

New Hope: Towards Flexible Hybrid Learning in Post-pandemic Education

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Abstract

Hybrid and flexible teaching modes in university courses soared during the pandemic and continue to be how courses are arranged post-pandemic. At the same time, increasing concern is raised for the mental well-being and equal treatment of students and the quality of such teaching modes. In this paper, we looked at the students' experiences in two different delivery formats for learning: lectures and exercises in an Information Security course. The paper is based on an anonymous online survey distributed to the students at the end of the study period. The results reveal that students prefer fully flexible course arrangements in lectures and exercises when given a choice. The majority wanted to participate in live lectures but had the opportunity to do so remotely if it suited their situation better than being in the classroom. In exercises, remote participation was also favoured, but some indication can be found that live tutoring, especially if the exercise task is more difficult, is needed. Going back to classroom-only teaching does not present an appealing option for the students in the future. Thus, teachers and universities must design quality hybrid courses that promote the social aspects of studying.

Keywords

Hybrid Learning, Blended Learning, Higher Education

1. Introduction

The worldwide spread of the COVID-19 pandemic in early 2020 forced higher education staff everywhere in the world to jump into remote teaching mode literally overnight. The following two to three years gave teachers hands-on experiences in completing remote teaching and new tools to perform successful online courses. At the same time, many higher education students found new opportunities in freedom of time and place where they study and even which institutes' courses they participate in. When everything was remote, university administration and degree programs saw it beneficial to accept more and more courses out of the home institute in their study programs. This has meant that remote teaching is here to stay even if the pandemic might soon be history. However, with known negative impacts on many students' mental health and social well-being, it is crucial that the classroom dimension is somehow implemented in teaching as an alternative option. This has led us to pilot flexible hybrid teaching: a teaching mode that is meant to be completed online and is flexible over time and space but provides necessary social interaction in the form of live lectures that can be participated in a hybrid mode.

Hybrid (stating independence on the place where students study, usually including teaching both in a classroom and remote locations) and flexible (stating independence in time, when students perform their studies) teaching and its performance, especially in the post-pandemic setting, still lacks depth in the scientific literature [1]. Some aspects are covered better than others, especially the technological advances for hybrid learning [2], such as the importance of the audio quality and availability of subtitle systems [3] or classrooms completely set up for hybrid learning in mind [4].

In this paper, we looked at the students' experiences in two different delivery formats for learning: lectures and exercises in an Information Security course. The paper is based on an anonymous online survey distributed to the students at the end of the seven-week study period that consisted of 12 hybrid lectures, weekly online exercises, three online counselling sessions, online materials, and lecture

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recordings available on our online platform. Students are already familiar with most of the remote teaching facilities after the COVID-19 pandemic and are somewhat "techie" in nature as information processing science students, so we expected the technology to be the number one concern among the survey responses. However, our results show that the experiences were more versatile and the motivations behind the students' answers more personal than first anticipated.

This paper aims to study students' experiences when studying in a hybrid and flexible environment after multiple years of remote-only teaching. First and foremost, our focus is to improve the practice of hybrid teaching methods. Thus, we aim this paper for teachers and practitioners who are interested or mandated to teach synchronously a diverse group of students who come to the classroom, stay remotely, or may do both on different days.

2. Related Work

Hybrid and blended teaching pre-COVID. Traditionally or pre-COVID, hybrid teaching (or sometimes called blended teaching) practices were seen as an essential tool to engage students of different backgrounds in the content matter of the course [5]. In practice, students with different skill levels could be taught simultaneously by allowing some to practice more while others may complete the coursework faster. In this context, engagement has also been seen as a pre-requirement for equality. Blended learning has been utilised to provide teachers with more tools and platforms, from mobile games to online surveys, to increase engagement and other positive learning factors [6]. Some pre-COVID studies have also highlighted the improvements in students' learning and grades whenever hybrid teaching tools were utilised in the course implementations [7, 8, 9]. However, these studies were primarily conducted with a design principle that the same student participates in both in-class and remote activities [5, 1]. In fact, the current situation is that there are multiple groups of students, some of whom participate in a classroom and others in a remote-only form.

Remote emergency teaching in the global pandemic. With the health regulations and restrictions for access to campuses and educational facilities, remote teaching became normalised overnight [10]. The research community is only starting to figure out how long-term the effects will be. These might include, for example, a decrease in social and other soft skills that determine how "employable" students are after graduation [11]. From the teacher's perspective, it has been essential to highlight that a successful online or hybrid learning experiment is not the same as extempore forced distance learning during the global pandemic. Some even call it "emergency remote teaching" [12, 13].

With the harmful effects of remote-only teaching but the simultaneous benefits of providing some teaching remotely, the natural next direction seems to be hybrid or flexible teaching. Whatever the teaching mode, the mode must be chosen by teachers as a teaching method – as well as students who attend the class have chosen this as their learning environment [14]. Indeed, experience during the crisis does not necessarily make all the teachers now experts in remote – or even less hybrid – teaching, and as such, more research is required [15]. To mitigate the difference between emergency and normal, it is crucial to understand not only the situation before or during the pandemic but also after it. For example, the value of the recordings of the teaching sessions is recognised based on the research literature [10]. Still, at the same time, the creation of high-quality videos (even through Zoom's recording feature) is not a task that can be done without necessary technological investments and skills. Previous literature highlights especially the role of institutional support and organisational factors for adapting new teaching methodologies [16].

New normal post-COVID. What has changed in the educational practices and situation with hybrid and remote teaching is summarised in Figure 1. Critical here is that hybrid and blended teaching development design principles have focused on improving students' motivation and learning capabilities and supporting and complementing traditional classroom participation instead of replacing it. With the post-COVID "new normal", premises for implementing hybrid teaching have changed: there might be fewer options to perform the course in any other way, or the options given are hybrid or fully remote. This is no longer due to the health crisis (which may appear again in the future) and lockdowns of the



Figure 1: From classical hybrid learning to emergency remote learning during the COVID-19 pandemic, and towards the “new normal” of flexible hybrid learning.

campus premises but to demands of the students who are already used to studying when and where they like. Some attend universities in different cities where they live; some complement their studies with simultaneous work, either because of economic reasons or because studying is a secondary activity now. Some may live in rural areas far from the campuses and educational institutes [17]. In addition, health reasons are and will be present in the future; this can be expanded to health and care obligations students may face at home. One outcome of hybrid teaching is that students who could not otherwise participate in education are now given such a change.

The original goal of improving inclusion and equality is still strongly present. Still, instead of being mainly a “nice addition”, it is now forced by our new environment and educational culture. Available capacities for remote learning will likely be an increasing rate part of the higher educational institutes’ recruitment strategies [1].

3. Methods and Materials

3.1. Research context

From Spring 2020 to late 2022, universities and other higher educational institutes were forced to teach remotely because of the global COVID-19 pandemic. Even if the initial jump to remote teaching was sudden and unexpected, many online tools were quickly adopted and utilised for remote teaching. When it was made clear after several semesters that some students would be allowed back into campuses and classrooms, some students were forced to still study at home due to their own or families’ health conditions. In addition, when remote studies became available during the pandemic, many students took courses and classes from different national and international universities, which was also supported by study programs and university administration. Thus, it became clear that even after the health crisis, some students would be remote and not present in the exact location altogether, underlying a need for remote and hybrid teaching as a new normal from now on.

The literature’s definitions of hybrid teaching vary, especially after the COVID pandemic made it more mainstream [18]. We aim not to conceptualise but to give context to the different teaching modes in our university. Thus, we shortly define the following, which were considered and are later discussed in the data collection and results sections:

- **Classroom lectures** are traditional; in a classroom-only taught lectures.
- **Classroom exercises** are solved either in a classroom or before the classroom session, where the solutions are gone through together, usually led by a teaching assistant. No online return is required, but the teacher may check everyone’s solutions.
- **Remote lectures** are essentially like traditional classroom lectures. Still, instead of being taught in a lecture hall, they are given through an online voice and video media that can be Zoom or similar. There might be a recording available or not, but the students are always in a separate space compared to the teacher. This was primarily the case in how lectures were performed during the COVID-19 pandemic.

- **Hybrid lectures** can be attended either in a classroom or remotely through a voice-video link. The students have a free choice over these two options. Pre-registration for a certain mode may be needed.
- **Flexible teaching mode** includes hybrid lectures, but participation in the lectures is not a mandatory part of the learning experience. For example, recordings or videos are available for students to watch later. Learning and teaching are not tied to place or time, but a classroom element is included compared to fully online courses or Massive Open Online Courses (MOOCs). Students can choose when and where they study in a given period of time. This means the exercises can be completed remotely at any time in the study period, and students can choose flexibly if they want to attend the lectures remotely or in a classroom, watch recordings later, or study with a textbook.

A set of pilots to find the best solutions and practices for flexible and hybrid teaching was run at the University of Oulu during the 2022 – 2023 semester. The pilots aimed to design operating models and general instructions related to flexible hybrid teaching and make them University-wide in the future. The pilot framework supported the planning of hybrid teaching, related pedagogy, technical support, and a peer network for teachers. Out of these initiatives, this paper focuses on one course that was part of the university-wide pilot, Information Security.

The course Information Security is part of the Bachelor program of Information Processing Science (BSc) at the University of Oulu, and it is aimed to be completed in the first year of the studies. Some students in the course participated through the Open University or adult/continuous education programs, or they were from different degree programs studying Information Processing Science as a minor. The course consists of five ECTS, i.e. 133 hours of student work, and is completed in an 8-week period. Seven weeks are used for lectures and exercises; the last week is reserved for students to finalise their work to complete the course.

The course aims to teach basic concepts of information security. These include security threats, vulnerabilities, and risks, for example, hacking, malware, and computer viruses. The course also discusses relevant national and international regulations, standards, and frameworks for risk management, information security technologies, and the basics of cryptography. The course gives basic skills to understand information security research; the students can later take advanced courses in security technologies and cryptography if it fits their study plan.

The course instalment that is studied in this paper was run in the spring of 2023 with a staff of a responsible teacher, two senior lecturers, and two teaching assistants. Students passed the course by completing weekly exercises, an online exam, and group work. This paper focuses on hybrid teaching related to the course's lectures and exercises, excluding the online exam and group work. The online tools used in the course were Zoom virtual meeting platform ¹ and Moodle ², an online learning platform that included all the course's instructions and materials such as reading materials, lecture slides, links to Zoom, links to the lecture recordings through the university's video sharing platform, and returning and grading of the exercises, group work, and the exam. Through these platforms, the student could complete the course entirely remotely without attending the classroom. However, classroom lectures were also provided with a Zoom connection so that the students could attend the lectures in real time in a classroom or remotely.

The primary teacher of each lecture wore an attached clip-on microphone. The lecture slides were shared on Zoom, and the Zoom view was then shared on the classroom's screens. In the video call, the lecture room was visible to the remote participants with a 360° camera, but remote students were not mandated to use a camera due to university policies. Zoom's chat feature was used to create interaction between the students in remote mode; another teacher or teaching assistant was following the chat and answering questions, or depending on the case, they brought the question to the classroom to be answered by the primary lecturer. The exercises were published and returned to the course's Moodle platform; there were exercise counselling sessions in a remote-only mode in Zoom in addition

¹<https://zoom.us/>

²<https://moodle.org/>

Question	Answer style
Section 1: Lectures	
Q1 Consider this course and other courses you have previously taken. In what mode do you usually stay most motivated and learn best?	Options 1) Fully remote (every participant is remote). 2) Fully in a classroom (every participant meets face to face) 3) Hybrid (some participants remotely and some in a classroom) 4) Flexible (you can choose during the course, incl. video recordings)
Q2 If you would retake this course, what learning mode would you prefer?	Options 1) Fully remote 2) Fully in a classroom 3) Hybrid (I'd be remote) 4) Hybrid (I'd be in a classroom)
Q3 Please evaluate in your own words why you would choose a certain learning mode (remote, classroom, or hybrid).	Open-ended
Section 2: Exercises	
Q4 Consider this course and other courses you have previously taken. In what mode do you prefer for exercises?	Options 1) Traditionally, every participant is in a classroom once a week 2) Traditionally, hybrid mode is available once a week 3) Remote exercises in the learning platform and help available only remotely 4) Remote exercises in the learning platform and help available in hybrid mode
Q5 If you would retake this course, what learning mode would you prefer for exercises?	Options 1) Traditionally, every participant is in a classroom once a week 2) Traditionally, hybrid mode is available once a week 3) Remote exercises in the learning platform and help available only remotely 4) Remote exercises in the learning platform and help available in hybrid mode
Q6 Please evaluate in your own words why you would choose a certain learning mode for exercises.	Open-ended
Section 3: General questions	
Q7 What was positive in this course's hybrid teaching?	Open-ended
Q8 What should be improved in this course's hybrid teaching?	Open-ended
Q9 What do you think about hybrid teaching, in general, in our university or faculty?	Open-ended

Table 1
The survey questions (translated into English by the first author).

to the Moodle discussion forum, where students could ask questions and discuss the course topics. The teaching assistants mainly performed the exercise counselling, but also senior staff participated from time to time.

3.2. Data collection and analysis

The students were sent an anonymous questionnaire through the Moodle platform to gather feedback from the flexible hybrid teaching. The questionnaire, detailed in Table 1, consisted of nine questions, separated into three sections: lectures, exercises, and general feedback about hybrid teaching. For lectures and exercises, the students were asked to evaluate what would be their preferred teaching mode (i.e. if they would typically like to have a hybrid, remote-only, or entirely classroom teaching) and if they would retake the course after experiencing the course's hybrid teaching practice, what would be their preference out of the given options. These questions aim to gather their expectations and past experiences to compare them to how they perceive hybrid teaching after the course instalment. In addition, open feedback was gathered. For the general section, students were asked to evaluate the hybrid teaching in the given course (what they experienced as positive and what should be improved) and in the university and faculty in general.

The questionnaire was made available in the students' native language and later translated by the first author and the teacher responsible for the course for the sake of this article. Answering the

Attendance	Hybrid, I'd be remote	3	20	-	-
	Hybrid, I'd be in classroom	2	8	-	-
	Fully remote	1	4	4	1
	Fully in classroom	-	-	-	1
		Hybrid	Fully flexible	Remote only	Classroom only
		Expectations			

Table 2

Students' expectations of how they would usually attend the lectures (Q1) versus how they would prefer to attend after this hybrid course (Q2).

questionnaire was completely anonymous and voluntary, and it did not affect the course grade. No personal information was gathered. The University of Oulu integrates the TENK national research ethics principles for ethical considerations.

4. Results

In total, 320 students enrolled on the course; 53 did not take any of the exercises, and 19 dropped out before finishing with an acceptable grade. Thus, there were 248 students at the end of the course. Of them, 44 students answered the questionnaire, giving a response rate of 18%. However, almost everyone who completed the survey took time to answer the open-ended questions. The responses included some valuable insights that are reported in this section.

4.1. Results on lectures

In this context, lectures mean teaching situations where the responsible (senior) teacher delivers a teaching session with slides and small interaction tasks, such as questionnaires and puzzles, in the middle of the session. In our course instalment, the students have three options for following the lectures: 1) live in a classroom (lecture hall), 2) remotely in Zoom in real-time (with a chat channel open to a second teacher and the possibility to interact with the live audience), or 3) recordings of the live sessions. In addition, the lecture materials (as PDF slides) were made available before or immediately after the teaching session.

The questions Q1 and Q2 (see Table 1) captured the students' expectations of how they usually perceive their learning capabilities in a hybrid setting and in what way they would prefer to take the course if given an option (considered as attendance). The relationship between these expectations and attendance in practice is summarised in Table 2 (cross-tabulated test statistics for the whole table are $\chi^2 = 39.25$, $p < 0.001$). Out of 44 students, the majority, i.e., 38 students, were expected to prefer hybrid or fully flexible ways of following teaching. In reality, 33 participated altogether or mostly remotely, and only 11 preferred the live, face-to-face classroom option.

The vast majority (32 out of 44 participants) expected a fully flexible mode (i.e., all options of live participation, remote video link, and recording available) to support their learning and motivation best. Of these 32 students, 20 would utilise the hybrid opportunity of being mostly remote, and eight would be mainly in a classroom in practice. Only four students would choose not to use the possibility to attend the classroom at least some times but prefer fully remote participation. Four students answered they would expect fully remote teaching as an only teaching mode, and the same four students would consistently attend remotely only. Only two students would expect classroom-only teaching (even if another of them answered to, in reality, attend remotely only – there is some slight inconsistency in the answers).

We perform a thematic analysis for the answers to the open-ended Q3, "Please evaluate in your own words why you would choose a certain learning mode (remote, classroom, or hybrid)", which aims to clarify the reasons behind the choices in Q1 and Q2. The answers can coarsely be categorised into four groups: 1) those who prefer remote teaching (19 answers), 2) those who watch only recordings (10 answers), 3) those who prefer to participate live in a classroom (7 answers), and 4) those who would

prefer to be in a classroom, but have specific reasons not to do so (5 answers). Next, we look at these groups and highlight some selected answers.

Students who prefer remote teaching mention that studying is more manageable at home, there's a more peaceful environment for learning, or they can arrange their environment suitably when remotely. Nine students mentioned that one of the main reasons for attending the remote teaching session was their schedule, either because of work, family, or other courses with overlapping teaching sessions (about students who work; see the next group, too). One student claimed they still enjoy later mornings thanks to obligatory attendance in a classroom.

Nine students (not always overlapping with those who mentioned the schedule) said that their distance to the university campus is inconvenient or they already live in another county, so remote participation was their only option for practical reasons. Some also mentioned that coming to the university for a single lecture only is not sufficient (being too "troublesome" to go to the campus). Negative aspects of remote attendance included hardness of hearing all the time, especially if some other student in the classroom (not the teacher who wore a microphone) asked a question or commented on the lecture. One student mentioned that they "Never again want completely remote classes", probably referring to the COVID-19 lockdowns when teaching was forced to be completely remote.

Students who only watch videos and many who took remote classes work simultaneously when attending university courses. They comment it's either the only option or more convenient to watch recordings after the class, in their own time, compared to day-time live lectures (either remote or in a classroom). One student commented, "Live recordings are more pleasant than slide shows" referring to the online lecture style where a presentation is pre-prepared by a teacher without a live audience. The quality of the (live) recording audio was thanked, too.

Students who prefer to participate in a classroom mentioned their main reasons being better concentration (4 answers), interaction with the teacher (2 answers), and better voice quality (1 answer). One student mentioned that they felt too alone during the COVID-19 period and thus now prefer to attend in-classroom lectures. Another student commented, *There is nothing that can replace being in the same space*, adding that feeling of belonging and interaction also helps them to learn. The third student commented they did not learn "anything" during the COVID-19 period and in complete remote teaching, fearing they would miss too much because of not actually participating at home.

Students who would like to participate in a classroom but cannot do so for different reasons, including living in another country (but preferring live lectures over remote ones). Some students were very flexible about their presence and mode of participation; some referred to it as *"I like live lectures because I believe I can focus on live lectures' contents better than in remote mode. The best option for me is a hybrid course, where I can participate in a classroom when it works with my schedule and not participate (live) when I cannot come to the campus."*

4.2. Results on exercises

Attendance	Online exercises, hybrid help	22	-	-	1
	Online exercises, remote help	-	14	-	1
	In classroom-only exercises	-	-	2	-
	In classroom, hybrid exercises	1	-	-	1
		Online exercises, hybrid help	Online exercises, remote help	In classroom-only exercises	In classroom, hybrid exercises
		Expectations			

Table 3

Students' expectations of how they would usually attend the exercise sessions (Q4) versus how they would prefer to attend after this hybrid course (Q5).

Similarly to lectures, we next discuss exercise sessions and show expectations and attendance in

Table 3 (cross-tabulated test statistics for the whole table are $\chi^2 = 87.08$, $p < 0.001$). The results from Q4 and Q5 here are somewhat straightforward: 22 students expected to learn best in online exercises with hybrid help available and would also continue taking their exercises in this format. Fourteen students claimed they prefer online exercises with only remote help and would also like to continue in this manner. Few individual students opted for classroom-only exercises, too.

In open-ended Q6, we asked students to evaluate their reasons for participating in exercise sessions in different modes, similar to lectures. Based on the thematic analysis, there are two groups of students in our data: those who are happy to have everything entirely remotely (23 answers) and those who want exercises to be returned in an online format but wish to have help available, such as mentoring or counselling sessions given by the teaching assistants, also live in a classroom. There are some of the reasons we can highlight from the answers:

Students who preferred all exercises and help online mention similar situations than participating in lectures: they live in another county, work during daytime hours, or have otherwise been in a situation where remote mode suits their schedule and lifetime better. Remote counselling and online exercises were even mentioned as supportive of combining studies with work life. Again, some mentioned that their concentration is deeper at home (2 students) or prefer their home ergonomic setting or own PC over a laptop. Two students mentioned that because they feel the exercises are so easy, they do not need help, or remote help is enough. One student highlighted that because the exercises are clearly designed to be done online, they do not see a need for live counselling. One student mentioned they could not concentrate well as the campus was too crowded and noisy, and thus preferred the online exercises and individual counselling over group activities and sessions.

Students who preferred online exercises but live counselling sessions mentioned it is easier for them to discuss their problems face-to-face with the teacher. One student pointed out that it is possible to show their solution and ask more precise questions when in the same space. Three students mentioned they preferred face-to-face communication over remote counselling, if available because it is "*easier*" and "*more comfortable*" for them. One student also noted that it highly depends on the exercise if help is needed and how much – this can be linked to the answers from another group where students claimed some exercises were so easy that no counselling was needed at all.

Even if not explicitly asked in this questionnaire, some students referred to group work in their answers. Some saw face-to-face meetings with the group as beneficial instead of only calling or doing online work. One student mentioned that the education system has already trained them to work and solve problems in groups effectively, and that is what they prefer to continue and where live meetings are better.

4.3. Results on general feedback on hybrid teaching

In section three of the questionnaire, we asked students to provide general feedback on the course instalment, what was positive in the hybrid teaching methods (Q7), and what should be improved (Q8). In addition, the last question asked for feedback about hybrid teaching in the faculty or university in general (Q9). These were all open-ended questions.

Positive feedback can be divided into five categories: 1) video recordings (15 mentions), 2) online exercises (3 mentions), 3) flexibility (8 mentions), 4) technical comments (4 mentions), and 5) other comments. The video recordings – and especially their timely delivery immediately after the live lecture (through the university's video platform) – were liked, and some students indicated that they watched the videos again even if they also attended the lecture. Several students mentioned through this question and other previous questions that when they were sick (of COVID-19 or some other illness), the recordings helped them to catch up with their learning goals. Technical comments thanked the quality of the teacher's voice, which was recorded through a small, clip-style microphone. Interaction through the chat service during the live lecture was also thanked. In this section, the other comments somewhat misinterpreted the questions, and there were also positive comments about the teacher's sense of humour and the course content (feedback on the material and course content was collected separately).

Flexibility was mentioned multiple times. One student stated, "Attending the course was very flexible thanks to the hybrid teaching. Instructions were clear, and communication worked out well." In addition, there were mentions of speedy answers to emails, fast grading of the weekly exercises, and comprehensive, well-structured materials online. This highlights how important clear instructions are and how paying attention to the course's details and structure helps students achieve their goals without too much struggle in the remote environment.

Required improvements included comments on 1) technical quality (11 mentions), 2) interaction between the students in the classroom and remotely (8 comments), and 1) one mention about the confusion on how the remote counselling session is supposed to work. In addition, there were comments that the course content was irrelevant in the hybrid teaching context. Technical improvements were also requested in the voice quality, but mainly when someone other than the teacher talked. For example, one student commented: *Discussion in the lecture hall wasn't always heard at all or badly by the remote participants, but I understand that the students in the classroom get prioritised. In one lecture, the teacher drew on the whiteboard, which was not visible on camera.* In this case, the discussion in the classroom led to ex tempore whiteboard use that was not planned and thus not visible to the remote participants. As mentioned, there is very little space for improvisation in hybrid teaching, and the "invisible" students behind the camera are easy to forget during lecturing. These occasions and the situations where the remote audience did not hear live students' questions and comments provoked the feeling that the classroom students were more important than those participating remotely (8 mentions).

Hybrid teaching in the faculty and university, in general, got more positive (35 mentions) than negative (2 mentions) comments. Based on the answers to this question and previous evaluations, the students seemed to like the possibility of remote participation even if they personally preferred to participate in the classroom setting. Flexibility was mentioned together with equality; however, the same flexibility allowed some students to take courses simultaneously in multiple universities through national collaboration channels. The change from remote and online teaching only (during COVID-19) to hybrid teaching was welcomed and highly anticipated. One student mentioned that the flexible hybrid opportunities are *a competitive advantage* for the university when recruiting new students. The availability of live recordings and other materials promptly was mentioned multiple times as an essential factor for efficient hybrid learning. The exercise sessions were mentioned again, and they divided more opinions: many seemed to think that face-to-face help with exercises is necessary whenever exercises are more demanding.

On the other hand, remote teaching was mentioned to be even *depressing and lonely* without any interactions. For those students, it feels important to provide live experiences and encourage them to be present on the campus, even if the remote options take place. One student added that not every teacher is in line with the latest hybrid teaching methods and materials, so clearly, there is still an improvement in capabilities and resources on how to deliver hybrid classroom experiences.

5. Conclusions

This study aimed to determine the preferred learning methods for students in a university course where hybrid teaching was piloted. During the pilot study in the Information Security course, the students could attend the teaching either fully present in the classroom, fully remote via real-time video link, or fully remote by watching recordings of live lectures. A survey was used to collect feedback from the teaching mode. According to the results of the study, the majority of the students prefer a flexible way of attending lectures. This means that they appreciate the experience of live lectures along with the interaction with the teacher and other students while still being mainly remote. However, the answers reveal that hybrid lectures have some practical difficulties that still need to be overcome. The remote participants are at the mercy of the chosen technology; they may not always be able to hear the discussion in the lecture room or see activities outside the camera's range. They may also feel that participating in the discussion is more complicated. These interpretations imply that when planning hybrid teaching, the teacher needs to carefully consider how to involve the remote participants in the

class and what technologies best suit the course learning activities.

In the exercise sessions, although the majority preferred the hybrid while being remote again, the option to come to the classroom or discuss live with the teacher was seen as needed, depending on the difficulty of the exercise. In our case, the exercises were designed so students could do them independently, and only some need for live guidance was anticipated. This proved to be accurate based on the students' responses. Our course design may have impacted the responses and students' expectations for the teaching mode in exercises.

Overall, COVID-19 made remote course participation possible practically anywhere, anytime. It also created opportunities for students to better plan their time between courses, commuting, and working. This does not come without some issues. We are only starting to see the effects of the pandemic. Some students thrive, and some need more support than before. Being able to design courses that would suit different types of students, different learning styles, and different goals (degree programme students vs continuous education) remains a challenge. Teacher resources are not infinite, and support for quality hybrid education is still needed.

Declaration on Generative AI

The authors have not employed any Generative AI tools.

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