Distance Teaching Experience of Campus-based Teachers at Times of Pandemic Confinement

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ABSTRACT
Amidst the outbreak of the coronavirus (COVID-19) pandemic, distance education, where the learning process is conducted online, has become the norm. Campus-based programs and courses have been redesigned in a timely manner which was a challenge for teachers not used to distance teaching. Students' engagement and active participation become an issue; add to that the new emerging effects associated with this setup, such as the so-called “Zoom fatigue”, a term coined recently by some authors referring to one’s exhaustion feeling that stems from the overuse of virtual meetings. In realising this problem, solutions were suggested in the literature to help trigger students’ engagement and enhance teachers’ experience in online teaching. This study analyses these effects along with our teachers’ experience in the new learning environment and concludes by devising some recommendations. To attain the above objectives, we conducted online interviews with six of our teachers, transcribed the content of the videos and then applied the inductive research approach to assess the results.

CCS CONCEPTS
• Social and professional topics; • Computer science education;

KEYWORDS
Distance learning, Pandemic, Teacher's experience, COVID-19

1 INTRODUCTION
As we write this paper, we are, hopefully, amidst the final stages of a global pandemic, during which the world has experienced unprecedented turbulence at all levels, including uncertainty in academic upbringing [17] [16]. The student experience is an important concept and looking after the student’s academic well-being is only one part of the picture [5], especially during this time of pandemic confinement. Previous literature confirmed that working from home increases flexibility in attaining academic tasks and correlates positively with overall task satisfaction. However, it can also lead to stress and negative personal well-being, according to Anderson et al. [4]. Swedish universities have been more fortunate in academia than other countries to transition our teaching and research swiftly and smoothly to be performed remotely to comply with the lockdown protocols. Based on the experiences of both teachers and students over the last year (2020), things will not necessarily go back to exactly how they once were. For instance, course structures were altered, lectures reimagined, examination content and setup redesigned, and so on. Even though these adaptations were performed due to necessity, they may have triggered the interest of change in teachers and students alike.

There is a plethora of literature discussing student engagement, mainly in traditional distance teaching settings [15, 22, 25], campus teaching [7, 12], or as a combination [13]. The term “Engagement” refers to the level of attention, interest, optimism, and passion students show when taught a given subject. This can be reflected notably through asking/answering questions and interacting with the teacher, for example. With the sudden change to online teaching, it is reasonable to believe that many elements were ported into the online setting. The courses might not have been altered to facilitate the distance teaching setting fully, as there was not enough time. Additionally, the courses taught were not intended to stay online forever either. The goal of the universities has remained to continue campus teaching as usual when the pandemic passes.

Some recent publications deal with the COVID-19 situation but mainly in the challenges that it imposes [11], in the ways to increase productivity for businesses [16], in scrutinizing work-life conflict during pandemics [28], or in providing a general diagnosis [24]. One of the major discussion points from the literature has brought up the issue of interaction with students during this pandemic. With most students having cameras turned off, giving lectures online does not allow student interaction. It is harder to judge their engagement as compared to seeing individual reactions and interactions of students during traditional lectures. It is challenging to gauge the level of understanding of lectured topics if we lack such non-verbal interactions.

2 RESEARCH PROBLEM
In the realm of the COVID-19 pandemic and its consequences on academia, it would be interesting to investigate what our teachers have identified as issues during remote teaching and what they have learned from such experience. A few papers try to capture teachers’ emerging experiences from this sudden shift to remote teaching and their adaptability [18, 20]. In this study, we want to
contemplate the same matter among our teachers at the Department of Computer Science at (Blekinge Institute of Technology), and we enrich that with self-reflection (which is an integral part of the process by which individuals in higher education become more critical beings [6]). Hence, this study sheds light into our teachers’ experience and their recommendations when it comes to online teaching tailored to a pandemic and lockdown scenario. We aim to identify what common issues have been seen by the teachers, what they have adopted and, foremost, what they have learned. Ultimately, we answer the three nagging research questions which are reported in section 5.3.

3 RELATED WORK / STATE OF KNOWLEDGE

Amid the COVID-19 pandemic, the online teaching scenario is no longer an alternative; teachers within the traditional learning (campus-based) platform found themselves suddenly required to adopt distance teaching. A modest number of literature papers discuss the current lockdown situation and its impact on the learning atmosphere, including ways to get the best out of distance learning technology. The effect of the COVID-19 pandemic has been investigated in a few different ways. A study shedding light on the psychological well-being of students in China [9] showed that a great deal of anxiety was felt during the initial months of the pandemic, especially for students with relatives that had gotten ill. Another study was performed in Pakistan, where they investigated the student perspective of the e-learning adaptation to COVID-19 [1]. Due to a lack of well-functioning Internet infrastructure, many students needed help to perform their academic activities. Furthermore, projects, seminars, and other group activities were perceived as more complex to conduct than before. Similarly, a study about the effect of poor Internet infrastructure was performed in Indonesia [30]. It has been proven harder to transition from a traditional set of classroom lectures into an online format and monitor students’ progress [10]. According to the literature, students perceived the new nature of e-learning positively, partly due to it being in the asynchronous mode [23]. Now they are able to access the information in their own time instead of being forced to attend lectures.

On the other side of the spectrum, the sudden shift to online learning has shown some difficulties for students in adaptation. Specifically, the importance of time management and ability to focus for a long period of time behind the computer screen [3]. Along the same line, Wiederhold [31] published a short editorial communication letter in which she discusses what becomes known as “Zoom fatigue”. She brings about the mental exertion, lack of nonverbal cues, whether others on the call are with the teacher and following, whether the message went through, etc. Video calls leave students and teachers alike feeling unsettled and exhausted. To increase students’ engagement and enhancing non-verbal communication, a suggestion is brought forward to shift from Zoom to other platforms that allow learning through virtual reality (VR) with avatars; needless to say, such a suggestion requires special equipment (i.e., VR headset and associated technology) which are not attainable by the majority of the students (e.g., cost restrictions). Realising this constraint, Wiederhold [31] suggested an alternative to breaking down the “Zoom fatigue” by giving a set of best practices, such as looking at the camera, to limit the use of videoconferencing technology by trying staggering meetings with non-screen breaks in between [31, 32]. Abu Jarour et al. [27] investigated factors that could impact academics’ productivity while working from home during the pandemic lockdown. The study uses a survey conducted in different parts of the world. Their results show that both personal and technology-related factors impact productivity.

4 METHODOLOGY

Notably, there are many essential advantages of e-learning and its influential role in disseminating knowledge. However, overcoming space and time restrictions in the educational process to help increase students’ engagement is a challenge, especially when e-learning is no longer merely an option but the only option. To answer the research questions, this study will be based on open-ended interviews via Zoom with a predefined focused group (i.e., teachers) from our Computer Science department at Blekinge Institute of Technology. Whether our learning environment is synchronised or asynchronous, it must embody the spirit of flexible academic orientation well, especially when wedded to an unenviable pandemic reality. There needs to be a clear strategy in place, and the academic atmosphere in Sweden is lurching from one crisis to another in dealing optimally with students’ engagement during this pandemic. Our interviewees were made aware of the purpose of their participation and the way we intend to collect and analyse the data (i.e., recorded meeting to be transcribed), therefore, their initial consent was needed. The issues to be discussed were sent to them in good time prior to having the actual interview, giving them ample time to reflect upon the raised matters. We adopted the qualitative analysis approach to investigate the uncharted side of the collected transcribed data from the interviews.

4.1 Tables Participating Teachers

Teachers at the department of Computer Science at Blekinge Institute of Technology were contacted by email to explain the motive behind our intended interview and the protocol and to seek their consent to participate. Issues/questions to be discussed (the contemplation points, see Section 4.4) were sent to the interviewees some days prior to the actual interview. The interview was conducted online via Zoom, and each session lasted for approximately one hour for each teacher. The interview took place end of March/beginning of April 2021. Participating teachers were informed that the interview would be recorded for post-transcription and comparing participants’ inputs. The participants could revoke their permission to use their interview if we were notified 24h post-interview. As for the confidentiality of records, the data was stripped of confidential information (i.e., the transcribed text is anonymised). The interview ended up having 6 participants, three male and three female teachers from different specialisations (i.e., Computer Security, Data Science, Digital Scheduling, Software Engineering, Game Technology, and Telecommunication).

4.2 In-depth Qualitative Analysis

The most intuitive analysis for interviews is the qualitative approach since we are after perception, opinion, reflections, etc.,
which cannot be quantified. We intentionally avoided questionnaires since they limit the outcome to our perception and because, responsive interviewing is generally gentle and cooperative, feels respectful and is ethical [26]. Thus, we value that "the interviewer must nevertheless recognize that the meaning is, to some degree, a function of the participant’s interaction with the interviewer", according to Seidman [29].

Coding and thematic analysis: Interviews were transcribed from their initial state (i.e., video recording of an oral interview). Coding (content analysis), labelling the categories (organising the code into themes) and subsequently describing the connections between them will eventually form the primary addendum, which connects the dots and unravels any findings.

The naturalist and interpretive constructionist perspectives’ model was followed since we were concerned with the goggles through which our interviewees viewed and how they interpreted them. In this model, we, as researchers supervising this study, need to know our biases and how they may influence our research outcomes [26]. Thus, a variety of naturalistic data-gathering techniques will be deployed. Some of the cues we will be questing for are repetitive words/suggestions, reflections/suggestions that may attract readers' attention (e.g., surprising ideas, unique observations), anything deemed necessary by the interviewee, etc.

4.2.1 Inductive research approach (bottom-up approach). In this study, we opted to follow the inductive research approach as we were dealing with the unstructured data type (i.e., interviews). This bottom-up approach lets ideas, concepts and themes emerge from the interviews data:

- Data cleaning and semantic segmentation (quotes)
- Open coding (summarization of each segment and constructing salient codes)
- Closed coding (identifying overarching categories that can gather the open codes)
- Themes composition (reflective, exhaustive, relevant to the data being explored) need to be ranked
- Theme Analysis (examining each theme for ideas and relationship to other themes)
- Repeat 1–5 while having constant comparison
- Concluding remarks (common recommendations, narrative from themes, relationship between themes, own reflection)

4.3 Data Gathering

Interviews were conducted with our peers, where the aim was to describe their experience with student engagement within their courses and whether they performed any adjustments. Each subject was sent a set of questions in advance for some preparation. Due to current restrictions, all interviews were conducted over Zoom and recorded to ease transcription. The transcription was performed with the software (Descript2) and manually overlooked for correctness. All produced transcripts were included in the analysis, and all recordings were deleted to address privacy concerns.

4.4 Interview Discussion Points

Benefiting from the related literature review we conducted, the following contemplation set was conceived, which eventually drove the discussion with our teachers. Contemplation 1 relates to RQ1, contemplation 2–4 relate to RQ2 and contemplation 5 relates to RQ3. The research questions are listed in section 5.3.

Contemplation 1 - Adaptation: The credibility of quality education and good learning practice must be safeguarded. While it is not feasible to control and gauge students’ motivation, we are accountable, as teachers, for managing their learning experience, preferably espoused with an enhancement of their learning engagement. In the current pandemic, distance learning activities must be adapted so that high quality is achieved in education [2], making home a study-friendly environment; what are/could be the significant adaptations you adopted or wish to adopt?

Contemplation 2 - Sessions Recording: It has been proven harder to transition from a traditional set of classroom lectures into an online format and monitor students’ progress [10]. According to the literature, students perceived the new nature of e-learning positively, partly due to it being in the asynchronous mode [23]. Now they are able to access the information in their own time (recorded videos of the lecture and lab sessions) instead of being forced to attend lectures. However, some teachers oppose this idea, for it was not used during campus-based learning and in their view, it might not support student engagement (in the worst case, the teacher will end up talking to herself/himself). What is your take on this issue?

Contemplation 3 - “Zoom fatigue”: This is a newly emerging term. Wiederhold [31] published a short editorial communication letter in which she discusses what becomes known as “Zoom fatigue.” She brings about the mental exertion, lack of nonverbal cues, whether others on the Zoom call are with the teacher and following, and whether the message went through. Video calls leave students and teachers alike feeling unsettled and exhausted. Do you agree with this note? Why or why not? Moreover, if you do agree, what would be the remedy for this situation?

Contemplation 4 - Virtual Reality: To increase students’ engagement and to enhance non-verbal communication, a suggestion is brought forward by Brenda [31] to shift from Zoom to other platforms that allow learning through VR with avatars (such as the Spatial3 platform). “Zoom is not a good replacement for being in the office with other people, whereas something like VR gives you that level of presence and personification.” Apart from the hardware constraint (special VR headsets), what do you think of this proposition (e.g., pros/cons, possibility of increasing student engagement)?

Contemplation 5 - Gained Experience: During the pandemic, many compromises, challenges and changes occurred in the courses we conducted. Some studies show that during the pandemic, students’ performance and satisfaction increased. What is the lesson(s) learned and how do you envision benefiting from that when education returns to normal (e.g., implementing blended/hybrid learning)?

2https://www.descript.com/ Accessed on 2022-11-29.

3Spatial is a start-up company that recently released a program that enables people to meet through augmented reality or VR technology.
5 RESULTS

5.1 Construction of Themes

As mentioned earlier, we adopted the inductive research approach. After all interview sessions were transcribed, the authors independently examined the text by performing the steps reported in Section 4.2.1. Then, to validate our findings, we discussed and merged the common themes and their underlying entities.

Interactivity: One of the most apparent themes that appeared during the interviews was interaction. All teachers have mentioned that the interaction with students was the significant change that occurred during the distance teaching episode. At the pandemic’s beginning, most students did not participate verbally during lectures, e.g., by asking questions. Therefore, it took much work to use the chat proficiently for the teachers, making it harder to gauge their understanding. One teacher mentioned that sometimes you just had to assume that the topic was understood. However, as time progressed, we noticed the following: the more comfortable the teachers became with the technologies (including Zoom’s polls and chat), the more interaction they started to receive from the students. This was especially important for their lectures. One teacher specifically mentioned that using asynchronous communication during the lectures was essential in improving student interaction. Having the students write their questions in a private chat with the teacher removed the shyness barrier that can be present for some students, primarily when teaching large classes. Most of the lectures produced by the interviewees were broadcasted live and then often recorded for convenience. To help gauge the student’s knowledge and understanding of the lecture topic, the polls and questions from students in the chat helped the teachers in the lectures. Two teachers brought up the topic of students learning from each other. One teacher perceived it as a negative aspect of the distance learning we provided during this pandemic. It was harder for students to interact with each other at the same level as they did in physical labs. In contrast, another teacher revealed a healthy interaction between the students in the chat during the lectures. A few who had not understood part of the topic got help from other students who grasped the topic more quickly. There were also concerns regarding formal meetings where meeting room discussions were harder to achieve, as whiteboards and related tools were not feasible to deploy.

Availability: Another common aspect we gathered was the theme of availability during the pandemic. In contrast to campus-based teaching, providing recordings of presented lectures was generally less possible, increasing the course’s costs and labour for the teachers. However, this old hassle vanished when the shift to distance teaching occurred. It is immensely easier in this education setting to provide recorded lectures than it used to be. All teachers but one agreed that their courses should offer recorded lectures, both for those who intend to re-watch it later in the course and those not attending or having network problems. Some interviewees mentioned that smaller video segments, e.g., specific videos focusing on one specific area, would also benefit the courses. However, concerns were raised regarding students not attending the live lectures and only viewing the recorded lectures. The primary concern about this scenario was that the students would not have the same opportunities to ask questions or ask for clarifications during the lecture. It may also promote procrastination for some students. However, they all agree that lectures in a recorded format were needed and could lead to a higher understanding of topics, as the students can revisit the lectures.

Digital Tools: One of the most significant challenges for the teachers was the sudden need for digital tools to conduct their courses, along with all their associated problems. Most interviewees were keen to learn the tools and started incorporating quizzes, polls and Mentimeter into their lectures. After getting past the first hurdle with the technology, it was evident that the teachers wanted to adapt and learn these new tools. Most of them also found these tools useful for future applications in their campus-based teaching. Furthermore, one of the teachers raised the issue of complying with the national guidelines of recordings in a governmental body. All recordings must include subtitles that suffice for those with hearing impairments if it is deemed necessary. Depending on the size, students, and course contents, the teachers who conducted the lecture might be forced to transcribe their lectures, resulting in a significantly higher workload for each lecture.

Strains: With all-new adaptations, some strains always come along. When the sudden shift to distance teaching happened, there were many new elements all teachers had to learn. Recording and editing videos, adapting assignments, creating home exams, making sure the exams were legally correct, etc., were all time-consuming tasks, especially in the beginning. The interviewees also brought up the increased fatigue one may experience in digital environments. Some teachers noticed that the number of attending students started to drop towards the end of their digital lectures. Furthermore, the teachers who taught students from abroad noticed their need for more reliable Internet connections, making presentations and seminars harder to conduct.

5.2 Interesting Quotes

In what follows, we gathered some quotes from the verbal interviewees’ responses that are interesting and need to be shared with the readers.

There was an apparent prevalence of the sense of longing for ordinary campus-based teaching among teachers. However, this pandemic’s impact on academic teaching setup is a temporary impetus. One teacher describes the distance teaching: “You [We] were doing what we could to simulate a situation there [on the Zoom platform] as if we were always at Blekinge Institute of Technology.”

Another teacher added about the importance of non-verbal communication by saying: “You get the impression that they [students] listen, because you see that they nod or they’re not falling asleep at least [on campus] ... And that is what we are lacking here [distance teaching].” “...I currently feel a little bit like we’re a radio station.” According to one interviewee, the current situation is an urgent response contingent to the pandemic, and traditional campus-based teaching shall retain its value: “Why do you need a university [campus-based education]? You need university because of the exchange of knowledge. University is a collaboration with students, with researchers, with companies. It’s the interaction and the discussion that are interesting.”

4 Accessibility for Digital Public Services Act (2019:995). Available in Swedish: http://rkrattsraker.se/sfat/?bet$/=2018:1397 Accessed on 2022-11-29.
Our teachers’ sudden and unprecedented exposure to contemporary technology-heavy online teaching is deemed essential to help fortify campus-based learning by borrowing new learning styles (e.g., chat) and tools. “It seemed that maybe they [students] feel a lot more comfortable actually with us using chat.” “... Some things like thesis courses, some supervision, sometimes I think we will keep [online]... I think we will bring more digital tools from this process that we have started to use more.”

A critical aspect brought up by one interviewee is the technical readiness and the pre-training. Although the practical details are different for every teacher, some teachers initially fumbled through a vague path that created undue strain, eventually surpassed by their remarkable aptitude for learning while teaching. “We did not, or most of us did not have experience with providing digital courses. We are not honestly there yet on the technical readiness level and even on the application readiness level.”

5.3 Answering Research Questions
In this sub-section, we try to answer the research questions which we set up to answer in this study.

RQ1: How did our teachers adapt to distance teaching within computer science at this time of pandemic and lockdown? All interviewees agree that adaptation was highly needed during the pandemic, e.g., in the way we interact with the students, in the way we conduct home-based exams, etc. One teacher believed that “as much as possible, we need to keep the same setting as is in campus-based teaching. The current situation mandates moving to distance teaching, but what we are teaching is not originally distance lectures.” Making ourselves acquainted with digital tools was another important aspect that came up in their interviews. Recording live lectures or using pre-recorded material was a common adaptation that all but one teacher had performed. Their reasoning for providing these recordings was that not all students function similarly. Some students might need multiple video views to fully understand the content or view the lecture at a time better suited to their daily routines. However, one concern that was repeatedly brought up regarding recorded lectures was the lack of interaction with some students. The students that only watch the recordings and never attend the live lectures might end up with questions that could have been otherwise answered during the live lecture.

RQ2: What are possible ways that our teachers perceive to get the learning platform engaging? During the interviews, all teachers acknowledged that it is infrequent that students turn on their webcams on Zoom during lectures. Such student reactions made it harder for the teachers to view visual cues and gauge the students’ understanding of the lectured topics. The interaction between the teachers and students seemed tougher. However, using the chat within Zoom and other tools, such as Kahoot, polls, and Padlet, allowed the students to interact with the teachers asynchronously. Some teachers felt there was even more interaction than it was on campus-based courses by allowing the students to interact with the teacher asynchronously, via text or polls, which eventually removed the “shyness barrier” (according to these teachers).

RQ3: Do our teachers believe that their new teaching experience (distance teaching) could benefit their campus-based teaching in the future? One clear idea that all teachers were keen on bringing with them for the future was adding communication tools, such as Kahoot and polls. The asynchronous nature of interacting with the students was believed to increase communication during lectures and made it easier to grasp whether they understood the topic. For example, small online quizzes during lectures were shown to help one of the interviewees to gauge the student’s understanding. In addition, some have expressed an interest in using online lectures or recorded lectures to provide more time for seminars and other personal activities with students, leading perhaps to an improvement over the educational system with traditional lectures.

6 DISCUSSION AND RECOMMENDATIONS
Collective shared views: All interviewees agree that adaptation is highly needed (e.g., in how we interact with students and conduct the home-based exam). Making ourselves acquainted with digital tools was another important aspect that came up in their interviews. Our teachers agree that a webcam should be activated but cannot enforce that on students. A teacher believed that “as much as possible, we need to keep the same settings as is in campus-based learning. The current situation mandates moving to distance teaching, but what we teach is not originally distance lectures.” Another teacher mentioned that teachers’ workload and attention to small details would eventually increase if we adopted the asynchronous mode. For example, remembering to record a lecture, remembering to have pause and resume, post-processing of a video and uploading and updating it (in case corrections or modifications are to be made) is time-consuming. Students may be unable to understand the whole lecture from recordings, and they must know that there is much more beyond merely watching these recordings; moreover, recording lectures do not allow interactivity (e.g., asking questions). “Zoom fatigue” is acknowledged as a substantial effect by all teachers. This pandemic will change our teaching culture forever. Having flipped classrooms (i.e., hybrid mode) is a joint view of the teachers, where campus-based and distance-based teaching are mixed in post-pandemic education. Adopting digital tools, which we got exposed to during this pandemic, would benefit campus-based teaching. Finally, using virtual reality and avatars to engage students in an immersive virtual classroom environment for teaching is believed to be a far-fetched and overkill solution.

Recommendations: The technical readiness level must be improved. We need to be better prepared for the emergency shift to distance education at any time (this was also recommended in the literature [21]). Adopting technology and digital tools (e.g., “Mentimeter”, “Padlets” & “Zoom” Polls, “Kahoot” or the “Discord” platform which is believed to be much suited for interactivity) to help engage students and increase the chance to get their feedback is one of the recommendations we got from our teachers. Despite changing academic teaching approaches appearing to be especially tricky, a flipped classroom where online teaching is occasionally adopted would be a good option. According to Brownell et al. [8],
there might be better ways to engage large numbers of diverse populations of undergraduates than the didactic modelled in traditional classroom settings.

7 CONCLUSIONS

Higher education took a drastic turn towards remote learning due to the procedures implemented to counteract the COVID-19 pandemic. A massive amount of effort was needed to enable the transition to a functioning remote learning structure in a concise amount of time. With more than a year of performing remote learning, this paper investigated common difficulties and remedies with the help of interviews with six of our peers (teachers in the Computer Science department). Active participation, engagement, and interaction were identified as more complex to achieve than in campus-based settings. However, the endorsement of traditional classroom education with asynchronous communication, such as chats and polls, would allow for the same, if not higher, interaction degree with the students compared to when having pure campus-based teaching. Furthermore, the change to remote learning has sparked teachers’ interest in adopting such technologies to campus-based teaching to increase students’ understanding and engagement. This goes hand-in-hand with the activity-based learning (ABL) concept, in which students engage in the process of learning through activities and/or discussions, as opposed to passively listening to an expert is deemed extremely important [19]. Thus, the notion of flipped classrooms would allow integration between pedagogy and technology, leading to cultivating students’ learning experiences [14]. We also identified mutual interest in our teachers to keep some

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