacher educators' working methods became different. One FH-teacher educator claimed that:

[...] communication on the digital platforms is unnatural.

Further, several participants noted that communication forms had changed because digital teaching possibly requires more written, individual communication outside the teaching events compared to face-to-face teaching.

Some participants had trouble with achieving two-way communication in Zoom because some students turned off cameras so that neither the FHTe nor co-students could see them. Instead, they saw many black computer screens. Several participants told that they did not manage to conduct active dialogue with the students in their lectures and students asked fewer questions in fully-e-learning compared to no-e-learning. One participant stated:

[...] It's something about when you are asking a question, you might get an answer, but it comes from a black screen, and that is pretty difficult to relate to [...] There is no eye contact, there is nothing [you can use] to confirm anything.

The lack of a face behind some answers makes teaching more challenging because the FHTEs struggled to determine whether their students have understood what is lectured. Teaching can be understood as interaction (Kansanen, 2006) in which both teacher and students participate and have mutual expectations for presence and feedback. However, black screens can challenge these basic premises of teaching and learning. The participant continued by stating:

While lecturing, I try to compress it more, and to be more precise. This is shorter sequences, but it is the only opportunity to capture and hold attention for a longer time span. I understand that the students find it hard to stay focused online. I can imagine that it feels more tiring than being in a classroom for example, and it becomes more monotonous.

Many of the participants recounted having similar experiences, finding communication with students easier to achieve on a face-to-face teaching. Despite this, according to FHTEs, several students experienced more freedom with digital teaching because the learning is more student-led, meaning they decide how much to listen. This freedom can be both beneficial and harmful for learning. This causes more responsibility for learning on the students. This could be one of several explanations as to why some FHTEs perceived their students were less engaged in digitized learning environments compared to no e-learning.

Another reason for the apparent reduction in student activity in fully-e-learning situations could be explained by the fact that not all teacher education institutions in Norway have integrated digitized teaching in their ordinary teaching practices (Instefjord & Munthe, 2017). A literature review of 134 empirical studies (Carrillo & Flores, 2020) indicated that teaching in digital learning environments challenges teacher collaboration and communication between several actors throughout the organisation. Accordingly, while the process of digitizing teaching practices is spreading in teaching institutions through teacher educators, they are only one link in a larger spreading chain. Other possible links could include administrative staff who ensure that timetables inform, for example, whether digitized teaching is synchronised, and technical staff who could ensure the required technical devices are working correctly. Our study indicates that FHTEs have digital assistance easily available and most of them needed support from technical staff. This need for support was uniform,

regardless of the participants' existing technical skills with digital tools. One participant remarked that:

The support I got was essential for my teaching. The critical point is that support must be available at the exact moment it is most needed. The fact that I managed to conduct the planned teaching on that Wednesday was only because of the help I got from the IT-assistance team.

However, most of FHTEs consider informing students about practical issues essential for successful teaching this practical-aesthetic subject FH. One participant noticed the missing communication too late:

[...] one problem I encountered the day of teaching practical digitized cooking was that the students had not been told to buy food [...] there were practical challenges that became quite demanding in order to make the teaching relevant to those who participated in the lecture from home.

### Teaching quality

Teaching quality can be clarified by using complicated criteria (Harvey & Green, 1993) as well as by clarifying external and internal expectations and requirements. Our analysis indicates that FHTEs have been concerned about the quality of teaching during the pandemic. Furthermore, they experienced several unexpected circumstances in their teaching practice, such as problems with digital equipment and software and communication with students. One participant expressed that the pandemic was a "kick off" for the development of her digital skills.

There was a clear distinction between the digital and physical learning environments. Several teacher educators said that

It [digital learning environment] can never be the same [as physical learning environment].

The findings suggest that it was very hard to achieve engaging dialogue and discussions on Zoom/Teams, despite the FHTEs testing different methods. However, as communication stands at the very core of all teaching, this is a question of teaching quality. One participant referred to discussions about the black screens as follows:

[...] the digital teaching degrades the quality because the teacher students have special expectations for digital communication.

FHTEs teaching methods became different and communication was more limited and unnatural on the digital platform, more teacher-led teaching, less dialogue. Moreover, there can be a limit into which the students ask questions. One cannot exclude that shy students will become even more timid when there is a computer screen between them and the FHTE. One participant noted that some students found communication via a screen less satisfying and that current practice in digitized learning environments reduces teaching quality. Another perception was that other students were grateful and held that online teaching was preferable to no teaching. Another FH-teacher educator remarked that:

With in-depth learning there is usually an advantage of varied teaching methods.

Her experience was that in-depth learning was more difficult to achieve when there was no normal teaching situation.

The main concern of FHTEs was whether their teaching was good enough to support students learning. This was because some students required more attention and individual guiding as the pandemic progressed. A series of surveys have confirmed this as a relevant concern, demonstrating the pandemic has had a negative influence on expected learning outcomes (NOKUT, 2021). An interesting situation is when students are individually working with cooking tasks in their kitchens while in digital learning environments (such as Zoom), and the FHTE and other students enter there for following up the student and learning together. One participant expressed the concern this way:

If they are at home, they must open their home to the whole class and to the teacher educator and it can feel quite problematic for many.

Hence, our study shows it is possible to create a positive and permissive atmosphere that facilitates learning by using the attempt-fail method, such as in learning to use digital devices. Moreover, mutual



openness to learning challenges between the teacher and students (and between the students themselves) improves the learning atmosphere. The teacher is primarily responsible for student learning and is also a supervisor. One participant noted that:

...this [work as a teacher educator] includes being a supervisor [...] not only giving students tasks they must solve individually and in groups.

Several participants felt external expectations from leaders. One recounted her managers expecting them to control the digital classroom environment during Zoom-lectures. Some FHTEs used “icebreakers” such as correct and incorrect statements, which are designed to open conversations and improve the digital classroom environment, because they were expected to do so by their leaders.

FHTEs have taught students digitally, and this indicates their willingness to change their teaching practices. This means that FHTEs adapted to new learning environments and learned how to use digital tools effectively within a short period. Many students miss campus teaching, and the pandemic has placed campus-teaching in a more positive light. According to several participants, many students find face-to-face teaching on campus more active, present, complementary, and social compared to fully digitized teaching.

## Conclusion

The aim of this study was to explore FHTEs’ experiences and reflections about their teaching during the COVID-19 pandemic. In fact, experiences and reflections were all about complex processes concerning changes in learning environments in which new ideas about teaching had to be found rapidly because existing teaching practices could not be implemented during the pandemic. Teaching had to be digitized, and it happened in different extend in different places. Our study was informed by literacy, political documents and participants’ experiences and our own experiences. Our thematic analysis was driven by translation theory (Czarniawska & Joerges, 1996) which gave us concepts to understand the ways new ideas and practices can spread in chain processes where different actors are involved in varying degrees. To understand how the different degrees of digitalised learning environments can influence teachers’ teaching the translation theory was combined with the model of the technology-based learning by Bates and Poole (2003). The theory and concepts we used allowed us to explore the goal of our research in a productive way. The results are not widely generalisable in other contexts, but still give a single picture of the implementation of FH teaching during the pandemic. Our study shows that COVID-19 has provided both challenges and opportunities for developing teaching practices. Thus, the findings and discussions can be interesting for policymakers and teachers who develop FH-teaching. However, we conclude that the underlying challenge revolves around being able to innovate personally and institutionally, not the COVID-19 pandemic itself. FHTEs are just one link in a long chain of developing processes, but they can make a difference.

This study indicates that the COVID-19 pandemic has changed FHTEs’ teaching practices. It could be possible to conduct innovative theoretical and practical FH teaching in digitized learning environments, and digital teaching can challenge communication and relationships between teacher educators and students. Our findings also indicate that several of the participants in the study will continue to develop and use digital teaching practices after the pandemic.

## Author biographies

*Lilja Palovaara Sjøberg, Associate Professor / Senior Lecture, Inland Norway University of Applied Sciences. Study manager and teacher of Food and Health in primary and secondary school teacher education, and the study of food, nutrition, and health in the Section for Public Health. Research interest: Subject matter didactics and Food pedagogy.*

*Dr Hanne Müller is an associate professor at OsloMet- Oslo Metropolitan University, Norway Of Applied Sciences, Education, and international Studies in Primary and Secondary Teacher Education. She is the study manager and teacher of Food and Health. Her research interests include pedagogy and didactics, nutrition, and biochemistry, with a special interest in active learning methods.*

## References

- Allen, E., & Seaman, J. (2013). *Changing Course. Ten years of Tracking Online Education in the United States*.  
<http://www.onlinelearningsurvey.com/reports/changingcourse.pdf>
- Arstorp, A., Helland, K., & Kelentric, M. (2017). *Professional Digital Competence Framework for Teachers*. The Norwegian Centre for ICT in Education.  
[https://www.udir.no/globalassets/filer/in-english/pfdk\\_framework\\_en\\_low2.pdf](https://www.udir.no/globalassets/filer/in-english/pfdk_framework_en_low2.pdf)
- Bates, A. W. (2019). *Teaching in a Digital Age. Guidelines for designing teaching and learning*. (2nd ed.). Tony Bates Associates. Vancouver, B.C.  
<https://opentextbc.ca/teachinginadigitalage/>
- Bates, A. W., & Poole, G. (2003). *Effective Teaching with Technology in Higher Education: Foundations for Success*. Jossey-Bass. San Francisco
- Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., Lambert, S., Al-Freih, M., Pete, J., Olcott, D., Rodes, V., Aranciaga, I., Bali, M., Alvarez, A., Roberts, J., Pazurek, A., Raffaghelli, J., Panagiotou, N., de Coëtlogon, P., ... Paskevicius, M. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, 15(1), 1-126.
- Brökel, T. (2021). *How Covid-19 will change university lectures*. <https://khrono.no/how-covid-19-will-change-university-lectures/556876>
- Brown, M., Dehoney, J., & Millichap, N. (2005). *The Next Generation Digital Learning Environment. A Report on Research*. EDUCAUSE. Learning Initiative.  
<https://library.educause.edu/-/media/files/library/2015/4/eli3035-pdf.pdf>
- Brown, V., & Clarke, V. (2013). *Successful qualitative research. A practical guide for beginners*. SAGE. London.
- Carrillo, C., & Flores, M. A. (2020). COVID-19 and teacher education: a literature review of online teaching and learning practices. *European Journal of Teacher Education*, 43(4), 466-487, DOI: 10.1080/02619768.2020.1821184
- Commonwealth of Learning (COL). (2020). *Guidelines on Distance Education during COVID-19*.  
[http://oasis.col.org/bitstream/handle/11599/3576/2020\\_COL\\_Guidelines\\_Distance\\_Ed\\_COVID\\_19.pdf?sequence=4](http://oasis.col.org/bitstream/handle/11599/3576/2020_COL_Guidelines_Distance_Ed_COVID_19.pdf?sequence=4)
- Czarniawska, B., & Joerges, B. (1996). Travels of ideas. In B. Czarniawska, & G. Sevón (Eds.). *Translating organizational change*. Berlin: Walter de Gruyter.
- Damşa, C., de Lange, T., Elken, M., Esterhazy, R., Fosslund, T., Frølich, N., Hovdhaugen, E., Maassen, P., Nerland, M., Nordkvelle, Y. T., Stensaker, B., Tømte, C., Vabø, A., Wiers-Jenssen, J., & Aamodt, P. O. (2018). *Quality in Norwegian higher education: A review of research on aspects affecting student learning*.  
<https://www.forskningsradet.no/siteassets/publikasjoner/1254035532334.pdf>
- Education International. (2020, November 23). *AUDITING EDUCATIONAL EQUITY in Light of the Covid-19 Pandemic. A guide for Education Unions*.  
[https://issuu.com/educationinternational/docs/2020\\_eiguide\\_equityaudit\\_covid19\\_en\\_final](https://issuu.com/educationinternational/docs/2020_eiguide_equityaudit_covid19_en_final)
- Ferdig, R. E., Baumgartner, E., Hartshorne, R., Kaplan-Rakowski, R., & Mouza, C. (Eds.). (2020). *Teaching, technology, and teacher education during the COVID-19 pandemic: Stories from the field*. Waynesville, NC: Association for the Advancement of Computing in Education. (AACE).  
<https://www.learntechlib.org/p/216903/>
- Flores, M. A., & Gago, M. (2020). Teacher education in times of COVID-19 pandemic in Portugal: national, institutional, and pedagogical responses. *Journal of Education for Teaching*, 46(4), 507-516.  
<https://doi.org/10.1080/02607476.2020.1799709>
- Gubrium, J. F., & Holstein, J. A. (2012). Narrative Practice and the Transformation of Interview Subjectivity. In J. F. Gubrium, J. A. Holstein, A. B. Marvasti, & K. D. McKinney, (Eds.). *The Sage Handbook of Interview Research. The Complexity of the Craft*. Sage. Thousand Oaks, California.
- Harvey, L., & Green, D. (1993). Defining Quality, *Assessment & Evaluation in Higher Education*, 18, 9-34.
- Instefjord, E. I., & Munthe, E. (2017). Educating digitally competent teachers: A study of integration of professional digital competence in teacher education. *Teaching and Teacher Education*, 67, 37-45.  
<https://doi.org/10.1016/j.tate.2017.05.016>
- Kansanen, P. (2006). Teaching as Teaching-Studying-Learning interaction. *Scandinavian Journal of Educational Research*, 43(1), 81-89.  
<https://www.tandfonline.com/doi/abs/10.1080/0031383990430105>
- Kvale, S. (2008). *Doing interviews*. London: Sage.
- la Vellea, L., Newman, B. S., Montgomery, C. C., & Hyatt, D. (2020). Initial teacher education in England and the Covid-19 pandemic: challenges and opportunities. *Journal of Education for Teaching. International Research and Pedagogy*. 46(4), 596-608.  
<https://doi.org/10.1080/02607476.2020.1803051>
- National Council for Teacher Education (NCTE). (2016). *National guidelines for the primary and lower secondary teacher education program for years 5-10*. [https://www.uhr.no/\\_f/p1/iecd98eeb-d012-44ce-b364-c8787ca51a95/national\\_guidelines\\_for\\_the\\_primary\\_and\\_lower\\_secondary\\_teacher\\_education\\_programme\\_for\\_years\\_5\\_10.pdf](https://www.uhr.no/_f/p1/iecd98eeb-d012-44ce-b364-c8787ca51a95/national_guidelines_for_the_primary_and_lower_secondary_teacher_education_programme_for_years_5_10.pdf)

- NOKUT (Norwegian Agency for Quality Assurance in Education). (2021). *Svake resultater fra Nasjonal deleksamen for grunnskolelærerstudentene* [Weak results from the National partial exam for primary school teacher students].  
<https://www.nokut.no/nyheter/svake-resultater-fra-nasjonal-deleksamen-for-grunnskolelærerstudentene/>
- Norwegian Ministry of Education. (2016). *Quality Culture in Higher Education*.  
<https://www.regjeringen.no/contentassets/ae30e4b7d3241d5bd89db69fe38f7ba/en-gb/pdfs/stm201620170016000engpdfs.pdf>
- Norwegian Ministry of Education. (2018). *Digitalisering ilærerutdanningene 2017-2021*. [digitization of teacher education 2017-2021].  
<https://www.udir.no/kvalitet-og-kompetanse/profesjonsfaglig-digital-kompetanse/digitalisering-i-lærerutdanningene/>
- Norwegian National Research Ethics Committees. (2016). *Norwegian National Committee for Research Ethics in the Social Sciences and the Humanities*  
<https://www.forskningsetikk.no/en/>
- Organisation for Economic Co-operation and Development (OECD). (2020). *Education responses to COVID-19: Embracing digital learning and online collaboration*.  
<https://www.oecd.org/coronavirus/policy-responses/education-responses-to-covid-19-embracing-digital-learning-and-online-collaboration-d75eb0e8/digitalisering-i-lærerutdanningene.pdf>
- Øvrebø, E. M. (2008). *Fagdidaktikk i mat og helse* [Subject didactics in food and health]. Høgskoleforlaget. Kristiansand.
- Silverman, D. (2013). *Doing Qualitative Research*. (4th ed.). Sage. London.