

# The Things We (Might) Lose. Content and Context of Online Learning in Times of COVID-19

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## Abstract

COVID-19 forced higher education institutions to almost instantly switch to online teaching – uncharted territory for most German universities, as academic education had mostly taken place taught on-site. This paper investigates possible gains and losses university students experience in the process of abrupt digitalization. The study focuses on experiences collected in the frame of transferable skill courses offered by the University of Cologne's ProfessionalCenter. Those courses, open to only a small number of participants, have always had a synchronous, interactive and practice-based character, which was to be implemented in their digital versions as well. Cross-sectional surveys conducted in summer term 2020 and winter term 2020/2021 enabled insights into the students' perception of online teaching and learning: They seem to be satisfied with online learning, evaluate course delivery positively and experience several advantages, such as flexibility and no duty to commute. Simultaneously, they mention disadvantages and losses. The biggest downside is the deficit in social interactions as students miss exchange with and social contact to their fellow students, their teachers and campus life. Our findings indicate a two-way development revealing fatigue and isolation among students but also the acknowledgement that online learning is here to stay. Ultimately, students do not miss the academic content in online learning, but rather the academic context: campus life and vivid exchange.

## Keywords

Online Learning, Students' Perspective, Transferable Skill Courses, COVID-19, Advantages, Disadvantages

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## 1 Introduction

When in early 2020 the COVID-19 pandemic forced society to rethink ways of communicating and collaborating, higher education institutions had to switch almost instantly from face-to-face (F2F) to online teaching. In Germany, this meant a big shift: Omnipresent online teaching was uncharted territory, as “in conventional universities [in Germany], open, online and distance learning initiatives are offered predominantly in life-long continuing and professional education programs that are partly self-supporting” (Bernath & Stöter, 2018, p. 66). Consequently, all four purposes of higher education in Germany – the production and teaching of scientific knowledge, students’ personal development, their enablement for participation in civic life, and their preparation for the labour market (Schaper, 2012) – suddenly had to be maintained in a digital environment.

Online learning does not always mean the same thing (Tang et al., 2020). As Means et al. (2014, p.10) state, there are eight variable design features of online learning, including modality (fully online, blended, web-enabled) or online communication synchrony (synchronous only, asynchronous only, both). These different kinds of online learning existed long before the pandemic breakout in the form, for example, of live sessions via a videoconferencing system or e-learning courses without any student-teacher interaction. While the majority of literature regarding online teaching and learning before and during the pandemic focuses on disciplinary courses offered by departments (i.e., teaching of scientific knowledge), little is known about university-based courses that focus on other areas such as interdisciplinary soft skill courses. These classes, as offered at the University of Cologne, teach a small number of students competences that are not discipline specific but relate to the students’ behaviour in both personal and professional environments, e.g., conflict management. Our contribution will partly close this gap. We investigate possible gains and losses university students expect in the process of an abrupt shift to online learning while examining the evaluation of mostly synchronous, interactive and small transferable skill courses at one of Germany’s biggest universities (see more on context of the study in section 3). Our research question is: Which disadvantages and advantages did students experience in digital classes in contrast to their previous university experience?

Not only the mode of online education can differ, the context is crucial as well – in our case that of the COVID-19 pandemic. Hodges et al. (2020) differentiate in this case between “Emergency Remote Teaching” (during a crisis) and “Online Learning” (beyond a crisis). They argue that “well-planned online learning experiences are meaningfully different from courses offered online in response to a crisis or disaster” (Hodges et al., 2020, p. 1). The emphasis on “well-planned” courses seems to be the key. Not all courses designed before the COVID-19 shutdown were well-planned. Neither were all courses during the pandemic poorly planned. We will show in our paper that even in a short amount of time, well-planned online courses are possible – at least from the students’ point of view. What

we also will show is that, in the end, course content is not the most important feature of (digital) education for the students.

To answer our research question regarding possible gains and losses in online learning from the students' perspective, we will firstly discuss previous findings from relevant literature (2). In the second step, we will introduce the setting of our research (3). After having discussed the data and methods used (4), we will turn to our findings, divided in two areas: evaluation of online courses (5.1), and advantages and disadvantages of online learning (5.2). Based on these results, we will conclude with a broader picture on online education in the higher education area (6).

## 2 Literature Review

While discussing previous findings, the focus is on students' perspectives towards online learning. However, we will add findings regarding teachers' perspectives to the discussion, as learning-teaching aspects are tightly interwoven. We will close the literature section by discussing the advantages and disadvantages of online learning. We consider studies from before and during the COVID-19 pandemic.

We draw upon literature mostly beyond the German context, as before the pandemic, German public higher education institutions had an outspoken affinity for F2F programmes and courses (Breitenbach, 2021; Rühl, 2010). Those F2F courses were only partly enriched by digital elements. When Persike and Friedrich (2016) examined students attending F2F classes in Germany, they divided the digital media into five groups, e.g., classic media (learning platforms, emails or PDFs etc.), social (chat, forums, social networks etc.), interactive media (educational games, web conferences etc.). Around 30% of the students made use predominantly of classic digital media, and only 21% of the students used a wide range of available digital media as part of their studies. It should be noted, however, that no consideration was given to which digital media the universities provided and how good their quality was (Breitenbach, 2021, p. 6).

### 2.1 *Student Perspective*

Although the switch to omnipresent online learning and teaching occurred fast, many universities had been working for some time with e-learning platforms to facilitate course administration (Harrison et al., 2017). Similarly, e-learning platforms supplemented F2F classes long before the pandemic. A study by Ituma (2011) showed that these e-learning platforms were mainly used as repository for slides, relevant literature and notes. Given the opportunity, students were willing to engage with the course material before F2F classes as preparation.

However, online learning and teaching goes far beyond the usage of e-repositories. When the pandemic hit, students had to take online courses with no alternatives to choose from (Zapata-Cuervo et al., 2021) and had to pursue omnipresent online education. Hence, students' perceptions regarding online learning in the time of COVID-19 probably differ from those they had pre-pandemic, when they had the option to choose between different modes of instruction when taking classes. Despite being generally engaged in online learning, "[students] felt their learning from online courses was limited, lacked quality, and was less effective, compared to traditional face-to-face learning" (Zapata-Cuervo et al., 2021, p. 10). Ramlo (2021a) gives a more differentiated picture and discusses three attitudes to online education among US students during the pandemic. The biggest share of students hates online classes. The second group can be described as those students who have accommodated the shift, as it is the only alternative, but miss their F2F classes and social contacts on the campus. The third and smallest group of students prefers online teaching to the classes with physical presence.

Whereas the presented studies speak about a strict distinction between online and F2F classes, a study from Kemp and Grieve (2014) showed that students preferred some elements in online form, e.g., completing written activities online at their own pace at a convenient time, while they preferred other elements, e.g., discussions, in a F2F environment. This indicates that blended-learning models could be an optimal solution linking digital learning units that allow self-paced self-study and analogue discussion-rich classroom events in a didactically sensible manner.

Digital competencies among students are a crucial factor in their perception of online classes. For Germany, Senkbeil and colleagues (2019) showed that 20% of study beginners do not have a sufficient level of digital skills needed for successful studies. For more advanced students (6<sup>th</sup> semester), this proportion reached 53%. The acceptance of online teaching among students may be linked with skills that teaching staff possess (or not). Among the skills needed for good online teaching is the timely planning of the course and proper communication with students, e.g., answering student questions and providing feedback (Martin et al., 2019). The importance of proper communication, also understood as connection with students in the classroom by being approachable and responsive to students' needs, was discussed by Frazer et al. (2017).

Furthermore, negative occurrences, such as withdrawing from or failing online courses, may be linked with students' previous experiences with online learning: If they have had such experience, they do significantly better in subsequent online classes (Hachey et al., 2013). James (2021, p. 5) highlights that success in students' learning in online formats is "the result of a complex combination of factors" (e.g., institutional support, technical design, level of computer skills among learners, e-learning readiness, computer anxiety, learner motivation, self-efficacy, teachers' characteristics) and that higher education institutions have to consider this complexity when designing their e-learning platforms

and support services. These results show that care and support from teachers in online learning are immensely important. That is why some institutions emphasize the relevance of interaction between students and teachers in the online environment (Rühl, 2010). Research on interaction (student-content, student-student, student-teacher) shows that interaction online, when properly integrated, increases students' learning outcomes (Bernard et al., 2009; Hodges et al., 2020).

## ***2.2 Advantages and Disadvantages of Online Learning***

Findings on perceived disadvantages and advantages regarding online learning differ. Some demonstrate a negative perception, with students in general disliking online education and anticipating a return to F2F learning (Aguilera-Hermida, 2020). They complain about lack of facilities such as learning centres, libraries or interaction with academic staff. Indeed, students prefer courses with live contact to teachers due to the possibilities to directly gain information or ask questions. Similar to teachers, students view well designed and carried out communication as an important factor of successful online teaching and learning (Tang et al., 2020). Those findings underline the significance of social interaction on the campus.

Recent research has shown that the switch to university-mandated online learning due to the pandemic created physical and psychological stress, anxiety and sleeping issues among students (Birmingham et al., 2021; Jafari et al., 2021; Ulrich et al., 2021). Asked for methods to overcome these negative occurrences, students name exercising, professional support from mental health services, and social contact with others – the latter named as the most successful coping strategy (Jafari et al., 2021).

Moreover, Breitenbach (2021, p. 8) pointed out that the digitalization of teaching had a strong impact on student workload. Over 42% of all respondents to the Global Student Survey (Aristovnik et al., 2020) stated that this had increased compared to the time before the COVID-19 crisis. This particularly affected Oceania (59.8%), Europe (58%; for Germany 76%) and North America (54.7%).

Pre-pandemic, it has been shown that as far as grades are concerned, students in online classes have slightly worse grades than those attending similar F2F classes (Bettinger & Loeb, 2017). However, this may result from self-selecting mechanisms. Failing rates are also higher for online students (Gregory & Lampley, 2016), but they depend on the mode of teaching, with some modes having the same failing rates as F2F classes (Tang et al., 2020).

On contrary, other studies point at an improved engagement with class and learning material, less withdrawal from studies as well as “a stronger sense of community” in online courses (Nguyen, 2015, p. 310). Also, it has not been found that F2F learning works better than online learning (Pei & Wu, 2019). Thus, at least theoretically, online teaching can

widen access to higher education: “A large number of colleges and universities across the United States are transitioning traditional face-to-face classes into fully online, blended, or web-facilitated courses. This is partly due to the need to maintain a competitive edge and make classes more accessible to a growing and diverse student population” (Keengwe & Kidd, 2010, p. 533).

This supports other studies reporting positive aspects of online learning. One of several often-mentioned advantages in regard to online learning is flexibility (Dumford & Miller, 2018; Zapata-Cuervo et al., 2021; Zaveri et al., 2020). Online courses allow students to link different domains of their lives, e.g., family and work. Asked for reasons for choosing distance learning, students at an exclusively distance learning university in Germany reported flexibility (“flexibility of time / no classroom schedule”) as well as financial situation (“more compatible with work commitments” & “financial need / must continue to earn money”) most often (Stöter et al., 2014, p. 443).

### 3 Context of the Study

To better understand our findings, we here introduce our research context. The University of Cologne (UoC) is the biggest German university regarding on-site teaching. Along with other universities in Germany, our institution predominantly offered F2F programmes before the pandemic. UoC is attended by 50,000 students. It employs around 4,700 academics and 4,400 non-academic staff (Zahlen Daten Fakten 2018, 2020). As well as over 330 (inter)disciplinary study programmes, UoC offers both discipline-integrated and additive soft skill training. The latter is coordinated by the Professional Center (PC). PC offers courses for students from all faculties to foster professional and personal development and enhance key competencies relevant for their studies and future careers.

All courses are part of the general studies, the so-called Studium Integrale/Extracurricular Offer, that gives students the opportunity to think outside the box and acquire interdisciplinary and professional skills during their studies. In order to graduate, Bachelor students must accomplish 12 Credit Points in Studium Integrale. Students in Master programmes, teacher training programmes and the state examination programmes can voluntarily attend PC courses under the framework of Extracurricular Offer as an unaccredited supplement to their disciplinary studies.

PC offers about 70 different courses per semester, including soft skill trainings, certificate courses in cooperation with the Chamber of Commerce and Industry in Cologne, language courses and lecture series on socially relevant topics. Before the COVID-19 pandemic breakout, the programme was mainly offered as analogue classes with F2F teaching, based on the institutional belief that the acquisition of key competencies would be more successful this way than in digital form.

## 4 Data and Methods

This contribution focuses on gains and losses university students of transferable skill classes expect in the process of an abrupt shift to online learning. To address this topic, we use data gathered in an online-survey regarding online learning at PC during the pandemic, conducted in summer term 2020 and winter term 2020/2021. The design of the study was cross-sectional. These two periods of time were used to monitor possible changes in the evaluation of online courses, as the summer term 2020 was the first term conducted online with little time to prepare due to the COVID-19 pandemic breakout at our institution. The questionnaire was designed by the authors and tailor-made for the spectrum of PC's offer.

The study focused on different aspects of online learning, such as interaction in class, teacher support, teaching quality, overall attitude as well as disadvantages and advantages regarding online courses in online education. While the questionnaire contained mainly close-ended questions, some open-ended questions were added to get deeper insights into the respondents' perspectives on online learning. The link to the survey was sent to students who participated in one or more PC class(es)<sup>3</sup>. The questionnaire was open for three weeks after the respective lecture period<sup>4</sup> (14th September 2020 – 06th October 2020 in summer term 2020 and 01st March 2021 – 21st March 2021 in winter term 2020/2021). As incentives, twenty gift cards for a book store were offered in each term. In total, we received 684 questionnaires (see Table 1).

Table 1: Original Sample Size and Response Rate

Term	Summer 2020	Winter 2020/2021
Population	1201	1167
Sample	362	322
Response rate (%)	30	21

From all returned questionnaires, we selected a sub-sample based on the following criteria: only in-house offered courses (e.g., language courses were offered by an external service) and only formats with a sufficient number of responses ( $n > 10$  in each term). Therefore, in the final sample, only respondents of the formats Lecture Series (LS), Soft Skills Training (SST) and Service Learning (SL) were included (see Table 2). By reducing

<sup>3</sup> A complementary survey among teachers who taught a class within the ProfessionalCenter program was conducted.

<sup>4</sup> At the University of Cologne, summer term starts in April and winter term in October. The lecture periods start in the second week of the respective month.



the sample, we were able to draw valid comparisons not only between the formats but also across the two terms in focus. LS offers synchronous online lectures by experts from science, economy and society on varying socially relevant topics chosen by the format coordinator. At the end of a term, a multiple-choice test assesses the students' content-related analysis of the lecture topics. SST embraces a broad variety of small classes that are geared towards the development of specific key competences. SST courses are taught by experts with many years of practical experience, e.g., time management, voice and speech training, statistical analysis etc. Classes are mostly taught in synchronous online formats, with only few teachers offering asynchronous elements. The choice of student assessment is made by the individual teacher with the respective topic in focus, e.g., presentations, written self-reflection, portfolios, etc. The third format in focus, SL, combines civic engagement with knowledge acquirement: Interdisciplinary student teams cooperate with a non-profit organisation (NPO) to work together on a project and are supported by a specialized synchronous online seminar during which they learn relevant theories and methods. In SL, students present their project results at the end of the term and reflect on their development and the process of their project work.

Table 2: Final Sample Size

Format & Short Description	Summer 2020	Winter 2020/2021	Total
Soft Skills Training (SST) skills for career and studies	191	167	358
Service Learning (SL) project work with NPOs	23	26	49
Lecture Series (LS) lectures on socially relevant topics given by interdisciplinary experts	44	27	71
Total	258	220	478

As mentioned before, we draw upon findings from both quantitative and qualitative variables in our questionnaire. As far as qualitative variables are concerned, we focus on students' answers to the open question "What will you as a student possibly lose if teaching continues to be digital?". 143 students' answers were inductively coded. If a text passage could not be subsumed, and a new category had to be formed, another material pass followed – the system was final and was added by anchor examples only when no more new categories could be formed (Kuckartz, 2018). One text passage could be assigned to several codes. The code system was finalized by the coding of three persons: one after the other, they coded the answers to verify, revise and confirm the category system. This paper's authors did the final coding and had the final say in case of conflict. The categories can be found in the coding guide (Table 4 in the results section). All answers could be coded and



were eventually quantified to get a first decent understanding about possible perspectives of online learning. Next to answers to this question, we also used students' responses to the open-ended question "Please feel free to let us, the ProfessionalCenter, know about any further ideas, wishes, comments, praise or criticism". However, we only used these answers when we needed to underpin the quantitative findings as the majority of the answers focussed on organisational aspects, e.g., the size or variety of the course offer.

To analyze the quantitative data, we used mainly descriptive statistics. To track significant differences, we used significance level of 5% ( $\alpha = 0.05$ ). For nominal variables, we conducted the Chi<sup>2</sup> Test or Fisher Exact Test – depending on the number and distribution of categories. For ordinal variables, the Wilcox Test was conducted (with Bonferroni correction for variables with more than two categories). All analyses were conducted in the software R. Section 5.2, regarding advantages and disadvantages of online courses, uses original variables from the data set. To describe the areas of online teaching (5.1), we created three indices (see Table 3) and report findings of three items. To calculate the indices values, we summed up the values from single original items and divided the result by the number of variables in the respective index. This led to values in the indices between the original categories from "1: positive" to "7: negative" (e.g., 6.33). For the sake of reader friendliness, our figures round values that are integers and mirror the original scale.

Table 3: Areas of Digital Courses: Indices

Index Areas	Original Items ("1: positive" to "7: negative")	Cronbach's $\alpha^*$ entire sample (paper sample)
Interaction	<ul style="list-style-type: none"> <li># The opportunity to exchange with other participants was given.</li> <li># The opportunity for exchange with the lecturer was given.</li> <li># Compared to the face-to-face courses, I was equally involved with my own contributions (oral or written).</li> </ul>	0.68 (0.60)
Teaching (only SL & SST)	<ul style="list-style-type: none"> <li># The digital competences of the lecturer are...</li> <li># The lecturer has made use of diversified digital teaching methods.</li> <li># The teaching and learning materials were adapted to digital teaching.</li> </ul>	0.68 (0.68)
Support	<ul style="list-style-type: none"> <li># Overall, I felt well supported by the lecturer.</li> <li># The lecturer was easy to contact.</li> <li># The lecturer has given instructions on how to use the relevant tools.</li> </ul>	0.77 (0.79)

Note: \* Generally, a cut-off value of 0.7 for Cronbach's  $\alpha$  is accepted. However, as Cronbach's  $\alpha$  "punishes" indices with a lower number of items (Landmann et al., 2015), we decided to maintain the indices created. This also satisfied theoretical considerations. Additionally, we use descriptive indices with the primary aim of data presentation in a reduced and reader friendly manner.

## 5 Results

Our findings will be discussed in two parts. First, we turn to the overall evaluation of different areas of online courses (5.1). Second, we present concrete positive and negative aspects of online courses (5.2).

### 5.1 Overall Evaluation of Online Courses

To investigate different aspects of online courses, we subsumed some items from the survey to higher-ordered areas: *Interaction*, *Teaching* and *Support* (for this calculation see chapter 4, especially Table 3). Additionally, we will present three original items from the survey aiming at assessment of both the courses and learning outcomes.

In regard to three aforementioned areas, there were barely any significant differences<sup>5</sup> between the two terms in focus. Hence, we will focus on comparison between the formats. From Figures 1–3 we can conclude that most students were content with the online courses. However, there are some (significant) differences between the formats. In regard to the dimension *Interaction*, Lecture Series does not do as well as the other formats. Indeed, this format is set up with less participatory elements in comparison to the others, as the focus lies on the lectures' content and less on the active acquisition of soft skills. This was also the case during F2F terms. Students seem to have this in mind, as their overall assessment of Lecture Series is mainly positive.

In the area *Teaching*, we observe that more than 90% of answers are positive. This is to be highlighted, as it shows that lecturers made an effort to adapt their courses to the digital environment. The positive evaluation of this area, consisting also of the item “The lecturer has made use of diversified digital teaching methods” is somewhat contradictory with the findings regarding advantages of online learning, where under one third of the students recognize online courses as a good way to use innovative methods.

As far as the area *Support* is concerned, we see slight differences in the evaluation between the formats. Those students taking part in Soft Skills Training evaluate their courses better than students taking part in the Lecture Series. This may result from the size of the groups, which are much smaller in Soft Skills Trainings. There are no significant differences between Service Learning and the other formats. In this area, positive evaluation dominates the picture, too.

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5 No significant differences between the indices. Significant differences ( $\alpha = 0.05$ ) in regard to items “The opportunity to exchange with other participants was given” and “The digital competences of the lecturer are ...” between summer term 2020 and winter term 2020/2021.

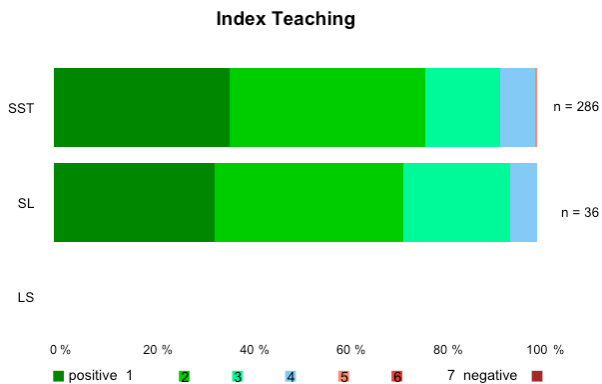


Figure 1: Index Teaching by format

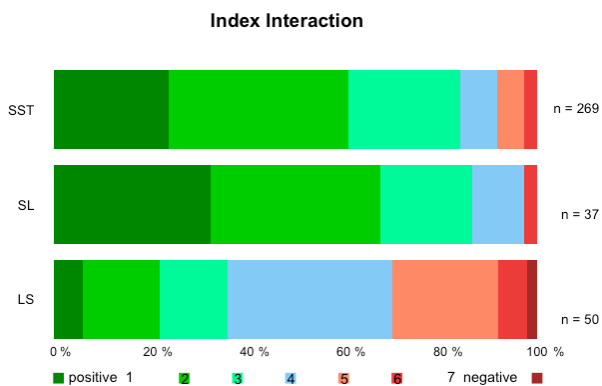


Figure 2: Index Interaction by format

Note: Significant differences ( $\alpha = 0.05$ ) between Lecture Series & Service Learning and Lecture Series & Soft Skills Training

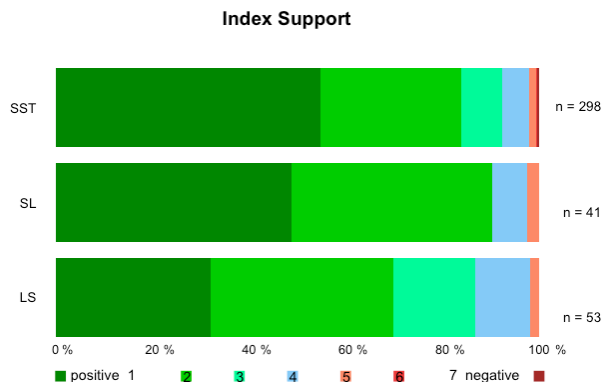


Figure 3: Index Support by format

Note: Significant differences ( $\alpha = 0.05$ ) between Lecture Series & Soft Skills Training

Against the backdrop of positive evaluation of the areas *Interaction*, *Teaching* and *Support*, the *overall assessment* captured in three single items (Figures 4–6) is less satisfying, with more evaluation in the middle range and in some cases at the bottom of the scale. The digital implementation (Figure 4) seems to have been successful for all formats in focus. However, most participants (79%) in Service Learning wish for a F2F variant (Figure 5). This is due to the specifics of this format: In Service Learning, students from interdisciplinary teams collaborate with non-profit organizations of their choice for one term. Therefore, before the pandemic, the widespread opinion was that the format would only be successful and efficient in the analogue space – an opinion that the student majority shares after participating in a digital Service Learning. The core of Service Learning consists of communication and collaboration paired with direct insights into the non-profit organizations' structure, vision and mission. Hence, as a format that relies on a lot of interaction, the overall evaluation is slightly less positive. On the contrary, students would rather prefer to keep the digital variant of – the less interactive – Lecture Series. There is no clear picture whether they prefer a F2F or digital mode to acquire the learning content, with some students preferring the one or the other format, and others seeing no difference between them (Figure 6).

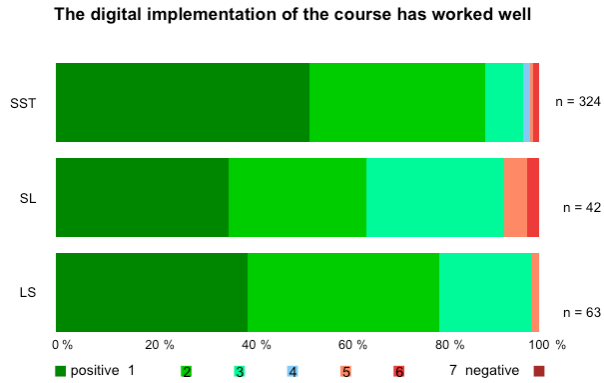


Figure 4: Overall assessment: digital implementation by format  
Note: Significant differences ( $\alpha = 0.05$ ) between Service Learning & Soft Skills Training

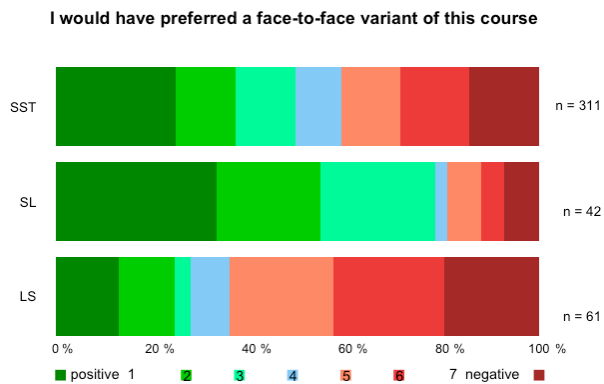


Figure 5: Overall assessment: preference for face-to-face variant by format  
Note: Significant differences ( $\alpha = 0.05$ ) between Service Learning & Soft Skills Training and Service Learning & Lecture Series

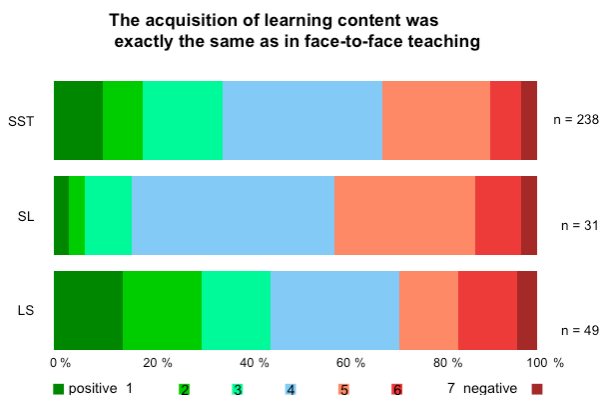


Figure 6: Overall assessment: acquisition of learning content by format

## 5.2 *What Students Might Gain and Lose in the Online Learning Environment?*

The previous section delivered the overall evaluation of online courses and their different aspects. Here, we turn to concrete aspects that were positive or negative for students. Before describing specific aspects students miss and disadvantages they experience in the digital classroom (5.2.2), concrete advantages of students' online learning experiences (5.2.1) will be discussed. Whereas the analysis of gains of online learning is based on quantitative findings, the section regarding the possible losses draws upon both quantitative and qualitative data. The quantitative data was drawn from the questions "As a student, which benefits have you experienced in the online learning environment?", as well as "As a student, which disadvantages have you experienced in the online learning environment?". Both items provided several answers to choose from, such as "no commuting" and "flexibility" respectively, "no direct contact with lecturers" and "insufficient technical equipment", as well as the option to add further answers.

### 5.2.1 *What is Gained in the Online Learning Environment?*

While this research emphasizes the potential disadvantages of online learning (see next section) for best possible prevention and future support, it also inquires into the concrete benefits that online learning can bring. As seen in the previous section, the overall perspective of the online courses was positive. In this section, we will pay particular attention to the development of students' perceptions regarding the advantages of online learning across two terms, as there were almost no significant differences between the formats.

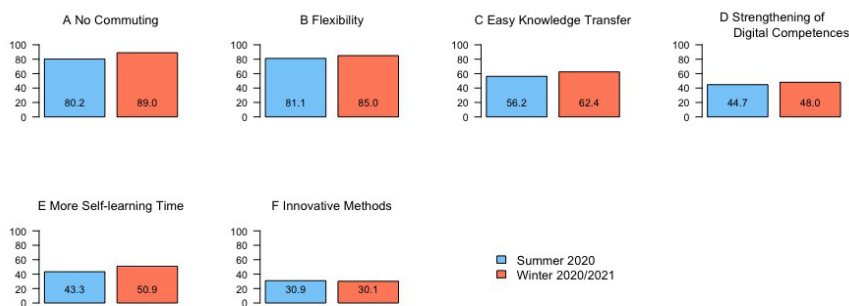


Figure 7: Advantages of Digital Courses, % of Students Naming the Respective Advantage  
 Note: Significant differences ( $\alpha = 0.05$ ) regarding item A No commuting.

As far as advantages of online courses are concerned (see Figure 7), *A No commuting* and *B Flexibility* are ranked the highest. In winter term 2020/2021, *A No commuting* was seen as advantage by almost 90% of the students. Both items indicate that students favour less rigid timetables. Presumably, asynchronous offers at the university allowed more flexibility in comparison to tight schedules during off-line teaching and learning before the pandemic. Indeed, students mention in the open comments: “Evening courses in online format are super; I’d like to do the rest in F2F-mode again as soon as possible” and “Digital teaching saves a lot of time (commuting, etc.), which is why it is easier to take courses.” Additionally, many students save a lot of time as they do not commute. This assumption can also be underlined by open answers to the question that actually aimed at detecting disadvantages: “What will you as a student possibly lose if teaching continues to be digital?”:

Nothing. Since the digital switch, I’ve made massive progress in my studies and no longer spend time on hour-long commutes on the train. Especially in the winter, where the trains then also tend to be cancelled. The latter has also often resulted in me not getting active participation due to being absent from the event. You unfortunately cannot do much when the unreliable Deutsche Bahn [German Railway Company] always puts obstacles in your way. Since the digital teaching I have not missed a session. And learned a lot.

The University of Cologne is a regional university: Half of the students come from suburbs in the nearer Cologne area (Borbély, 2020), only around 15% come from another federal state (Zahlen Daten Fakten 2018, 2020). We can assume that some live with their parents to save on living costs, as Cologne is among the most expensive cities in Germany (Jauernig, 2021).

Around 60% of the students see online courses as an easy way to gain new knowledge (C). Between 40–50% of the students stated that online courses enable them to strengthen their digital competences (D) as well as grant them more self-learning time (E). Under one third of the students recognize online courses as a good way to use innovative methods (F).



### 5.2.2 What is Possibly Lost in Online Learning Environment?

Having presented the positive aspects of online courses (5.2.1), we now turn to possible losses in the process of abrupt digitalization, starting with responses from the quantitative analysis. We can see that in an online teaching and learning environment students experience many downsides across the two terms in focus (Figure 8): Over three quarters (in the winter term 2020/2021, over 90%) of students miss contact with their student-peers (A). Lecturers are missed as well (C) by around 60% of the students. In this case we observe a higher percentage of students naming this aspect in the winter than in the summer term. As will be shown in following paragraphs, missing social interactions are indeed the aspect students suffer mostly from.

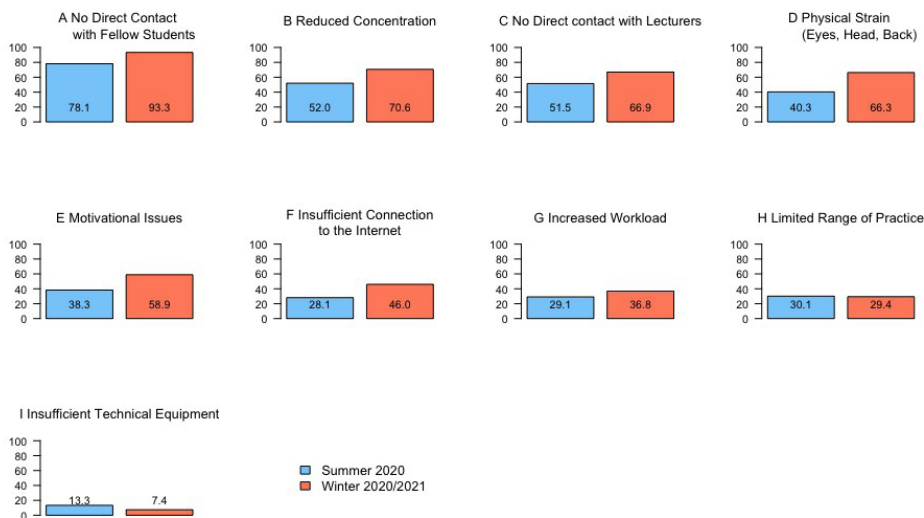


Figure 8: Disadvantages of Online Courses, % of Students Naming the Respective Disadvantage  
 Note: Significant differences ( $\alpha = 0.05$ ) regarding items A No direct contact with fellow students, B Reduced concentration, C No direct contact with lecturers, D Physical strain (eyes, head, back), E Motivational issues, F Insufficient connection to the internet.

The second highest rank disadvantage is **B Reduced concentration** – in the winter term 18% higher than in the summer term – a rise of almost 40%. Next to that, students complain about **D Physical strain** and **E Motivational issues** linked to online courses; online fatigue has risen between the two terms in focus.

Similarly, although to a lesser extent, approximately one third of students complain about **G Increased workload** caused by online courses. A similar percentage suffers from **H Limited range of practice** offered by online courses.

The next area – technical disadvantages – shows a disappointing picture as technical infrastructure is a prerequisite for digital participation (Breitenbach, 2021). In the winter term almost half of the students claimed not to have sufficient internet connection (F). This result is almost 20% higher than the result from the summer term. It may be assumed that in the winter term 2020/2021 – the second online term – more courses were held synchronously where a better internet connection is needed to fully participate in the course. *Insufficient technical equipment*, on the other hand, was less of an issue in the winter than in the summer term, which hints at positive development. However, considering the technical issues overall, we can conclude that an alarmingly high percentage of students is not adequately equipped to fully participate in digital education.

The quantitative data regarding the disadvantages of online courses have been complemented by qualitative findings. Based on the respondents' answers to the question "What will you as a student possibly lose if teaching continues to be digital?" we were able to detect students' biggest fears and losses. As Table 4 shows, students miss social contact with fellow students the most (n=85), including the feeling of togetherness and the everyday exchange: "Above all, the shared experiences and the normal everyday life with chatting, drinking coffee and so on are missing." Following this, the students describe that they also lack and are afraid to lose the exchange with their fellow students about everyday university life, university-related information and recommendations (n=50). They miss "exchange with fellow students also on topics related to studies" or experience an increased sense of insecurity:

[I miss] the otherwise possible time to make contacts; in general, I have become very insecure and shy again since the online lessons, because I am no longer used to talking in front of crowds, so that it is now difficult for me even in small groups.<sup>6</sup>

Less but still missed is exchange with and contact to the university teachers (n=23), including generally "getting to know them." Responses show that the absent opportunities of direct exchange result in a less personal learning environment with an increased focus on duties and exams.

Moreover, Cologne, being one of the biggest cities in Germany with a dense student population, usually promises an exciting student life. Therefore, it does not seem surprising that the respondents criticize the lack of university life with all its trimmings (n=23), claiming the experience to be short of "actual student life" and "impressions that you have during a university day":

I enrolled in order to learn and study at a university, with everything that goes with it: lecture hall, lecturers, students, cafeteria, breaks, packed lectures and also smaller seminars with a completely different dynamic, browsing in the library and reading books, experiencing the diversity of my fellow human beings and thus receiving other impressions. In a nutshell, the university life is lost on me.

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<sup>6</sup> The used quotes were translated from German to English by the authors.

Table 4: Code System and Frequencies “What Will You as a Student Possibly Lose if Teaching Continues to be Digital?“, Top 5 in Bold  
 Note: students’ answers in total: 143; coding in total: 315

Category	Sub-category	Description	Frequency	
Social aspects	Social contact with fellow students	Statement directed at fellow students; relating to contact, togetherness; everyday exchange	85	
	Exchange with fellow students (information, suggestions)	Exchange with fellow students, which concerns everyday life at the university, learning materials, organizational matters, uni topics ...	50	
	Exchange with / contact to teachers	Statement directed to lecturers	23	
	Interpersonal interaction	Statement not directed at a specific group of people; lack of togetherness in the context of the university	20	
	Student friendships	Explicit mention of making friends	9	
	Networks	Explicit mention of benefits and development of networks	6	
	Student life / Uni life	Description & missing of typical or imagined everyday life at university	23	
	Motivation	Motivation, drive	19	
	Change of time and place / separation of learning and leisure time	<b>Demarcation of free time and studies; possibility of change of location</b>	11	
	Pleasure in studying	Evaluation of one’s own learning success in digital classrooms	8	
Facilitation of studies through ...	Quality of what has been learned / learning success		6	
	Uni flair / atmosphere		4	
	Relation to the university	Relation & sense of belonging to the university	4	
	Library		4	
	Concentration		4	
	Easy access to research literature	Aggravated access to literature research	2	
	Joint learning	Mention of joint learning, the establishment of learning groups or group work	2	
	Student Associations / committees		1	
	Social competence / soft skills	Loss of own competencies	11	
	Discussion	Less dealing with learning material due to less discussions	11	
Competences & learning situations	Practical application		8	
	Language skills		1	
	Creativity		1	
	Eyesight	Worsened eyesight	1	
	Mental stability		1	
	<b>Health</b>			

Another often named category related to the facilitation of their studies is the students' motivation (n=19) – they fear to lose their drive to study in an ongoing digital university:

My motivation to study has decreased significantly in the last two terms. Although I am very interested in my studies, my own performance has become less important to me and I have noticed that I am making much less effort in seminars and also in examinations such as homework.

The top five named categories resulting from the analysis of the students' answers to the question "What will you as a student possibly lose if teaching continues to be digital?" relate to social aspects. Hence, when given the chance, students predominantly name interaction, spontaneous talks, dissemination of information and exchange, be it with teachers or other students, as aspects they miss the most.

## 6 Discussion and Outlook

This paper gives some insights into students' mindsets after several months in a pandemic and consequently in a digital university environment. We have presented a first impression of how students at the University of Cologne evaluate both the spontaneous introduction of digital formats and the introduction planned somewhat longer in advance. These impressions can help higher education institutions and teachers to respond to concerns in a preventive manner and also to meet the needs of students in the digital space. Our findings indicate a two-way development: While a feeling of fatigue and isolation during online learning is revealed, positive aspects of online learning, such as the dispense with a commute, are also increasingly being perceived.

Since the most frequently mentioned answers to the question "What will you as a student possibly lose if teaching continues to be digital?" relate to social aspects, it is clear that students miss the social exchange and interaction the most. This result coincides with previous findings (Aguilera-Hermida, 2020). This is particularly striking, given that students in PC courses simultaneously emphasize how interactive the formats they attended were: 80% of the respondents state that they have attended a highly interactive class. Hence, even classes rich in interaction cannot replace the fact that students see, meet and talk to each other in person – there is close to no small talk or spontaneous exchange about non-university topics. Online classes should therefore emphasize sufficient and technically functioning possibilities that encourage interaction on the seminar content, but also other – daily-life – communication among the participants (Hodges et al., 2020; Tang et al., 2020).

The lack of sufficient interaction and communication consequently leads to slightly less positively assessed formats, e.g., Service Learning, that have always relied on interaction and direct collaboration – this specific type seems to be less compatible with the digital

environment than classes where less vivid exchange is needed. Therefore, there is no one-size-fits-all model.

On the other side, what students appreciate most is that they no longer have to commute, which supports other research findings naming flexibility as an asset of online courses (Dumford & Miller, 2018; Zapata-Cuervo et al., 2021; Zaveri et al., 2020). As this is an advantage that teachers also identify as the greatest (87%) in our parallel survey (Hoffmann et al., 2021), this assumption should be further investigated with an appropriate instrument. This result might point to issues students and teachers may be faced with, e.g., the rise in living costs in big cities and the coordination of study and work with other (family) commitments. Thus, online learning may be an inclusive alternative for some groups, as already stated in the literature (Keengwe & Kidd, 2010).

However, it should be noted at this point that in the PC formats, only those students who had the technical equipment participated successfully in class and accordingly in our study. Thus, we could not consider views from those who were completely disconnected from their studies during the online terms, whether for technical or other reasons. As shown in this paper, even among those students participating in our courses, a high percentage were not adequately equipped to fully participate in online classes (Figure 8). Additionally, this contribution primarily focused on small courses enhancing key competencies relevant for studies and students' future careers (as opposed to courses delivering disciplinary knowledge). Even though we believe that it is not the content but the mode – small and interactive units – that is key, it may be disputed how our findings could be expanded to other contexts, e.g., beyond the pandemic, as this study was conducted during the COVID-19 breakout.

As it is improbable that higher education institutions will fully return to the face-to-face mode in the next terms, and post-pandemic, it is important to draw upon the latest findings to enable sufficient online as well as hybrid learning environments combining the assets of both modes (Kemp & Grieve, 2014). As shown before, the more online class experience teachers and students have, the more positive their attitudes become towards them, and the more their mastery of the format increases (Hachey et al., 2013; Ramlo, 2021b). This is especially crucial as higher education institutions serve heterogeneous audiences – from freshmen to PhD students, from very young to advanced learners, from technophilic to technophobic students.

Thus, teachers and faculties must consider all these aspects and consequently also the disadvantages of online teaching and learning. Interactive formats in particular require digital equipment and the corresponding skills – instructors must therefore take the time to introduce students to the tools and, if necessary, to make inquiries in advance. In case of PC, teachers did offer the support needed (Figure 3) – an aspect that is of immense relevance for students' performance in an online learning environment (James, 2021). Further research could investigate significant differences of support needs between spe-

cific student groups. Because PC's program is open to students of all faculties and all semesters, as well as to both Bachelor and Master students, this study did not differentiate between these individual groups. By reaching out to all students, we could present a general, though representative sample of the UoC's student body.

The days of universities resting on quickly implemented "emergency remote teaching" (Hodges et al., 2020) should now be over. The focus should be on improving digital classes with suitable modalities and communication varieties as well as constant evaluations and exchange between different stakeholders at higher education institutions (Zapata-Cuervo et al., 2021).

Our study showed that PC managed to quickly get on a good track (see Martin et al., 2019): PC teachers implemented their objective-oriented learning concepts in mainly synchronous live workshops with several interactive elements instead of leaving learners alone with learning material. Even if PC enabled social interaction and communication among participants, apparently it was not enough, as social contact was still missed. This stresses the context this study was implemented in: a worldwide pandemic that reduced social contact to a minimum in all aspects of life. Our results consequently emphasize that university life is also an area in which students benefit from a lot of interaction and personal encounters. The amount of social interaction in a classroom might therefore influence the students' evaluation and perception of a course. Teachers should keep this in mind when designing online courses. In the end, students do not miss the academic *content* in online learning, but the academic *context*: campus life and vivid exchange.

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