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COVID 19 Pandemic and Online Education in Hong Kong: An Exploratory Study

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ABSTRACT: The initially localized outbreak of Corona transformed into the COVID 19 pandemic, profoundly impacting not just the daily lives and work of people around the world but also the delivery of education to students across the globe due to mass campus closures and suspension of face-to-face teaching. The current study was aimed at identifying how COVID 19 impacted university education in Hong Kong. Data were collected through online structured questionnaires administered via google online forms to students at two prominent universities in Hong Kong. The study revealed that although COVID 19 had negative affected educational delivery, the transition to online modes of teaching by the teachers during the strict lockdown had created a positive image of technology. The study further revealed that having to provide online education had compelled universities with poor infrastructure to improve the means for delivering online learning. In addition to highlighting the damaging impact of COVID-19 on the educational sector, the findings also suggest the need for all educational institutions, educators and learners to adopt technology and to improve their digital skills in line with the emerging global trends and realities in education.

Keywords: Coronavirus, Online education, Technology, Virtual learning, Hong Kong.

I. INTRODUCTION

Koksal [1] highlights that online education has demonstrated 'significant growth over the last decade, as the internet and education [have combined] to provide people with the opportunity to gain new skills'. Drawing on the articulation of the potential of online learning for higher education by [2, 3] suggest that in addition to its capacity for providing 'learning to new audiences' online education also furnishes the fundamental opportunity 'to transform learning delivery and the competitive landscape'. Thus, online learning not only represents an innovative approach to facilitate the process of educational delivery at a large scale but it also creates new opportunities for global markets. In particular, [1] points out that in the wake of the COVID-19 pandemic, 'online learning has become more centric in people's lives [as] the pandemic has forced schools, universities, and companies to remote working, and this booms the usage of online learning'. Thus it can be argued that online education has become an essential component in the field of higher education, attracting more universities to accept and follow this latest and user-friendly technology [4], although there still exist some concerns about its quality. From the perspectives of tertiary institutions if they want to ensure the effective implementation of online teaching and learning, they must identify the factors which influence the quality of online education. This paper explores the students' responses towards online education and use of online learning applications in the wake of COVID-19.

Since the early 1990s, research has focused on online delivery in education, especially in the areas of distance learning, computer-based learning, distributed learning and lifelong learning. Hence, it is necessary to define online delivery and its relationships with others' terms. Distance learning was originally designed to cater to students who lived at a distance from university campus. With the development of postal service in the 19th century, commercial correspondence colleges began to provide distance education to students across the United States. Therefore, distance learning began to be understood as an educational approach which could replace face-to-face traditional classrooms by means of electronic communication [5].

From its initial utilization in technological fields (e.g. math, engineering), computer-based learning expanded to other disciplines (e.g. linguistics, geography). Due to the capacity of computer-based learning to present instruction, materials and data in interesting ways, computer-based learning enabled students to engage actively in their study rather than passively as in earlier learning processes [6, 7].

The concept of lifelong learning focuses mainly on learning through social and cultural life changes. Extensive research has shown that many people have capabilities and motivation to study actively during the course of their live [8]. Lifelong learning is not only self-directed but also entails engaging with various organizations, companies and communities. Turning to distributed learning is learner-centered, such a learning approach "integrates a number of technologies to enable opportunities for activities and interaction in both asynchronous and real-time modes. The model is based on blending a choice of technologies with aspects of campus-based delivery and distance education" [9]. It has two aspects. Firstly, it involves a heavy reliance on technology heavily, and secondly it entails self-study which means that students must take responsibility for their own learning needs, goals and outcomes, scheduling and organizing their tasks and evaluating their values and significance [10].

Based on the previous concepts, online delivery is a blend of computer-based learning and web-based instruction [11] as it utilizes the World Wide Web as a repository for instructional information and is distributed by the Internet. It not only provides students with access to reading or downloading their learning materials but also facilitates communication, cooperation and support between staff members and students. With the

development of technology, it has accrued far greater advantages over traditional delivery. In the shared and virtual workspace of collaborative tools, both individual and interpersonal communications can be achieved amongst students. These interactions are not only synchronous (e.g. video conferencing) but also asynchronous. Interactive tools provide opportunities students with opportunities to self-practice and self-evaluate, for instance through simulations. The limitation of these tools is that students can only interact with the technology instead of with other students or instructors.

[12] identified three measures of online delivery effectiveness, namely learners' outcomes, attitudes and satisfaction with distance education. Ruessel [13] also adds to these measures by listing 355 sources. Webster and Hackley [14] observed that there are several dimensions which can capture the concept of effectiveness, for instance students' physical and cognitive engagement and technological self-efficacy. Similarly, [15, 16] have identified three main factors as influencing online delivery effectiveness, including technology, instructor characteristics and student characteristics.

There are several aspects in technology that require considerations such as reliability, quality and medium richness. Particularly, the network set should enable students to access synchronously and asynchronously and exchange documents at minimal time [17]. The quality of the interface is also essential [17]. Previous literature shows that the interface design for online delivery ranges from highly artistic [18] to highly technical [19] and identifies several important dimensions in user interface such as cognitive load and screen design. The effectiveness of online delivery is also influenced by technology richness. In the medium richness theory, one of the key mediums is concerned with ensuring synchronous and asynchronous communication as well as supporting other teaching elements including texts, pictures, audios and videos [20]. The core of medium richness is interactivity. McIntyre and Wolff [21] suggested that in the environment of web, one of the powers of interaction is to provide compelling interaction and feedback to students. Engagement is also an essential factor in the educational setting.

Collis [22] has noted that the instructors play an important role in determining the learning outcomes to which factor of importance can be added attitudes to technology, teaching styles and the control to technology [14]. It has been observed that those students who have instructors in their class are more likely to become motivated in learning to learn actively. Students who have distributed study are more likely to feel lonely as there are fewer interactions in class [23]. To solve this problem, instructors can inform students of their office hours or provide them with email contact. What is the most important is that instructors should teach communicatively, be familiar with technology and know how to solve technical problems. Haynes [24] emphasize that it is essential to identify instructors and technical resources early on.

Therefore, with a view to the role of the teachers during the Corona outbreak, teachers' performance in using technical applications, student-teacher interaction and current situation of student during the complete closure of schools globally, the study addressed the following research questions:

1. What is the response of the university students in Hong Kong towards online education during the COVID 19 pandemic?
2. To what extent do teachers play their role in delivering their lessons through online applications?
3. Is online education better than face-to-face educational delivery?

COVID 19: An Overview. The outbreak of Coronavirus (COVID-19), a highly contagious disease, spiraled into a global public health crisis, causing large-scale illness in human populations unprepared for such a pandemic. Receiving the first reports about the pandemic outbreak in Wuhan, China, the World Health Organization (W.H.O.) coded this coronavirus as 'COVID-19.' [25]. Although it was a novel pandemic, the spread of COVID-19 was fast and noxious without any boundary, disrupting educational systems, scientific research, world economy, transportation, politics, sports and global health and changing the lives people many people around the globe.

It was found that women, the elderly, and those people with underlying medical were more likely to get infected than other groups. It was frightening that there were more than 1 million cases and over 220 thousand fatalities during the period of COVID-19. Due to the large increase of patients, the number of doctors and health equipment (e.g. face masks, protective gowns) became very limited and urgent. WHO took the responsibility of offering advice to public for preventing from the pandemic (e.g. washing hands constantly with alcohol-based sanitizers), publishing country and technical guidelines, and updating the COVID-19 situation in a rolling basis.

At the same time, many countries locked down to mitigate the spread of pandemic. In order to maintain 'social distance' as a way to curb the spread, large scale gatherings (e.g. sport games) had to be suspended. Most people are required to 'observe their self-isolation' work from home or attend online courses. The traditional way of classroom instruction had to be shifted abruptly to the online platforms. The following discussion will focus on the impact of COVID-19 to the educational system.

According to CDC (Centers for Disease Control and Prevention), up till June 10, 2020, 1,973,797 total number of infections with 112,133 total deaths in the U.S had been reported. In the education arena, based on the data provided by the United Nations Educational, Scientific and Cultural Organization (UNESCO), there were approximately 91.3%
of students across the world (around 11.575.270.054 learners) affected by the school closures. Therefore, it was recommended that teachers should continue their teaching online [26]. CNN reported that a large number of U.S. schools shut down in COVID-19 would not re-open for the rest of the academic year, thus affecting more than 60 million students [27].

The cases in New York and the California States were the most serious among the U.S and spiraled out of control as reported by ABC7 news. At New York University, student residence halls are close and remote instruction was implemented for the 2020 summer terms. The federal government adopted some strong measures in response to COVID-19 as shown on its official website which included providing Federal Student Aid, calling for people to stay at home, and President Trump also invoked the "Defense Production Act." However, the number of people of people being infected continued to soar and the government had to declare a national emergency [28].

Schools in Spain were also closed which closures affected around 11 million students. In Madrid, the capital of Spain, many staff members in the schools had

to suspend their job offers [29]. In Saudi Arabia, the government encouraged the activation of virtual schools and online education alike to ensure the continuity of education [30]. After COIVD-19, it might provide future implications or directions for combining online and offline education effectively and thus instituting a new trend in learning.

China too faced a tremendous challenge during the Coronavirus outbreak after the first case of unknown pneumonia was identified in Wuhan City, China. This virus spread very quickly around the Wuhan City and then to many other cities in Hubei Province within 30 days. The timing of the pandemic outbreak was very near to the Chinese Lunar New Year holiday. Although it is the largest holiday for family gatherings in China, the Chinese government acted very quickly to curb the spread of disease. It called for people to stay at home and restricted the transportation of some typical cities such as Wuhan [31]. Schools were closed and people were required to work from home until the battle with pandemic ended. The Chinese government worked efficiently in treating COVID-19 patients, placing the whole country into a lockdown and reducing the risks of future possible spread, although these actions debilitated its economy. In March, 2020 China's COVID-19 reached the milestone of 0 new cases [32] and many cities started to reopen schools and companies requiring people to wear masks in May. Hong Kong (HK), the special administrative region of China, having learnt a lesson from the SARS outbreak treated COVID-19 very seriously. HK universities switched to online education as well, and people who sought to enter Hong Kong had to comply with a 14-day compulsory quarantine.

In Australia, a large number of private schools were closed and moved to online teaching, whereas some remained open while implementing strong measures to prevent teachers and students from being affected [33]. In an approach that diverged from that of the Chinese government, the Australian government supported the opening of schools during pandemic. Scott Morrison, the Prime Minister of Australia, argued that as children were at lower risk of being infected from pandemic, schools needed to remain open. Although the government has cited some cases wherein the opening of schools has not increased the number of children's infections, many teachers and parents still have doubts in it and have become very worried [34]. Irrespective of this, the Australian government reacted proactively in mitigating the spread of virus by negotiating with the parliament to fund 18 billion dollars in form of COVID 19 relief support and banning gatherings of more than 2 people. In Italy, schools were closed indefinitely. However, although the government used strong measures to stall COVID 19 spreading by deploying the army to enforce lockdown, Italy had to deal with the dire consequences of the fast spread of the disease. According to [34], there were 969 fatalities on the deadliest day caused by the pandemic in Italy. In India, all of the universities and schools were shut down, and the Indian government invoked the "Janata" Curfew to keep citizens indoors to stop the virus spreading. France was also badly affected by the COVID-19. In order to reduce the health risk caused by COVID-19, President Macron announced that all schools should be closed. Although Iran also shut down its schools, the country was among the epicenter of the coronavirus outbreak, and the death toll in the country was high, with COVID-19 hitting Iran's economy the hardest.

The schools were also closed in German. The rate of death in Germany due to the pandemic was lower than in neighboring countries, and the government invested more than 800 billion dollars to fight the pandemic. Probably because of German's 'rule-following' culture, people were self-disciplined about staying at home and obeying the lockdown regulations strictly. As reported by [36], only people with an ID card were allowed to go outdoors for buying food. In Russia, many schools were closed and other measures were taken to fight this pandemic. Although the number of deaths in Russia due to the virus were low, the government was active in banning public gatherings such as processions.

In addition, this pandemic also affected African communities. Senegal was the first sub-Saharan African country in which the government required all schools to close and ban gatherings of more than 100 people in response to COVID-19. New cases were reported in the country and campaigns for behavioral changes were carried out to reduce the spread of the disease. Schools in Nigeria and Ghana were closed in accordance with directives by the federal governments of respective countries to curb the outbreak of Corona. The government also required citizens to suspend social gatherings to remain 'social distance' and work from home. It was reported by the government that the first COVID-19 case, an Italian patient, had recovered and was discharged successfully, but after that, several new cases emerged. Therefore, as the foregoing discussion shows, the outbreak affected almost every part of the world.

Emergence of Online Interactions: Flipped classrooms, MOOCS, Just in Time (JIT), Peer Instruction through Instagram, Google classroom and YouTube have been incorporated in contemporary teaching within many educational institutions. The sudden outbreak of Corona at a global level boosted a pre-existing online educational system. With the development of Internet, technology, teachers and students comprise three crucial factors which influence the effectiveness of online learning. People have begun to consider online delivery of education in a new way, establishing new rules to ensure effectiveness and to practice teaching or learning for improvement. A number of computer application were deployed by different institutions during the lock downs. These applications provided technical aid and support for implementing online education during the outbreak period. Some of popular computer applications are listed below:

Table 1: Use of Online Applications during COVID 19.

Online Teaching Applications		
Zoom (zoom.us)	GoToMeeting.com	Google Classroom
Canvas	Skype.com	funbrain.com (for kids)
WhatsApp	(edu.google.com)	whyville.net (for teens)
vedamo.com	Youtube.com	Edmodo (edmodo.com)
Khanacademy.org	Blackboard.com	schoology (schoology.com)
TED-Ed (ed.ted.com)	udemy.com	classdojo (classdojo.com)
Codeacademy.com	coursera.org	googlehangouts (hangouts.google.com)
Stanford Online (Online.stanford.edu)	Instagram	Facebook

Although effective online teaching is largely possible only due to the above-mentioned technological applications, teacher interactions with students have a pivotal role to play in ensuring the effectiveness of the learning experience via computer applications. Audio/Video calls, recorded lectures and YouTube lectures were all used as mediums by the teachers to set up interactions with learners to provide instructions, provide understanding of content and to foster student questioning, critical thinking and reflection which are all key processes for successful learning.

Teacher interaction or presence is of pivotal importance in online learning as online classrooms "may also involve remote but instant methods of feedback between student and instructor, facilitated through live chat, video/webcam interactions, and small-group "break-out rooms." Further, [37] add that online teaching requires the building up of student rapport, delivering of feedback and implementing of assessment differently from face to face classrooms. They add that "student engagement and course completion" are dependent upon clarity of communication by the those running the courses (Roddy *et al.,* 2017). Drawing upon [38, 39] observe that "increasing the interaction between learner and instructor can lead to a smaller transactional distance (i.e., a physical separation that results in a psychological and communicative gap) and more effective learning".

Theoretical Framework

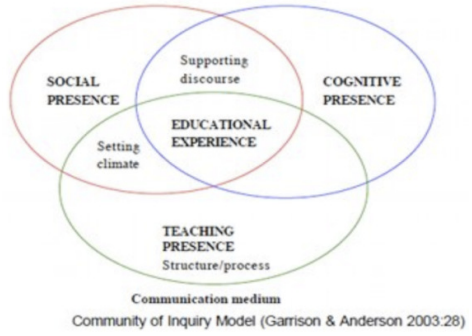

Fig. 1. Community of Inquiry Model [40].

In view of the importance of teacher interactions with students and regulation of the online teaching environment, this study adopted the Community of Inquiry model proposed by [40] which focuses not only on the environment of the educational experience but also the interactions that facilitate student learning. Based on the idea that learning by students takes place within a community of actors and that they should develop responsibility for their own learning, this model is premised on three key components which include the following:

• the learner's social presence (the ability of learners to establish themselves socially and emotionally as a real person through the learning experiences)

• the learner's cognitive presence (the ability of the learners to construct and confirm meaning through interaction and reflection)

•the teaching presence (involving the provision of structure and a process for the learning by the teacher).

Although 'the Community of Inquiry (CoI) framework highlights social presence, teaching presence, and cognitive presence as essential elements to facilitate successful educational experiences in online distance learning environments"[41], this study focused on two of the elements in the model in particular, namely learner's cognitive presence and the teaching presence due to the limited scope of the study. The questionnaire was designed to canvas student responses to the presence of the teacher (and interactions) and access to opportunities for reflection and discussion.

II. METHOD

The current study adopted a quantitative approach to collection and analysis of data in order to arrive at generalizable findings vis-à-vis the topic of the research. A structured questionnaire with 22 items and closed responses was designed to canvass respondent responses to university education provision and online learning during strict lockdown in Hong Kong. The structured questionnaire items covered topics such as corona out break and online education, student-teacher interaction and virtual classroom. The questionnaire was distributed to respondents from two universities e.g. City University Hong Kong, and The Hong Kong Polytechnic University as these two universities had led the way in commencing their online sessions on priority after the lockdown initiative.

III. RESULTS AND DISCUSSIONS

A total of 50 students from two universities provided responses to questions on the experience of online education during pandemic COVID 19. The questionnaire was administered on google forms and distributed to participants studying at selected Hong Kong universities.

Table 2: Questionnaire Response Detail.

Sampled	Total
Male students	17
Female students	50
Gender (Anonymous)	19
Total Questionnaires	86

Analysis showed that of the 86 responses, 30% of the respondents showed their interest and strong willingness in taking classes via online apps such as Zoom and Canvas. These two computer applications were mentioned in particular because many of the institutions in Hong Kong have been using Zoom and Canvas as a medium to teach online classes. The responses were significantly satisfactory, and students showed their interest in taking classes online. Fig. 1 shows the frequency distribution of the responses of the students.

Interestingly, when the learners were asked whether online education is better than face to face interaction, 22% of the respondents strongly disagreed with the statement, and 32% expressed disagreement with the idea of studying online after the COVID 19 situation ends. However, 32% remained neutral and indecisive whereas only 12% showed their strong willingness to study online. Although these results suggest that face to face interaction is considered very important by the students which reflects their uncertainty to understanding the lecture through online classes, a substantial percentage (32%) of the respondents either refrained from showing a preference for face to face interaction or stated a preference for online teaching (12%). This indicates that there is a substantial percentage of learners who are not distinguishably committed to a preference for face to face teaching. The following figure shows the percentage of responses of the students of the survey.

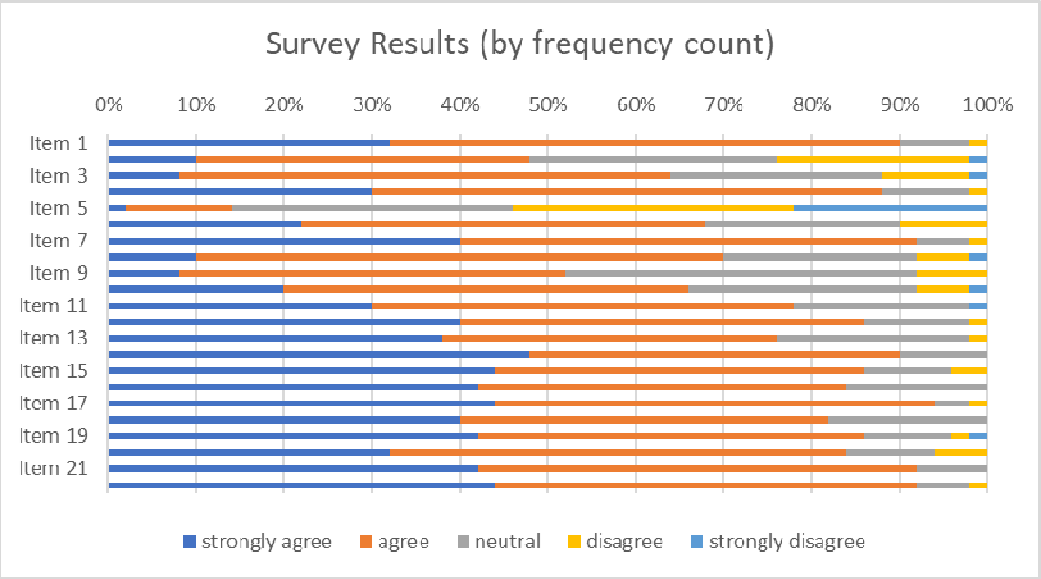

Fig. 2. Percentage by Frequency Count.

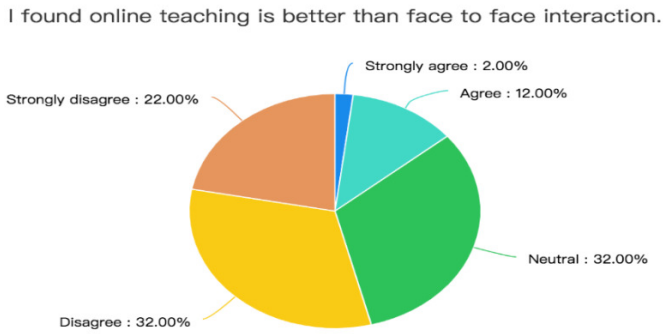

Fig. 3. Responses to Face to face interaction.

I found online teaching is better than face to face interaction.

Table 3: Frequency Count of Student's Responses.

	strongly agree	agree	neutral	disagree	strongly disagree
Item 1	16	29	4	1	0
Item 2	5	19	14	11	1
Item 3	4	28	12	5	1
Item 4	15	29	5	1	0
Item 5	1	6	16	16	11
Item 6	11	23	11	5	0
Item 7	20	26	3	1	0
Item 8	5	30	11	3	1
Item 9	4	22	20	4	0
Item 10	10	23	13	3	1
Item 11	15	24	10	0	1
Item 12	20	23	6	1	0
Item 13	19	19	11	1	0
Item 14	24	21	5	0	0
Item 15	22	21	5	2	0
Item 16	21	21	8	0	0
Item 17	22	25	2	1	0
Item 18	20	21	9	0	0
Item 19	21	22	5	1	1
Item 20	16	26	5	3	0
Item 21	21	25	4	0	0
Item 22	22	24	3	1	0

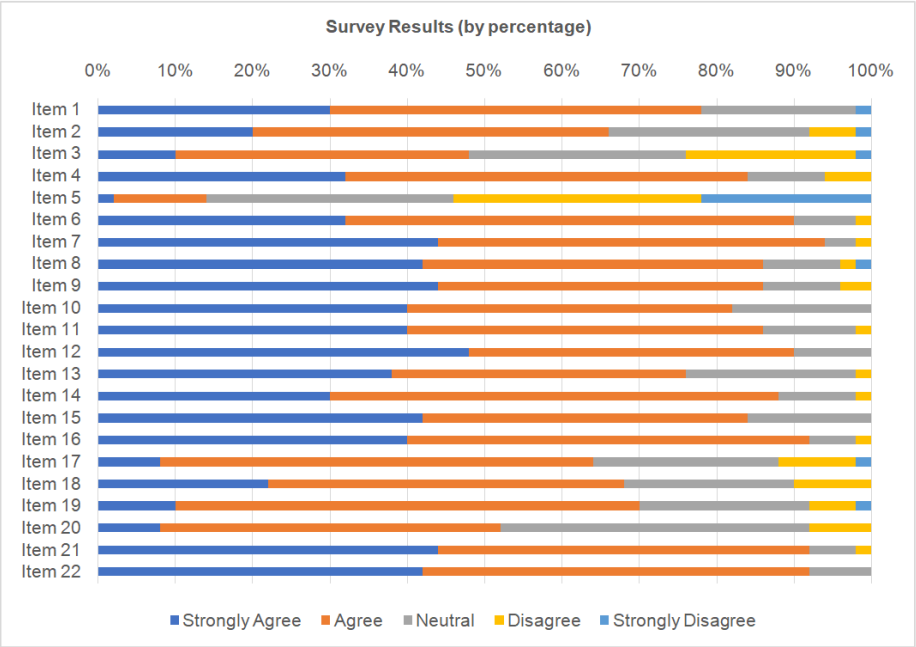

Fig. 4. Survey Results by Percentage.

Above figure shows the responses of whole survey conducted for the study. The results show that 42 % students strongly agreed with the statement that instructor provided them time of questions and answers during teaching slots whereas 50 % agreed, and only 8 % remained neutral and couldn't decide what to answer of the questions. Overall an overwhelming number of students (92%) were in agreement that the teachers had provided them with opportunities for questions. Responses to research item 20 seeks also showed respondent agreement with the statement that they had experienced the timely feedback from online resources such as Zoom and Canvas. The responses showed that 44 % students showed their agreement whereas 8 % express strongly agree with the question rather 40 % remained neutral on the decision whether online resources provided them time to give feedback on teaching. 32 % students strongly agree while using Zoom and Canvas as an application medium of online classes, and 58% agree with the statement, however, 8 % remained neutral and 2 % were not in agreement. Therefore, it could be assessed that Zoom, and Canvas were found more easily approachable platform for online classes.

Items eight to item 13 present the responses on the role of instructor in online classes. These items show the instructor' role in online teaching, their style, and teaching aptitude through online system. The data reveals more positive responses that students strongly agree with the teaching style. 40% students strongly agree, and 82 % students agree with the view that teachers know these applications and show friendly behavior while teaching online.

Interestingly, the question on the interaction between students and teachers provide an excellent result with 40 % students expressing strong agreement, 52 % showing agreement, 6% student remaining neutral and only 2% respondents not agreeing with the statement in response to the item. The following figure shows the summary of responses to the item on teacher-student online interactions:

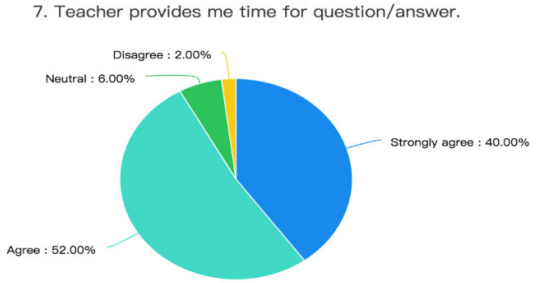

Fig. 5. Responses to teacher-student interaction.

According to our findings, in online education, teacher-student interactions play a dominant role in making the virtual classroom successful. This role has been significantly observed through the analysis that teachers at Hong Kong universities were prepared for online teaching, and that they were able to do their best to facilitate the students and to maintain the standard of education during COVID 19 lockdown.

The importance of classroom interactions has further implications, shifting the academic role from the intellect-on-stage toward a learning catalyst. In particular, the results of the study are in accordance with the view offered by Massy that faculty will change their role from a content professional to a combined expert including teaching, interpreting knowledge and leading learning process.

Hence, the study highlights the positive role of teachers during severe lockdown and enhances the need of to cultivate students' learning ability and discovering their learning spaces. Instructors should also guide and understand students communicatively, instead of just talking with them as 'expert.'

IV. CONCLUSION

Despite the global challenge presented by COVID 19 pandemic to educational systems and universities, the findings of this study support the key role of teachers in

providing an effective online learning experience to their students and demonstrate that technology, while pivotal as an interface for teaching and learning, cannot act as a substitute for effective teacher interactions. The results showed that students are satisfied with online education, virtual student-teacher interactions, and the knowledge of teachers in using the modern technical applications to continue online study. It further supports the importance of designing the online teaching/learning experience with the considerations of the teaching presence and cognitive presence.

Although it offers useful insights into elements that are important for structuring an effective online teaching experience, the study has a number of limitations. First of all, its generalizability is limited due to the small sample size. Future studies may make use of a larger sample of participants to come up with more generalizable findings. Secondly, it makes a study only of the online learning experiences of students in Hong Kong, a developed and technologically advanced city with a sophisticated educational system and trained teachers. A comparative study may triangulate the findings by undertaking a comparative analysis of university students in developed and developing contexts. Thirdly, the study used only questionnaires to canvas participant responses, and future studies may combine qualitative and quantitative methods to gain depth as well as breadth in the research findings. Fourthly, while it was not possible to interview or survey students in this research, researchers in the future may include stakeholders like teachers in the study to gain more insights into the role of teacher interactions and learner's cognitive presence in online teaching. Last but not least, future research may be designed to address all three elements of the theoretical framework through the data collection instruments and analysis.

Appendix-1

Question	ID
I could easily contact the instructor	Item 1
I could interact with classmates and discuss	Item 2
I did not experience problems while browsing.	Item 3
I feel the instructor was keen we use the Website	Item 4
I found online teaching is better than face to face interaction.	Item 5
I found the CANVAS/ Zoom easy to access for online lectures.	Item 6
Instructor encouraged student interaction	Item 7
Instructor explained how to use the Website	Item 8
Instructor had a genuine interest in students	Item 9
Instructor handled the Web technology effectively	Item 10
Instructor was enthusiastic about teaching the class	Item 11
Instructor was friendly toward individual students	Item 12
Instructor's style of presentation held my interest	Item 13
Overall, the lecture was easy to comprehend.	Item 14
Students felt welcome in seeking advice/help	Item 15
Teacher provides me time for question/answer.	Item 16
The browsing speed was satisfactory.	Item 17
The discussion was structured/ presented during online class.	Item 18
The Web site contained useful features	Item 19
The Web site gave me direct/timely feedback	Item 20
We were encouraged to participate in class	Item 21
We were invited to ask questions/received answers	Item 22

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