

Chapter #5

UNIVERSITY COLLEGE STUDENTS' PERSPECTIVES AND OPINIONS ON DIGITAL LECTURES

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ABSTRACT

The traditional lecture, with a teacher talking and writing on a blackboard interacting with students, has in many cases been exchanged with different digital or hybrid solutions. It was evident when the whole world went into lockdown, and education at all levels needed to emergency transform learning in classrooms to learning through digital platforms. New structures had to be made, new routines, and new approaches. It was necessary to develop solutions for presenting different programs or motivating students to be active, even without a camera or microphone. In some cases, the digital lectures were synchronous, with teachers and students meeting at the same time to discuss a topic both in small and big groups. Other times, the digital courses were asynchronous to give the students more time to prepare themselves and activate their learning by giving them the responsibility to study individually.

This study has investigated the student's views on what they have experienced during digital lectures. The students from different programmes were asked to answer an anonymous questionnaire of their opinion, ideas, and experiences with digital solutions. The results were categorized and analyzed to select some tools or approaches that most students found better or worse for their learning.

Keywords: digital learning, remote learning, students views on digital tools, synchronous and asynchronous lectures.

1. INTRODUCTION

The pandemic changed higher education. There was a need to deliver many lectures digitally, via video or streaming, or through other resources. Both teachers and students had to adapt to this (Hussein, Daoud, Alrabaiah, & Badawi, 2020, Lin & Gao, 2020, Nieuwoudt, 2020). When the world was battling the virus, and everyone was in self-quarantine, the progression in higher education courses was not canceled but instead transferred into new communication media. In some places, physical meetings were canceled for months, while in others, just a few weeks, depending on local and national restrictions. In Norway, delivering higher education through digital lectures differed between schools, professions, courses, and teachers. Some teachers preferred to hold synchronous (real-time) lectures and just changed the classroom with a digital conference. Others decided to give more asynchronous (not real-time) lectures filled with video files, pictures, and text explaining the topic that students could do independently. Then, they supported students with online seminars, group work, or Q&A sessions (questions and answers). Every teacher in Norway could adapt to the digital setting they preferred and what they considered would be the best (and quickest) solution for their students and their topics.

The need to transfer teaching into a digital setting (due to pandemic and closed campuses) caused changes in how the knowledge was shared and delivered. These changes were significant and rapid. Many teachers just went with ideas that might not have been scientifically researched before and tried to do something that could fit the new and unexpected situation. At the same time, the students tried to make sense of the new learning environment when staying home and connecting through digital media. In addition, the students had to deal with the rapid increase of self-study when most of the formal and informal group activities were canceled. The pandemic forced a quantum leap in digitalization for both students and teachers.

This book chapter describes different perspectives and opinions of university college students on different institutions, campuses, or programs. This relatively small study aims to present some circumstances that affected teaching in higher education in Western Norway University of Applied Sciences (HVL) and Volda University College (HVO) during the second year of the pandemic and discuss some tendencies connected to teaching through digital lectures. The authors conducted an empirical study with the research question to map students' voices in how they want to be taught through a digital lecture. What are university college students' opinions and experiences regarding digital lectures?

2. BACKGROUND AND PREVIOUS RESEARCH

Due to the Covid pandemic, many changes in teaching practices were made in a short time. As a result, questions and concerns were raised about the effectiveness of teaching and the impact on teachers and students. The previous research on remote learning focused on students' motivation or on finding factors that could support students that did not meet on-campus to participate in lectures. Remote learning is a method of teaching through various technical supportive platforms and software to teach students who choose to study off-campus, as they work full-time, have family commitments, live far from the college campus, and lately because of the pandemic restrictions. Due to the variety of the different teaching methods in higher education that fits with the term 'digital lecture', there was a wide variety of types and approaches conducted during the courses. This study separates between synchronous lectures, where the teacher and students were meeting on digital platforms through audio (and video) at a certain time, and asynchronous lectures, where teachers prepared materials (audio, video, text, etc.) that students could work through at their convenience.

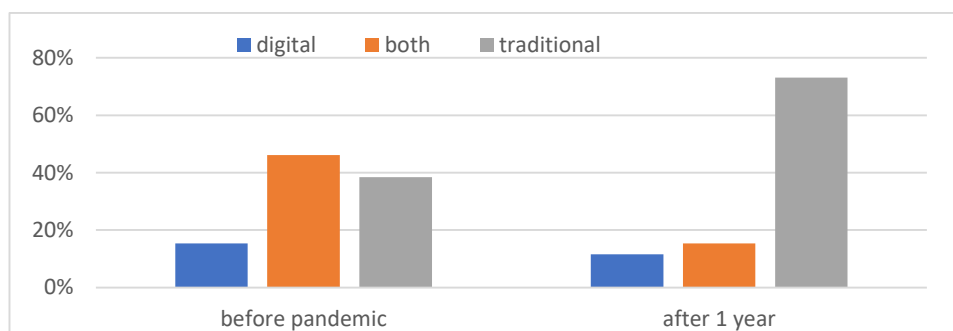
The 'digital lecture' aspect used in this study is relatively new. Still, it shares some similarities to remote learning, which had been researched for almost twenty years. Burston (2003) presented one of these similarities when he pointed out the need to focus on different aspects of remote lectures rather than on the immediate results of implementing new technologies. He claimed that there is more that is affecting students learning than just the technological equipment. In 1990, Donna Gee investigated variables, such as students' learning style, affecting remote learning through teleconferencing. Her study was relatively small-sized, but she found that students' attitudes and learning styles affected their performance and implied that some students worked more effectively on-campus while others were better remotely. Remote learning is a flexible and desirable option for independent students that like to have autonomy over their studies. Students that have self-discipline and enjoy working at their individual pace. However, students who sign up for on-campus studies generally want the entire college experience, collaboration, and group-studying, participating in exercises and laboratories. Such students expect to be on campus for long hours and have a strict schedule to follow. They still need self-discipline and

self-motivation, but the setting of everyone being in the same shoes makes it easier to accommodate. This does not mean that students cannot change between these learning methods. While some students can make sense of every learning method, other students might find remote learning challenging.

The pandemic raised again many of these questions about remote learning as teachers working at home had to reach students off-campus to carry out lectures that were not intended to be digital in the first place. How to adapt technologies to the course content? How to motivate students to participate and ask questions? How to keep their attention for more extended periods? How to practice collaboration and discussion remotely? How to reach students through screens and make them feel seen and heard? How to address technical difficulties and teachers' improvisation when things do not go as planned? The same challenges that remote learning raises were transferred to digital lectures for students and teachers worldwide.

The change that higher education in Norway went through during the pandemic became an important topic for teachers and researchers, and many of them conducted research in this new situation. A survey, conducted one year after the start of the pandemic, asking students what kind of teaching they preferred, showed that 73% of the students wanted a physical lecture in a classroom with a teacher and classmates (Figure 1 – after a year) (Fojcik, Fojcik, Kyte, Pollen, & Mjånes, 2021). Furthermore, 57 students responded wholly or partly to the survey, in which they evaluated teaching methods they were experiencing during the pandemic. The vast majority of students desired to return to campus and to the traditional lectures setting. A similar study before the pandemic, conducted on the same campuses, showed that students previously wanted a variety of digital and non-digital teaching methods (Figure 1 – before pandemic) (Fojcik & Fojcik, 2020). The most significant change in students' preference is that more students wish to interact with the teacher present, and fewer want just online lectures. Another interesting fact is that fewer students wanted both methods than before the pandemic.

Figure 1.
HVL: Lecture type according to student's needs
(Fojcik & Fojcik, 2020, Fojcik et al., 2021).

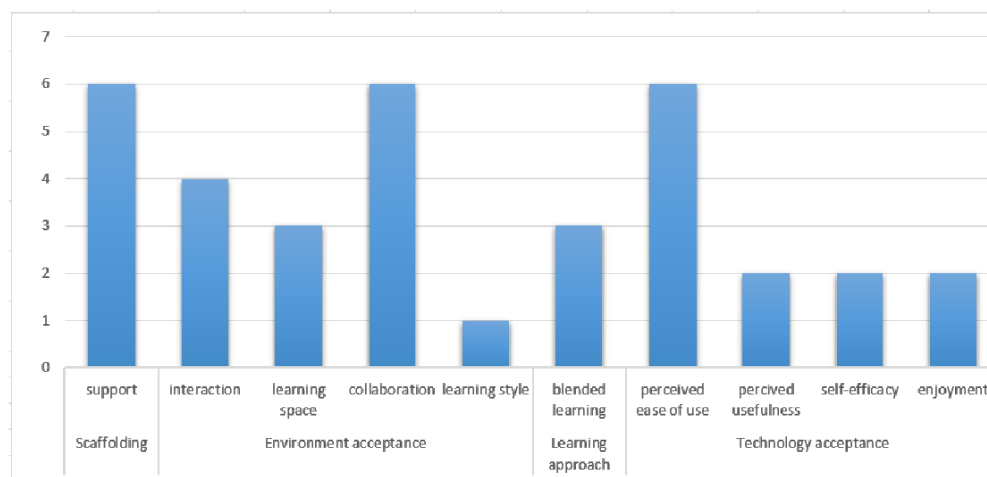


Many researchers (Li & Tsai, 2017; Kyewski & Kramer, 2018; Özhan & Kocadere, 2020) that studied remote or digital lectures suggested that the concept of motivation is an essential element. It is closely related to the professional engagement of students. Another fundamental concept is the teacher-student relationship that significantly impacts students'

achievements, according to Ayllón, Alsina, and Colomer (2019). Dörnyei (2020) suggested that teachers should actively keep students engaged and not just focus on the subject content.

Sun, Siklander, and Ruokamo (2018) identified, in a literature review, factors that trigger and stimulate learning in digital environments. According to their results, visible in Figure 2. there are four categories of factors in the literature: support to the students (as scaffolding), collaboration (through discussion and common activities), learning approach, and acceptance and use of technology. These factors look like elements of social constructivism theory (Vygotsky, 1978; Kurt, 2020).

Figure 2.
Factors that triggered students' interest in digital learning environments and the amount of research articles that examined these factors (Sun et al, 2018, p.70).

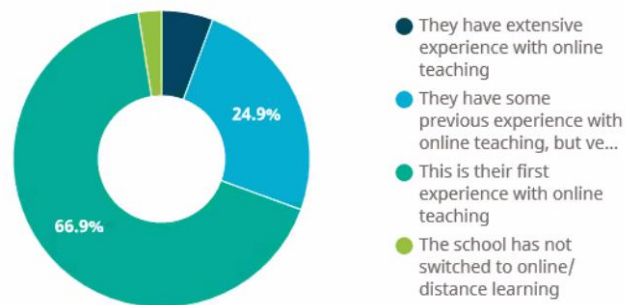


Other research presented by School Educational Gateway (2020) shows some challenges in using digital technology in teaching and learning remotely. The survey tried to find the most difficult (or essential) elements in digital education (4859 respondents). The most difficult/critical components are:

- Access to the technology 49%
- Stress working home 43%
- Keeping motivation and engagements 42%
- Involving persons from socially disadvantaged homes 36%
- Teachers access to technology 32%
- Digital competencies – students 24%
- Digital competencies – teachers 24%

In the same survey, respondents were asked how they would evaluate the teachers' experience. The results show (Figure 3.) that over 2/3 of the students experienced that the teachers did not have any previous experience with digital teaching. Regardless only 24% of people, in an earlier survey, complain about it (School Educational Gateway, 2020).

Figure 3.
Students' opinions regarding teachers' previous experience with online teaching
(School Educational Gateway, 2020).



3. METHOD

3.1. Description of the study

The authors decided to conduct a survey for university college students to answer the research question. The survey was given to students from various size campuses, studying different professions and experiencing various teaching methods to include students with different experiences, perspectives, and opinions on digital lectures. The aim was not to analyze a particular class or a teaching approach from an individual teacher but rather to get more perspective from students' point of view. Therefore, students were asked to share their opinion not for a singular course but for all their experiences with digital lectures. The idea was to divide students' views into different categories like:

- what kind of real-time or non-real-time lectures do they prefer,
- what kind of digital equipment they have access to,
- how they use their digital equipment,
- how their well-being is through digital studies,
- their motivation for learning, etc.

So that university college students' perspectives and opinions came to light in a way that makes it possible to facilitate change and development.

3.2. Data collection and description of participants

This study asked the students about their opinions, experiences, and attitudes towards the digital and on-campus lectures these past semesters. The data was collected in two parts. Firstly, similar size groups from different professions from two different colleges were asked to participate in this study. The first collection consisted of students from two study programs at HVL, campus Førde, and two at HVO. This collection was gathered in November 2020 after students had a hybrid semester combining digital and non-digital lectures through different methods. The results – from 57 students – showed some tendencies (Fojcik et al., 2021). Still, the authors decided to extend the survey to other campuses and professions to get more data. Still, due to the Covid-19 restrictions, the second collection needed to be postponed till May 2021. Therefore, the second data collection consisted of students from another program at HVL, campus Førde and students from campus Bergen. It was gathered in May 2021 after two semesters with digital or hybrid lectures.

The first group consisted of automation and ICT students from HVL, campus Førde. This student group had digital lectures and physical laboratories weekly during the last semester before participating in this study. The second group consisted of students at Volda University College who were studying Teacher Education. They had either on-campus lectures or digital lectures changing approximately every three weeks. All groups were located on small-size campuses, with groups of max 30 students that could remain open during the pandemic, as long as restrictions were held and some of the teachings were held online. Participation in this study was voluntary, and about 60-80% of the students participated in each class. Thus, altogether 57 students participated in this data collection.

The third student group consisted of 33 nursing students at HVL, campus Førde. They had most of the lectures digitally, while seminars with practical exercises were delivered on campus. The fourth student group consists of 48 students located on campus Bergen. HVL campus Bergen is a large-size campus, and students were not allowed to have on-campus lectures. Still, in spring 2021, they were allowed to return to campus for small self-organized seminars. Students were asked to participate to get opinions about large-size campuses, even if they did not represent the same study program. In the second data collection, altogether 144 students participated.

Some of the students did not fill out the entire questionnaire, and thus some of the questions had a different number of responses.

3.3. Survey

As previously mentioned, the study consists of a self-completion survey (Bryman, 2016), with 21 open-ended questions and 3 either-or questions. The survey covered several aspects of teaching and learning in digital lectures. Students were asked, among other things, about the self-assessment of their digital skills, the learning software used, their favorite or expected forms of lectures, exercises, and teaching methods. They were also asked if and why they use a camera in synchronous online lectures, if and why they use a microphone or chat, how they acquire study materials, what equipment and internet connection they use. Due to space constraints, only selected elements will be described in this article. The survey was anonymous and voluntary and no personal information was gathered about the participants. However, some of the obtained results were compared with the previous survey conducted before the pandemic (Fojcik & Fojcik, 2020). In addition, some preliminary results from the first data collection were presented (Fojcik et al., 2021).

The entire questionnaire, including the space for the answers, was given on one A4 sheet, printed on both sides. This was made to indicate that although these questions were open-ended, short and precise answers were expected. Most of the questions asked for choosing between a few suggested alternatives. Still, since there were open-ended questions, the students who did not have a particular opinion about these alternatives could write their own explanation. For example, question 5 stated: "What do you prefer; synchronous or asynchronous teaching? Why?". This allowed for quantitative analysis of the first part of the question while letting each participant explain their point of view in the last part.

4. RESULTS AND DISCUSSION

4.1. Teaching form: Digital or on-campus

One of the most fundamental questions in the questionnaire was questions concerning the type of lecture students preferred and wanted. Questions 5 and 6 (Figure 4 and Figure 5) were open-ended, and students wrote their opinions in their own words. They were also asked

to explain their point of view. Questions 22a and 22b were either-or questions (Figure 6 and Figure 7). Students were asked to choose if they preferred digital or on-campus lectures and exercises/laboratories. Diagrams below show how different groups of students answered in the study, and the bars on the right show the sum of all 144 students.

Figure 4.
Results from Q5: What do you prefer: synchronous or asynchronous lecture?

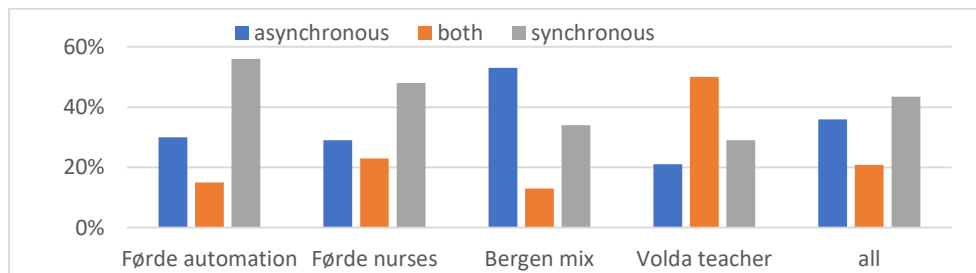
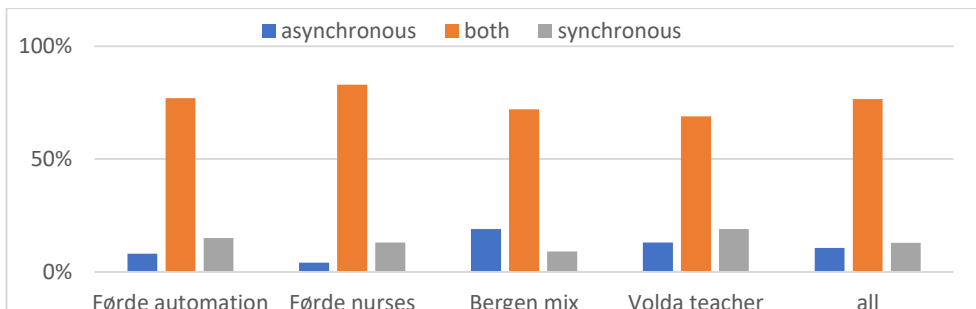


Figure 5.
Results from Q6: According to question 5, do you want both or choose one of them (synchronous or asynchronous)?



Students indicate advantages to both teaching methods, and the majority want access to both. Students claim that synchronous lectures are best for active participation and collaboration and asynchronous for their own repetitions and self-study before examinations.

Figure 6.
Results from Q22a: What type of lecture do you prefer: digital or on-campus?

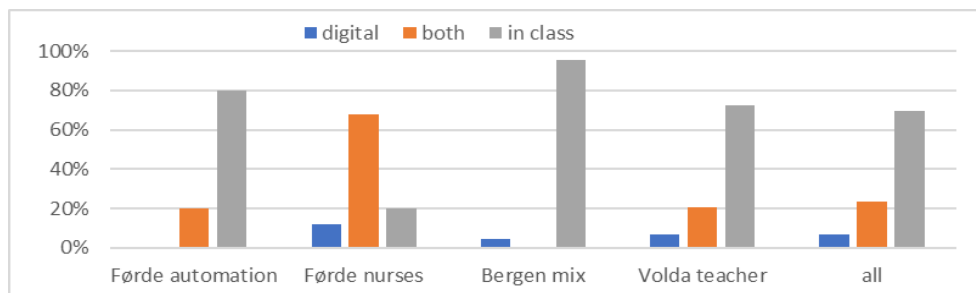
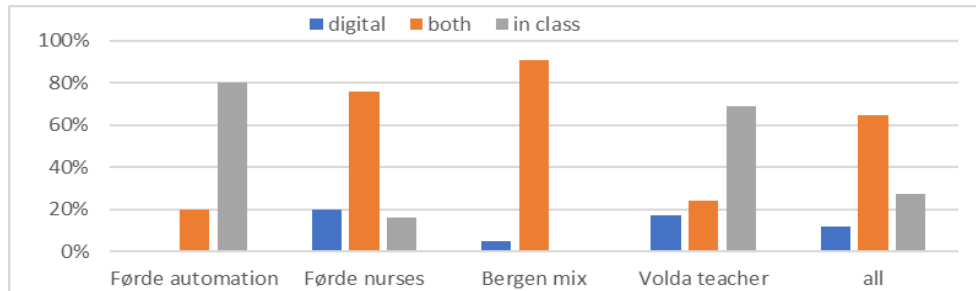


Figure 7.
Results from Q22b: What type of practical exercises/lab do you prefer: digital or on-campus?



There is a visible tendency that the students are not very fond of digital lectures and that they would choose on-campus teaching if they get to choose the type themselves. This correlates with the pre-and post-pandemic diagram shown in the introduction (Figure 1). The following questions examine the background, and the students' reasons, why they prefer on-campus teaching.

4.2. Participation during digital activities

Figure 8.
Results from Q10: Do you activate/turn on your camera for digital activities?

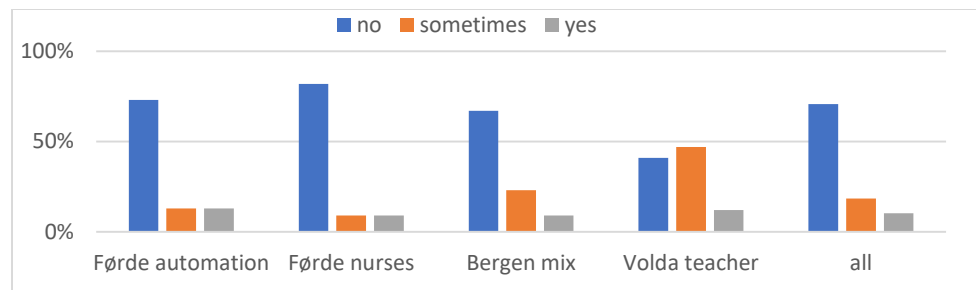
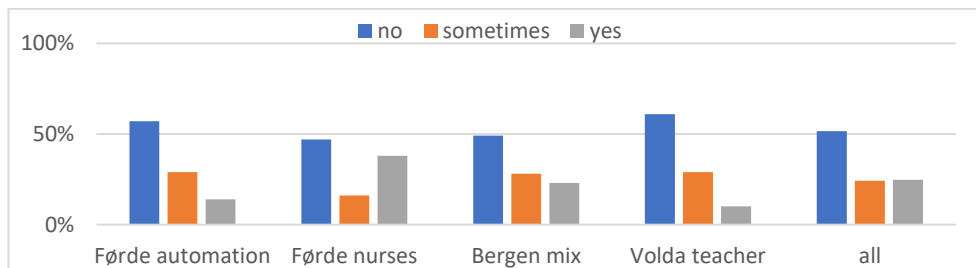


Figure 9.
Results from Q11: Do you ask questions in digital activities?



It is clear that the students do not use their cameras (Figure 8) and rarely ask questions (Figure 9). In addition, many of them explain that they still expect others to both ask questions and turn on their camera. Therefore, this suggests that they do not want to be the first person to turn on their camera. Using a camera in digital lectures can be both an advantage and a disadvantage. Advantage – it simplifies contact, makes better emotional participation (Gao, Zhao, Xiong & Gan, 2021), and weaknesses familiar with modern technology. The students do not want to show part of their homes or even themselves on camera for all to see. They indicate that having a camera off gives less pressure to look a certain way etc. Some students said that they take comfort in seeing other students listening to the same lecture. In contrast, others are distracted by all the faces on the screens.

The authors found some tendencies in students' answers about their views on a student's role in a lecture. One of them is that many students seemed to expect to be comfortable. In contrast, learning and the feeling of comfort and security seem stronger than learning for some students. While describing digital synchronous lectures, many students express that they are not accustomed (especially when using digital media) to being involved, visible and active. They focused more on not being seen, not disturbing the teacher, not being taken a picture of, not showing on camera, not being active, not asking questions, and generally not getting any attention from the class at all. 63% of the students in this study do not use the camera at all, 23% of the students only use the camera occasionally (in smaller groups/when others do the same/when they are in a good mood), and only 10% of the students answered that they use the camera constantly during the digital lectures.

4.3. Student's motivation for learning in lectures

Other questions asked about the motivation for learning with digital methods or comparing motivation in different types of lectures. The survey asked the students whether they think that digital lectures have less variety than on-campus lectures, and if so, why, and whether the motivation is different: in on-campus and digital lectures, what about the synchronous or asynchronous lectures (Figure 10 and Figure 11).

Figure 10.
Results from Q16: Are you affected by lack of variation in digital teaching?

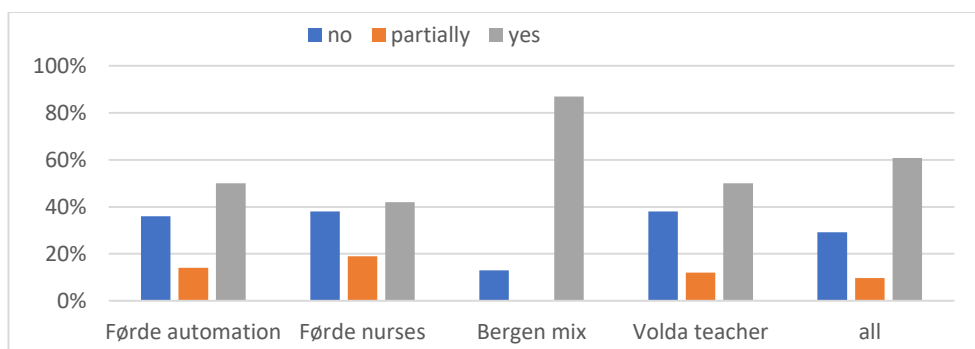
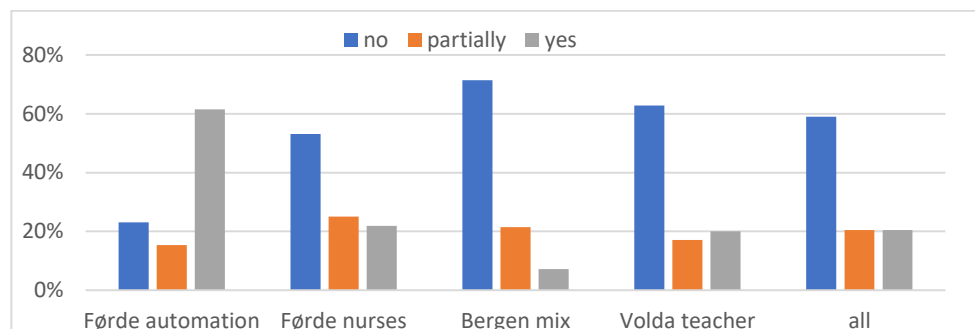


Figure 11.

Results from Q18: Is the lecturer able to motivate you in digital lectures in the same way as in physical lectures?



Most students (59%) report that digital lectures do not motivate them, some (20%) express that they are partially or temporarily motivated (responses are divided, some are motivated only by asynchronous lectures, and some only by synchronous with collaboration). Only 20% of students felt they were inspired.

Students complained about various factors that made it difficult to concentrate on learning through digital lectures in the answers to the survey questions. Often the disadvantages for some are benefits for others (Lin & Gao, 2020, Nieuwoudt, 2020). Students commented both the teaching modality: monotonous monologue by the teacher, staring at the screen for many consecutive hours, lack of discussion, dialogue, social elements, and technical aspects: problem with hardware configuration, inability to use it properly, either by the students or the teacher, internet connection problems and so on. Some students explained why they were motivated by asynchronous lectures, comparing them to podcasts, praising the ability to stop the video or repeat a segment, or just deliver the lecture when they felt well awake and well-rested. On the other hand, other students complained that the asynchronous lectures were challenging to do individually because of lack of self-discipline, too little interaction and/or discussion, the video did not answer their questions, or did not understandably explain the topic. This shows many different opinions about digital lectures and whether and how they succeed in motivating students to learn. Similar results have also been found in other universities in Norway, such as OsloMet (Almendingen, Morseth, Gjølstad, Brevik, & Tørris, 2021).

Figure 12.

Results from Q17: Did you learn during digital activities the same as expected?

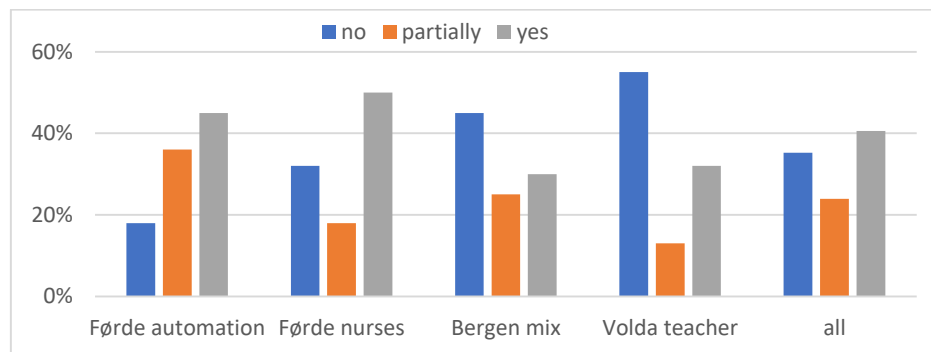


Figure 13.
Results from Q20: Is it important for you to influence teaching methods?

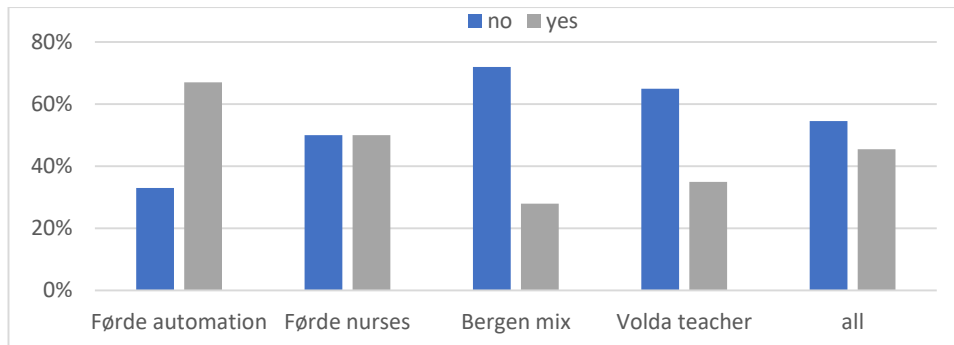
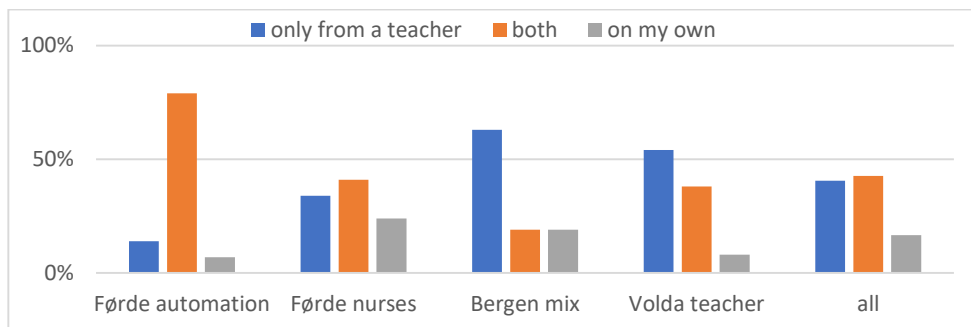


Figure 14.
Results from Q4: Are you using materials only from a teacher, or are you looking for additional information?



The last three charts are very similar (Figures 12-14). Many students did not feel that they had learned what was expected, did not feel the need to influence teaching methods, and did not use materials not provided by the teacher.

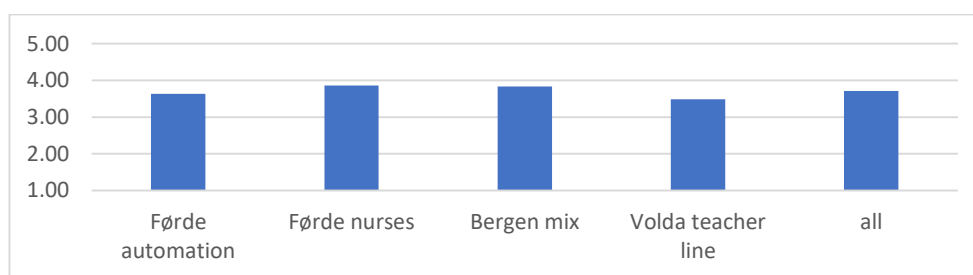
4.4. Students environment and self-evaluation

The students' responses in the questionnaire indicate that they have access to good quality technical equipment for digital learning. They all have laptops (but many write they don't use a camera because they don't have a built-in one?) and a mobile smartphone. Most also have a desktop computer with several monitors at home. In addition, about 1/3 of them have a notepad/MacBook/tablet. The need for technical equipment comes with a cost, which can be a problem, especially for students. Students were satisfied with their equipment, but most explained that they only use one or two devices in lectures, both on-campus and digital lectures.

In addition to questions about their technical equipment, students were asked to rate their own digital skills on a scale of 1-5, where 1 meant very poor, and 5 meant very good. Figure 15 shows the average of each group of students. The average of every group was between 3 and 4, with teacher education students rating themselves lowest. The highest-rated students, on average, were the nursing students.

Unfortunately, when comparing the students' self-assessment of their digital skills with other survey responses, there are many uncertainties about their basic skills. This manifests itself in how they describe the programs they use, the technical problems they have, the quality of the Internet connection, etc. Most students responded that they had a relatively fast broadband connection when asked about their Internet connection. Still, students who rated their digital skills as very good answered: "good quality", those students who consider themselves less competent answer: "50/50Mb/s" or "300Mb/s". These descriptions demonstrate an ability to name and define certain technical elements. However, they do not coincide with self-assessment, or self-assessment can be interpreted differently (Fojcik, Galek & Fojcik, 2017). It is often, but of course not always, more of an opinion about oneself than an assessment of one's abilities.

Figure 15.
Results from Q1: self-evaluation of digital competencies.



4.5. Additional results

Students participating in this study want a teacher who will use various devices and different learning methods to present the content and make it interesting and exciting for the students to attend the lecture. Most students explained that they do not have strong opinions about their preferences for digital lectures (Brockfeld, Müller, & de Laffolie, 2018) and that they like to have both types, asynchronous and synchronous lectures combined. The reasons for this are interesting and sometimes in opposition to the wishes of others (Nieuwoudt, 2020). Students want the synchronous form so that they can interact with the teacher, ask questions, ask for clarification, or repetition. However, very few of them ask questions at all. 70% of the students in this study do not ask questions at all, and 29% do so only sometimes, in smaller groups.

The survey showed that today's students expect lectures to have good quality recordings, various activities, and interactive forms, even in the case of digital lectures - Padlet, Kahoot, or quiz. Such a recording should have both relevant subject content pedagogical approach and be of high quality. Before and at the beginning of the pandemic, the students paid little attention to the technical quality of the recording and were satisfied if the content was explicit (Fojcik et al., 2020). Now, one year later, they are much more likely to expect teachers to have better video quality or at least be more proficient with the equipment.

When students were asked to describe their ideal lectures (without thinking about practical applications), many responded that on-campus/digital synchronous lectures with various activities, exercises, and discussions would be best, as well as watching asynchronous videos explaining the topic while writing assignments or preparing for an exam. Combining classroom teaching with videos is an efficient learning method (Noetel et al., 2021, Means,

Toyama, Murphy & Baki, 2013). Some students preferred to have separate videos, while others said recording lectures/exercises would be sufficient. Students want a videotaped format to learn at their own pace, with the ability to pause and rewind and fast-forward or repeat more complex parts. One course in this study records all lectures (both digital and on-campus). Unfortunately, statistics from video managing software show that most students will only re-watch the recording a few days before the exam if they watch it at all.

5. CONCLUSION

Digital lectures were needed during the pandemic. Teachers and students had to change their routines and try different tools and methods to create learning environments through digital media. It is not possible to say whether digital lectures will continue even after the pandemic or whether they will be reduced to students who choose to learn remotely. This article presented some results of the questionnaire given to different students in which they were able to provide their perspectives and opinions on digital lectures.

The overall result is that there are advantages and disadvantages of teaching digitally. For instance, digital lectures have a different setting than on-campus meetings, and many teachers do not have sufficient experience in getting through to the students through digital media. This requires different preparation than on-campus lessons, both for teachers, who must consider different social dynamics through digital communication and for students who must choose and arrange the space at home for studying. The equipment needed for digital lessons may be easier to obtain in a multicampus environment than for a single subject, but even with special equipment, digital lectures can be monotone, with low levels of interaction. Whether it is monotone or not is mainly up to the teacher, not the teaching method. Teachers can be tedious in on-campus and digital classes, depending on how they incorporate new elements and new methods for students.

Most of the students in the selected subjects taught at HVL and HVO participated in the survey. Still, both schools are relatively small, so the survey is not quantitatively representative. Thus, the results can only show general tendencies in both places.

This study tried to answer the research questions: How do digital lectures work, and what are students' opinions and experiences about their lectures? The results show that the students seem to have specific expectations about the different methods of lectures. They know what they like and what they dislike. Still, their answers often contradict each other both within a class and among the students themselves. Some students like asking questions, using the camera, and participating actively in the lectures. Others prefer to learn at their own speed, with videos and less interaction, or just without any camera or microphone so that no one can notice them. Most students in this study seem to have struggled with motivation for online lectures and the social connection with other students. Another result is that some of the students comment on the insufficient technical knowledge of the teachers; errors in recording, problems with sound, image, graininess, illegibility of text, image freezing, constant switching, etc.

The authors have noticed multiple times that learning is much more effective when the teacher is a part of the learning process and can guide and support the students. While students comment on things like "they would not want to disturb" or "they want to do this themselves", which often may be a good idea. Still, the students should know that teachers' role is to guide and support them so that they are not entirely on their own. The teachers' involvement in students' learning process is important for the students' achievements (Ayllón, Alsina, & Colomer, 2019).

The arguments students use to describe why they don't switch on the camera are reasonable in larger groups or publicly open lectures. Still, they are, in some part, questionable when the student meets the same group of people again and again, both in digital lectures and on-campus lectures. The groups are less than 30 students. Another questionable factor is the lack of technical skills such as removing the background (available in many programs) or switching the microphone (mute on / mute off), or the lack of conditions or interest to find creative solutions such as preparing the learning station before the lecture, clear the presence of other people, noise and other distractions which in itself makes learning difficult. There may be many reasons why the students rather choose not to participate in online lectures than take some time to prepare their surroundings, physically or digitally.

The widespread availability of video games and movies with special effects means that a "normal" lecture recording can be uninteresting. That might signify that the students are more occupied by the quality of the digital lectures when they are exposed to them for more extended periods than when the videos were used as a variation in the learning process.

Students want a combination of synchronous and asynchronous teaching. Watching videos asynchronously has the advantage that students can watch something repeatedly. However, only watching videos is not necessarily the best way of learning (Haakens, Karlsen & Bråten, 2021), and earlier studies point at the combination of videos and other learning methods as face-to-face classes as preferable (Means et al., 2013, Noetel et al., 2021).

The study shows that most students do not use a camera in three of the study programs. However, using a camera does not necessarily correlate to asking questions during digital lectures. The study program where students use cameras to the smallest extent is also the study program where students, to the greatest extent, ask questions during lectures. This may imply that other factors than switching the camera on are more important than using the camera to activate students during lessons. There are claims that social presence is a powerful concept within digital teaching since it positively influences student participation, satisfaction, and student engagement (Bentley, Secret & Cummings, 2015). This could be a topic for further research in future studies. Students in our study propose "camera on" as a measure to make digital teaching better regarding the social aspect. Still, they also propose other measures such as using smaller groups, discussions, and talking together. Learning through discussions and collaboration is well established in physical learning environments (Lim et al., 2019). In an era of digitalization, we need to explore how these elements best can be transferred to a digital learning environment.

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