

Learning in Higher Education Under the Covid-19 Pandemic: Were Students More Engaged or Less?

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Abstract

This study explored students' learning experiences in higher education during the Covid-19 pandemic. A journal writing methodology was used to extract learners' reflective thoughts regarding their living and learning during the pandemic outbreak. The results were interpreted through the views of relevant student engagement frameworks. The students' structural factors (family, support, and pressure) were impacted because of political and sociocultural factors (restrictive measures in response to the pandemic outbreak) within which the university factors were embedded (total closure with online education, subsequent reopening allowing physical attendance, and later principal distance education with approved exceptions), which collectively and psychosocially influenced students' life and studies. The learners self-adapted via their individual efficacy to tackle the unfamiliar situations by digitally reaching out to family/friends and enhancing skills/self-learning; learner differences in learning style and preferences were noted. Online courses offered flexibility for learning independent of time and space while social presence in the learning community during online lessons remained less effective; traditional values of face-to-face physical classrooms were recognised among some learners. Learners' perceived effective engaging measures underscored the importance of ensuring learner well-being (counselling and mask-wearing), learning independence (online lecture recordings and optional attendance), and strengthening online learning experiences (building the learning community, enhancing class dialogue, and demonstrating problem-solving techniques). Recommendations for engaging learning were discussed.

Keywords: learning, student engagement, social presence, cognitive presence, teaching presence, journal writing, online hybrid lectures, physical face-to-face classroom, Community of Inquiry, Covid-19 pandemic

1. Introduction

1.1 The Covid-19 Pandemic

Year 2020 marked drastic changes in nearly all human activities worldwide due to the Covid-19 pandemic. The Covid-19 has at the time of writing claimed more than 3 million lives, with over 140.3 million reported cases (based on World Health Organisation's weekly epidemiological update, 20 April 2021). Various measures have been taken to curb the spread of the disease, ranging from total society lockdown to individual quarantine and social distancing. The measures taken had both positive effects and negative consequences. Negative consequences included social isolation, economic loss, and educational challenges. Many universities were forced to close after March and turned to online education instead. As the pandemic evolved, governments gradually reduced restrictive measures just before the summer to ease economic constraints. After the summer, the higher education sector allowed physical attendance in courses, along with online remote learning.

1.2 The Student Engagement Framework

As political and social environments change, students' learning could be impacted (Kahu, 2013). Based on Kahu's conceptual framework of learner engagement, sociocultural influences including economics, policy, power, and culture could play a role in student engagement. Because of the pandemic, teaching paradigms were shifted, along with political and social changes; it is thus anticipatable that students' learning engagement could vary and their learning outcomes may be affected. In this framework, structural influences consist of university factors (including culture, policies, and assessment) as well as student factors (background, family, support, and pressure), which collectively or independently contribute to psychosocial influences (i.e., university

factors—teaching, staff, support, and workload; student factors—motivation, skills, identity, and efficacy) that determine student engagement. Engagement is realised in three forms: affect (enthusiasm, interest, and belonging), cognition (deep learning and self-regulation), and behaviour (time and effort, interaction, and participation). Kahu and Nelson (2018) later added a metaphoric interface of education for the individual psychosocial space where student factors interact with institutional factors via the student's self-efficacy, emotions, well-being, and belonging to account for why students of certain demographic background manage to retain engagement and succeed in their study while others of similar characteristics do not. Likely the three forms of engagement may be compromised or enhanced in light of these factors embedded within political sociocultural contexts during the pandemic.

1.3 The Present Study

This study is concerned with students' learning experience in higher education during the Covid-19 pandemic. As the pandemic progressed into the autumn 2020 semester, higher education reopened to allow for physical classroom teaching alongside online courses and hybrid teaching. One would probably ponder as to whether students, after training of the six-week purely online learning during the spring 2020 semester, would become more accustomed to and more engaged in online education in the autumn semester relative to traditional on-campus teaching and hybrid instruction. As the university structure-factor (cf. Kahu, 2013; Kahu & Nelson, 2018) change in response to the pandemic (switching to purely online courses) could have impact on students' learning, as well as the student structure-factor change (family now living in isolation) may affect their living situation that in turn poses changes in their learning patterns, this study seeks to explore students' learning circumstances impacted by the Covid-19 pandemic and to subsequently uncover their learning needs during such unpredictable and unusual times. The student sample was drawn from engineering majors who enrolled in an academic English course during the autumn 2020 semester and who supposedly were more technology-oriented and would likely have less computer-anxiety than students of other domains. A journal methodology was conducted towards the end of the semester to elicit students' reflective thoughts regarding their learning experiences during the pandemic, which was qualitatively analysed and interpreted through the perspectives regarding student engagement. As this study is primarily exploratory in nature, quantitative inquiry such as investigating links between student reflections, learning style/preference, and skills/performance, though important and highly relevant, is beyond the scope of the present research design. A further aim is to recommend effective measures to assist students' learning in long-term perspectives.

The following research questions were raised:

RQ 1: How were students' daily activities and learning impacted by the Covid-19 pandemic?

RQ 2: How did students cope with the challenges encountered during the pandemic?

RQ 3: What do students perceive to be effective measures that would help foster their learning?

The following section reviews previous work related to online learning.

2. Related Work

2.1 Online Lectures Characteristics

Online courses were characterised as having three main features, namely, presentational advantage, performance-tutoring function, and epistemic engagement (Larreamendy-Joerns & Leinhardt, 2006). The presentational advantage refers to visualisational richness that multimedia technologies may bring to enhance explanatory effectiveness. The performance-tutoring perspective concerns creating intelligent systems that accommodate individual needs. The epistemic engagement dimension regards knowledge as the product of practice and judgement and learners as emergent participants of disciplinary communities. Students gain disciplinary practice through social acts and meaningful discourse presented and supported in online learning opportunities, in which domain knowledge, skills, and language are also obtained. The teacher is seen as the facilitator who initiates a series of pedagogic dialogues that present learning contexts in which students may learn to connect, infer, solve problems, and express their thoughts or arguments. One caution in this construct is that social interaction (with fellow students or the teacher) does not guarantee reflective learning or knowledge co-construction, nor the latter a necessary consequence of the former.

2.2 Community of Inquiry

Following this line of pedagogical centeredness along with the aim to portray, explain, and enhance online learning experience, a conceptual framework known as Community of Inquiry (CoI) was proposed (Garrison, Anderson, & Archer, 2000; Garrison, Anderson, & Archer, 2001; Garrison, Anderson, & Archer, 2010). The

framework employs three constructs to represent actual experiences: teaching presence, social presence, and cognitive presence. The role of a teacher in this framework is similar to that as explained in the epistemic engagement view posited by Larreamendy-Joerns and Leinhardt (2006). The teacher's responsibilities include the following: primarily curriculum creation, pedagogical activities, and scheduling; managing collaborative learning and reflection; tailoring for learners' needs and facilitating community learning outcomes. Social presence refers to the participants' ability to identify with the learning community (course of study), communicate with members of the community, and cultivate their interpersonal relationships through projecting their personalities in the trusted environments (Garrison, 2009). Social presence is considered as the mediating construct between teaching presence and cognitive presence. Cognitive presence manifests the learning process as well as practical inquiry process. Practical inquiry as a process encompasses four phases: problem defining, knowledge exploring, ideas absorbing and integrating, and solutions testing (Garrison, Anderson, & Archer, 2001). All these realisations occur via learners' reflecting, analysing, synthesising, and discoursing in the collaborative learning environments where teaching presence and social presence converge.

To estimate the utility of the CoI model, the three presences were measured via a questionnaire survey with more than 2,000 student respondents (Shea & Bidjerano, 2009). The results showed that both social presence and teaching presence are correlated with cognitive presence and that 63% of the variance could be explained using the three factors; further, teaching presence and social presence are predicted to impact cognitive presence. The CoI framework was further examined in terms of their causal relationships among the three presences via a developed survey instrument (Garrison, Cleveland-Innes, & Fung, 2010). The results indicated that teaching presence holds a key role in initiating, sustaining, and facilitating a collaborative community of inquiry, social presence is perceived as influenced by teaching presence, and both teaching presence and social presence function together to significantly influence cognitive presence. A recent thematic synthesis study analysing qualitative approaches employing Community of Inquiry framework indicated that successful online learning experience is a shared endeavour among course designers, instructors, and learners (Caskurlu et al., 2021). Further, through confirmatory factor analyses, the ten categories within the three presences of the CoI framework were found to be reliable and valid (Heilporn & Lakhal, 2020).

2.3 Online Student Engagement

Students enrolled in online courses also tended to have higher dropout rates compared to traditional classes (Bawa, 2016). One key issue was low student engagement (Banna et al., 2015). To help tackle this issue, one specific measure termed Online Student Engagement Scale (OSE) was proposed (Dixon, 2015). In this scheme, students responded using a 1–5 scale to 19 questions concerning their behaviours and thoughts related to their skills, emotion, participation, and performance. The study showed that this scale was positively correlated with application learning behaviours (e.g., emails-writing, quizzes-taking, posting messages to forums). Bolliger and Halupa (2018) used the OSE scale and Transactional Distance scale (Paul et al., 2015) to examine connections between students' perceived engagement, transactional distance, and learning satisfaction in online courses. Their findings indicated that the three constructs were moderately correlated and that student engagement could be predicted by transactional distance which Moore (1991) defines as learners' perceived geographical distance in online education. Transactional distance is determined or affected by sets of variables involving learner-instructor dialogue, course design or program structure along with printed support material, and learner characteristics/learning style, all of which as well as interactions among them would create variability of transactional distance in distance education. The tendency is that the greater transactional distance, the greater learner autonomy.

2.4 Emergency Online Courses

A recent study evaluating a rapidly transitioned online course due to the Covid-19 pandemic found that overall student engagement decreased, and the course became less interesting and less enjoyable (Garris & Fleck, 2020). Another recent study assessing 15 courses after the March 2020 lockdown similarly found that student engagement was reduced after an urgent transition to online courses (Walker & Koralesky, 2021). Their study also showed that students' preferred learning style seemed to affect their level of engagement. Those who learn by interacting with others (peers or teachers) showed decreased engagement while those who learn by listening and reading displayed increased engagement. Erickson and Wattiaux (2021) employed the survey instrument based on the CoI framework to investigate perceived preparedness in urgent online remote learning as well as students' educational experience during the spring 2020 semester. They found that students experienced high teaching presence through direct instruction, high cognitive presence in terms of exploration, but less social presence of group cohesion.

In another study exploring students' learning patterns during emergency online courses, Abou-Khalil and colleagues (2021) drew upon Moore's interaction framework (1989) for distance education and conducted a questionnaire survey derived from initial interviews to elicit students' responses concerning what they perceived to be effective learning strategies. Their findings showed that students perceived Learner-Content interaction to be the most effective (e.g., screen sharing and summaries). In Moore's words, this form of interaction involves the learner's intellectually interacting with the content, hence bringing about changes in understanding, perspectives, or cognition; in certain learning programmes and among adult learners, learning is chiefly self-directed. Learner-Learner interaction was perceived as the least effective (e.g., collaborative work and group chats). Learner-Instructor interaction was perceived as the second most effective (e.g., questions/answers sessions; reminders).

Contrasting traditional face-to-face teaching with emergency online mode (first eight-week traditional versus subsequent six-week online in response to the pandemic), Knudson (2020) employed the survey instrument named Assessing Student Perspective of Engagement in Class Tool (ASPECT with three factors: value of group activity, personal effort, and instructor contribution, cf. Wiggins et al., 2017) to examine students' perceived engagement and administered a pre-test and post-test to probe learner performance in mastering biomechanics concepts. The study found no correlation between perceived engagement in either instruction mode and normalised learning gain, but there existed a significant correlation between previewing the textbook prior to online lessons and perceived value of online lectures. Surprisingly up to 28% of the students reported resistance in group-based active learning exercises (projects, discussions/sharing, demonstrations, and self-assessments). Further, most students (59%) favoured face-to-face instruction while fewer preferred remote mode (23%); only 18% of the students indicated no preference regarding education mode.

2.5 Online Engagement vs. The Student Engagement Framework

As reviewed above, students' online educational experiences are aggregates of variables which could be explained in terms of presences (teaching, social, and cognitive, cf. Garrison, Anderson, & Archer, 2000; Garrison, Anderson, & Archer, 2001; Garrison, Anderson, & Archer, 2010), of perceived transactional distance (dialogue, structure, and learner characteristics, cf. Moore, 1991), and in perspectives of interaction (learner-instructor, learner-learner, and learner-content, cf. Moore, 1989). Seemingly all of these constructs could be encompassed under the general student engagement model (Kahu, 2013; Kahu & Nelson, 2018). Teaching presence and course structure could be considered as part of the university psychosocial processes. Social presence, instructor-learner dialogue, learner characteristics, and learner-learner interaction could be regarded as part of the student psychosocial processes in which student factors interact with university psychosocial factors through the students' self-efficacy, emotion, and well-being. Cognitive presence and learner-content interaction as processes are related to or contribute to cognitive engagement realised as deep learning and self-regulation.

3. Method

3.1 Experimental Design

The study employed a journal writing task to elicit students' learning experience during the pandemic outbreak. Journal writing methods have been used to elicit and assess students' learning strategies (Glogger et al., 2012; Al-Rawahi et al., 2015). This technique has also been used for different purposes, for instance, as a way of reflecting over events or experiences through which meaning was derived (Boud, 2001). Journal writing also helps foster personal development, encourage self-expression, increase problem-solving abilities, reduce stress, and enhance reflective and critical thinking skills (Heimstra, 2002). This method is chosen with these specific benefits for students in mind. Additionally, journaling methodology is akin to an informal interview except that investigators would not be able to intervene or ask questions beyond what is assigned and that respondents would have a longer time span to internalise and construct their response than real time onsite interviews.

3.2 Participants

The sample was drawn from engineering majors, in the fields of mechanical engineering, electrical engineering, chemical engineering, civil engineering, and computer science. The participants were enrolled in the academic English course as a required or optional course as a part of their respective bachelor programmes during the autumn 2020 semester. The writing task used for this study was exploratory in nature to elicit as diverse as possible responses from students of all engineering programmes for the purpose of uncovering students' learning needs during the Covid-19 pandemic; therefore, no criteria were exercised to exclude specific learners. Altogether 35 students submitted their writing as the third and final written assignment for the course.

3.3 Procedure

The students were asked to write an essay describing and analysing their learning experience during the pandemic. The three main open-ended questions were given as prompts to guide the students' thinking and writing: how their daily activities and learning were impacted, how they coped with the challenges, and what they perceive to be effective measures that would assist their learning. The length of the essays varied between 1,500 and 2,000 words.

3.4 Analysis

The data were analysed qualitatively employing the summative content analysis approach (Hsieh & Shannon, 2005) where content/ideas or keywords are identified, counted, compared, and interpreted within given contexts. The analysis comprised two phases. Initially the text was manually inspected, and ideas were extracted according to the responses to the three main open-ended questions (three main categories: impacted areas, coping strategies, and future effective measures). Subsequently these extracted ideas were interpreted and sorted based on the constructs of Kahu's engagement framework (Kahu, 2013; Kahu & Nelson, 2018), including structural and psychosocial factors that influence student engagement of affect, cognition, and behaviour. Where applicable, other constructs were also referred to highlight their relevance in terms of learner engagement, including Community of Inquiry (Garrison, Anderson, & Archer, 2000; Garrison, Anderson, & Archer, 2001; Garrison, Anderson, & Archer, 2010), epistemic engagement (Larreamendy-Joerns & Leinhardt, 2006), transactional distance (Moore, 1991), and interaction framework (Moore, 1989).

The analysis was not conducted until the course was finished and grades were issued so as not to introduce biases and to ensure anonymity. Examples from the students' reflections were also provided. Note that typographic errors or grammatical mistakes were not corrected for the purpose of presenting and preserving authentic thoughts.

4. Results and Discussion

The results were presented in three main themes: how students' daily life and learning were affected, how they coped with the challenges, and what they perceive to be helpful measures to assist their learning. Under each theme, concepts related to the constructs of the student engagement framework (Kahu, 2013; Kahu & Nelson, 2018) and other relevant constructs were identified and discussed.

4.1 How Daily Life and Learning Were Impacted

Most students experienced difficulties in daily life and learning during the pandemic (see Table 1). Factors impacting students' engagement at levels of affect, cognition, and behaviour were identified and described in the following subsections.

4.1.1 Affect

The students experienced psychosocial strains such as social isolation, loneliness, boredom, fear of infection, economical loss, less enthusiastic or motivated to work/study, less accessible to training facilities, harder to purchase food/essentials, and stress caused by fear or worry for oneself/family. Psychosocial stress could impact students' life as well as learning, influencing their emotional engagement.

One student commented "...many of the people I know expressed that staying at home and not meeting people was hard for their mental health." Another student also expressed that "I too started feeling more alone than I usually do. The reason for this I think is because I was not able to go out and meet family and other friends than the ones I already lived with." Although one may experience such feelings in other circumstances, they seem to be more pronounced during the pandemic possibly because of society lockdown and the high fatality rate of the Covid-19. One student described the state of his social life as such:

My social life suffered a lot when the country went in to lockdown.... I woke up, attended my zoom classes, played some PlayStation and went to bed, this cycle repeated itself for the first two weeks.

Despite that chatting with friends via digital means would be possible, one student noted that he still missed meeting friends in person:

After a while though, living alone in my apartment became very lonely. Having nobody to talk to meant I was completely alone with my thoughts. Luckily, I was able to chat with my friends online and play games together, and also watch movies together synchronized over video chat.... Despite all that I still missed actually seeing my friends in person.

Missing socialising with friends and classmates was also strongly felt, as expressed:

I used to look forward to going to the university where I could see and work with my fellow students. During this pandemic that's what I've been missing the most. Even at my job I'm now working from home... in the beginning of this pandemic not being able to socialize like I used to was definitely a challenge.

Feeling alone could also occur when one did not live alone, as shared:

I personally felt alone sometimes during the longest periods where I had to quarantine, or when my boyfriend was at work testing people for covid-19 before they were joining the army. However, it made me really appreciate the times he came home, and when I visited my family. The situation reminded me to not take anything for granted.

Prolonged social isolation could impact one's motivation to work and complete assignments, as reflected: "The isolation also gave me a huge toll on my motivation for my work ethics towards assignments and it sure became worse over time."

Students reported that it was more challenging and less motivating to work/study at home, as one commented:

Before COVID-19 I had two different spaces: one was a school where I could study, and another space was my home where I was able to relax after a long day in the university. Because of the pandemic... my relaxation space became my workspace. This made my motivation from high to absent and as a result, made studying a really difficult task. Not to mention that I had to be alone, [anonymised] km from my family, made it even more difficult.

Economical loss was another factor that could affect students' living condition and hence could also cause psychosocial stress. One student stated: "I had a part-time job in [anonymised job description]. Due to the measures, my type of work wasn't possible to do and led to layoffs without pay." Another student commented further:

Loneliness and missing my job were maybe the hardest part to deal with.... While people who were working full time had gotten help from [Department of Employment and Social Welfare] and other organizations, students were neglected... I was fortunate enough to have some savings, and therefore I was able to continue my bachelor's degree. However, constant stress about my economy did not make it easier for my mental state.

Life needs also became less accessible/convenient, including harder to purchase food/essentials and less accessible to training facilities, which could impact students' well-being. One observed:

Everyday activities have been affected in a whole new way. Things we have taken for granted earlier, like go shopping or working out at the training center have given us second thoughts. It was normal to often go to the grocery store several times a week, but when things have changed like it has, it has been normal to plan the week more than before. Many decides to go grocery shopping once a week, and work out at home or outside instead of at a training center, because the risk of being exposed to the virus are much higher.

4.1.2 Behaviour

Psychosocial factors that were caused by students' structural factors (e.g., background, family, and support) may contribute to behavioural change that impacts learners' level of engagement, including time and effort, participation, and interaction.

One student described how prolonged social isolation impacted his in-class participation: "Other issues such as my participation in class and not being able to see my fellow classmates are just the tip on the iceberg."

One student mentioned the uncommon situation in which she had to use the living space differently to accommodate the needs of her family members, affecting her learning behaviour (more prone to procrastinate):

Since my partner had a lot of meetings, he used the kitchen table during the day. Making me start trying to keep up with school for the bed. Which was not a good move on my part. Because this meant I was not getting out of bed before 5 p.m. I became really lazy, both physical and psychology.

Home space for all members to work and study proved to be challenging. Having a quiet and private time had become nearly impossible, as reflected:

...I live with my wife, and three other housemates in a collective housing. We have our differences, but our condominium has always been feeling big enough to keep both privacy and a place to feel comfortable both without being disturbed and disturbing others.... The apartment that earlier had felt spacious and homely, quickly turned into a cramped mix of a workspace and a living space. It almost felt as we had gone from

five people living there to ten. Small things as someone leaving a glass out and going to bed turned from something trivial to something exasperating... it was no longer very comfortable to go out for some time alone in the nature.

Time mechanism also seemed to be changed for individual students. Some expressed that they had more time for their family members because of temporary job loss while some had less time but more duty for family members (e.g., having to care for the young/old besides studies). Others also expressed that they had more time to study due to pandemic restrictions (e.g., "As a result, my grades were actually better because I had enough time to study more."). Having no clear routine at home over time became unmotivating and hard to self-discipline, as reflected:

...after the outbreak my routine didn't change a lot in the beginning, then it shortly graduated over to me staying awake later at night, sleeping through the day, and staying home a lot. This made me feel tired and unmotivated all the time, that's when I understood the importance of having a routine in life regardless of the situation. The adjustment to life limited to your own home has been tough and boring but necessary.

Likewise, having no clear daily routines, along with lacking training facilities, one student expressed his frustrations that also affected his sense of identity, willpower, and motivation to study:

My daily routines fell apart like a house of cards and my physical form vanished into thin air. When playing in the [*anonymised description*] being away from training even just for two weeks you lose your touch. After a month or two it disappears completely. I have played [*anonymised sport*] my entire life and it is a big part of my identity. Losing the ability to play [*anonymised sport*] due to the shutdown of athletic facilities hit hard. It made me lose my self-confidence almost completely, and my motivation and willpower in academics.

4.1.3 Cognition

Home environments may affect students' focus during their study and online lectures, hence impacting their cognitive engagement. As one student reflected, "...studying from home is not that easy because they can be so many distractions and can lead to miss some of the classes..."

The main challenge of participating in digital education during the transitional period was that students were confined to home environments whose purpose is for relaxation, hence distracting from learning, as commented:

When we transitioned to digital school, I had a hard time focusing on my education and got distracted by my personal hobbies and activities. This is likely the most common issue with digital education. Being focused in an environment which is normally used for relaxing can be challenging. Personally, this was the main issue with digital education. The digital tools could be excellent tools, but if my mind and focus were somewhere else, I would not learn anything. This is the main benefit of physical attending lectures; I would be much less distracted from the subject.

Similarly, not being able to stay on campus impacted a student's work on assignments:

...It was in the middle of our semester, and I was already getting started on several assignments for different classes. From being used to work at campus constantly, even after school time, it surely impacted me by being away from school.

As also felt by another, university closure directly caused psychological strains in various forms (e.g., home studying and zoom lectures), affecting his work efficiency (preferring on-campus study and courses):

...the mental strains for me were the shutdown of the university.... The problem was that it worsened over time. I generally like to work longer hours at campus due to me being way more efficient at campus than working from a comfortable couch at home. Also, due to zoom lectures, a lot of home-studying was required. Zoom became more frequent as a substituent for physical classes, but I was not particularly fond of it.

Also, one main drive for learning was the sense of belonging of the community and communicating with fellow students, not simply the act of being in the class. One student's cognitively engaged learning was through discussing with fellow students:

A big part of studying is in my opinion the social networks you build, and events you can both attend and be a part of hosting. Schoolmates are one thing. I do not think I am exaggerating if I say that most of the reason I have had the motivation to wake up and go to school to read or an early class is that there was a community of other students that is in the same bubble. Most of what I have learned is not during class, but in engaging discussions with classmates or while explaining a younger student something I have studied

earlier. This is an arena this virus has all but destroyed.

Using Kahu's engagement framework (Kahu, 2013; Kahu & Nelson, 2018) the difficulties the students expressed could be identified as structural/psychosocial influences of university factors (emergency closure and online/distance education) combined with structural student factors (family, pressure, and support) that led to psychosocial influences, which in turn resulted in lower student engagement in learning during the Covid-19 pandemic.

Table 1. How daily life and learning were impacted

Category	Aspects impacted during the Covid-19 pandemic	% (freq.)
Affect	Loneliness	14% (18)
	Social isolation	12% (15)
	Less motivated to work or study	10% (13)
	Less accessible to training facilities	9% (11)
	Stress caused by fear for oneself or family	8% (10)
	Boredom	5% (7)
	Economical loss	5% (6)
	Harder to purchase food or essentials	5% (6)
	Fear of infection	4% (5)
Behaviour	Lack of space for all family members	4% (5)
	Harder to self-discipline	3% (4)
	Prone to procrastinate	3% (4)
	More time for family due to job loss or social restrictions	2% (3)
	Less time but more duty for family besides studies	2% (3)
Cognition	Challenging to work or study due to mixed environments	7% (9)
	Monotone study at home over time	5% (7)
	More distractions at home during study	2% (3)

4.2 Students' Coping Experiences During the Pandemic

Initially most students found it hard to deal with the unknown situation, but most were able to adapt and adjust changed routines caused by pandemic restrictions (see Table 2). The students' reflections could be categorised into three types: student psychosocial factors, university structural factors, and university psychosocial factors.

4.2.1 Student Psychosocial Factors

Most students tackled the difficulties successfully via their self-efficacy, including reaching out digitally, enhancing skills, self-learning, group learning, self-discipline, and role-adjusting. Many students expressed that they tried to reach out for family or friends via digital means such as talking through mobiles, meeting, chatting, or gaming using digital platforms (e.g., Facebook, google, and zoom among others). For instance, one student commented "I maintained my interaction with my family and friends through Zoom and social media." Another student reported that "we use voice communication applications such as Discord to hear one another. Hearing a friend's voice is always a relief. I can say that finding fun things to do digitally is a boost during this pandemic."

Several students used their spare time to enhance their skills (e.g., knitting, drawing, cooking, and practicing programming), maintain habits, or developed new habits/skills (e.g., new training features/programming language). One student described how he enhanced his knowledge/skills through self-learning online:

I started to search online courses. I have taken a plenty of courses from coursera, Edx, and LinkedIn. Moreover, I began to practice software, such as Revit, AutoCAD, and programming languages, and I have mastered the python, R, and java. I left no place to stress and I tried to utilize my time fully so that to develop myself.

Several students reflected that they learned to adjust their role as both parent and student, which was not an issue prior to the pandemic. One single-parent by constant dialoguing with her family/herself eventually found a new direction for herself and the child, as she shared:

...I had to decide what was really important right now and what could wait? It can be hard to let things go, but spreading yourself too thin can lead to nothing going well and extra anxiety. Instead, I had to invest my energy where I thought my child really needed right then and let the rest slide. So, things started falling into place, I used that time for finding new recreational things to do with my child, spent more time nurturing, cuddling and making healthy food choices for us and took her more to playgrounds. I was now a mother

first and a student second.

Many students reflected that they learned to self-discipline and plan, and two students specified that they made to-do-lists to self-motivate. One student reflected:

Self-discipline is something I discovered to be extremely useful during this pandemic.... Whenever, I didn't have the motivation or the will to do the assignments, listen to zoom lectures, study for the exams and etc., self-discipline was the key. Relying on self-discipline made me complete those things during this pandemic. And to make it more efficient, I started to plan my near future more.

When certain practices which were commonly available during traditional class setting became impractical or unavailable during online lessons, such as asking questions and obtaining assistance by teachers/student assistants, some students were able to overcome by discussing with friends or peers online (e.g., "If I couldn't get the help I needed from a teacher, I would then reach out to my friends and have a Zoom meeting to help each other.") Several students also expressed that they participated in online group study sessions via zoom. One student depicted how their group members worked together via zoom to combat scheduling and software licensing problems, although they still missed their natural gatherings:

Some group assignments required physical attendance at the university because we needed to use licensed computer programs that are only available on the school computers. Most of the challenges related to group work were solved using Zoom-meeting, this made it possible for us to gather the group and then coordinate the assignments between us. However, we do miss the opportunity to be able to sit together at the university and work together.

To help reduce physical strains from long sitting for online lectures and required assignments, one student reduced screen time with reading or drawing:

Ways I have been trying to avoid this is by taking short breaks more often where I stretch and try to do some small task that needs to be done.... One thing I have been able to cut out a little is the amount of time I used on social media. I have not cut it out completely, since I need to have contact with my friends, but some of the time I usually would spend on social media have been replaced with calming activities like reading books or drawing.

One student summarised his experience during the pandemic outbreak in the following words:

The positive outcome of this situation is that through the many challenges I have endured the last year, related both to my daily activities and student life. I have grown to be more independent in my work, I have found new ways to learn by, and achieved a better relationship with both my family and friends. I have also picked up a few new hobbies along the way such as hiking and home improvements, which I doubt I would have found if the outbreak never happened.

These positive experiences indicated that most students were capable of self-adapting to fulfil their social needs and expanding their skills under the pandemic restrictions. Describing this positive development using Kahu's engagement model (Kahu, 2013; Kahu & Nelson, 2018), the psychosocial space of the student (skills, motivation, and self-efficacy) was strengthened through self-adapting despite the sociocultural restrictions, and this positive influence would help engage the student's learning.

Table 2. How the students coped with the challenges

Semester	Category	Experiences under studying restrictions	% (freq.)
Spring – second half (online)	Student-psychosocial	Learn to self-discipline and plan	7% (12)
		Reach out to family or friends digitally	5% (10)
		Enhance skills	4% (7)
		Develop new habits or skills	4% (7)
		Adjust role as parent vs. student	3% (5)
		Group study sessions via zoom	3% (5)
		Discuss with friends online to help solve problems	2% (3)
		Learn to communicate/respect for space/privacy	1% (2)
		Make to-do list to stay motivated	1% (2)
		Reduce social-media time to relieve long e-screen hours	1% (2)
	University-structural	Home examinations being flexible	5% (10)
		Practical sessions cancelled affect understanding	4% (7)
		Home examinations pass/fail to be fair	2% (4)
		Home examinations being easy to cheat	1% (1)
	University-psychosocial	Hard to sustain retention during online lessons	5% (10)
		Online distance courses being flexible	5% (10)
		Less interesting during online lessons	4% (7)
		Less interactive during online lessons	4% (7)
		Passive participation during online sessions	4% (8)
		Questioning or help during online sessions less available	3% (5)
Varied online delivery styles		2% (3)	
Prolonged online sitting caused headaches/back pains		1% (2)	
Online help chat available most of the time		1% (2)	
Autumn (online, hybrid, and physical)		University-structural	University reopening helps reduce social isolation
	Prefer early policies and no sudden change		1% (2)
	University-psychosocial	Physical attendance courses with safety seating being helpful	5% (10)
		Prefer part on-campus and part online	4% (7)
		Online prevention-safety courses being helpful	3% (6)
		Prefer physical attendance combined with online mode	2% (4)
		Prefer online or mixed mode	2% (4)
		Physical labs with smaller classes/altered objectives worked well	2% (3)
		Digital simulations help self-learning	2% (3)
		Felt no difference in learning with on-campus or online mode	1% (1)

4.2.2 University Structural Factors

University structural factors include policies, assessment, curriculum, and support, all of which may affect learner engagement at various levels. Several experiences were shared concerning useful counselling, unfortunate cancelling of practical sessions, and flexible home examinations.

Counselling activities were appreciated by some students who needed such support to enable them to face life impacted by the pandemic lockdown, as one remarked:

During the summer I started talking to a counselor through [*Student Welfare Services*]. I really appreciate that this is something [*University*] offers its students. [*Anonymised Course*] can be a lonesome studie and having appointments to talk with somebody has had a positive effect on my mental health.

Practical laboratory sessions were regarded as helpful and important for theory learning. One student stated how replacing practical sessions with theoretical tasks could impede understanding:

...I prefer to learn through hands-on assignments such as laboratory work or experiments. Such assignments give me the ability to see and understand how it works in a practical way and not only theoretically. Since we don't have the opportunity to be more than a number of students in a classroom simultaneously, practical tasks have been replaced with theoretical tasks. The assignments can be confusing and incomprehensible as it's hard to understand how the process or program works.

Cancelling such sessions affected students' subject understanding, as one expressed:

I feel like lab experiments is one of the best ways of learning, because then you get to see the theory in practice. I had one lab cancelled because of the pandemic, and I feel like I missed out on some good learning from it.

These reflections confirmed the effectiveness of practical work in that students acquire knowledge and strengthen understanding by means of practically applying and exercising what they learned, which simultaneously engages students to focus and practise especially during the Covid-19 pandemic. Knowledge gaining through recurrent practice is one main principle of epistemic engagement (Larreamendy-Joerns & Leinhardt, 2006). During practical laboratory sessions, students would be presented with contexts and opportunities to observe, explore, connect, infer, and discourse with instructors and peers, which help consolidate their disciplinary knowledge, skills, and language. Through such practical learning students would progressively emerge as active participants of their respective disciplinary communities, thus completing the second goal of the epistemic engagement view. These students' reflections thus seem to underscore the significance of preserving and improving practical laboratory sessions to prepare and equip students as engaging disciplinary practitioners.

Further, many students indicated that home examinations were flexible, including allowing for all aid-tools. As reflected, "We were still to have exams in all the courses, all of these were changed to home exams so then we could use the books and all other aids we wanted." Another student expressed that "Exams are being done online which is completely understandable. Some exams have been easier considering that there are more helping materials." One student reflected that this suited his learning style as he enjoyed talking out loud during preparation for examinations as well as being able to get refreshments when needed:

Being a person that likes to talk out loud to myself to get my thoughts going proved that being home was beneficial. Also being able to go to the bathroom and getting snacks whenever I wanted was also a relief.

Home examinations, however, may be easier to cheat as a group, and some had cheated, as commented: "It was a huge lack of security and according to media many students cheated and worked together on the exam."

Moreover, an impact of this examination mode was that grades could not be issued, but pass/fail had to be implemented to maintain fairness. Disappointment, however, may be felt by some students who have put in their efforts to achieve good grades: "Most of the exams that semester were graded approved/not approved. Which wasn't as popular to the students who really had put in every effort to get a good grade."

Although having benefited from the home examinations due to the free assistive tools, concerns were also expressed regarding its impact on learning outcomes:

I have benefitted from the way that exams are being held over the internet because all helping aids are available to me. This has resulted in a lack of motivation for me and my friends, since we have the internet available to us during the exam we aren't studying as fiercely as we would during a normal exam-period.

Examinations in the autumn semester would implement two schemes: some courses would issue pass vs. fail, while some would issue grades. Although the university would have improved setup based on the experience gained during the spring semester, some may still have concerns, as one expressed that it may not be easy to regulate students in internet home examinations compared to normal examinations: "It is however difficult to regulate students, students help each other and get much better grades than they would have done in a normal exam."

4.2.3 University Psychosocial Factors

University psychosocial factors encompass teaching practice, workload, and support. Pure online mode was introduced after March lockdown in spring, while in autumn all course modes were implemented (online lectures, hybrid teaching, and face-to-face instruction). The reflections indicated the following issues regarding courses and learning. Most students found online courses useful, despite certain challenges. Traditional on-campus courses were appreciated by some. Hybrid courses appeared to offer a compromise between online teaching and on-campus teaching, also welcomed by some. Each mode seemed to deliver certain benefits over the others, upon which learner differences/preferences also appeared to play a part. Required assignments were thought to be helpful in terms of raising interest and self-discipline. Practical sessions with smaller classes and changed learning objectives functioned well.

The students were given two free weeks to adjust and prepare for a new educational paradigm, i.e., remote online learning via zoom. Although the new learning platform was new to most students and teachers, it did not take long for them to get used to the new form of teaching and delivery.

The main challenge appeared to be learners' retention during online teaching. Many students found it difficult to keep their focus on the screen where lecturers deliver their teaching—their attention would drift away after some time. Though eager to have classes again after the lockdown, it was hard to focus during online lessons, as one shared:

...I was kind of relieved to have something I could focus on. But that feeling was short lived as it was not easy to follow online lectures. I have an awfully bad habit of easily procrastinate and it did not help by having classes while still being in bed. That is why I was glad that I at least had [*Anonymised Course*] as a subject where we physically had to meet up for classes.

One student reflected “Adjusting to lectures over the internet was a challenge, both technically, and most important with regards to learning. It was challenging staying focused and not be tempted to log off and do something else.” Another echoed: “The struggles I endured with Zoom was that it’s quite easy to lose focus during lectures.”

Vividly described below, one student pondered why he could not hold focus although he numerous times previously had watched YouTube instructions for self-learning:

However, during the lockdown I have had great difficulty in paying attention to the zoom classes. I don’t understand why I have found it so difficult. Throughout my time at this school, I have often relied on YouTube videos to explain the problems my teachers have not been able to make me understand. Yet when a teacher is holding zoom-class I find my mind wandering elsewhere and usually end up sitting on my phone.

The possible differences between physical classroom and online lessons were also reflected, over which relative retention issues were debated. Non-verbal cues and social politeness may be key elements, and teachers could demand compulsory webcam to enhance retention:

When you attend a physical class, it is way easier to keep attention on the teacher and what they are saying, not just because you are actually in a classroom, in front of a teacher, at the school, but because it is polite to keep attention and listen when someone is speaking. I think that is a big part of the problem. Over the internet we lose the politeness that we have in a classroom, because in the zoom-classes the teacher can’t see your face and then don’t know what you are doing. I think that if teachers made it mandatory to have your web-cam on during class, students would have a much easier time keeping focus because teachers could keep an eye on them.

Several learners also felt that online lessons were less interesting and less interactive. They quickly became bored as it was tiresome to listen to monotone talking or reading from slides, as one commented: “The lectures felt more monotone which made it hard to keep myself motivated.”

Impression of passive participation was also noted. One student described that students turned off their videos, leaving black squares on screens, with learning experience being less dynamic and less interactive than in traditional face-to-face classrooms:

I have not had many conversations with teaching professors about this, but I can only imagine how frustrating it is to go from a full classroom of eager students who you can have direct interactions with to a screen full of black squares not knowing if there actually are people paying attention to what you say. It was encouraged for the students to turn on their cameras so the lecturers would feel more comfortable and everyone would have a more dynamic classroom experience, but very few followed this encouragement. And the few students who did have their cameras on, gradually would be less and less enticed to do so and became black squares themselves on their professors’ screen.

Despite that many young people are socially active online, privacy may be one issue that prompted students to turn off their cameras during online lessons, as observed:

...I also noticed what most people like about being online on several platforms; and it is that people like to be anonymous on the internet. This was reflected in the online classes by almost everyone, except the lecturer, had their camera shut off so no one could see them and they only unmuted themselves to speak when the teacher pushed for an answer or there was an awkwardly long silence.

Still, many students found it flexible as online distance learning helped them save time required for travel. The flexibility also helped schedule one’s own activities: “At the same time as I got a very flexible timetable. Meaning that I can decide for myself when I want to do homework, eat, train or take a break.” Another student described his flexible online learning experience as such:

Online lectures have mirrored the usual classroom format where we still have breaks every 45m, an extended lunch break and a breakout session for group discussions. The lecturer has control over putting everyone in groups and then bringing them back into the main session so as students we haven’t had to do a whole lot. Another perk is that we can all sleep in just that little bit longer as we don’t have to take into

account travel time also by sneakily switching my camera off, I am able to learn and eat my breakfast of lunch simultaneously.

Nevertheless, the student also expressed that he missed natural interactions with fellow students in traditional face-to-face setting:

Despite it has been seamless, I personally miss the face-to-face interaction with my classmates and friends. Being able to actively engage with them and then go on coffee breaks together is, an activity that I hope I will get to enjoy again in the near future despite its my last semester in my bachelor level. It has been quite common to have lunch or even breaks together over Zoom but it is not quite the same as the real things at least we are trying though.

This thought was shared by another student, who also valued natural communications with fellow students and teachers instead of using e-screens in which non-verbal cues (e.g., body language) may not be easily available:

To communicate with other students was problematic. Yes, we are a generation of technology, and we use Facebook and other communication apps in our daily life. Yet, this way of communicating can not substitute the fact that communication in person is necessary and sometimes required for a good collaboration. Everyone needs to be seen, and the social distancing reminds us about the value of human interaction. When all you can communicate through is a screen, things don't get very personal, and you may have to give more effort to be the one to start a conversation. A lot of conversations may be lost in translation, when you can't read the other person's body language. At the same time, being able to get help with for instance schoolwork from a fellow student or teacher would also be very difficult since mail or text would be the only way of communicating. When sending a mail you may receive an answer one or several days later. Which then may lead you to not asking the question and then won't gain any new knowledge.

The last two statements in this reflection also indicated two aspects that are considered important from learners' perspectives. First, getting help via text/mail may not be the most effective form since individual learners may require different degrees or types of help which may not be easily absorbable in text. Second, timing delay between sending and receiving could contribute to postponed answers that may discourage learners. This is congruent with the previous study that immediate non-verbal responses would be perceived as engaging measures in fostering learning (Dixson et al., 2017). At this point, learner characteristics and learning style come into play in realising learners' engagement: some students would find digital communications effective while other students may find natural communications more natural and comfortable. There may seem to be no universal ways of pleasing all types of learners; perhaps the best strategy an educator can implement is to try all sorts of delivering methods whenever applicable and possible (Eika, 2021).

Online lessons seemed to also offer a learning style via directly listening to the instructor's explaining concepts, which could be more effective than merely self-reading: "To be able to learn, not only by yourself, but be in class and listening to a teacher talking about the subject really helps. Only learning by reading can be very difficult over time." This reflection suggests that the student perceived concrete teaching presence and at least appreciated learning by listening to online lectures, corresponding to the previous findings that those who learn by listening showed increased engagement (Walker & Koralesky, 2021) and that students could perceive high teaching presence through direct instruction (Erickson & Wattiaux, 2021).

Yet, having several weekly online lectures along with coursework requirements that demanded long sitting hours could impact physical health as well, as reflected:

Ever since the pandemic started, and most parts of my studies went online, I have noticed that I get headaches more often and my back hurts. I believe it is because I sit in front of the computer and phone screen for many hours every day.... I do think the best solution is to cut the number of hours in front of the screen, but that is hard due to the fact that most lectures were online and the assignments required a computer.

Individual students' preferred learning style seemed to affect their learning patterns (including attitude and behaviour), which might have impacted their level of engagement in online courses (along with other contributing factors). As one student described, he learned better by participating/inquiring in face-to-face classrooms, and switching to online lessons caused some mismatch in his learning habits as well as living mechanism, which eventually pushed him to stop participating in online classes:

Zoom was and still is one of the best options we got, but I learn better by being present in class, participating and asking questions. This again also includes physical aspects where before; I would wake up early and go to class, which by itself is a habit that is built over time. Just a stable habit like a good sleeping

schedule, and also waking up the same time every day is healthy for the mind and body and by losing this habit procrastination sure hits you before you even realize it.... Now however when there is a zoom lecture, I just barely wake up right before the lecture starts, put on clothes then I log into zoom. It got even worse when I stopped participating in zoom lectures which forced me to compensate by reading up on it late at night while working with other assignments. This totally weakened my work ethics and efficiency during morning times. Mentally and physically it affected me since I woke up as late as I possibly could, barely could follow up on the zoom lessons since it got more tiresome and some of our professors didn't provide notes from the classes held at zoom. They also read straight from the PowerPoint which made it even harder to motivate myself to participate.

The student's last statement seemed to suggest that some online lessons may be tiresome for unknown reasons (one may imagine factors such as having to endure long sitting positions with eyes fixing on e-screen when concentrating), but providing lecture notes that were used would help engage students' learning. Avoid monotone reading by varying speech acts and tasks would also help motivate learners during online lectures. Additionally, implementing more social presence in terms of learner-instructor dialogues and learner-learner interactions (cf. Garrison, Anderson, & Archer, 2010; Moore, 1991, 1989) would help create variations to capture students' attention. In any case, learners' preferred learning style needs to be considered; one way to combat this is to vary task types now and then during a limited time frame.

Several students commented that lecturers seemed to have different ways of conducting their online lessons. For instance, some included summaries posted on canvas, and a few used pre-recorded videos as content delivery besides online zoom meetings for discussions and quizzes (flipped classroom plus online discussions). However, not all lecturers preferred placing online teaching recordings on canvas. One single-parent student reflected over her learning situations where her busy schedules impacted her studies, and she had no easy access to recorded online material:

The teachers all had their own way of doing video lectures, some used zoom, some used other channels, and only one in the beginning recorded it and uploaded it on their canvas site. While others had other channels, they used and did not record it for later viewing. All this accumulated into me falling behind on my studies.

Despite having lecture recordings available for learning convenience, unexpected challenges could kick in—convenience seemed to push personal freedom into more relaxed mode, hence procrastination followed, which appeared to have become a disadvantage that more workload awaited, as reflected:

Because most of my lectures are being recorded it allowed me to watch them at a later time, this resulted in me sleeping longer in the mornings and procrastinating my workload. Another problem is concentrating during the lecture due to distractions at home compared to physical classroom attendance.

This final statement of the reflection indicated that home distractions during online lessons contribute to retention difficulties, which are left to individual learners to react in their home environments as opposed to physical on-campus classrooms where distractions are less prevalent possibly due to social politeness. This appears to confirm the link between perceived transactional distance in distance education and learner autonomy (cf. Moore, 1991).

Students expressed their gratitude concerning teachers who were available on chat help most of the time: "Time wasn't the only thing that helped my grades, teachers being available almost all the time to text and ask for help was a great factor to consider as well." Concerns with gaining help were also echoed by several voices, e.g., "now that it was harder to get in touch with lecturers to ask for help."

Regular mandatory assignments could help boost learners' motivation to study and actively participate in class, which could impact learning outcomes/success, as commented:

Before the outbreak of covid-19 some courses used to have weekly assignments that were mandatory to submit, this helped me to always stay on track with the courses, and therefore gave me the opportunity to participate actively in the lectures.... The challenge with courses without mandatory assignments or assignments in general is that it can be hard to find the motivation and time to study independently. I am sure this will be negatively reflected in my final grades.

The following autumn semester saw a slight change in the educational paradigm. The university was again open for physical attendance with one-meter safety seating, alongside online mode. All students and staff were provided with online courses plus quizzes concerning safety measures prior to the semester start. Several students reported this as being very helpful. One reflected "There is always a free seat between each student and

another. I am really satisfied by the way that the university has handled the situation.” Also praised was the adequate sanitising practices: “...I think they have done a great job into sanitizing the school and putting up sanitizing stations. Providing masks and sanitizers is also a good gesture.”

Many students appreciated physical attendance in face-to-face classroom after the lockdown of several months, as one described:

When school started back up in August, we had normal lectures in person, and I think that it was great to be back at school in person again. I met my fellow students again for the first time in five months.... All the courses I took had normal lectures, none of the classes were too big so it was fine to have normal lectures. I enjoyed being able to work with my fellow students again, we had a lot of group work in this term as well. I think this worked out well and I personally prefer working in groups compared to working alone. So, the student life was looking good again, I was working with a good group of students at campus almost every day.

Additionally, having on-campus physical attendance amidst online courses had positive impact on mood:

The sudden and abrupt stop in classes and my after school activities took a big toll on my mood. However, I did make it through it all.... This is mostly thanks to having weekly classes on campus. Although most have been through the internet, having two days of the week where I can go to campus and meet other people has been a big savior.

Walking to attend lectures and meeting people also helped physically and mentally:

This fall I have really appreciated having a subject with obligatory attendance. I started walking to school to avoid public transportation. The 4 kilometer walk to and from two times a week has had a positive effect on my body and mind. Being able to see other people during the week also had a beneficial impact.

Physical on-campus attendance with one-meter distance between seats seemed to work well. Still, for students who required public transport to the campus, it would seem to be a burden and a risk, as reflected:

I was worried of using public transport, and instead used my car to travel to school.... Not all students are as fortunate as me though, and do rely on public transport, which is cause for concern in a time like this.

Possibly one remedy would be to impose mask-wearing in public areas, including boarding public transport, which was later passed as required nationwide.

Several students also appreciated a mixture of physical lecture attendance with online mode. In this dual mode, possibly fewer students were physically present in the classroom, but other students would be able to simultaneously attend online. One student positively described this flexibility in choosing between online or physical attendance, appreciating having the possibility of being close to full learning:

I found this to be a very good choice because it made the classes available to everyone, even if you did not have the availability to meet physically, and still have close to the full experience and learning outcome no matter what you chose.

A variation of this combined mode was having partly physical lectures and partly online lectures. One student observed that having physical attendance brought out a comfortable atmosphere in class amidst online mode: “There were still online classes as expected, but also alternating with physical attendance which made it feel more comfortable and bearable for both the students and the professors...” This thought was shared by another who appreciated a semester employing both online teaching and on-campus instruction: “...I have had a better fall semester much thanks to the combination of lectures online and lectures in school.”

One student responded that it made little difference in either mode for her own learning as long as she could absorb course content and maintain contact with fellow students/teachers when needed:

For me, at least there is not much difference in learning whether the platform is online or as physical attendance in school. For as long as one is able to pay attention, still be able to take down notes, and most especially understand the explanation by the teacher, then the learning pace is the same...

Several students preferred mixed mode or online mode providing them more security during the pandemic. One student, however, indicated his preference over regular lectures: “Our daily routines are changed in so many ways. Lectures have been trying to compensate, but it will not be as good as regular lectures.”

Practical laboratory sessions were configured differently with smaller class size and altered objectives, which worked well, as experienced by several students. A positive experience was also reflected where certain part of the lab sessions included computerised simulations that helped assess self-learning progress without teachers’

presence:

...but what I found most intriguing was that some of the lab course had been modified into an online, interactive experience. This was done with an online tool which made it into an online simulator where you go through all the steps as you would in any normal lab, and even further with small quizzes and tests during to show that you actually paid attention. It was an individual experience, so no live monitoring from the professors during the simulation with just an obligatory submission of the completed assignment. But I believe it was a positive experience to learn more in an interactive way online like that instead of just reading from boring books and lecture notes all the time.

The final statement of the reflection also indicated that interactive learning would be appreciated by students even during self-online simulations in which learners have “silent” dialogues with computerised programmes in test forms. This reflection would seem to suggest that learners find it effective to interact with the simulated content, without presences of peers or instructors, thus agreeing with the previous findings that students found interacting with content being more effective than interacting with teachers or fellow students (Abou-Khalil et al., 2021). In perspectives of Community of Inquiry (Garrison, Anderson, & Archer, 2010), this reflection suggests that students could achieve educational purposes without human social presence although teaching presence may be implicit or explicit without onsite human teachers (as being simulated). From the perspectives of independent learning, this would also appear to be a fitting mode of learning during the Covid-19 pandemic that promotes learner autonomy given that support material is provided. In this scenario, perceived transactional distance (Moore, 1991) in this online simulation programme appears to be rather low, indicating that the learner is satisfied with the course structure and silent dialogue in quizzes without human interactions. Hence, perceived transactional distance is low, yet learner autonomy is high, which is perhaps not quite as expected in many online lessons as not all distance lessons could be fully automated without human interactions. Additionally, utilising multimedia resources in teaching was shown to foster learning interest and enrich concept illustrations, with which students were satisfied (Williams et al., 2013), as also reflected by online learners herein.

As the pandemic grew to be more severe again towards November 2020, reduced restrictions were replaced with new restrictions where the university was forced to change the physical attendance policy and reimpose purely online-teaching paradigm unless valid reasons were provided. Two students thus responded that it would be helpful if decisions could be made early in the semester and stick to them (although it is perhaps unrealistic to predict the pandemic and impose policies a few months ahead).

4.3 Students' Perceptions of Effective Measures

Most students reflected that the university has done well in helping them cope with the situation. One student commented “I think the university did the best they could in this situation.” As for what could be done to more effectively assist their learning during the pandemic, the students proposed the following measures (see Table 3).

4.3.1 University Structural Factors

University policy-related issues were suggested, including initiating counselling programmes, mask-wearing, digital accessibility, compulsory lecture recordings, offering hybrid courses, optional attendance, clear communication prior to semester start, flexibility concerning assessments, and free books.

To ensure students' well-being, initiating counselling sessions would help reduce psychological stress or social isolation, for instance, implementing check-up programmes, as remarked:

I imagine it is hard for a university to keep track of every single student and their mental health, but it should be considered to send out information on how to reach someone, and when to do it.

Another student suggested that creating stronger social activities (inside/outside classes) would help combat the psychosocial needs, and it outweighs any academic concerns. Further, debating and introducing fun topics in courses could be explored as social acts:

I think the social impact is bigger than the academic impacts. Who can care for studies if your life in general seems dull? ... Hosting debates, courses with fun topics and other social things could be one measure the university could explore. Another measure against students getting lonely and in the worst case dropping out from their courses could in my opinion be something that could be seen as counterproductive during the times of social distancing – making students do group assignments, having them meet up within cohorts, and making them get to know each other and speak to someone face-to-face.

Along similar lines of thoughts regarding tackling mental issues, mandatory individual conversations with professors or counsellors were suggested to prevent learners' depression:

One thing professors could have done differently is having more of a one-to-one conversation with every student over Zoom... they could have changed it to obligatory conversation over Zoom with professors or counsellors. That way students did not have to reach out, because that can be difficult if you are on your way into a depression.

Wearing face masks could be made compulsory to help reduce disease spread. One student remarked "...usage of mask in the campus should be recommended. Most countries all over the world who are leading the controlling of virus is using mask wherever there is contact with other people." Another student also recommended this as a safer measure, besides removing peer pressure: "...can make mask wearing mandatory, instead of optional; it also lessens the anxiety of peer-pressure and removes the fear of being judged."

Software programmes licensing should be more widely available to assist students' work as computer rooms were often crowded and not easily accessible for all:

...lower the need for specific tools such as licensed computer software in assignments... computer rooms used to be fully occupied at nearly all hours. This makes it harder to get the assignments done during the outbreak when the same amount of students need access to these tools.

Accessibility to digital education should also be ensured for inclusive education. Thus, resources required to participate in online courses should be provided, including internet connections and computers:

In general, students in Norway can afford their educational expenses, such as computer or tablets, and internet connection in order to follow online lectures. However, there can be some students who cannot afford these expenses. To solve this issue, the universities should make sure that everyone has access to these resources and do not leave anyone behind.

Providing discounts or free internet connections would financially assist students' digital access to online education:

In Norway not every student can afford themselves to pay for the internet in the situation when most of them have lost income from part-time jobs... maybe it will be a good idea to get support for the student from the Internet providers in a form of free internet or at least discounts.

Digital educational platforms should also ensure security and privacy for online courses. Security issues with zoom should be handled:

...the University should consider safe video-conferencing platform for meetings and classes.... Zoom's security has had a lot of problems, although some have been fixed over the past few months according to information-security professionals. Until recently privacy policies seemed to give Zoom the right to do whatever it wanted with users' personal data. Encryption policies also not trustful for many professionals...

Utilising the engagement framework proposed by Kahu (Kahu, 2013; Kahu & Nelson, 2018) to explain the reflections expressed by the students, providing easier, securer, and more private digital accessibility to online courses could be considered as enhancing structural university factors (policy and support) that would facilitate psychosocial university factors (teaching practices and support) as well as structural student factors (family and pressure) and psychosocial student factors (motivation, skills, and efficacy), which collectively contribute to student engagement at affective (interest and emotion), cognitive (deep learning), and behavioural (participation and interaction) levels. Secure (including privacy) digital networks would also reduce learner anxiety during inquiry processes, thereby also facilitating social presence that is often less realised during online courses (Garrison, Anderson, & Archer, 2010). Students' perceived transactional distance (Moore, 1991) would also be reduced in that learners may feel freer to engage in instructor-learner dialogues as well as learner-learner interactions (Moore, 1989).

Zoom online lectures could be recorded to assist learners learn independently, particularly for those who have needs to review lectures or could not attend online lectures. One student proposed that "...providing online class recording for students will be beneficial for those who have missed or have not understood any part of the lecture." Also, this would ensure self-learning with freedom to self-govern, as expressed: "I would also recommend that all online lectures be recorded because many people like to be able to see those types of lectures at their own pace. Being able to use the toilet without fear of missing out."

Hybrid mode was also recommended, seemingly for the purpose of promoting self-learning and improving grades at the expense of collaborative learning, as one remarked:

This helps a lot of students to keep their distance, but it also helps in the sense that people who live far away from the university sites can easily follow through the lecture. The downside is of course that students

stop participating, but that is why the teachers should also continue publishing their notes from the classes, and every presentation and so on. This will not only help students that are working at home, but this will also insure that its easier for students to look back to these notes when needed before exams are coming up, and it even helps students to write down what they might have missed during the lectures and re-read the topics again if it wasn't as understandable the first time.

This student's reflection also seemed to correspond to the finding of Abou-Khalil and colleagues (2021) that students perceived learner-content interaction as more effective or important than interaction of learner-instructor or of learner-learner. This comment would also appear to be suggesting that, from a learner's perspective, perceived transactional distance (Moore, 1991) in distance education is less important than learner autonomy so long as the transactional distance is overcome-able through printed materials and recordings. This student's view may also simply suggest that, for ultimate survival or success, achieving the best grade or learning outcomes outweighs interactions of any kinds other than content or knowledge. As far as applications and applicability of disciplinary knowledge and information are concerned, instructor insight as well as peer influences could serve as a scaffolding framework for learner maturity (Moore, 1989), which may be more directly relevant to the student's work at different stages.

Required physical attendance could be made optional. One student recommended prioritising safety over mode of education, and hence online mode be preferred despite its having more challenges compared to on-campus teaching: "Less obligatory physical projects or activities in school. Focus more on online education despite it being harder, it is a lot safer both for the students and teachers."

This line of thought was echoed by another voice. Although traditional on-campus courses may have certain advantages over online education, including easier to engage and focus, other pressing concerns caused by the Covid-19 pandemic should take precedence over course mode. Henceforth, online mode should win over on-campus mode:

There are clear benefits to physical courses, it is easier to follow, and students are more engaged and forced to focus. But in a pandemic, I believe we should strive even harder to stay at home. Every single student and teacher have an enormous responsibility to take everyone's safety in mind and having to miss education due to minor symptoms is frustrating and can make it hard to catch up to speed. Being able to follow the lectures from home makes it a lot easier to follow when taking pandemic precautions.

The student's reflection ended in a highlight that seemed to orientate the importance of learning independence. To be interrupted by any inconvenience in a student's learning process/progress poses a threat to learner autonomy in which the learner exercises control to pursue success in learning outcomes. This reflection also appears to be in line with what Moore (1991) proposed that perceived transactional distance would vary depending on learner characteristics. In this case, perceived transactional distance may be likely low, given that online courses would provide all learner-instructor dialogues and lesson materials, and that the learner seems eager to learn and not wish to miss any lessons. What may be perceived as being less important (although unsaid in the student's reflection) is social presence (Garrison, Anderson, & Archer, 2010) or learner-learner interaction (Moore, 1989), although other students have also reflected that online interaction seemed to be low or missing. This interpretation would be congruent with the findings reported in emergency online courses that social interaction such as collaborative work (Abou-Khalil et al., 2021) and group cohesion (Erickson & Wattiaux, 2021) were perceived as having low presence or least effective.

One concern over on-campus courses versus online teaching was voiced from the perspective of what qualifies for each. One compromise would be to have at least initial in-person meetings for online courses to help build up the learning community, as suggested:

In my opinion, the choices of which classes were on campus and which were online, were not handled well. I believe every course should have had at least one physical lecture at the beginning of the semester, and if the class was too big then it could have been split up during that lecture. I believe it is necessary to get to know both your peers and the lecturers to get a productive learning environment. I also wish there were more labs on campus. Being able to ask the lecturer or a student assistant is crucial to understanding.

The last three statements of the student's reflection seem to suggest that disciplinary learning communities would be important to learners who learn by inquiring and dialoguing with the instructors and peers. The principle of this reflection thus seems to fit well with the learning presences proposed by the framework of Community of Inquiry in which teaching presence, social presence, and cognitive presence co-act to promote engagement in online learning (Garrison, Anderson, & Archer, 2010). Judging from this learner's reflective thought, social presence and interactive learning during online lessons perhaps have not been optimal, which corresponds to the

previous study that students perceived social presence as least effective during emergency online learning (Erickson & Wattiaux, 2021). Further, students may find it challenging to have learner-instructor dialogues or interact in large online classes, and hence initiating several smaller physical class meetings to become familiarised with the online learning community helps foster interpersonal relationships that would increase social presence during subsequent online lessons. In traditional on-campus classes, students also reflected that smaller classes helped personalise learning experience, making it more motivating and easier to focus and interact, e.g., asking/responding to questions and doing presentations (Eika, 2021). It may be possible that the learning environment in smaller classes simplifies the orienting processes of the learning community, through which social presence may be more readily realisable. If so, the same principle may be applied to online courses, i.e., reduce online class size to increase social presence and reduce social pressure or social indifference.

Information should be disseminated accurately prior to the start of the semester to prepare and orient students. Additionally, showing flexibility concerning assessments would assure students that the university cares and is listening to accommodate their needs:

For new students in a pandemic, there should be more concrete and direct communication before the beginning of the semester.... The university also needs to be more flexible and be understanding of students who cannot attend class or have trouble meeting deadlines.

Free books could be home delivered for students to learn at their own pace. More free online courses and extracurricular activities could be implemented to engage students:

...university could have funded free online courses for its students which goes with its level of knowledge. The university could also deliver textbooks to its students at their homes. Hence, the students can use the textbooks when they get tired of watching the screen for a longer time. Furthermore, to keep its students busy, the university could arrange math, writing, reading and other competitions, debating, presentations and other extracurricular activities which can be done at home.

This student's suggestion seems to reflect a desire to self-learn, self-govern, and self-regulate as a knowledge seeker, also likely mirroring the student's independent learner characteristics. Possibly the perceived transactional distance during distance education for this student would be low, so long as online courses offer what he needs; course structure and dialogue may seem less vital while self-directing with content absorbing would be his primary concern (cf. Moore, 1991).

4.3.2 University Psychosocial Factors

University psychosocial processes involving teaching practice, workload, and support were reflected. These included more online interaction, more practical sessions with smaller class size, setting required coursework/tests, illustrating problem-solving techniques, and prompt information updates/delivery.

Issues of interaction in online classes were observed. One student proposed implementing quizzes to build up interaction with fellow learners and the instructor during online lessons:

It would have been nice to have some sort of interaction with the other students and the lecturer, rather than just watching a PowerPoint presentation. Perhaps some sort of a quiz every now and then, to have a more interactive lecture.

This thought was shared by one student, who also proposed having quizzes and small tasks to help engage students in online lectures:

I would recommend transitioning from a passive traditional way of teaching to a more active one where students are more involved in the lecture. This is a small change that will keep the students' attention easier. One can achieve this by having a small quiz or by giving the students small tasks to finish during the lecture.

Another voice proposed implementing questions and answering sessions combined with creative teaching moves to enhance class dialogues and set reminder notes for deep learning, hence sustaining learners' focus and motivation:

...make zoom lectures more interesting and make students make questions that can be answered during class, including new ways to present the curriculum. Because it can be monotone and quite stale to just look at a person that reads directly from the screen. It would be more exciting and motivating to participate on zoom if the students and teacher could communicate more. I would also suggest that teachers take important notes during classes that students can write off, so that students will not forget what they just learned.

Asking challenging questions during online lectures would help increase class interactivity and dialogues, as remarked:

Online classes are completely different from the traditional in - class lectures which teacher have more control over student so that teacher can measure student learning ability. However, in online teaching students are more passive, therefore, it is crucial to ask challenging questions to establish better learning abilities for students and encourage them to be more focused in classes. Higher interactivity can be achieved by increasing discussion among students and teacher.

Lectures could also be divided into several shorter sections to sustain focus, along with employing a series of related small tasks rather than single complicated tasks to manage cognitive loads:

A big class lecture can be divided into smaller modules so as to help students to remain attentive and focused during online classes. Another strategy to achieve concentration can be splitting a big single task into multiple small tasks and preparing online classes materials of less than 45 minutes. This will also help in improving student learning abilities during online classes.

Making reading material available prior to online lectures would allow students to familiarise themselves with content or background, which helps motivate and prepare students for in-depth learning, hence engaging students:

Reading material of each session should be available prior to the online lecture so that students can read them and prepare themselves for the lecture. This will help students to be more engaged into the discussions and answer questions if they have read the material already.

This student's thought corresponds to the previous finding that previewing course reading prior to online lectures are correlated with perceived effective learning during online lessons (Knudson, 2020).

These learners' suggestions indicate that keeping learners active during online lectures is one way to increase interaction and sustain interest and focus. Activating learners through their own questioning acts and responding to questions would engage their cognitive processes, which could be realised in group tasks (peer interactions), plenary tasks (teachers with individual learners or groups), or alternating both forms in sequential or parallel mode. Although pure informational exchange does not necessarily engage students in learning (cf. Larreamendy-Joerns & Leinhardt, 2006), it may help reduce monotone reading contents from the printed material, with possibilities of motivating students to act, which may ultimately lead to engagement. Setting reminder notes or learning goals in short class sections as well as illustrating problem-solving procedures and techniques following completed group tasks (progressing from simple to complex tasks) may require instructors' facilitating and coordinating skills, which are among the responsibilities outlined in the Community of Inquiry framework (Garrison, Anderson, & Archer, 2010). These students' reflective suggestions may have stemmed from their learning needs, which they experienced during online lectures in response to the pandemic outbreak. Addressing these reflected needs in the teaching presence would bring forth learning experience in the presence of socialising acts (with peers/instructors) that leads to cognitive presence/processes with ultimate engagement of deep learning and self-regulation.

Learner characteristics and preference, however, should not be neglected. As observed, some students prefer physical on-campus teaching, and online lectures seem to cause mismatch in their learning style. One student reflected that online educational mode may have induced more anxiety during learning processes and that benefits of face-to-face instructions could not be undermined:

The wellbeing issue are not simply the result of students being at home and the concern cover Covid-19, but that the way that university have managed interactions and online learning has increased their anxiety and had a negative impact on their wellbeing. It's not simply about putting support mechanisms in place to help students with their wellbeing, it's about stopping the causes. Many surveys showed that the scenario of limited face to face teaching, does not have the same result as normal teaching scenario.

This student's reflection suggests that learner characteristics and learning style should be taken into consideration amidst promoting online distance teaching. Physical on-campus education does have its value in fostering student engagement while reducing learning anxiety with simultaneous privacy preservation during interactions, which may be less easily realisable in online education.

More course assignments could be made compulsory to motivate learners and help sustain learning progress, as one commented:

For some considerations to learn more effectively with the current regulations i would suggest making more

mandatory assignments that not necessarily contribute to your final grade, but are there to make sure your progress stays consistent. Many students need a little outside support to keep going in these times.

Concerning practical laboratory sessions which some students regarded as effective in enhancing understanding, two students recommended smaller classes, more simulations, and more individual sessions to promote self-learning. As remarked, having some labs would be better than having none:

This could perhaps have been solved by dividing the class into smaller groups and preforming the lab over a longer period of time, this could then again lead to different problems if you were to have multiple lab exercises during one term. But in my opinion, it is better to have at least some labs than nothing at all.

Frequent updates concerning information should be communicated promptly to help ease students' anxiety and help them feel being in control. Even simple brief confirming messages would be welcomed:

It is therefore important that the school and teachers frequently updates the course with announcements. Even an announcement confirming status is reassuring and makes it easier to feel in control. This has been a lack in several courses and should be improved. Highly important messages should be distributed using more direct methods of communication, for instance SMS.

These comments seem to suggest that the students appreciate information delivered from the instructors and that updates from the structural university factors (policies, assessment, and support) and from the psychosocial university factors (teaching, workload, and support) would be received well, which would influence psychosocial student factors that ultimately lead to their engagement in learning (cf. Kahu, 2013; Kahu & Nelson, 2018). In sum, the university factors (structurally or psychosocially) matter in motivating and engaging students in learning situations through communicating with students in forms of offering support and indicating understanding.

Table 3. Students' perceived effective measures to assist learning

Category	Effective measures to assist learning	% (freq.)
University-structural	University has done well in helping students regarding learning situations	25% (18)
	Counselling would help reduce social isolation	11% (8)
	Online teaching be recorded for flexible learning	6% (4)
	Provide internet support with discounts	6% (4)
	Physical attendance be made optional	4% (3)
	Compulsory mask wearing to reduce virus spread	3% (2)
	Secure online platform to ensure privacy	3% (2)
	More flexibility in assessments	3% (2)
	Hybrid mode be considered for future emergency programmes	3% (2)
	Disseminate information promptly and prior to semester start	3% (2)
	Free home books for self-learning	1% (1)
	Extracurricular home activities to enhance skills	1% (1)
	Computer licensing be more available	1% (1)
	University-psychosocial	More interaction during online sessions
More required assignments to assist learning		4% (3)
Introduce weekly tests/practice tests in online classes		4% (3)
More simulations for lab courses		3% (2)
Implement individual lab sessions for self-learning		3% (2)
Reduce class size for online courses to enhance attention		3% (2)
Reading material be available prior to online lectures		3% (2)
Split a complex task into several related tasks to sustain focus		3% (2)
Frequent course information update	1% (1)	

5. General Discussion

The study shows that the students experienced difficulties in daily life and studies during the Covid-19 pandemic largely because of unexpected changes and restrictions imposed by the government as required measures to curb the virus spread. Overall, societal changes induced by governmental regulations impacted both their daily activities and learning. Their daily living conditions, along with a changed teaching and learning platform (online during lockdown vs. hybrid or physical classroom after university reopening), impacted their learning activities, making them less engaged or more engaged depending on their personal learning and living styles as well as teaching practices. This phenomenon seems to be consistent with the engagement model proposed by

Kahu (Kahu, 2013; Kahu & Nelson, 2018): sociocultural and political perspectives form the overarching background, with the learner being the centre of engagement (including affective, cognitive, and behavioural levels), while other perspectives contribute to the engagement level (including factors of institutions and teaching practices, as well as personal student factors such as family, interest, and health). The pandemic impact seems to confirm the overarching layer of sociocultural and political influences that have been mostly invisible or overlooked in previous models attempting to explain what contributes to students' engagement during learning.

Despite the unexpected changes, the students were able to adjust their learning with online/hybrid teaching; several learners also expressed their preferences of traditional face-to-face courses. Many learners reflected that it was difficult to stay focused during online lessons and it was less interesting, which is congruent with the findings of recent studies (Garris & Fleck, 2020; Walker & Koralesky, 2021). The main challenges appear to lie in the issues of retention and interaction during online lessons. Based on the students' reflections, there may be several reasons, including lack of non-verbal cues, less concerns of online social politeness, more home distractions, conflicting personal learning style (preferring on-campus physical classes to ask/answer questions and interact), having online anxiety, preferring online anonymity, having concerns of computer security and privacy, and style of teaching presence (e.g., much reading from slides). Effect of group discussions online was less reflected, aside that they (the students) did not have to do much and that the teacher had full control (using the breakout room for group discussions). The findings in this present study thus also seem to suggest that social presence or group work is perhaps less effective compared to teaching presence (via slides presentations with explanations) or cognitive presence (thinking, reflecting, and interacting with content/knowledge), although it is not possible to quantify the effect given the qualitative exploratory nature of this study. The findings thus agree with the recent studies on emergency online courses that social presence was less realised (Erickson & Wattiaux, 2021) and that learner-learner interaction was perceived as less effective than instructor-learner interaction and learner-content interaction (Abou-Khalil et al., 2021).

Several students did express that they prefer online distance teaching for flexibility; some preferred lecture recording for reviewing. These, however, perhaps have little to do with retention or interaction. As massive open online courses first occurred, some were concerned that schools or universities would become obsolete (Vardi, 2012). It turned out that most online open courses were not massively used as expected (Reich, 2019), and the targeted users who made use of them were much fewer than anticipated (Emanuel, 2013). By 2013, it was deemed that massive open online courses were out (Yang, 2013). A similar mismatch occurred with online patient-therapy platform where online psychiatry assistance offered would require patients' input and interaction, and their efficacy was not the same as with actual psychiatry sessions (van Ballegooijen et al., 2014). A question worth asking is thus whether online pedagogical interaction is identical to physical on-campus pedagogical interaction? One may argue that they are not identical except the participants. Even the participants would not be the same if one were to count the unknown or unseen online participants. Likely other factors also play a role in terms of implementing pedagogical interaction, including task, interest, and cognition, in addition to technological advances. Further research is needed to ascertain what contributes to online learning interaction and what contributes to interaction in physical classroom settings. Until the issues of retention and interaction are resolved, it remains to be seen as to whether online distance learning is the long-term solution; this view borne out from the findings of this exploratory study appears to be congruent with that of Aboujaoude et al. (2021).

The students also proposed what they thought to be effective measures that would foster their learning. These measures included initiating policies to ensure students' well-being and educational accessibility (counselling, mask-wearing, more practical sessions, and internet connections), promoting learning autonomy (online recordings and optional attendance), and enhancing online learning experiences (more interaction). Regarding interactive learning during online lectures, several students suggested initiating on-campus personal meetings to build up the online learning community, class dialogue through quizzes/small tasks, teachers' asking challenging questions with creative moves and demonstrating complex problem-solving procedures, and learners' creating/responding to questions. All of these would also seem to adhere to the three presences illustrated in the Community of Inquiry (Garrison, Anderson, & Archer, 2000; Garrison, Anderson, & Archer, 2001; Garrison, Anderson, & Archer, 2010), with the majority mentioned herein being the teaching presence (teachers' tasks), followed by the social presence (learners' actions) and the cognitive presence (problem-defining and solving). The role of the teacher during online lessons thus seems to be vital in fostering students' learning engagement through implementing and facilitating social interactions and inquiry processes, which also corresponds to the previous findings employing the CoI framework (Garrison, Cleveland-Innes, & Fung, 2010).

Overall, the students reflected that they learned greatly both in life and in studies despite under the impact of the

Covid-19 pandemic. Some expressed that they probably would not have learned this amount and in this fashion without the pandemic. Nearly all expressed that they have become more independent and grown to appreciate what they have in life. This reflection also appears to correspond to Kahu's engagement framework (Kahu, 2013; Kahu & Nelson, 2018) that students' successful learning would lead to their life-long learning and societal contribution (i.e., the consequence dimension).

Possible recommendations in terms of effectively assisting students' learning are outlined as follows. Based on the findings, a learner-centred approach appears to be most suited where learners' needs are taken into consideration to bring about their ultimate engagement level, hence achieving intended learning outcomes. To accommodate learners' emotional needs, in-class/outside-class social contact could be implemented through regular group tasks. To enact learners' cognitive focus, types of tasks should be varied and renewed, and content be creative and diverse. To enhance deep learning, goal-setting and compulsory assignments could be made explicit and gradually increase difficulty level. Antecedent factors (e.g., university and teaching practices) could take various shapes to appeal to different students' preferences, and therefore allowing different teaching modes may be beneficial (including distance education, hybrid mode, and face-to-face classroom). Addressing antecedent personal student factors (family, interest, workload, employment, and health) may require new flexible reconsiderations from both governmental agencies and the university in order to encourage students of all levels and all types (including single-parent students and minority students).

6. Conclusions

This study explored learners' experiences and needs as expressed through their own written reflective thoughts during the Covid-19 pandemic. The findings indicate that political and sociocultural factors (university closure with distance education) imposed because of restrictive measures impacted learners' structural factors (family, health, pressure, and support) that in turn affected their psychosocial factors (motivation, identity, and efficacy), hence impacting their living and learning. The students coped with the unfamiliar situations through self-adapting psychosocial mechanisms of efficacy and motivation (digitally reaching out to family/friends, enhancing skills, self-learning, and group discussion) with differences in learner characteristics and learning preferences. While online courses offered educational flexibility, social presence involving learners remained less effective. Conventional values of learning in face-to-face classrooms were recognised among some students. The students' perceived effective educational measures highlighted the importance of ensuring learner well-being (counselling and mask-wearing), learning independence (online recordings and optional attendance), and strengthening online learning experiences (cultivating the learning community, enhancing class dialogue, and illustrating problem-solving techniques). Recommendations for effective engagement were discussed.

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