

The Effects of Time and Location on Attention during Hybrid Education

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Abstract

Studying the use of how digital technologies mediate online learning through the educational method of hybrid learning indicated that time and location are important factors to consider. The phenomenological study demonstrated that participants experience advantages during both online and in-person lectures. Participants showed a preference to in-person education due to the fact that the factors of time and location needed to be adapted in online learning. Due to the COVID-19 pandemic, online education highlighted the need for more structured approach where lectures are involved. Time schedules for the attendance of online lectures motivates students to be more engaged and interactive. Having smaller lecture halls and more accessibility to online course materials encourages students to attend lectures more regularly. The study concludes that hybrid education would be beneficial to students given that these factors are properly adapted for. The study includes the discussion of the implications of the research as well as suggestions for future research.

Keywords: online learning, hybrid education, experience, time, location, COVID-19

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Introduction

March 11th, 2020 is a day marked forever as possibly the largest historical event of our lifetime. The day marked by the declaration of the COVID-19 or Corona virus as a world-wide pandemic, as presented by the World Health Organization (WHO) (Cucinotta & Vanelli, 2020). It is safe to say that the Corona Virus pandemic derailed the lives of the masses and affected almost every person on the planet. The need to minimize infection and fatality rates provided new challenges for educational institutions. Sumardi and Nughrani (2020) found that amongst others, the most prominent challenges reported by students and educators included the lack of drive, difficulty with accessibility, as well as a lack of social interaction and connectedness. As a result, educational institutions aimed to alleviate these problems through the adoption of hybrid education (Li et al., 2021). El Mansour and Mupinga (2007) defined hybrid education as a combination of both traditional in-person and online means of teaching.

A teaching technique that is based on the notion that including technological aspects (i.e. software) into online learning, improves the overall educational experience. (Davis et al., 2016). The integration and study of how digital technologies mediate online learning forms the main area of interest in the current research study. Singh (2017) expressed that hybrid education not only allows students to experience in-person and online education, but gives them free choice in whether they do so in a scheduled or a self-paced manner. Siegelman (2019) further elaborated that the interactions experienced through hybrid education allows students to complete courses either synchronously through in-person meetings or asynchronously, where students work independently. However, as mentioned before, several challenges affect the notion of online learning. As mentioned by Ellaway and Masters (2008), online teaching expertise happens over an extended period of time and the proper education of educators on these methods proves important.

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The abovementioned works by Singh and Siegelman touches upon the factors of time and location in hybrid education, while Ellaway and Masters focus on the role of educators and their methods of teaching. Elaborating on the overall theme of digital technologies, the current research sets out to explore how the factors of time and location affects students' abilities to pay attention during hybrid education.

Literature review

The following literature review examines several previous research works on the factors of presence of an educator, location and time in the context of hybrid education. Jensen (2011) stated that hybrid courses resulted after research was done on the shortcomings of distanced learning as compared to in-person learning. The exploration was based on the understanding of the best combination of the advantages of both in-person environments and the flexible nature of online learning. The main advantages of in-person education, as explained by Paul and Jefferson (2019) includes the provision of motivation and encouragement to students as well as a sense of social connectedness. On the other hand, the ability to work independently, at one's own pace as well as the cost effectiveness are among the most advantageous aspects of online learning (Singh et al., 2021).

Albeit both educational methods provide several advantages, a study conducted by Roval and Jordan (2004) indicated that students who show preference to in-person education do so because they value the discussions and social connectedness they experience through these methods. These students tend to show less enjoyment for online learning. Furthermore, online education proved less effective and beneficial in certain aspects, according to Setyaningrum et al., (2021). Their findings indicate that the lowered effectiveness of online education results from the misunderstanding of course material. Thus, the ability of educators to properly convey course material in online settings holds immense value.

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Presence of the educator

In-person courses offer students the ability to interact with their educator and other students. This allows for student-student discussions as well as clearer explanations by educators (Paul & Jefferson, 2019). Furthermore, educators can better pick up on body language and other cues presented by students (Kemp & Grieve, 2014). The factors of discussion and nonverbal cues mentioned above allows for educators to make adjustments to their teaching methods as well as the course materials. These adjustments however, prove more difficult in online settings. Singh et al., (2021) indicated that in hybrid education, however, online learning replaces the face-to-face aspect of in-person education. The lack of face-to-face interaction between educators and students reinstates the challenges of online education mentioned by Sumardi and Nughrani (see above, in Introduction).

Ellaway and Masters (2008) elaborated on the timely adaptation from in-person to online teaching stating that educators should aim to create an engaging experience. Incorporating both social as well as teaching presence in online education results in personalized education where students both indicate increased motivation and academic achievements (Martin et al., 2020). Furthermore, a study done by Pacansky-Brock et al., (2020) found that educators who place larger importance on student-educator relationships encourage students to aim for higher achievements. It is evident that the presence of an educator with regard to academic support and student-educator relationship aids student performance. Nevertheless, as hybrid education excludes the face-to-face interaction (Singh et al., 2021), it is vital to study the effects of the online presence of educators.

Wang and Antonenko (2017) found that the visible presence of a lecturer improves performance as well as judgement in cases where more complex subjects are studied. Students also tend to show increased levels of attention, along with lowered tendencies to easily become distracted. In another study conducted by Pi et al. (2017) results indicated that the movement

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of the lecturer not only attracts the attention of their students, but also directs their attention to the most relevant material of the course at hand. Thus, if the movement of the lecturer affects the attentiveness of their students, the location of the lecture indirectly becomes of interest.

Location

Learning space, as defined by Rowley (2014), marks a location of interaction between students and educators. The definition is based on the notion that the space allows for learning to occur. The effectiveness of the learning space is directly related to the method of education which it allows. That is to say larger lecture halls would hold larger groups, with minimal interaction between the educator and students. Bennet et al. (2020) explored learning space and learning success. Their study found that students generally follow learning strategies known to result in the best academic achievements for themselves personally. Moreover, these achievements are directly linked to the space in which learning occurs. Although Bennett et al. indicate that the relationship between study location and academic success may appear minimal, it holds great power.

A relevant example of the influence of location is given by Bolden et al. (2019). The work indicated only minimal differences in students' ability to pay attention when in a larger lecture environment as compared to a small one. The study did however indicate a discrepancy regarding the social aspects of smaller lecture venues, where smaller venues were preferred. Another study that elaborates on the same topic is that of Jensen (2011). The work concludes that students are attracted to attending lectures in an online format, but in reality a strong preference for in-person lectures was indicated. The strong preference for in-person lectures resulted from the interaction amongst students, as well as between students and their educators. The interactions mentioned here kept students attentive, while they indicated a lack in motivation to attend lectures or study online. Jensen (2011) found that when students attended lectures only online, a large decrease occurred in participation and attendance, as well as the

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use of online course material. Furthermore, students indicated that in-person lectures were more beneficial as it provided study environments that are not only free from distraction but follow a regular time schedule. Contrary to the findings by Jensen (2011) however, regarding time, several studies indicate a preference for the freedom and flexibility of online learning

Time

Although the flexibility and freedom of online learning appeals to students, research indicates that most students underestimate the demands of hybrid courses (Lin, 2008). Hall and Villareal (2015) found that students of hybrid courses greatly value the ability to work at a pace they personally preferred. The study found that students who generally have busier extracurricular schedules preferred working around their own routines. Several students also indicated that the freedom to complete coursework in their own time resulted in the tendency to fall behind. Eneau and Develotte (2012) explains this as a result of the relatively larger amounts of time hybrid courses take to complete. Furthermore, in line with Lin (2008), they elaborate that hybrid education is seen as a more demanding form of learning, as compared to in-person education. Another study conducted by Grabe and Christopherson (2008) found that students tended to study course materials where the least amount of time needs to be invested, i.e. were unable to discern the importance of a section of material in the overall scheme.

The demands of hybrid education have been shown to decrease both student attendance as well as their overall effort in hybrid courses (Jensen, 2011). In a study conducted by Bos et al. (2016) the attendance of students in lectures was directly affected by the length of the lecture. Extensive online lectures decreased students' ability to pay attention for the duration of the lecture, which ultimately resulted in lower attendance in those courses. Farley et al. (2013) describe that students remembered more course material conveyed during the first half of a lecture as compared to the second half. They elaborated that shorter lectures would thus be better for students to stay engaged and motivated. It is important to note however that course

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material tends to increase in difficulty as a topic is discussed, which could influence the ability students have to remember certain topics. The ability that students have to stay attentive appears to be dependent or at least related to the amount of time invested in the lecture material (Risko et al., 2012a; 2013a).

Overview of the study

Wieling and Hofman (2010) indicated that a hybrid form of education would provide the best educational method where online learning is concerned. This study aims to examine how digital technologies mediate online learning from a phenomenological perspective. More specifically, the lived experiences of students who were exposed to hybrid education during the COVID-19 pandemic. The overarching goal of the research is to explore whether hybrid learning could be a beneficial educational method despite the reduced impact of the pandemic on student life. Furthermore, it aims to evaluate whether adapting the factors of location and time could help attain the most functional form of education.

Method

Design overview

The current research paper follows qualitative methods to study the experience of hybrid education that students at the University of Groningen underwent during the Corona Virus pandemic. Qualitative methods aim to achieve a deeper understanding of personal experiences (Patton, 2002). Furthermore, according to Miles and Huberman (1994) qualitative research methods pinpoint where people place meaning on experiences in their daily lives. These meanings can further be connected to people's social experiences with those surrounding them as the data is based on their personal experiences. As this study elaborates on the experiences of students, following the phenomenological paradigm became the main focus, where personal accounts were studied and evaluated in order to best describe the phenomenon of hybrid education (Hall & Villareal, 2015).

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This study involves four participants which all currently study at the University of Groningen. Interviews were privately conducted with each participant with the interview times ranging from 35 minutes to 57 minutes. Each participant was recruited in person during a face-to-face conversation. Prior to the start of the interview participants received a study information form, explaining the main aspects of the research. Each participant was asked whether they had any further questions, and once those were answered a consent form was signed. The thesis group supervisor submitted a request for ethical approval for the study to the Institutional Review Board. The request included an overview of the planned research study, that is, the above-mentioned study information form, as well as potential interview protocol questions. Once the ethical approval was finalized, the full interview protocol was set up. The protocol consisted of a handful of main lead-off questions with some follow-up questions where it was relevant. The questions were formulated in such a way as to not sway the answers of the interviewees.

The four participants all study different courses at the university, including: Psychology, Communication and Information Studies, European Law and European Languages and Culture. Of the four participants only one participant follows the Dutch track while the other three are in the international tracks of their respective studies. Furthermore, one participant was male and three were female, and for the sake of confidentiality, pseudonyms were used when discussing the results of the analysis. The pseudonyms used were as follows: Marie, Kaia, Clara and Gino.

With the guidance of the supervisor, it was decided that the current analysis would follow: inductive, generally phenomenological, explicit and overall analytic strategies (see below, in Data Analysis section). Following the interviews, the audio recordings were transcribed and coded using the analysis software ATLAS.ti. The codes were further analysed and grouped into themes and discussed in the thematic analysis.

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Purposeful sampling

Participants were selected based on purposeful sampling, a method which selects participants that provide the most extensive and valuable accounts, allowing one to gain the best use out of the phenomenological method (Patton, 2002). Purposeful sampling can be divided into several concrete categories of sampling, including the chosen method for this study, namely criterion sampling. The criterion of this study includes the requirement that participants are currently active students at the University of Groningen. Moreover, the participants were all students during the pandemic and experienced online as well as hybrid education during the lockdown period. The participants all vary in the courses they follow, as well as the stage (i.e. year) of study. One participant started their studies during the online only lockdown period, whereas the other participants had all completed their first, and some their second years of study prior to the university's conversion to online education.

Each of the participants received the exact same information on the research being conducted. The research form handed out prior to the start of each interview included information on the interview process as well as the main aim of the research being conducted. Any further questions the participants may have had about the research was answered before the informed consent forms were signed. Participants were all clearly informed that their full withdrawal from the study was allowed at any point prior to the final submission of the research paper.

Data collection

Data collection occurred in the form of a semi-structured interviews, conducted one-on-one with each participant. The interview was recorded as an audio file on an iPhone 13 and focused on the accounts the students had with hybrid learning. More specifically, the decision was made to study students' experiences with lectures only instead of their experiences with education in general. Each participant follows a different course, with a different setup

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regarding whether they attend seminars or practical classes in addition to lectures. Thus, only looking at lectures provided the best generalized measure of experience that all the participants shared. The participants were asked to elaborate on their personal experiences regarding both in-person (i.e. traditional) lectures as well as online (i.e. pre-recorded or live streamed) lectures during the pandemic.

The semi-structured interview followed questions from the interview protocol set up prior to the start of the data collection process. This protocol was inspired by Carspecken (1996). The protocol was merely followed with regard to addressing all of the lead-off questions, but the precise order and follow-up questions varied depending on the direction and flow of the conversation. The decision to conduct a semi-structured interview allows for new directions and topics to arise in a natural flow throughout the interview (see Appendix A for the Interview Protocol).

Creswell (2008) stated that the use of broad lead-off questions allows one to inquire on newly surfaced themes throughout the interviews. These questions indirectly opened the conversation up to both the factors of time and location that are of main interest in this study. The overarching topic of interest for the thesis group revolves around how digital technologies mediate online learning. In the context of this work, online learning is studied through the means of hybrid education, and factors affecting how well this method of education works elaborates on several factors, including digital technologies. It is important to note that hybrid education at the University of Groningen came about as a result of the COVID-19 lockdown period. Prior to the introduction of a hybrid system the participants in this study only attended online classes. Thus, the study created a comparison between online lectures and in-person lectures. The aim being to discover which factors of each of these methods work the best for students and furthermore, how to combine these factors to create the best functioning hybrid education system.

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The interview protocol was set up in such a way to ask participants to elaborate on their experience with in-person lectures and then, separately to share their experience with online lectures. The comparison between these two experiences gives an indication as to which factors of each of these lectures they place positive emphasis on. As already mentioned, the interviews ranged in times between 35 minutes and 57 minutes. The shorter interview times resulted due to one participant stating they have some anxiety when conducting an interview, resulting in more abrupt answers. In addition, another participant struggled with answering some of the questions in English, as they mostly speak Dutch and have a more limited vocabulary.

Data analysis

The chosen method of data analysis as best suited for the phenomenological perspective in this case is the thematic analysis. The method of thematic analysis was opted for as, among others, it is a relatively easy analysis to conduct, even in the case of an inexperienced researcher (Braun & Clarke, 2006). Moreover, the current research was conducted without any prior experience in qualitative research methods, but rather only quantitative methods. The work of Braun and Clarke (2006, p. 79), specifically their six-stages approach to analysis, was extensively studied and followed for the current analysis. Their work describes the method of thematic analysis as a means of evaluating the “patterns” of meaning in data (i.e. themes) that allows us to draw inference about the topic at hand. This method of data analysis allows one to identify the position the analysis takes regarding the relevant theories.

Furthermore, after a discussion with the thesis group supervisor it was decided that the analysis will be conducted following a pre-decided strategy. The strategy planned for the nature of the analysis, the levels of analysis as well as the perspective, and four decisions were made here. Firstly, we followed an inductive analysis where the codes and themes originate from the data itself. The analysis was conducted at an explicit level, which entails that the themes arise directly from the data given by the interviewees. That is to say that the researcher does not

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make inferences about topics that are not explicitly mentioned during the interview. Furthermore, the entire data set was included in the description as an overall analysis. Including the entire data set of each participant allows for the most information rich description in the analysis. Finally, the work followed the phenomenological approach, analysing the personal accounts and experiences of the participants.

This analysis process started once the interviews had been conducted and transcribed. The audio recordings of each interview were transcribed into a Microsoft Word document with the aid of the software's dictation function. The transcripts were edited to ensure that the dictation did not mistake what was being said throughout the interviews. With the aid of the Web version of ATLAS.ti the interview transcripts were then coded. During the coding process, mere descriptions or paraphrases of each transcript line or paragraph were created. There were no inferences or conclusions made, just the mere reporting of what the participant said. Thereafter, the codes were grouped into relevant categories based on similar codes or repeated patterns. Several reports were created on ATLAS.ti, where these categories could be edited to the extent that all the relevant codes were grouped into one report. Singular codes or codes that were irrelevant to the study were disregarded. As a result of the abovementioned process the main themes of the analysis emerged. These themes were then analysed and reported in the thematic analysis, allowing for the discussion of the results of the data. (see Appendix B for the Thematic Analysis).

Results

The results of the research study at hand describe the personal accounts and experiences of four students from the University of Groningen. During the analysis (see above, in Data Analysis) the interview questions were divided into the experiences participants had with in-person lectures as well as their experience with online lectures. The goal was to analyse whether education mediated by digital technologies is more beneficial than in-person education.

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The thematic analysis resulted in the creation of three main themes: (1) the focus of attention, (2) the accessibility and comfort of the lecture, and finally (3) the motivation to attend and study lectures. The first, the focus of attention, regarded the placement of students' main attention during a lecture as well as other factors that influence their attention (i.e. distractions). The second theme, the accessibility and comfort of lectures, explained the factors that affect the overall experience students had during lectures. The third and final theme, the motivation to attend lectures and study focused on the factors that influence the drive students have to actively participate in lectures.

The focus of attention

Participants tended to have placed their main focus during lectures on either the lecture material or the lecturer themselves. During in-person lectures, for three of the participants, the main focus of attention was on the lecture material presented. Kaia mentioned that this is "because they would have keywords, and if I was making notes I'm always looking at the slides." Contrary to the other participants, Gino indicated that he based his notes on what the lecturer was saying, as he could always study the lecture's slides after the fact. Other than the focus on making notes, the general lecture material was often more engaging to the participants than the lecturer. Clara elaborated saying that "the thing that is most engaging for me would be like the videos and stuff because it's something visually to watch." The inclusion of video aids presents new information that creates a focus point for students to become more engaged in the lecture (Davis et al., 2016). However, when studying online lectures, the lecturer tended to be the main focus of the participants. Online lectures were often recordings from lectures conducted in previous years. This meant that the students had access to the lecture recording and the slides separately and could separately study them both.

A main lack of attention in in-person lectures sparked from the need to actively note down the lecture slides while the lecturer is discussing them. Both Clara and Marie mentioned

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that the lecturers often discuss the slides at a pace that they struggled to keep up with. As a result Marie stated that “I catch myself like not listening as I should.” In this regard, the participants showed preference for the ability to study lectures in an online format as in-person lectures could not be paused. Marie however, further explained that studying online materials takes a lot longer “because when they are recorded, I know that I pause them a lot.” In general, lectures that take longer to complete were correlated with a decrease in participant attention (Bos et al., 2016) which was elaborated on by several participants. Clara mentioned that lecturers often discussed topics extensively where “I just, bleh, zone out”, and she would often lose track of what was being discussed. Here, according to Gino, another factor that affected these extensive lecture discussions were based on the large number of slides that the lecturers aimed to discuss, while the designated lecture times were too short.

The lack of attention students experienced, however, was not merely just due to longer lectures. Larger lecture venues often formed a main distraction. Kaia mentioned that “if I was sitting at the back of a lecture hall that was massive, I am not listening to a single thing that is going on.” Generally, larger lecture halls not only made it difficult for students to pay attention to the lecture, but it allowed them to participate in other activities while the lecturer was busy. The use of digital technologies (i.e. laptops) proved to be amongst the biggest forms of distractions in lectures (Blasiman et al., 2018). More specifically, for Gino, his laptop was most distracting during the football season “especially during the world cup, you know.” Moreover, Kaia mentioned “but I always found social media distracting, because I had all of it at my fingertips during the lecture, and I wasn’t going to get called out for it.” During larger group lectures, participants felt that they were less engaged and merely “one of the numbers” to the lecturer.

During online lectures, participants reported the same situation regarding distractions, as they would either attend lectures with their cameras switched off, or simply study the lecture

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recording. Online lectures however, present additional and different distractions as compared to distractions experienced during in-person lectures (Blasiman et al., 2018). Participants often attended online lectures from home. Both Clara and Kaia touched upon the fact that they would complete chores (i.e. cleaning or laundry) while they were listening to the online lectures. The added distractions that evolved during online lectures highlighted the fact that participants are better able to pay attention during in-person lectures. Kaia reiterated that “I was definitely more distracted with the online ones.”

The accessibility and comfort of lectures

Students tend to adapt how they engage in their learning depending on the location of the lecture (Bennet et al., 2020). All of the participants in the study stated that they actively take notes during lectures, and that the ability to do so is important. Marie attended several of her lectures in the cinema, and elaborated on the lack of comfort this informal setting held. “I get my laptop and I just have it on my lap. Usually I put it on the little desk in front of you, but now I just have to put it on my lap.”

She explained that the cinema is too large and that the factors of lighting as well as her ability to hear the lecturer is negatively affected during the lectures. Larger lecture halls played an important part in the experience most participants had and consensus among students specified the preference that they have to smaller lecture halls, with smaller lecture groups. The engagement between students and lecturers is directly dependent on the location in which the lecture takes place (Rowley, 2014). Kaia mentioned that “I feel like whenever I’m in a smaller room that the lecturer is literally looking at me and I feel more engaged.” The interactions between the students and the lecturer in smaller lecture halls allowed students to inquire and discuss course material they struggled with (Paul & Jefferson, 2019).

This interaction and engagement were expressed to build a comfortable relationship with the lecturer during in-person lectures. Nevertheless, it was evident that during online

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lectures, the lack of engagement and interaction left participants feeling “uncomfortable and awkward” as mentioned by Kaia. Participants felt that they could not reach out to their lecturers and were left with little to no student-lecturer relationships, as compared to the periods of in-person lectures. “When the person is there right in front of you, you can create... a dynamic where they hold your attention all the way through, and I think it forms an important relationship” as mentioned by Gino. Although online lectures affected the comfortability students experienced, online lectures provided advantages regarding the accessibility of course materials. All four the participants mentioned that they preferred having access to the recordings throughout the semester. Lecturers providing the course materials as well as relevant information at the start of the course allowed the students to create more structured study schedules (Singh et al., 2021).

The motivation to attend and study lectures

With regards to attendance, participants were more likely to attend lectures in person as compared to online. Clara mentioned that “if they were recorded ones, then usually you like have a deadline of when to watch it by.” Her attendance of online lectures was dependent on the time limit, before the lecture would be taken offline, as given by the lecturer. Whether there was a time limit set by the lecturer, or assignment deadlines and exams approaching, participants all suggested that they attended online lectures based on time pressure. Furthermore, when it came to studying online lectures, students tended to study the most beneficial materials, in the shortest possible amount of time (Grabe and Christopherson, 2008). Gino described that “I would always do the bare minimum.” Another example was given by Kaia when she explained that “before the exams I definitely would go through the lectures and I would speed them up or whatever just to get the information that I needed.” Online learning, in hybrid education led to lowered student effort (Jensen, 2011). As a result, in-person lectures offered several motivating factors that seemed to be lacking online. The aspect of social

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connectedness was widely mentioned by the participants as a leading factor in their motivation to attend and study lectures. All of the participants mentioned that they attend lecture with their friends, or at least acquaintances.

The “study mindset” was mentioned several times throughout the interviews and elaborates on the motivation participants had to continue studying after they had attended a lecture. Kaia was the only participant to indicate that “I would kind of consider the lecture as being productive” and preferred to study on days where they had no lectures scheduled, as she felt more productive in doing so. Both Marie and Clara agreed that “if I don’t have class that day, I’m definitely less motivated to get up early and actually get work done,” as it was mentioned by Clara. The preference in whether participants continue to study after having attended a lecture often coincided with their preference in lecture schedule. “I think I would like it better if they are on the same day” and “I think I prefer when it’s maybe two in one day or multiple on one day. Just because then that day is a good day to study” are two accounts indicating that the lecture schedule greatly affects whether the participants would be productive after their lectures. Contradictory to the other participants, Gino preferred having his lectures on several days as he mentioned “if I had all day lectures, then I would just lose the limited time span I have.” He further elaborated that he was more likely to continue studying after a singular lecture as compared to several lectures on one day with a separate free day only to study. Throughout the analysis, it became evident that participants were all more motivated when they are attending in-person lectures, and preferred to do so in a social regard.

When participants would decide to study independently, both Clara and Kaia indicated that they decide where they will be studying based on the work that needed to be completed. Kaia demonstrated this when she said that “I feel like I love studying in a café, but only whenever I’m writing an assignment. I can’t learn things in a café.” Both of the participants mention that they study in a café when they are working on assignments.

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Furthermore, all of the participants mentioned that they tend to study for exams in the University Library. The location in which participants decided to study was affected both by the goal of the study at the time, as well as the amount social interaction that would participants could endure without being distracted.

Discussion and Implications

The findings of the phenomenological study revealed how the factors of time and location affect how well students were able to pay attention during a lecture. More specifically through the means of hybrid education during the COVID-19 pandemic. There were clear advantages as well as disadvantages for both in-person and online lecture formats. When looking at in-person lectures, the main advantages included that they followed a strict and planned time schedule. Students were able to stay motivated and engaged as they had a structure they could follow. Additionally, in-person lectures included face-to-face interactions with the lecturer. Student-lecturer relationships directly affect how satisfied students were with the education they were receiving. Participants shared that they experienced in-person lectures to be more engaging and interactive. However, a big disadvantage mentioned by the participants, is that in-person lectures were often held for large groups of students. Generally, it was harder for the participants to pay attention at times, and they reported that sometimes it was difficult to see or hear when they were attending a larger lecture.

On the other hand, online lectures presented the advantage of having access to lecture materials at any given time and location. Nevertheless, the downside to these lectures included that they had the added distractions of the location in which they were attended. Attending lectures at home or in a public place easily added more distractions. Furthermore, they often took longer to complete, than in-person lectures would, as students would pause the lectures or rewatch sections of the lecture that they found important. Through the analysis it became evident that the factors of time and location effect lecture experience, be it a online or an in-

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person lecture. As a result, the discussion will elaborate on the factors of time and location with regard to each respective lecture form.

As it was previously mentioned, Bennet et al. (2020) indicated that the space in which learning takes place, influences how students decide to approach the lecture material. In the context of this paper, participants demonstrated that they adjusted how they studied based on the location of the lecture. When lectures were attended in a lecture hall, participants made use of the physical aspects of the venue that was at their disposal. This included using the desks when participants would be taking notes during the lecture. However, certain lectures occurred in more informal lecture spaces (i.e. the cinema). Here it was harder for the students to engage in the lecture as they had limited options regarding the ability to make notes. When attending online lectures, participants were able to decide where they would watch the lecture from, and as a result they would be able to comfortably participate.

With regard to the study of online lectures, participants had more freedom in connecting their study methods to the setting they were in. Participants elaborated that when they were studying for exams, which needed more direct attention, participants preferred a university setting like the library. Whereas when they were merely completing assignments participants indicated that they were more open to working in an external study space (i.e. a café).

The location not only mattered when studying independently from a lecture, but also when attending lectures. As mentioned by Jensen (2011), participants are more motivated to attend a lecture when it occurs in-person and the study found that participants' motivation to attend a lecture is directly related to this ability to pay attention. In-person lectures were more engaging to them, as the ability to interact with the lecturer was greater. This in turn meant that students were less easily affected by external distractions. Students' ability to stay engaged was affected by the size of the lecture as well. Firstly, larger lecture halls tended to impact their engagement negatively, as larger rooms affected the audio and visual interactions students had

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with throughout the lecture. Secondly, the number of students in the lecture made a difference in students' engagement, as there was a lack of interaction between the students and the lecturer in larger lecture halls. Smaller group lectures allowed for discussions to be conducted among the students, as well as with the lecturer.

Paul and Jefferson (2019) elaborated on the importance of the interaction between a student and a lecturer. During online lectures there was a large lack of ability to communicate with lecturers. Students expressed that they felt disconnected from the lecturer which meant that they were less likely to contact them when they had important questions, or misunderstood important information. Singh et al. (2021) found that the ability for students to feel like they belong, especially with regard to online education, directly affects the academic satisfaction and success these students experience. Generally, it was evident through the current research study that participants struggled with the lack of social connectedness they experienced when studying online, and therefore were more drawn to in-person lectures where location was involved.

Where the factor of time was involved, participants indicated the importance of a time schedule. Three out of the four participants prefer to schedule their lectures on the same day, or in the case of having multiple lectures, planning them on consecutive days. This would motivate them to attend their lectures, as well as drive them to study on the days that they do not have scheduled lectures. In agreement with the study conducted by Jensen (2011), the motivation to attend, as well as access the material of online lectures were a lot less than that of in-person lectures. A major factor that influences this attendance is the factor of time investment (Grabe & Christopherson, 2008). It was evident that during the course of online education, participants merely completed the minimum required work where possible.

Studying online course material, while attending in-person lectures only occurred when participants were actively studying for their exams or needed information in order to complete

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deadlines. Here, the integration of strict deadlines to access online materials was said to be a solution that would motivate the students to engage more when learning online. Participants did however express that the accessibility of online material at any given moment was appreciated, and would be an ideal addition to the functionality of a hybrid education system. When studying the online material presented to them, participants indicated that the time investment was significantly larger compared to in-person lectures, but the advantage of being able to pause and replay important aspects of the lectures, still attracts students to the notion of online learning.

The findings of the study imply that smaller in-person lectures or scheduled group discussions (i.e. seminars) would allow students to connect better with other students and with the lecturer. They would be more engaged in the lecture material and be less likely to give in to distractions. Furthermore, when the only option is a larger lecture, only an insignificant difference is experienced between attending these lectures online versus in-person. In this case, online access to the lecture materials, along with deadlines by which the material should be studied would work best for most of the participants.

Limitations and future research

The current study examined how digital technologies mediate online learning with respect to hybrid education during the COVID-19 pandemic. As the research was based on experiences students had with online education during a lockdown period, under normal circumstances the results may differ. Additionally, due to time constraints during the data collection process, the study only sampled four participants. The sample followed a strict criterion, including that participants were all currently still student at the University of Groningen, and that they experienced both in-person and online lectures prior to or during the lockdown period. These factors could affect the generalizability of the study, as the experiences of students at other universities might differ.

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Future research or replications of the current research should consider the effects that the COVID-19 lockdown period may have had on the participants' experiences of both in-person and online lectures. Conducting a similar study looking at the factors of time and location without the influence of the pandemic could result in a more realistic experience of hybrid education. Furthermore, the study concluded that hybrid education would be extremely valuable and beneficial to students, given that they are able to follow a set schedule to attend lectures, while having free access to both study locations and study materials. Thus, finding the exact balance between the amount of in-person versus online education should be further researched.

Conclusion

The research identified the adaptations to be made to the factors of time and location, so that hybrid education would be most beneficial for university students. Overall, the results of the study are in favour an adapted form of hybrid education. The advantages and disadvantages of both in-person and online lectures showed which aspects of each of both lecture formats would result in the best combination of hybrid education. In conclusion, hybrid learning would work best if the factor of time was adapted for, through shorter lectures with a stricter schedule, while distraction-free locations should be readily available to students. Having direct access to online course materials as well as the lecturer would benefit the experience students have the best. The study of the factors of time and location as well as the results of the study create a solid starting point for an educational method that could be adapted to suit the needs of almost all students.

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Appendix A**Interview Protocol****Introduction:**

- Hello, and thank you for allowing me to conduct this interview with you. The interview is for my Bachelor Thesis project and concerns how you experienced different forms of lectures during the Corona Virus pandemic in the last 2 years.
- The interview is completely confidential and will last about an hour.
- You are completely free to stop at any point, and if there are any answers you would like to avoid please just let me know.
- If everything is okay with you then, we can start.

General Questions:

- Do you regularly attend your lectures?
 - Do you study the lecture recordings or slides after the lecture?
- Do you prepare for your lectures?
- Where did you spend your time during the COVID-19 lockdown?
 - Were you in the Netherlands?
 - Were you in your home country?

In-person lectures:

1. Could you please share with me your experience of the last in-person/ pre-recorded lecture you attended?
2. Could you take me through your activities during this lecture, from when you entered the lecture hall or study space, until the lecture was finished?
3. Where do you place the most of your attention during these lectures?
 - Do you focus on the lecture slides?
 - Do you focus on the lecturer?

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4. What do you find most distracting during these lectures?
 - Do you find your laptop/notepad distracting?
 - Do you find your friends to be distracting?
 - Do you find other students distracting?

Online Lectures:

1. Could you please share with me your experience of the last in-person/ pre-recorded lecture you attended?
2. Could you take me through your activities during this lecture, from when you entered the lecture hall or study space, until the lecture was finished?
3. Where do you tend to place most of your attention during these lectures?
 - Do you focus on the lecture slides?
 - Do you focus on the lecturer?
4. What do you find most distracting during these lectures?
 - Do you find your laptop/notepad distracting?
 - Do you find your friends to be distracting?
 - Do you find other students distracting?

Conclusion:

- Is there anything else that you would like to add?
- Thank you for your time.

Appendix B

Thematic analysis

Theme One: The Focus of Attention

Key words and phrases: *focus, attention, concentration, attendance, distraction, zoning out, in-person lectures, lecturer, lecture slides, writing notes, most engaged, interactive activities, questions, notebook, laptop, cinema, small groups, live stream lectures, voiceover lectures, natural tendency to watch the lecturer, ability to pause, changing the playback speed, binge-watch recordings, indicated deadlines,*

Description: The theme of attention focuses on where students place most of their *focus* or *attention* during their lectures. An important distinction between the inability to pay attention and *distraction* is important here, as struggling to pay attention does not necessarily relate to external factors that distracted the interviewees. An example here refers to one of the interviewees stating that they tend to *zone out* during lectures. *Attendance* played an important role in students' abilities to pay attention. Attendance increased closer to exam periods and most interviewees stated that they attend lectures from the middle/end of the academic block. And lecture preparation mostly occurred only when the lecture was of a small nature, or for seminars where they were likely to be called on directly.

Interviewees first described where they place the most attention when they were attending *in-person lectures*. The *lecture slides* proved to have the main focus of most interviewees, even more so than the lecturer themselves. The main reason for this being that they all take *notes* during the lectures. Following along with the slides tends to be easier for them than listening to the lecturer as it is sometimes harder to follow what is being said than reading and copying the lecture slides. Here however, important additional information and explanations are often missed and copying a current slide before moving on to the next may be hard. Out of all four

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interviewees only one showed preference to a *notebook* instead of a *laptop* when taking notes in a lecture. This meant that sometimes the notes were messy and unreadable.

Staying attentive or keeping focus during lectures also depended on the size of the lecture group and the lecture hall. Small groups allowed the interviewees to be *more engaged* and more likely to *ask questions*. One interviewee mentioned that smaller lectures tended to have more *interactive activities* and group discussions through which they were more *concentrated* and attentive as the likelihood of being called on was larger. The location and lighting of the lecture also made a difference to how well interviewees were able to focus as one mentioned that lectures in the cinema proved challenging as they felt more tired, had no desk to put their laptop on and struggled to hear the lecturer due to the size of the hall.

The *natural tendency to watch the lecturer* themselves was mentioned by one of the interviewees when the discussion of watching *lecture recordings* came up. When watching a recording from previous years the attention shifted to the lecturer more as they were *able to pause* the recording and note down the slides without the fear of missing out on important information if the lecturer moved too fast. The challenge of switching back and forth between the slides and the recording also aided in the shift of attention seen here. The most mentioned benefit of watching the recording was the ability to *change the speed* of the recording, allowing the interviewees to slow down and concentrate more on the topics they may struggle to understand. However, most of the interviewees struggled to make use of this benefit as they had no strict deadlines to watch the weekly recordings and often only *binge-watched* them during their exam preparations. Only one interviewee *indicated deadlines* were given to them, but they only had a handful of recorded lectures throughout their course.

One interviewee referred specifically to *voice-over presentations*, where the lecturer was not visible, and here they were most focused on what was being said and not the lecture slides as they could already read and note down the information on the slides. Here the most important

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information was noted to be the material mentioned by the lecturer in addition to the content of the lecture slides.

Generally, all interviewees state that they are more attentive during lectures if they occur in person as they only happen once. Given that the recordings become available to most a few weeks prior to exams, due to time stress most interviewees do not rewatch the full lectures. And as these live lectures cannot be paused, the need to gain any important information forces them to be the most attentive they can.

Sub-theme of Theme One: Distractions

Key words and phrases: laptops, phones, large lecture halls, social media, being called on, deceiving, friends, conversations, other students, large groups, cinema, feeling tired, taking notes, pre-recorded lectures, camera movement, lockdown location, bedroom, cleaning, own personal space, uncomfortable, not visible, family, partners, procrastination, stress of being watched, invasion of privacy,

Description: The theme of distraction looks at factors that draw students' attention away from the lecture, and causes them to lose track of the lecture and the important information shared at the time. General consensus among all interviewees showed that *laptops* and *phones* were the most distracting during in person lectures. In the *large lecture halls* it is easy to be active on *social media* while seeming attentive. With large groups students are also less likely to be *called on* specifically to answer questions, and thus it can easily be avoided, if the interviewees do not wish to answer questions. Moreover, all the interviewees mention that another massive distraction revolves around their *friends*. Two interviewees mentioned that in general *other students* in the lecture room do not distract them. Other students are all perceived to be active in lectures as to also learn and focus. However, it is clear that *conversations* with their friends

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do. One interviewee described her experience having lectures in the *cinema*. They explained how the dark environment made them feel more *tired* and distracted.

Although somewhat contradictory, interviewees all stated that they pay most attention to the process of *taking notes* in the lecture. However, they all mention how the act of paying attention to lecture slides and their note pages, whether on paper or on a laptop distracts them for paying attention to the lecturer.

On the other hand, *lockdown* lectures provided several distracting factors, a main one being the setting or location where lectures were attending or watched. Most interviewees mentioned studying *pre-recorded lectures* or attending live-stream lectures from their bedrooms. They were able to wake up and immediately join a call from bed. Lectures later on during the day were still completed in their bedrooms and meant that they were easily distracted by other chores or activities, like *cleaning*, in their rooms. One interviewee attended and studied lectures at their grandmother's cottage. They were distracted by conversations about tea and felt as though they had *no safe space* to work or study, but felt rather *uncomfortable* instead.

At home *family and partners* were very distracting. Interviewees studied according to the schedules of their families and although they were supportive and encouraging, parents were deemed the most distracting. One interviewee stating that their father's love for family time often interrupted their study time. Dates and the need for quality time with partners also distracted a lot, not only during the actual lectures, but also led to *procrastination* in getting to watch them in the first place.

Moreover, when lectures were pre-recorded the *movement of the camera* in the recording proved distracting to most of the interviewees. As the lecture hall itself was stationary through their screen, interviewees were more likely to study other aspects visible to them instead of the lecture slides or the materials. One interviewee only experienced live-stream lectures and not pre-recorded ones. But for all interviewees live-stream lectures provided the stress and

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distraction of switching on their cameras. Through which they all placed their main focus on their behaviour as they all experienced this as an *invasion of their privacy*. They all felt like they were *being watched*, and couldn't pay attention as a result.

As with normal in person lectures, once again interviewees' phones and social media showed to be very distracting, even more so than in live lectures as they were able to use them freely when watching pre-recorded lectures. Overall, all four interviewees stated that they were more distracted during online or pre-recorded lectures than in person, and that majority of the in-person lecture distractions were still present, along with several other, new distractions.

Theme Two: The Accessibility and Comfort of the Lecture

Key words and phrases: *smaller groups, more engaged, asking questions, exit, seminars/practicals, distance from the lecturer, cosy, invasion of privacy, home environment, inaccessible, access to recordings, freedom in schedule, library, at home, cafes, social study, productive, exams, assignments.*

Description: After having attended their lectures in person, interviewees showed preference to *smaller groups* and smaller lecture halls. They found them to be more comfortable and they were better able to *engage* themselves in the lecture. These smaller lectures allowed for the interviewees to be *asked questions* more directly and they would more likely answer the questions or raise their hand to. One interviewee mentioned how these classes were better as they weren't just 'one of the numbers' to the lecturer. The location and room layout was mentioned by one interview, who stated that the accessibility to the *exit* of the hall also proved important.

Several interviewees follow courses that had more *seminar or practical classes* than lectures. This links back to the preference for a smaller lecture as they had more *access to the lecturer* and had the opportunity and ability to ask questions and discuss course materials.

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Comfort largely affected how well students were able to pay attention and attend lectures as one participant mentioned the challenged of working in the cinema and their lack of attention when the *lecture was too far away*. Another problem concerning the use of the cinema for example is that the interviewee mentioned feeling too *cosy* and tired in a setting so unlike the university.

Online lectures were perceived to overall have been uncomfortable and difficult to most of the interviewees. When it comes to live stream lectures all interviewees mentioned similar challenged and problems. Live stream lectures proved to be an *invasion of their privacy* and most students felt uncomfortable when others could see them working in their own home environments. Moreover, WiFi, connection, and technological issues made live lectures inaccessible or inconvenient for most.

At the same time, interviewees preferred the option of being able to *access recorded materials* at any point in time and the *freedom of deciding* when to study these materials, although also a downfall for many, motivated many to study on their own schedule.

Accessibility to facilities and study locations also showed important as three main locations were mentioned. University facilities, like the library, at home, and independent locations such as cafes. All interviewees stated that the library was the location where they are most productive and motivated to study. Cafes are popular study location among some of the interviewees, but tends to only be productive when assignments are being done and not active learning for exams. None of the interviewees study at *home* and all mentioned strong opinions about their inability to do so.

Theme Three: The Motivation to Attend and Study Lectures

Key words and phrases: *attendance, feeling productive, inattentive, study day, early lectures, study mindset, engaged, personally addressed, interactive activities, group discussions,*

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friends, planned, lecture location, recorded lectures from previous years, demotivating, setting, assignments, exams, compulsory, alone, on pause, cheat sheets, knowledge gain

Description: The theme of Motivation to Study revolves around the factors that give students a drive to focus and both attend lectures and study the course materials. When looking at the in-person lectures here, motivation is more closely related to *attendance*, whereas online the motivation to study recorded material and to study for exams was more prominently discussed. Firstly, a contradiction occurred among the interviewees regarding whether attending a lecture motivates them to continue studying for the rest of the day. One interviewee stated that attending a lecture meant they *felt productive* for the day, even if they were *inattentive* and distracted throughout the lecture. They were more motivated to study on days where they had no lectures as that will fill their need to feel productive that day. On the other hand interviewees felt more productive to continue studying after lectures and complete a '*study day*', especially when they were early lectures. This was because they'd already have woken up *early* and be in the *study mindset*.

Lecture size also had a large effect on attendance. Smaller lectures also motivated more attendance to lectures as interviewees were more *engaged*, and their absence would be noticeable. The intimacy and social connections also play an important role here, as smaller lectures motivate students to be participative. Interviewees feel like they are tended to more and not just 'one of the numbers' like they would be in a large lecture. The fact of being more *personally addressed* and more closely educated motivated student to attend and study these courses as they would gain the most from these situations. Small lectures also often included more *interactive activities* which allows for *discussions* and questions once again giving the interviewees more knowledge and understanding of those course materials.

Interviewees also agreed that they were more motivated to attend lectures and study when they had *friends* in the course and planned to attend lectures or go and study in the library together.

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One interviewee also mentioned that the location of the lecture affected their motivation to attend, as they wouldn't cycle to the far, early lectures as often.

Regarding the motivation of studying recorded lectures, interviewees all stated that they had little to no motivation to study the recordings. Most of them received *recordings from previous years* and had no time schedule with deadlines to complete the lectures. Only one interviewee mentioned that they had weekly deadlines to watch recording by, in preparation for that weeks seminar. However, the lack of a set schedule meant that interviewees weren't motivated to study and mentioned that they fell behind on the course materials.

Moreover, the lack of a university *setting* to study in was mentioned by several interviewees to be *demotivating* as finding somewhere to go and study was immensely difficult and most location proved distracting. Two interviewees mentioned that they only watched recorded materials when they had *assignments* due or the weeks before *exams*. However, when it came to studying for exams or the decision was made to watch a recording, one interviewee said they would be motivated and focused at such a time.

Live-streamed lectures had a larger motivation for attendance and study than pre-recorded ones, but this motivation came from the *compulsory* aspect of these lectures. When the lectures were optional, interviewees rarely attended them as they did not have the motivation from their friends and procrastinated starting course work or staying on track throughout the block. Attending these lectures *alone* proved to be difficult and very demotivating to the interviewees. Setting and location once again disrupted the motivation to study immensely as finding a suited location to watch a two hour lecture was difficult for all interviewees, this being of no fault of their own as life in general was '*on pause*' for a long time during the lockdowns.

Finally there seemed to be no motivation to study for their exams. One interviewee specifically mentioned that they *gained no new knowledge* or information during the online period as they had open book exams and merely learnt how to quickly access necessary notes or information

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from their *'cheat sheets'* as needed during their exams. Overall the interviewees did mention that they received better grades during the online period, but this made no difference to their levels of motivation to be prepared beforehand.

Sub-theme of Theme Three: Social Connectedness

Key words and phrases: *friends, acquaintances, smaller groups, connection with the lecturer, togetherness, engaged, the vibe, academic help, home alone, different schedules, lacked new connections, contacting lecturers*

Description: The current theme discusses how social aspect of study were experienced both in-person and online and how the change to online may have affected the relationships the interviewees had and made throughout their studies so far.

All interviewees stated that they went to in-person lectures with someone they know. Mostly course *friends*, or *acquaintances* if they weren't very close to those in their course. The interviewees all felt a better connection with students in their course when the lecture groups were *smaller*, and one interviewee specifically stated that more importantly, they felt connected to the lecturer during these smaller lectures. The smaller lectures also tended to feel more like seminars, and the feeling of *'togetherness'* was largely important to the interviewees.

Interviewees felt as though *the 'vibe was off'* when they attended live stream lectures, as they were only seeing people through the small screen. It was harder for all interviewees to be motivated to study and even more so they feel like they lost out of *academic help* and benefits such as study groups and group discussions. Finishing lectures the interviewees were *alone at home*, where normally they would have been able to go for coffee or continue studying with their friends or other course members.

Regarding recorded lectures, interviewees felt like they lost out the most when they were studying lecture recordings as they wouldn't complete them at the same time as other students

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in the course. One would normally communicate with their friend during the lecture discussing materials and information they fail to understand. They lacked the ability to do this during the study of recorded lectures as communication proved harder and *study schedules* did not always align. All interviewees highlight the fact that they lacked new connections and making new friends when they were studying purely recorded or online materials and lacked the motivation to attend these classes and study.

Overall the interviewees agreed that they all felt that they had lost out on the *connections with their lecturers*, as they barely knew them or their names even, and felt too scared to contact them. Before or in in-person classes asking questions or explanations wasn't a problem, but asking when class was online proved anxiety inducing and ineffective.

