



# Transition from Traditional to Online Learning in Hong Kong Tertiary Educational Institutions During COVID-19 Pandemic

Vincent T. S. Law<sup>1</sup> · Hilary H. L. Yee<sup>2</sup> · Tommy K. C. Ng<sup>2</sup> · Ben Y. F. Fong<sup>1</sup>

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## Abstract

The adoption of online learning approach in education is becoming more popular around the world to overcome the time and spatial barriers of traditional face-to-face learning. The Coronavirus Disease 2019 (COVID-19) pandemic has affected the normality of learning and avoiding face-to-face activities is one tactic to minimise the spread of COVID-19. This study investigated the perception of online learning from students' and teachers' perspectives compared to traditional face-to-face learning during the COVID-19 pandemic. Ten focus group interviews were conducted, nine of which involved fifty-five students, while the remaining one involved eight full-time teachers. All informants were recruited from two Hong Kong tertiary educational institutions: the Hong Kong Community College, and the School of Professional Education and Executive Development of The Hong Kong Polytechnic University. The Community of Inquiry model and Pedagogy-driven, Learner-Centred, Objective-Oriented and Technology-Enable model were adopted as a framework to analyse students' and teachers' perceptions of social presence, teaching presence, and cognitive presence. Qualitative content analysis indicated that teacher-student and student-student interactions were the biggest challenge in online learning, and this affected the acquisition and application of knowledge in terms of cognitive presence. Other factors such as personality, learning environment, and technical skills affected the perception of both online and face-to-face learning.

**Keywords** Online learning · Face-to-face learning · Community of inquiry · COVID-19 pandemic · Tertiary educational institutions

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✉ Hilary H. L. Yee  
hilary.yee@speed-polyu.edu.hk

Vincent T. S. Law  
vincent.law@cpce-polyu.edu.hk

Tommy K. C. Ng  
tommy.ng@speed-polyu.edu.hk

Ben Y. F. Fong  
ben.fong@cpce-polyu.edu.hk

<sup>1</sup> College of Professional and Continuing Education, The Hong Kong Polytechnic University, Hong Kong, China

<sup>2</sup> School of Professional Education and Executive Development, The Hong Kong Polytechnic University, Hong Kong, China

## 1 Introduction

The Coronavirus Disease 2019 (COVID-19) pandemic has caused temporary closures of educational institutions around the world, leading to the widespread suspension of face-to-face classes and cancellation of examinations. To minimise the disruption of the academic calendar, a majority of educational institutions have replaced traditional face-to-face learning with online learning—that is learning remotely via online platforms. Having many impacts on the education market, online learning has been gaining popularity worldwide due to technological advances and the proliferation of the internet. However, it is now being further accelerated and may eventually become an integral component of education systems after the pandemic.

Online learning is a type of distance education, in which “the students are physically separated from the instructors and institutions” and gain knowledge and skills by accessing technology in synchronous and asynchronous environments (Anderson, 2004; Jolliffe et al., 2012; Schlosser & Anderson, 1994). It is cost-effective and overcomes geographic boundaries, providing educational opportunities for those who live far away, and allowing learners to schedule a blend of online courses (Panigrahi et al., 2018; Stone & Perumean-Chaney, 2011).

Many researchers have discussed the learning outcomes of online learning and the successful implementation of online social networking activities in higher education (Amador & Amador, 2014; Lee, 2014). The use of social technologies in online networking educational activities appeal to students and therefore improve their learning motivation, leading to better self-efficacy to develop a deeper learning attitude (Bradley et al., 2017; Tower et al., 2014). Online learning increases students’ in-class participation and can reduce anxiety in raising questions in front of classmates, particularly for introverted students who prefer less interaction and collaboration (Picciano, 2017; Wheeler et al., 2008). It also improves learning process as learners are exposed to learning materials with variations of text, visual, audio and animation (Hasibuan et al., 2016).

There are limited studies conducted in Hong Kong to compare the differences between traditional and online learning from the perspectives of both the students and teachers. To improve higher education teaching with online elements in the future, it is important to compare the differences between traditional and online learning. This study aimed to examine the perceptions of both teachers and students, and investigate the differences of the two learning and teaching methods. With the support of literature review, the Community of Inquiry (CoI) model developed by Garrison et al., (2000), and elements in Pedagogy-driven, Learner-Centred, Objective-Oriented and Technology-Enable (PLOT) model by Lam (2018) were employed as the framework in comparing traditional and online learning.

Despite of multiple benefits of adopting online learning, potential challenges may appear to be more obvious with the sudden transition to fully online learning during the COVID-19 pandemic. It was expected that online learning brought confusion to both students and teachers. In order to improve the learning process in the future with the adoption of online learning, in-depth views from teachers and students should be collected to examine the limitations and areas for improvement. We hypothesised that there will be negative comments towards online learning from both groups of participants. Through analysing the results of focus group discussions, this study provides suggestions for educational practice in higher education in Hong Kong.

## 2 Theoretical Models and Literature Review

### 2.1 Community of Inquiry (CoI) Model

Various theoretical frameworks explain how people learn in an online learning setting while the Community of Inquiry (CoI) model is one of the prominent models. CoI involves a learning process between teachers and students that occurs through the interaction of three elements—teaching presence, social presence, and cognitive presence (Garrison et al., 2000). The model emphasises that online learning can fulfill cost-effectiveness and enhance the quality of educational experience only if all three elements are present. It is not easy to fulfill all three presences in a traditional face-to-face learning environment, and it becomes even more challenging to both instructors and learners in online context (Van Wart et al., 2020). Instructors mainly rely on both verbal and nonverbal communication to create cultural norms, learning behaviours and practices in a traditional face-to-face class environment. However online learning and use of technology in a virtual environment disrupt the learning process and change learners' communication behaviours (Greenan, 2021).

Teaching presence refers to the perception of learners on the quality of communication in learning, including clear, focused and encouraging feedback received from the instructors (Van Wart et al., 2020). Instructors are responsible for the functions of design, direction, and facilitation of meaningful educational experiences while teaching presence is positively related to student satisfaction, perceived learning, success, and sense of community (Chakraborty & Nafukho, 2015; Garrison et al., 2000). An online class could be poorly conducted because the instructor is distracted by technological issues, thus affecting the learners' satisfaction (Van Wart et al., 2020). An appropriate moderation style and active role in online discussions are reported to increase cognitive presence and thus perceived higher levels of perceived learning (Zhao & Sullivan, 2017).

Social presence is a combination of (1) the ability of learners to project themselves socially and emotionally as real and salient to social actors in online environments, (2) the extent to which learners feel connected to one another within a group, and (3) the degree to which learners see and interpret the presence of others including beliefs, objectives and open communications (Garrison et al., 2000; Warner, 2016). Through the creation of a sense of belonging that supports freedom of expression, and sustains cohesiveness, social presence is a crucial component in developing positive online culture and it is also a stronger predictor of learners' satisfaction and attitudes compared to traditional face-to-face learning environment (Horzum, 2017; Law et al., 2019; Zhan & Mei, 2013). Interaction between instructors and learners is changed in the online context as both parties experience fewer social exchanges but increased anonymity that hinders development of relationships (Greenan, 2021).

Cognitive presence is “the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse” (Garrison & Arbaugh, 2007). It consists of four phases: (1) a triggering event that presents feelings of unease, (2) a search for information for clarification, (3) integration of acquired information, and (4) resolution of the problem (Garrison et al., 2000). Consequently, cognitive presence reflects meaningful learning and the success of the learning experience (Vaughan & Garrison, 2005). Learners should be cognitively active in seeking effective and efficient ways to solve a learning problem, and in applying solutions (Kozan & Richards, 2014). Earlier studies have suggested that cognitive engagement of students tend to stay low in the online context, but later research suggests that facilitators like the use of brainstorming, visual representation

tools, reflection practice and peer facilitation can increase cognitive presence (Chen et al., 2019; Galikyan & Admiraal, 2019).

## 2.2 Pedagogy-driven, Learner-centred, Objective-oriented and Technology-enable (PLOT) Model

The PLOT model is a new online learning model that focuses on how technology has changed the roles of teaching in tradition teaching method (Lam, 2018). The model identified four elements: (1) Pedagogy-driven, (2) Learner-centred, (3) Objective-oriented, and (4) Technology-enabled. The Learner-centred element is the centre of the PLOT model and it interacts with the other three elements. It explains that learning occurs when learners have set learning outcomes (Objective-oriented element), have guided learning from instructions (Pedagogy-driven element), have self-directed learning with learning activities, and collaborate with teachers and students (Technology-enabled element) (Lam, 2018).

The Pedagogy-driven element consists of teaching materials, instructions and learning activities, for example recorded lectures, discussion questions and assignments, that enable students to be engaged in useful and appropriate learning contents and activities. While the Objective-oriented element means whether the intended learning outcomes are achieved through assessment, for example assignment, and online participation. Interacting with Pedagogy-driven and Objective-oriented elements, the Technology-enabled element entails providing an environment for learning through student–student communication and student–teacher communication.

## 2.3 Online Learning Versus Traditional Learning

There are contrasting results in the adoption of traditional and online learning modes in different studies. For instance, Clayton et al. (2018) studied the preferences for course delivery among 464 university students and found that all of them preferred traditional classes as they viewed traditional learning method more engaging and interactive than hybrid or online classes. Yusnilita (2020) found that 80% of students felt online learning interesting and 90% of them regarded online learning practical. Other studies reported positive learning outcomes and stronger performance of students taking online courses than traditional face-to-face courses (Hurlbut, 2018). A meta-analysis compared 12 studies conducted from 2013 to 2014 found that students enrolled in either fully online or hybrid courses performed better than, or as well as, those enrolled in traditional teaching classes (Wu, 2015).

However, the flexibility provided by online learning does not necessarily contribute to effective learning, since it is affected by individual differences in learning styles (Toddhunter, 2013). Students' learning outcomes depend on several factors such as self-efficacy, self-regulation, team cohesion, and technology fit (Panigrahi et al., 2018). Students who are suddenly not being bounded by location or the presence of teachers in real time require good time management and additional self-discipline (Gorbunovs et al., 2016; Panigrahi et al., 2018). Research suggests that successful online learners tend to be more organised and are self-motivated to accomplish their work even without close supervision, thus online learning may not be suitable for all types of students (Dumford et al., 2018; Wang et al., 2019).

Instructors remain an important role in both online and traditional classes, but students have identified different useful instructional strategies in the two teaching modes. Hurlbut

(2018) discovered that students regarded participation in hands-on activities, class discussions, and small group work as the most beneficial strategies in traditional class, while those in online class regarded course media, textbook, and off-class assignments as more helpful strategies. Woldeab et al. (2020) also affirmed in a systematic review that there were no significant differences between online and traditional learning but the course design and institutional support system through the alignment and pedagogy were more important aspects to be considered.

### 3 Methods

#### 3.1 Participants

Participants were full-time students and teachers recruited by email from the Hong Kong Community College (HKCC) and the School of Professional Education and Executive Development (SPEED) of The Hong Kong Polytechnic University in Hong Kong. A purposive sampling was used by recruiting students and academic teaching staff who experienced the transition from face-to-face learning to online learning. Students were remunerated with HK\$100 cash vouchers for their participation while teachers were not. Fifty-five students and eight teachers participated in this study. Nine focus group interviews with five to eight students in each group were held while one with eight teachers was held.

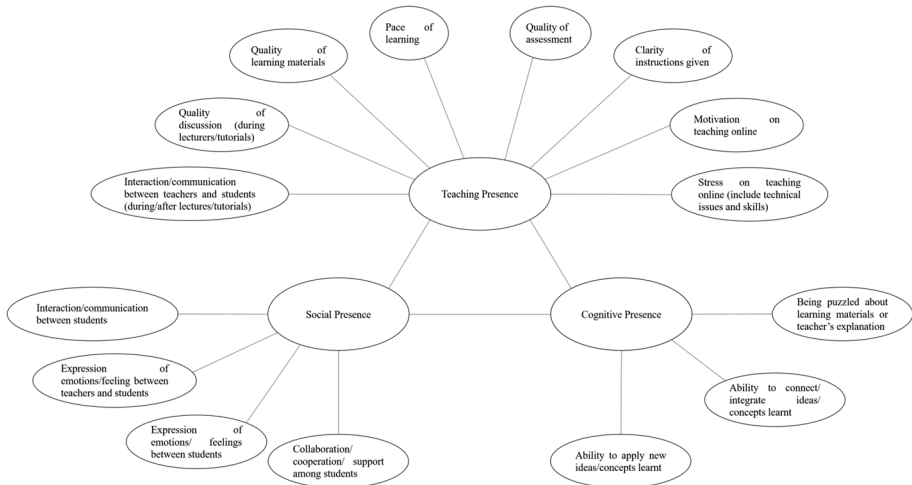
#### 3.2 Study Design

A qualitative research method was adopted in the present study, and focus group interviews were conducted in order to gain insightful information on online and traditional learning methods. The research framework of this study was based on the principles of Community of Inquiry (CoI) Model which has been frequently researched and tested with certain reliability and validity (Lee, 2014). The categories were adopted from the PLOT model, with “Motivation on teaching online” and “Stress on teaching online (include technical issues and skills)” added for teacher participants (Fig. 1).

#### 3.3 Data Collection and Procedure

Following the teaching, social and cognition presences in the CoI model, two interview guides were developed for student and teacher participants respectively. All participants gave informed consent prior to starting the study and data were collected anonymously. All ten focus group interviews took place from 10 June to 8 July 2020. The interviews were conducted in Cantonese and were audio-recorded. Each focus group lasted for approximately 150 min on average and two researchers took field notes and monitored the interview time. Anonymity was ensured by masking the names of all participants.

Before the start of each focus group interview, the moderator introduced the study, reminded participants of its purpose, and encouraged them to openly share their viewpoints and experiences related to online learning and face-to-face learning. The moderator followed the interview guide, asked a series of open-ended questions and facilitated discussion between participants. For example, in teaching presence, the moderator asked student participants “How do you feel about the clarity of instructions given by the teacher in online classes?” and asked teacher participants “How do you feel about the clarity of



**Fig. 1** Themes and categories for data coding

instructions given by you in online classes?”. In social presence, the moderator asked student participants “What do you think about the expression of emotions and/or feelings between you and the teacher during online classes?”, and asked teacher participants “What do you think about the expression of emotions and/or feelings between you and the students during online classes?”. In cognitive presence, the moderator asked student participants “Do you think you are able to connect/integrate ideas/concepts learnt in online classes?”, and asked teacher participants “Do you think your students are able to connect/integrate ideas/concepts learnt in online classes?”. The moderator ensured data saturation was reached in a question before moving to the next question.

### 3.4 Data Analysis

A deductive content analysis approach was adopted to test existing concepts regarding online education derived from the CoI model and PLOT model (Garrison et al., 2000; Lam, 2018; Marshall & Rossman, 1995). A figure was developed for data coding according to the adopted themes and categories from the CoI model and PLOT model, namely teaching presence, social presence and cognition presence (Elo & Kyngas, 2008) (Fig. 1). Data collected in the audio-recorded focus group interviews were transcribed verbatim into English and input to Qualitative Data Analysis (QDA) Miner 5 of Provalis Prosuite for analysis. The analysis began with multiple readings of the transcribed scripts by researchers to acquire an overview of the texts. The texts corresponding to the categories in Fig. 1 were highlighted and coded. The codes were then grouped into relevant themes according to their meanings, similarities and differences. Only appropriate data were coded to the respective categories. Data that were not suitable for any categories were used to create new codes as necessary (Elo & Kyngas, 2008). Frequency count of each category was recorded, representing the frequency of that category being discussed among participants.

Researchers were familiar with the literature review of the present study and understood the research framework clearly. To avoid personal bias and misinterpretation of data, the data coding process was completed by two researchers independently to

increase the trustworthiness and reliability of the analysis. The researchers organised different codes and collated the relevant data into potential categories and themes. They discussed the data coding, identified themes and categories in detail to resolve variance in interpretation between them. Researchers discussed how the data should be interpreted and compared their results until a consensus was reached (Caskurlu et al., 2021; Graneheim & Lundaman, 2004). Finally, they checked and assured that all the themes and categories were grouped accordingly.

## 4 Results

Interaction or communication between teachers and students during or after online learning was the mostly mentioned category in teaching presence among students while it was the third mostly mentioned category among teachers. Teachers reported that overall stress on technical issues and skills affected their teaching quality, thus it was their greatest concern during online teaching. In social presence, interaction or communication between students was the most discussed category among both students and teachers. In cognitive presence, both students and teachers discussed their ability to connect/integrate ideas/concepts learnt the most. Table 1 showed a structured categorisation matrix with the frequency count of each category under the respective themes.

**Table 1** Frequency counts by themes, categories and subcategories

Theme	Category	Count	
		Students	Teachers
1. Teaching presence	1.1 Quality of learning materials	115	40
	1.2 Clarity of instructions given	101	19
	1.3 Quality of discussion (during lecturers/tutorials)	145	16
	1.4 Interaction/communication between teachers and students (during/after lectures/tutorials)	264	44
	1.5 Quality of assessment	169	4
	1.6 Pace of learning	190	19
	1.7 Motivation on teaching online	–	18
	1.8 Stress on teaching online (include technical issues and skills)	–	31
2. Social presence	2.1 Interaction/communication between students	176	31
	2.2 Expression of emotions/feeling between teachers and students	89	17
	2.3 Expression of emotions/feelings between students	48	3
	2.4 Collaboration/cooperation/support among students	75	9
3. Cognitive presence	3.1 Being puzzled about learning materials or teacher's explanation	35	–
	3.2 Ability to connect/integrate ideas/concepts learnt	136	24
	3.3 Ability to apply new ideas/concepts learnt	61	8
4. Other difference	4.1 Travelling	11	0

## 4.1 Teaching Presence

Under the theme of teaching presence, “Interaction/communication between teachers and students (during/after lectures/tutorials)”, “Pace of learning”, “Quality of discussion (during lectures/tutorials)”, and “Quality of assessment” were categories that mostly discussed among student participants. For teacher participants, “Interaction/communication between teachers and students (during/after lectures/tutorials)”, “Quality of learning materials” and “Stress on teaching online” were the issues of most concern.

### 4.1.1 Interaction/Communication Between Teachers and Students (During/After Lectures/Tutorials)

Many students commented that interaction and communication between teachers and students were affected during online learning compared to face-to-face learning. Although students could ask questions during online learning via the chatroom but teachers sometimes misunderstood or ignored their questions: “*The lecturer may miss or forget to answer questions raised in the chatroom.*” (Student 19); “*It is hard to ask every question in detail in online learning*” (Student 36). Teachers also commented it was challenging to interact with students in online environment: “*I received fewer responses from students in online classes.*” (Teacher 1) and “*We interact less even after classes.*” (Teacher 3). Teachers tried to enhance interaction by setting more questions on the online learning platform: “*I set some questions on the Moodle platform to ask students.*” (Teacher 2).

Student participants pointed out that online learning was beneficial to students who are usually shy and quiet in traditional classes to be “*more active in typing out questions in chatroom and communicate with each other through WhatsApp and email.*” (Student 37). Teachers also held similar views that “*Students who usually sit at the back of the classroom and seldom gave response are more active in giving response during online classes.*” (Teacher 5).

### 4.1.2 Quality of Discussion (During Lectures/Tutorials)

Students felt that online learning had a negative influence on the quality of discussion due to limited interaction with others and the reliance on one-way communication. In contrast, they perceived that a traditional classroom setting allowed more discussion among students: “*It is inconvenient to ask questions and I can’t express my ideas by pointing at a diagram.*” (Student 8).

### 4.1.3 Quality of Assessment

Mixed views on the quality of assessment were observed from student participants. Some students felt that the replacing traditional physical examinations to additional assignments were time-consuming and caused increased workload. Some enjoyed the process of searching for sources of information which helped strengthening the understanding of their subjects and therefore improving long-term memory: “*Examinations only depend on how*



*much we have recited from the notes and I will forget what I have memorised quickly. Additional assignment is better.” (Student 52).*

#### **4.1.4 Pace of Learning**

The pace of learning was affected as many students felt easily distracted and failed to concentrate during online classes. Some of them also felt little need to pay attention to real-time classes and relied on revising the uploaded learning materials in their own time after classes and this occupied more studying time. Both students and teacher participants pointed out that the learning environment at home was not ideal and lengthened the time spent on online classes compared to face-to-face classes. Some students do not have a good learning environment at home such as small living space, poor WiFi connection and the need to share computers with siblings: *“I needed to write down all notes for my revision because I don’t have a printer at home.” (Student 36); “My family disturbed me during online classes.” (Student 24); “Online learning is not suitable for those who have financial difficulty in buying technological devices.” (Teacher 1).*

#### **4.1.5 Stress on Teaching Online (Including Technical Issues and Skills)**

From the teachers’ perspective, online teaching relied more on technical devices and systems that created stress and affected teaching quality. Teachers felt that switching to online teaching had led to heavier preparation workload in designing classes and teaching materials: *“I needed to make sure my recordings are fluent, so I recorded some specific slides for several times.” (Teacher 1); “Preparation time for online lectures is around double.” (Teacher 4).* Unexpected technical issues during online learning also caused additional stress by affecting teaching progress: *“My computer even shut down in the middle of the lecture.” (Teacher 4).*

### **4.2 Social Presence**

Interaction and expression of feelings between students and teachers are essential to facilitate critical thinking. However, both students and teachers identified difficulties in interacting, and in expressing feelings and emotional support, compared to face-to-face learning.

#### **4.2.1 Interaction/Communication Between Students**

Interaction between students was affected during online learning and some could not frequently contact others. Students commented that classmates became very independent, and they had no chance to socialise with each other physically after online classes. Completing group assignments was challenging: *“At the end, I finished all the work by myself that should be done by a groupmate; it’s uncontrollable and makes me upset.” (Student 34).* Teacher also noticed similar situation: *“Students missed their campus life and they wanted to meet their classmates to have social life.” (Teacher 8).*

#### **4.2.2 Expression of Emotions/Feeling Between Teachers and Students**

Both students and teachers mentioned that facial expressions during face-to-face classes were one way to express feeling, and hence for teachers to know whether students

understood the learning materials: *“The lecturer cannot see students’ faces and emotions ... If he knows that we feel confused, he will know which specific areas need elaboration.”* (Student 34); *“I can understand their learning progress through their written notes and facial expressions during face-to-face classes.”* (Teacher 3).

### 4.2.3 Collaboration/Cooperation/Support Among Students

As students could not easily form groups for assignments, some teachers arranged random groups, and students had to work with classmates whom they had never met. Some students found that it took additional effort to discuss with their groupmates and proofread others’ work: *“I have arranged some group meetings with other students but most only show up just before the deadline. I need more time to proofread their work.”* (Student 52).

## 4.3 Cognitive Presence

Cognitive presence includes critical thinking and efficiency of learning new knowledge. Online learning allowed some students more time to understand and apply concepts and knowledge in their assignments. However, application of knowledge through practical experiences was limited in online setting.

### 4.3.1 Ability to Connect/Integrate Ideas/Concepts Learnt

Students expressed a wide range of views regarding their ability to learn during online learning. Some spent more time studying learning materials but others found it difficult to integrate concepts. However, teachers might not know whether students truly attended class: *“I understand the learning materials easier.”* (Student 17); *“Although the class schedule is more flexible, I learnt less.”* (Student 28); *“I have extra concerns about whether students are concentrating in class and whether they understand concepts that I taught them.”* (Teacher 1).

### 4.3.2 Ability to Apply New Ideas/Concepts Learnt

Application of knowledge into practice is essential for students to understand concepts thoroughly. Nevertheless, some students were unable to participate in practicum, laboratory works, or internship during online learning and were unable to apply what they had learnt: *“For my further study or career, I find it difficult to apply the knowledge learnt during online learning.”* (Student 22).

## 4.4 Other Difference

### 4.4.1 Travelling

Students saved the travelling from home to school. A student mentioned that she got more time to rest before attending an online class.

## 5 Discussion

This study investigated the perception of traditional and online learning from the perspectives of both students and teachers in terms of teaching presence, social presence, and cognitive presence in the CoI model, as well as elements in the PLOT model. Compared to traditional face-to-face learning, online learning posed great challenges in that interaction and communication between teachers and students in terms of teaching presence and social presence was unsatisfactory. The poorer interaction in an online setting affected the quality of teacher-student and student-student relationships. It also affected the acquisition and application of knowledge in terms of cognitive presence due to the lack of direct feedback from teachers. Other factors were also found to affect the pace of learning, including personality, learning environment, and technical support. The home learning environment was a barrier for some students in attending online classes, particularly for those with financial difficulties or without sufficient equipment.

Most students and teachers reported that the interaction and communication between them was negatively affected in an online learning setting. This was supported by the stronger effect on social presence noted in the online environment (Zhan & Mei, 2013). Previous studies have shown that social interaction is a primary variable of student satisfaction, feelings of isolation, and persistence in online learning (Croxtton, 2014; Garrison et al., 2000; Kuo et al., 2014a, 2014b; Zhan & Mei, 2013). Informal social interaction allows the creation of spaces that incorporate social relationships, group cohesion, trust, and belonging, thus having higher levels of student-student and student-teacher interaction (Croxtton, 2014; Todhunter, 2013). However, unlike having direct communication during or after face-to-face classes, one-way communication in online setting was difficult for students and teachers to receive timely and quality feedback electronically. Students experienced inaccurate responses and misunderstandings of wordings by teachers when communicating through emails and chatrooms. Although social experience can be replicated through social networks, it is argued that online learning environments affect cognitive and social learning, and activities with a physical presence in a face-to-face environment cannot be replaced by online interactions or activities (Todhunter, 2013). These create a barrier to developing closer interpersonal connections and relationships between students and their instructors and classmates, resulting in feelings of isolation and helplessness among students.

It is rather challenging to maintain effective socio-emotional interaction in an online learning setting due to reliance on the written words and the lack of visual cues. Although previous research suggested that affective online communication could still be similar in face-to-face context despite the lack of non-verbal cues, students and teachers in this study felt less likely to express and feel emotions from others (Derks et al., 2008; Marsh, 2012). Communication between students and teachers in a face-to-face learning environment occurs not only through words, but also through body language and emotional expressions (Cleveland-Innes & Campbell, 2012; Jiang & Koo, 2020). For example, teachers can quickly conduct impromptu activities to change the atmosphere and direction of face-to-face classes, making them more interesting and interactive. But the absence of these elements was more salient in online setting as reflected from the focus group interviews, most students and a few teachers did not appear on camera in online classes. Therefore, it may suggest that a stronger focus on emotional support is needed while the physical medium is missing in the virtual learning environment (Jiang & Koo, 2020).

The results also aligned with the important role of social identity in social presence in online learning. Online environment inhibits the students and teachers to construct their identities and create an environment that is comfortable enough for students to participate in groupwork (Jaber & Kennedy, 2017). Without revealing faces, it is difficult for both students and teachers to be aware of each other's presence in an online setting. Reduced interaction and absence of a sense of immediacy affect students' capacity to develop others' impressions of them, resulting in frustration and constraints particularly in collaborative groupwork (Jaber & Kennedy, 2017; Robinson, 2013). Some students found it difficult to meet new friends, and even more challenging to collaborate with their groupmates without knowing who they were. Without physical constraints such as the lack of physical contact, body language, facial expression in online setting, students in a face-to-face environment could build relationships with their classmates by quickly forming peer groups during classes, or at off-campus locations to discuss topics related to their learning and hobbies. The lack of identity between classmates or close interpersonal relationships seriously affected collaboration with others for learning, and ended up with unhappy learning experiences in some cases.

In terms of cognitive presence, students had mixed views on acquiring and applying learned knowledge in an online learning setting, depending on the nature of a subject. As online courses required more reliance on self-directed learning, students reported re-listening to recordings of lectures to solve queries, and learned more knowledge as they gathered more online sources to complete their online assessments (Jaggars, 2014). However, students preferred studying "easy" academic subjects online, and "difficult" and "important" subjects face-to-face. Participants agreed that an online setting was more suitable for learning theoretical knowledge, which did not require practical experiences such as laboratory experiments and programming (Jaggars, 2014). Students also absorbed less course material compared to face-to-face classes due to reduced discussion and direct feedback from instructors (Lam, 2018). The level of critical thinking among students was impacted in an online learning setting, where instructors could not actively facilitate discussions or provide encouragement (Hosler & Arend, 2012; Lam, 2018).

This study found that some students were more willing to ask questions and express their thoughts in online classes than traditional classes. This may suggest that compared to extroverts, who like direct connection with others, introverted students prefer an online environment as it involves fewer physical collaborations, while asynchronous communications are less threatening than face-to-face communications (Pavalache-Ilie & Cocorada, 2014; Picciano, 2017). Thus, introverts who prefer working alone and solving assigned tasks at their own pace may not experience negative interactions with others in online settings. Students who prefer online learning have high conscientiousness and self-discipline, leading them to be very independent and have a higher sense of responsibility for their learning. Such students are more likely to complete tasks and gather information related to their subject from the internet and spend less time online for entertainment purposes (Hughes et al., 2012; Wang et al., 2012). However, as reflected by students and teachers in this study, only a very small number of students possessed the above characteristics and performed better in an online learning setting. Therefore, introverts and more conscientious learners might be more favourably disposed to online learning as they may face fewer challenges in making the most of online settings.

Learning performance of university students is inversely correlated with complaints about indoor environmental quality (Hamid et al., 2014; Lee et al., 2012). Students and teachers in this study raised similar concerns that affected the pace of learning, including the home learning environment and the availability of appropriate technological

equipment. Teaching activities in Hong Kong are normally conducted on campus, where students attend classes in a high-quality indoor environment with air-conditioned classrooms and enjoy campus facilities like libraries, laboratories and others. Online learning usually takes place at home, where students' living environments may not be conducive to online learning due to issues such as privacy, size, and noise (Gou et al., 2018). Some also faced barriers in online learning due to the lack of appropriate equipment at home as those with limited financial resources could not afford to buy equipment such as laptops and printers.

Online learning is a valuable method of teaching students around the world but successful implementation of online learning into education curriculum requires a well-thought-out approach and support. Based on the results of the study, some recommendations for international educational practice are made. To improve the unsatisfactory teaching presence and social presence among teachers and students, practical technical support is essential. Some teachers missed the students' questions during online class because they were unfamiliar with the new technical devices. Students encountered technical issues such as connectivity and system malfunctions. Thus, technical support is needed, and is positively associated with learning satisfaction for both students and teachers (Lee et al., 2011). Training sessions, detailed guidelines for the use of online learning platforms can be provided to teachers so that they can be well-prepared for providing online instructions and teaching materials. In addition, online technical support will be helpful to both teachers and students. Exploring phone modality can also be one of the solutions for providing timely and clearer feedback among teachers and students (Oyedotun, 2020). Most of the students and teachers have a smartphone nowadays and the creation of online chatroom can enhance the timely feedback and social interaction among students and teachers.

Interaction between teachers and students is one of the challenges in online learning, and some students may be easily distracted and less active. Therefore, an interactive approach can be adopted to boost the interactivity during online learning. Game-based learning which integrates learning knowledge into games is suggested to positively change learning behaviours and improve learning outcome (Hwang & Chen, 2022; Kim & Castelli, 2021). Another approach focuses on social and collaboration that allow students to work together on solving problems and sharing ideas. Teachers could post some discussion questions to facilitate the critical thinking of the students (Zhu et al., 2019). Providing authentic learning scenarios during the discussion session of the online class can lead the students to apply their knowledge and enhance the students' engagement. The use of asynchronous online discussion forums is an effective instrumental support for teachers to understand the level of students' cognitive engagement, and facilitate students' discussion and collaboration in the class (Galikyan & Admiraal, 2019).

## 6 Limitations and Future Research

This study was subject to a number of limitations. The sample recruited consisted entirely of students and teachers from two tertiary educational institutions, thus limiting the generalisation of the results to other tertiary educational institutions. The sample size of teachers was insufficient to provide a conclusive teacher perspective. Another limitation was the comprehensiveness of this study, which was restricted from the use of qualitative data only. A quantitative approach may reveal other views about the transition from face-to-face learning to online learning from both students' and teachers' perspectives. Online learning

settings should also be further investigated to explore how to compensate for the deficits discovered in terms of social presence and teaching presence. Future research can also investigate in the mediating effects of the use of social networks and the control of group size in online learning settings as student satisfaction with synchronous online discussions has been found to increase when they participate in small groups (Akcaoglu & Lee, 2016; Glassmeyer et al., 2011).

## 7 Conclusion

The CoI model and elements from the PLOT model are useful framework for understanding students' and teachers' perspectives on traditional and online learning. Discrepancies in social presence, teaching presence, and cognitive presence were discovered. Interactions between teachers and students affected not just social relationships, but also integration of knowledge in the cognitive presence. In spite of the challenge of maintaining effective teacher-student and student-student interactions in an online learning setting, there are compensating strategies that may help support collaborative CoI. These include revealing faces by switching on webcams, manipulating group size, and using more emoticons and symbolic displays in chatrooms. Online programmes are emerging rapidly but successful online learning requires efficient interactions among students, teachers, and technology. Advantages and shortcomings of online learning and traditional face-to-face learning reveal that it is imperative to balance the two learning modes to create a supportive learning and teaching environment for both the students and teachers.

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**Data Availability** Not applicable.

## Declarations

**Conflict of interest** The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Consent for Publication** No personal information is being published. Informed consent was obtained from all participants and data was collected anonymously.

**Consent to Participate** All participants gave informed consent prior to starting the study.

**Ethical Approval** This study followed the Code of Ethics for Research of the College of Professional and Continuing Education, The Hong Kong Polytechnic University.

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