Online Co-Teaching in Higher Education: Prospects, Drawbacks, and the Way Forward

Lee Yee Ling*, and Kasthoori Bai Munusamy Naidu

Education for All Impact Lab, School of Education, Taylor University, Subang Jaya, Selangor, Malaysia.

ABSTRACT

Co-teaching occurs when two instructors share instruction planning, delivery, and assessment with students in a single physical space. This study aimed to investigate the impacts of online co-teaching on postgraduate student engagement, its drawbacks, and suggestions for improvement. A total of 26 postgraduate students completed an online questionnaire which consisted of closed and open-ended questions. Descriptive statistics were used to analyze the responses to the close-ended questions—the analysis of open-ended questions involved coding and categorizing the codes into themes. The findings indicated the participants were cognitively, behaviourally, and emotionally engaged during the online co-teaching. They benefited from the richness of knowledge shared by the two instructors, effective classroom management, and implementation techniques of co-teaching models. The only drawback was the confusion caused by the co-teachers different opinions and ways of approaching students. This study provides suggestions for planning effective online co-teaching in classrooms.

Keywords: online, co-teaching, student engagement, benefits, challenges, suggestions

Introduction

The unprecedented Covid-19 pandemic has impacted 220 million students at tertiary institutions (UNESCO, 2021). Lockdowns in response to Covid-19 led to worldwide school closures, including higher education institutions (HEIs) (Schleicher, 2020). In Malaysia, HEIs were closed when the government imposed a Movement Control Order (MCO) on 18th March 2020 (Tang, 2022). To ensure the continuity of education despite the lockdowns, most HEIs sought to offer online classes as a substitute for physical lessons (Schleicher, 2020). This endeavor was made possible with the advancement of web conferencing tools like Zoom, Google Meet, and Cisco Webex. The educators, on the other hand, had to adapt to the change in the mode of delivery and embrace new pedagogical concepts (Schleicher, 2020). UN News reports that teachers have been at the heart of the educational response to Covid-19 (United Nations, 2021), and one such response is online co-teaching.

Co-teaching is the practice of pairing teachers in a classroom where the teachers share the duties of planning, organizing, delivering, and assessing learning in a single physical space (Bacharach, Heck, & Dahlberg, 2018). Although co-teaching is widely practiced at the primary and secondary school level (Brendle, Lock, and Piazza, 2017; Caprio, 2019; Friend, Columbia & Clarke, 2014), its practice in tertiary education institutions has only recently started to gather acclaim (Kelly, 2018). Co-teaching allows faculty members with different expertise, diverse viewpoints, and teaching styles to share instruction, providing rich learning experiences for students. Co-teaching enables the continuation of collegial conversations and supportive relationships between Faculty that took place on-campus before Covid-19 closures. The nature of this collaboration allowed subject area experts to share scholarly resources and reduce the feeling of isolation that generally occurs in an online setting (Scribner-MacLean & Miller, 2011). Online co-teaching allows students to be continuously exposed to and enriched by different points of view and experience myriad pedagogical dimensions in terms of techniques and teaching methods (Kursch & Veteška, 2021).

The concept of online teaching at tertiary institutions during Covid-19 has been widely researched and reported (Schleicher, 2020; UNESCO, 2021). Most of these studies have centered on the impacts of online teaching on student learning, instructional methods adopted by teachers in an online setting, and the challenges teachers and students face. These studies were conducted in a silo-teaching context. The implementation and impact of online co-teaching on student learning during Covid-19 is under-researched. Although there are substantial studies conducted on co-teaching and the findings have shown that co-teaching improved student engagement (Ben-Eliyahu, Morre, Dorph & Schunn, 2018; Clancy, 2022; Lochner, Murawski & Daley, 2019), all of these studies were conducted in a physical learning context and not in an online learning context. The impact of online co-teaching on student engagement remains unclear. Thus, the first objective of this study was to investigate the impact of online co-teaching on postgraduate student engagement during Covid-19 in a Malaysian higher education institution.

Caprio (2019) argued that most of the studies related to co-teaching were conducted on teachers. These studies focused on investigating instructors co-teaching lived experiences in higher education, their mentoring practices, and their opinions on the impacts of co-teaching on their professional development (Cordie, Brecke, Lin, & Wooten, 2020; Lock, Clancy, Lisella, Rosenau, Ferreira, & Rainsburry, 2016). It is necessary to let students have a voice in expressing

their opinions on classroom practice, including co-teaching (Caprio, 2019). Moreover, co-teaching in higher education, especially for postgraduate students, is less prevalent (Bacharach et al., 2018; Harter & Jacobi, 2018). Therefore, the study's second objective was to explore postgraduate students' views on the benefits and differences compared to silo teaching, drawbacks, and suggestions for improvement regarding this practice. Two research questions were formulated to guide this study:

1. Research Question 1: How does online co-teaching impact postgraduate student engagement?
2. Research Question 2: What are the postgraduate students' perceptions of online co-teaching in terms of the benefits of online co-teaching, differences between co-taught and non-co-taught lessons, drawbacks of online co-teaching, and suggestions for improving online co-teaching?

Literature Review

This section will review the literature concerning the study's framing, as illustrated in Figure 1.

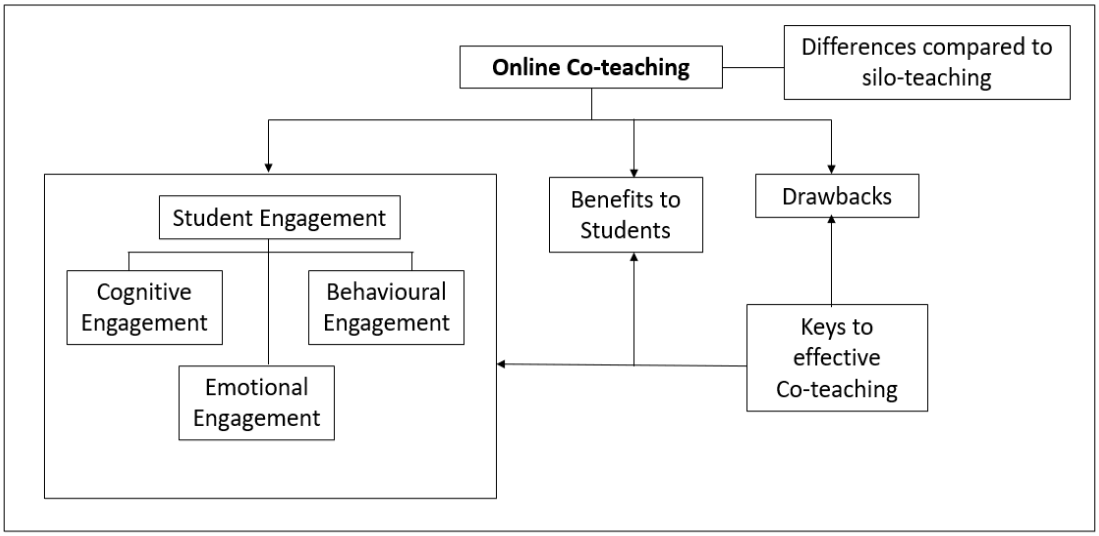

Figure 1. Framing of the study

The following sections present the key literature review that elaborates and supports the framing of this study. The literature review covers co-teaching models, impacts of co-teaching on student engagement, benefits of co-teaching, challenges, and keys to effective online co-teaching.

Co-teaching Models

Co-teaching is grounded in social constructivism, emphasizing the importance of social interaction, collaboration, and shared experiences in meaning-making. It is commonly related to apprenticeship, involving a collaborative partnership between experienced and novice teachers to improve student learning outcomes (Friend et al., 2014). A research synthesis found

seven co-teaching models (Bacharach et al., 2018; Badiali & Titus, 2010; Keeley, 2015; Keeley, Brown, & Knapp, 2017).

The "One Teach/ One Observe" model is called mentor modeling. This model is adequate for novice teachers as it provides an orientation to mentoring's instructional strategies. This model can be carried out in two ways. First, the novice observes a mentor's teaching and has a reflective conversation with the mentor about classroom teaching. Second, the mentor observes the novice teacher and provides feedback to help the novice improve their instructions. The third model is the "One Teach/ One Assist" or "One Teach/ One Drift" model. This model allows one teacher to focus on a large group of students while another monitors student progress and provides necessary support to individual students. In station teaching, students develop specific knowledge and skills when they visit each station. This model allows teachers to design various activities to cater to students' learning preferences.

In the fourth model, Parallel Teaching, the class is split into two groups. Each co-teacher teaches the same content to their assigned groups. The fifth model is Supplement Teaching, which allows one teacher to work with the whole class to help them achieve the intended learning outcomes. In comparison, one teacher works with students who need remedial education or extended resources. In Team Teaching or Synchronous Team, co-teachers share the same responsibility, presenting the same content and building on each other's ideas. The last model is the Alternative Teaching model. In this model, co-teachers differentiate the content or teaching approaches based on students' diverse learning needs. This model can happen in two ways. First, co-teachers modify the curriculum according to the student's progress. Second, two teachers teach the same content using different teaching methods to achieve the same learning outcomes.

Clancy (2022) categorized these seven models into two broader categories: (a) model with one lead teacher (i.e., one teach-one assist, one teach-one observe, and one teach-one monitor) and (b) model with co-teachers lead together. The models under the same category shared similar advantages and disadvantages, as shown in Table 1 (Bacharach et al., 2018; Badiali & Titus, 2010; Caprio, 2019; Clancy, 2022; Keeley, 2015; Lindgren, 2021).

Table 1. Advantages and Disadvantages of the Seven Co-teaching Models

Category	Co-teaching model	Advantages	Disadvantages
The model with one lead teacher	One Teach/One Observe	-Less interruption for other students and teachers -More eyes on students to identify and address their needs	Limit students' opportunities to benefit from the expertise and support of the other co-teacher
	One Teach/ One Assist		
The model with co-teachers leading together	Station Teaching	-Allow teachers to differentiate instructions based on students' learning needs	Requires extensive time planning and collaborating from both co-teachers. A healthy and mutual relationship is required based
	Parallel Teaching	- Students receive more attention from their teachers -Small group is more manageable	
	Supplement Teaching	Allow teachers to differentiate instructions based on students' learning needs.	

	Team Teaching	Capitalizes on two teachers' expertise and instructional strategies.	on trust and willingness to give and receive feedback.
	Alternative Teaching	Allow teachers to differentiate instructions based on students' learning needs.	

Benefits of Co-teaching

Numerous studies have highlighted the benefits of co-teaching for student learning (Bacharach et al., 2018; Boland, Alkhalifa, & Al-Mutairi, 2019; Caprio, 2019; Eschete, 2015; Holbrook, 2017). Co-teachers can leverage their strengths to provide students with diverse experiences and content knowledge. This can lead to variations in instructional materials, homework, and teaching styles that benefit students (Caprio, 2019; Gillespie & Israetel, 2008; Gokbulut, Akcamete, & Guneyli, 2020; Harter, 2018; Rahmawati & Koul, 2016; Wiesenberg, 2004). For example, using the station teaching model can cater to the needs of different learning styles, resulting in better academic performance and more positive student behavior (Badiali & Titus, 2010). Co-teachers can complement each other's opinions, provide timely feedback, and encourage students to view issues from different perspectives, thus helping to close learning gaps (Caprio, 2019; Gokbulut et al., 2020)

Caprio's (2019) investigation into students' perceptions of co-teaching revealed that they preferred it to non-co-taught settings as it allowed for quicker support and improved comfort in asking for help. Co-teaching can also increase interactions between co-teachers and students as teachers are less occupied due to the decreased teacher-to-student ratio. Students also perceive that co-teaching brings more fun to learning as two teachers can make jokes together. Co-teaching enables an effective grasp of student attention, with two teachers providing simultaneous instructions to students (Gillespie & Israetel, 2008). These factors lead to higher engagement and enjoyment of learning (Bacharach et al., 2018; Boland et al., 2019; Caprio, 2019).

Impacts of Co-teaching on Student Engagement

Student engagement is crucial for academic success (Clancy, 2022). While there is no universal definition for student engagement, in this study, student engagement was defined as "students' investment in and commitment to learning, belonging, and identification at school, and participation in the institutional environment and initiation of activities to achieve an outcome" (Christenson et al. 2008, p.1112). Student engagement entails three dimensions: behavior, cognitive and emotional (Ben-Eliyahu et al., 2018). Cognitive engagement reflects the extent to which one thinks about learning activities, focusing on tasks, and developing new meaning with information (Be-Eliyahu et al., 2018; Lochner et al., 2019). Behavioral engagement focuses on what students do during the learning activities (Be-Eliyahu et al., 2018). Emotional engagement refers to affect and motivation towards learning and schools (Be-Eliyahu et al., 2018).

Existing literature indicates that co-teaching has positive impacts on student engagement (Ben-Eliyahu et al., 2018; Clancy, 2022; Latorre-Navarro & Meier, 2019; Lochner et al., 2019; Nutt, 2021; Pilotti, 2017; Tonelli, 2019). Lochner et al. (2019) found that the student's cognitive engagement in their study was higher in a co-teaching classroom than in a solo-taught

classroom. The students asked and answered more questions and demonstrated higher thinking order skills. In agreement with Lochner et al. (2019) 's study, findings from the quasi-experimental study by Tonelli (2019) showed that the students in the treatment group (i.e., co-taught classroom) demonstrated a higher level of engagement. They had better knowledge of physical and earth science. They also experienced increased deep learning, attitudes toward learning, and school attendance. Tonelli (2019) attributed these positive results to stronger co-teacher support.

Clancy (2022) investigated the relationship between different co-teaching models (i.e., team teaching, station teaching, alternative teaching, one teach-one monitor, One teach-one assist, and One teacher-one observe) and student engagement in an inclusive classroom setting. Her research findings show a significant relationship between co-teaching models and student engagement. The students were more engaged during models in which co-teachers led instruction together than one co-teacher led instruction independently. Clancy (2022) concluded that the model, which is dominated by one co-teacher limited students' opportunities to benefit from the expertise and support of the other teacher. Lindgren (2021) reported similar findings that the One teach-one assist model was not very helpful for student engagement, particularly in an inclusive mathematics classroom setting. The student did not get differentiated instruction as one teacher only assisted without providing more individualized coaching. Conversely, the students showed positive behavioral, cognitive, and affective engagement in a station teaching context. This model allowed the co-teachers to differentiate the classroom instructions based on the needs of individual student groups (Lindgren, 2021).

Challenges in Co-teaching

Research has also indicated that there are some challenges in the implementation of co-teaching. In terms of individual factors, Chitiyo (2017) and White (White, 2020) reported that teachers lacked the skills and confidence to collaborate with their co-teachers, and this is supported by Hussin and Hamdan (2016), who highlighted strong self-concept as a key factor in co-teaching. Collaboration issues such as insufficient planning time, conflicting timetables, and increased workload impede co-teaching implementation (White, 2020; Dougan et al., 2022; Strogilos et al., 2023; Pratt, 2014). Co-teachers find it difficult to allocate time to create co-teaching plans; therefore, they must meet after school hours to co-plan lessons (Downey, 2017). They may need to use emails to share lesson plans and teaching resources outside of office hours, which impact the quality of their personal life (Downey, 2017).

Besides, teachers lack sound knowledge of co-teaching key principles and practices (Chitiyo, 2017). They have negative perceptions of co-teaching, thinking that it does not benefit student learning and is not helpful in fulfilling students' learning needs (Chitiyo, 2017; White, 2020). Moreover, differences in co-teachers personalities affect the implementation of instruction and co-teaching relationships. Teachers with different teaching and assessment approaches need time to navigate how to prevent conflicts during co-teaching (Lusk, Sayman, Zolkoski, Carrero, & Chiu, 2016). Co-teachers must discuss and compromise to achieve consensus on the type of instructions used and sharing responsibilities.

In addition, school factors such as school policies, availability of resources, and senior leadership support also influence co-teaching implementation (Chitiyo, 2017). School administrators do not take careful consideration when they pair co-teachers (Downey, 2017).

As a result, co-teachers need to pay additional efforts to learn how to work together to ensure that co-teaching serves its purpose (Scribner-MacLean & Miller, 2011). If they are not paired in the next semesters, they have to start building rapport all over again. Uncertainty in future co-teaching partnerships is detrimental to the development of a stable relationship among co-teachers (Downey, 2017)

Apart from that, not all students appreciate co-teaching in the classroom. For some, co-teaching is confusing as it differs from the conventional silo teaching models they are familiar with (Harter, 2018). Confusion, lack of clarity, and the uneasiness and tension brought upon by conflicting and incompatible instructions during class contribute to why some students may not prefer co-taught lessons (Hellier & Davidson, 2018; Pratt, 2014; Laughlin et al., 2011). They may resist co-teaching as they think it is less effective for their personal growth and development of competencies (Lusk et al., 2016). In contrast, the participants in Caprio (2019) 's study acknowledged this teaching approach and perceived that co-teaching did not negatively impact their learning.

Fundamentally, co-teaching challenges are rooted in what makes humans unique - our differences, be our personalities and behavior or values and philosophies. While traditional teaching cultivates an environment where an eclectic mix of individuals are guided by a single person who holds command of the room due to their professional qualification and role to guide the others (which in itself poses several obstacles), co-teaching goes beyond this dynamic and challenges the compatibility of multiple contrasting personalities by bringing another person with power into the picture to achieving the goal of effective teaching and learning. This then requires the equal distribution of responsibilities and workload, time management of both parties, prioritizing co-teaching regardless of the extra efforts required, discussing and aligning teaching philosophies, methods, and approaches, practicing combined instructions and assessments, and most importantly, consistently striving towards improving the rapport and coordination between two educators (Dougan et al., 2022; Strogilos et al., 2023; Pratt, 2014).

Strogilos et al. (2023) accurately described these issues as continuous challenges which are not limited just to the role of the educators in establishing effective co-teaching practices but also highlight the importance of strategic, systemic implications by academic institutions in supporting educators to co-teach. These include keeping co-teaching as a voluntary option, allowing educators to pick their partners, preparing ahead of time to pair educators, and allowing them to work on lessons long before the semester begins (Dougan et al., 2022). Moreover, ensuring that the extra workload is acknowledged and addressed through extra pay for extra working hours or reducing other responsibilities to allow for the conception and execution of effective co-taught lessons is also important.

Additionally, students' years desensitized to precise instructions in academic settings must be considered when discussing co-teaching challenges. Especially in an Asian, predominantly collectivistic (Loh & Teoh, 2017), contrasting instructions, ideologies, or opinions between educators who are often culturally revered can be uncustomary and thus present as strong student resistance. Nevertheless, clear communication, consistent and respectful discourse, and methodical co-teaching can easily overcome this challenge. Lock et al. (2018) wrote that co-teacher communication could be an exemplary collaborative practice.

Keys to Effective Online Co-teaching

Co-teachers must develop good co-teaching relationships to ensure that co-teaching can be practiced effectively (Downey, 2017; Lersch, 2012). Co-teachers should establish clear roles and responsibilities to work together effectively (Lochner et al., 2019). Co-teaching partners must actively engage in co-planning, co-instruction, and co-assessment, sharing the responsibility of all students.

Open communication is essential to foster stable co-teaching relationships so that co-teachers can share a common goal in co-teaching (Bacharach et al., 2018; White, 2020). Co-teachers need to achieve consensus on learning objectives, course ownership, course management strategies, and assessment tasks so that this information can be explicitly delivered to students (Lochner et al., 2019). The exchange of content knowledge and sharing of teaching methods and instructional beliefs are essential for effective collaboration. Co-teachers must demonstrate mutual respect's expertise, ideas, and contributions (Latorre-Navarro & Meier, 2022). They must collaborate to support student learning and create a positive classroom culture.

Competent information technology literacy facilitates online co-teaching (Scribner-MacLean & Miller, 2011). Co-teachers must identify appropriate technological tools and platforms for delivering instruction, communicating with students, and assessing learning. They also need to discuss the ownership of the online tasks and determine the meeting host.

Methodology

Research Context

This study was conducted during the implementation of a 4-week postgraduate module, Principles of Teaching and Learning, during the Covid-19 pandemic. All students from the Master in Teaching and Learning (MTL) program and Postgraduate Certificate in Teaching and Learning (PGCTL) program must enroll in this module. Most MTL students hold a bachelor's degree in a related field without working experience. The PGCTL students were mostly school teachers or lecturers from local universities. This module was practice-based, providing opportunities for students to relate learning theories to classroom practices, design lessons to meet the needs of diverse learners, and evaluate the quality of various teaching strategies. The instructors met the students for 1.5 hours per week.

The School of Education assigned two instructors to teach this module. The main author taught students specializing in Science, Technology, Engineering, and Mathematics (STEM) education. The first author was a novice lecturer with only 1.5 years of experience teaching at a higher education institution. The co-author taught the students whose specialization was in social sciences. She was a veteran who taught at a higher education institution for over 20 years. The School did not have a specific policy on co-teaching. Instructors could decide whether to teach students of different specializations in two separate classes or combine them. Since the three assessment tasks were the same for all students regardless of their specialization, the two instructors combined and co-taught the classes for collegial support. The two instructors had been co-teaching the lessons since the Covid pandemic outbreak started in the Year 2020.

A team teaching model was adopted in this co-teaching setting. The two instructors co-planned and co-taught the lessons. There was a clear instructional partnership as the instructors shared all responsibilities. Before the co-taught lessons, the instructors met and discussed the lesson content, teaching strategies, and learning activities. During the lessons, the instructors actively worked with the entire class as a whole and built on each other ideas. After the co-taught lessons, the instructors reflected on their co-teaching experiences. For instance, they shared their opinions on how the students responded to their questions, their participation in the learning activities, etc. Then, they made necessary modifications to improve the next lessons. For example, the instructors observed that some students listened passively throughout the lessons. They used Google Slides to encourage more students to provide their written responses. In one of the lessons, the students were split into two breakout rooms based on their program. Each instructor joined one breakout room to attain the students' specific needs from two different programs (e.g., how to relate their teaching experiences with the questions in the assessment tasks, how to improve their assignment draft, etc.). Figure 1 shows the online co-teaching cycle.

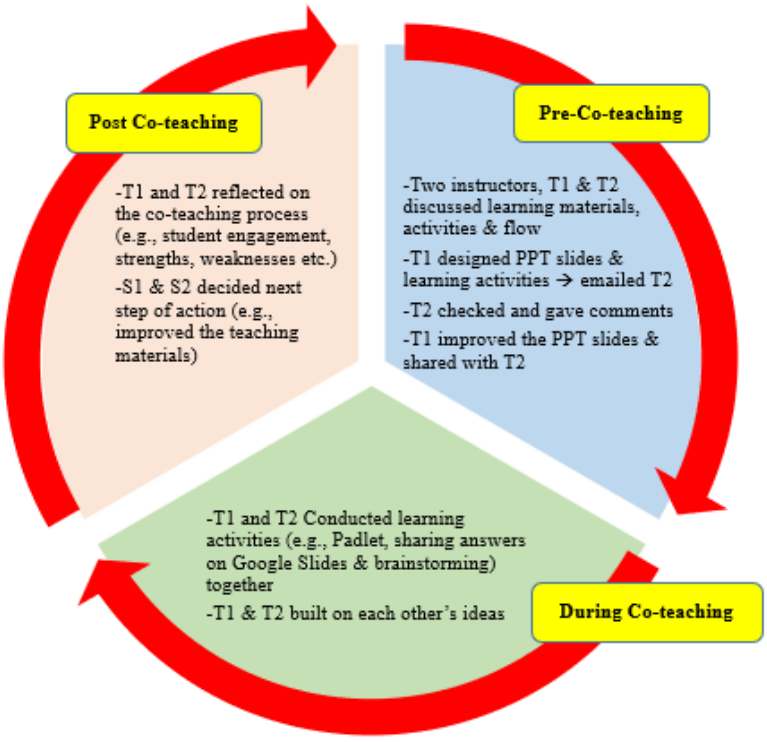

Figure 1. Online Co-teaching Cycle

Participants

A total of 48 postgraduate students enrolled in this core module—Principles of Learning and Teaching—in the 202106 Semester. 26 of them completed the survey. The responding rate was 54.2%. Thus, the data could be considered as reliable. Twenty participants (76.9%) were students from the MTL program. The remaining PGCTL students (n = 6, 23.1%). There were six male (23.1%) and nine female (34.6%) participants. 11 participants (42.3%) chose not to reveal their gender. More than 50% of the participants (n =15) were international students. The participant profiles are shown in Table 2.

Table 2. Participant Profiles

Demographic factor	Frequency	Percentage (%)
Program		
Master in Teaching and Learning	20	76.9
Postgraduate Certificate in Teaching and Learning	6	23.1
Gender		
Male	6	23.1
Female	9	34.6
I prefer not to say	11	42.3
Student status		
Local	11	42.3
International	15	57.7

Data Collection and Analysis

This study was guided by both qualitative and quantitative research design. An online questionnaire in the form of Google Forms was developed based on the existing literature. The questions were adopted from existing literature on student engagement (Hart, Stewart, & Jimerson, 2011; Veiga, Reeve, Wentzel, & Robu, 2014) and co-teaching (Bacharach et al., 2018; Gokbulut et al., 2020). The questionnaire consisted of four close-ended and four open-ended questions. The close-ended questions focused on student engagement during online co-teaching in terms of behavioral, cognitive, and emotional engagement and the benefits of online co-teaching. Each close-ended question consisted of six to eight items measured using a 5-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). The open-ended questions required the students to give their opinions on the drawbacks of co-teaching, effective strategies, and ways to improve co-teaching practice.

The online questionnaire was pilot-tested with the postgraduate students enrolled in the 202009 semesters who were not part of the final sample. Twenty-five participants had completed the pilot test. The interrater reliability for the close-ended questions in the pilot test was .65. The Kappa value between .60-.79 is at a moderate level of agreement (McHugh, 2012). Thus, the data could be considered reliable.

SPSS version 25.0 was used for data analyses. Descriptive statistics were used to analyze the responses to the close-ended questions. The responses to the open-ended questions were coded. Then the codes were categorized into themes related to the advantages and drawbacks of co-teaching and ways to move forward in co-taught lessons.

A few strategies were used to strengthen the trustworthiness of this study. First, all qualitative data were coded by two coders, the first and the second authors. The two coders chose one response and coded the data separately. Then, the codes were reviewed and revised based on the consensus of the three coders. Once agreement was reached on the coding schemes, all responses were coded. Next, the coders discussed their coding results and explained their coding decisions until a consensus was reached. Across the entire process, approximately 10% of changes were made. The second strategy involved data documentation which allowed for an audit trail.

Results

The research findings were discussed from five aspects: student engagement during online co-teaching; benefits of online co-teaching; online co-teaching practices; drawbacks of online co-teaching, and suggestions for improvement.

Student Engagement during Online Co-teaching

The research findings showed that the participants were behaviorally, cognitively, and emotionally engaged during the online co-teaching lessons. The mean scores for all the items in the three engagement scales were above 4.0. Amongst the three scales, cognitive engagement was rated the highest ($\bar{x}$ = 4.50). In contrast, behavioral engagement was rated the lowest ($\bar{x}$ = 4.28).

Table 1 shows the behavioral engagement of the participants. Overall, the mean score for behavioral engagement was ($\bar{x}$ = 4.28), showing that the participants agreed that they were behaviorally engaged. The statements which were rated the highest ($\bar{x}$ = 4.46) were BQ5 (i.e., When I encounter difficulties in completing my assignments, I keep working until I solve them.) and BQ6 (i.e., I joined online classes on time). The students rated BQ4 (i.e., I raised my doubts about the assignments) the lowest ($\bar{x}$ = 3.96).

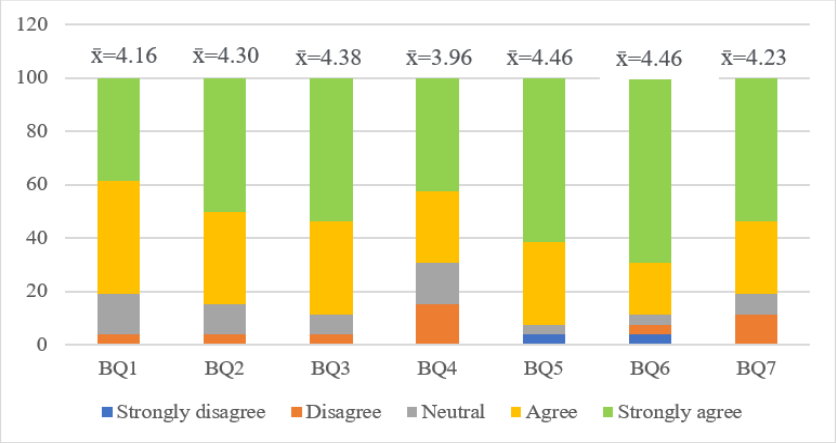

Figure 1. Participants' behavioral engagement during online co-teaching

As shown in Figure 3, the students agreed that they were cognitively engaged ($\bar{x}$ = 4.50). The participants strongly agreed that they tried to understand the requirements of each question (CQ6, $\bar{x}$ = 4.62). This is followed by statement CQ2 (i.e., I figure out how the module resources might be useful in the real-world teaching context) and CQ3 (i.e., When learning new information, I try to put the ideas in my own words) the same ($\bar{x}$ = 4.58). The statement with the lowest score was CQ5 (i.e., I thought deeply and critically about the questions, $\bar{x}$ = 4.34).

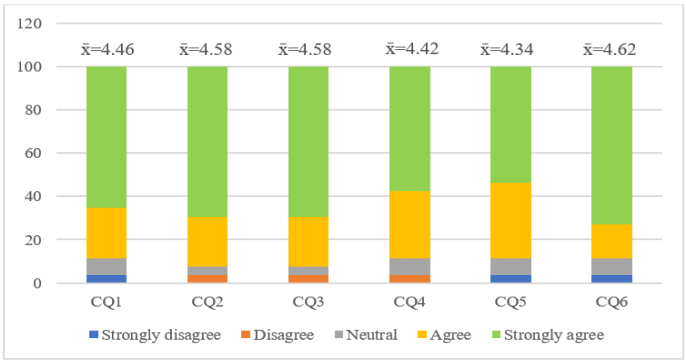

Figure 3. Participants' cognitive engagement during online co-teaching

Figure 4 shows the participants' emotional engagement during online co-teaching. The mean score for emotional engagement was 4.32, showing that the participants also agreed that they were emotionally engaged. The statement rated the highest was AQ4 (i.e., I enjoyed learning new things, $\bar{x}$ = 4.58). The statement with the lowest score was a negative statement (AQ7), showing that the participants did not feel that they were challenged in the presence of two instructors ($\bar{x}$ = 1.53).

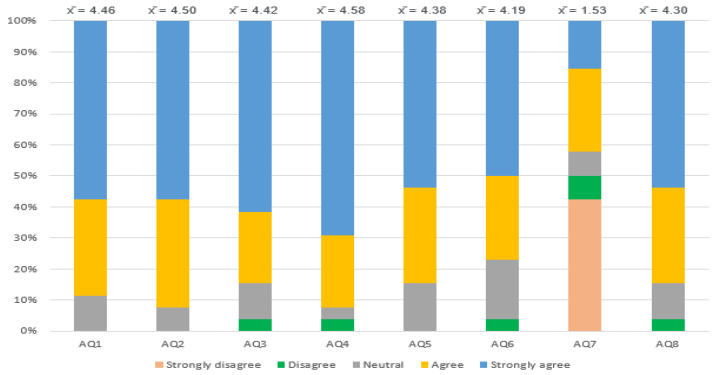

Figure 4. Participants' emotional engagement during online co-teaching

Benefits of Online Co-teaching

Figure 5 shows the participants' perceptions of the benefits of online co-teaching.

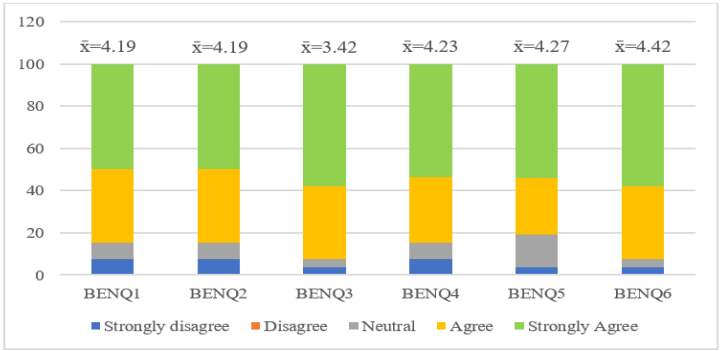

Figure 5. Participant's perceptions of the benefits of online co-teaching

The statement rated the highest was BENQ6 ($\bar{x}$ = 4.42). The participants strongly agreed that with the presence of two instructors, they could manage two breakout sessions or groups simultaneously. The students also agreed that the two instructors built on each other's ideas (BENQ4, $\bar{x}$ = 4.23). The students also had the opportunity to experience different instructional approaches adopted by the two instructors (BENQ5, $\bar{x}$ = 4.27). The statement rated the lowest was BENQ3 ($\bar{x}$ = 3.42). This finding showed that the participants neither agreed nor disagreed that the diversity of the experiences shared by the two instructors opened their minds.

Differences between Co-taught and Non-co-taught Lessons

In one semester, the postgraduate students took a few modules. Only the module taught by the main author and the co-author was conducted in an online co-teaching context. At the same time, other modules were taught by one lecturer. Co-taught and non-co-taught lessons were compared based on their experience in different modules. As shown in Figure 6, 23 participants (88.5%) claimed that there was a difference between attending a single-instructor and co-taught lessons. The differences can be discussed from a few aspects, including sharing knowledge and experience, classroom management, and modeling co-teaching practice.

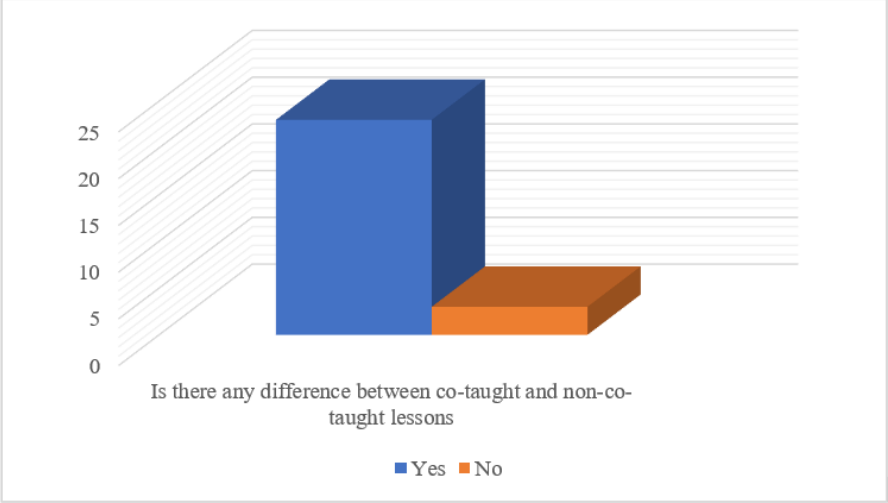

Figure 6. Participants' perceptions of differences between co-taught and non-co-taught lessons

The participants' justification about the differences between co-taught and non-taught lessons supported the quantitative data about the benefits of online co-teaching. The differences could be discussed from a few aspects, namely the diversity of experiences, classroom management, co-teaching exemplary and co-instructors complementary roles (Figure 7)

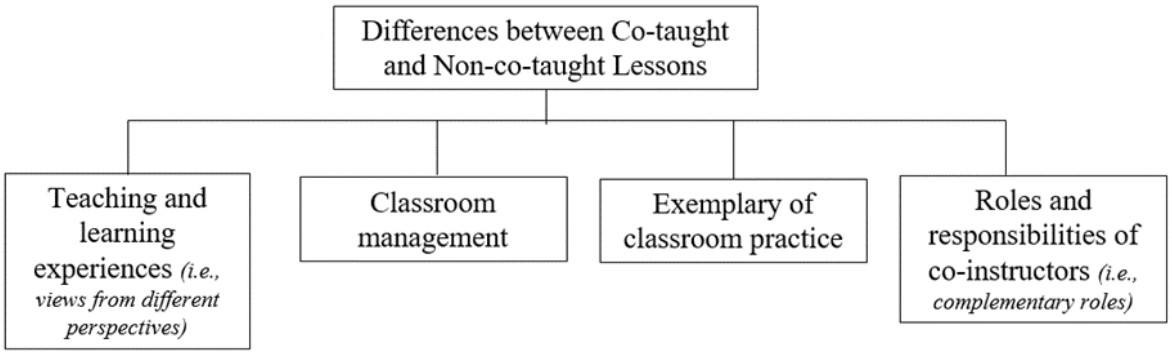

Figure 7. Participants' views on the differences between co-taught and non-con-taught lessons

Even though the participants rated BENQ3 (i.e., The diversity of experiences shared by two instructors open my mind) the lowest in the questionnaire, the qualitative data showed the opposite. The participants claimed they had benefited significantly from the online co-teaching practice of different perspectives and knowledge bases the two instructors brought forth individually. For example, five participants said,

"I like the way they can ask each other about their opinions and provide discussions with each other which we can listen to." (Student 4)
"The two teachers jointly teach, which can have the collision of two kinds of thoughts and obtain more angles and diversified classroom experiences." (Student 8)
"There's more than one teacher that I can ask when I need help or verification on my arguments, which is helpful since both teachers are aware of the context." (Student 13)
"The two instructors will have different viewpoints and thinking angles, which can cultivate students' dialectical thinking." (Student 20)
"Students get to hear various feedbacks and learn from different perspectives on a concept taught in class." (Student 23)

Other listed advantages are better classroom management, especially the breakout sessions. This data aligned with the participant's responses to BENQ6 (i.e., Two instructors can manage two breakout sessions simultaneously). For example, Student 4 said, *"Having two different breakout rooms when it (instruction) needs to be differentiated is also good."*

Student 6 elaborated that two instructors ensured the smooth flow of the lesson, *"I have more opportunity to direct my questions to the supervisors as one of them can continue giving lectures while the other will be able to answer my questions, without interrupting the lecture process."* (Student 6)

The participants also believed that the co-teachers set an exemplary collaborative teaching model. For example, two students mentioned, *"Two teachers can cooperate well with each other and accomplish teaching goals together."* (Student 7) and *"In co-teaching class, both teachers played an active instructional role. They introduced students to complementary teaching styles and personalities…Cooperation between teachers can also promote students' ability to work in teams, which reflects humanism."* (Student 20).

Two students further elaborated on the supportive roles of the instructors, which was impossible to be seen in non-co-taught lessons. For instance, Student 25 explained, *"When one of the*

supervisors missed or forgot certain points, the other supervisor could immediately add on and explain (the points) clearly."

Online Co-teaching Practices

The participants explained a few practices which made online co-teaching effective. These practices included turn-taking; co-planning; providing feedback; adopting teacher and student-centered teaching approaches, and integrating technology (Figure 8).

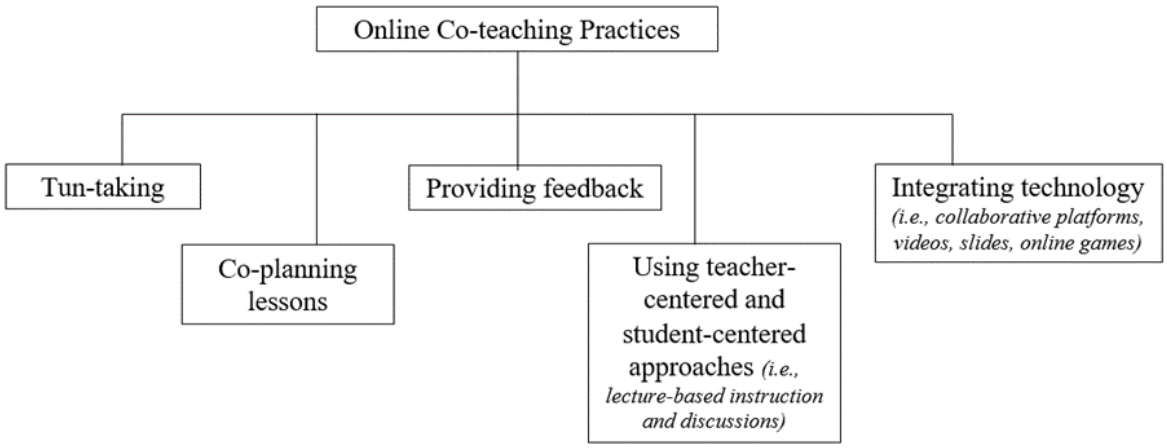

Figure 8. Online co-teaching practices by co-instructors

Even though the co-instructors shared the teaching responsibilities, the participants noticed that they occasionally practiced the "one teach, one assist" model. The co-instructors took turns playing the leading and supporting roles. Student 1 wrote, *"The teachers take turns to teach, and the main teacher for the lesson will do the teaching, and the co-teachers will work hand in hand by reinforcing the points."* Student 8 explained, *"The two tutors have a clear division of labor. They know their roles in each lesson. This was very helpful for me to understand the course."*

Collaborative co-planning is an essential practice in co-teaching. Co-planning requires co-teachers to plan the lessons and make appropriate accommodations based on students' learning needs. Student 26 was aware of the importance of co-teaching as she explained, *"They had good pre-planning. They gave clear instructions and conducted engagement activities."*

The participants also stated that timely feedback benefited their learning. They explained, *"Discussion on assignment questions and answered sharing from students to comment and provide appropriate feedback to our answers so that we can improve our answers"* (Student 5) and *"Constructive feedback is most helpful."* (Student 17)

The co-instructors adapted their teaching methods based on student participation in the online lessons. They adopted teacher-centered and student-centered approaches. When the participants responded passively, the co-instructors adopted lecture-based instruction. One of the participants explained, *"As most of the students were mostly silent, I think it's very teacher-centered even though the lecturers try to make the lessons student-centered. Some activities are used to help the lecturers interact with the students. However, most students do not even bother*

trying as they may not understand the questions given, making the lecturers answer some of them themselves." (Student 18)

Regarding the student-centered teaching approach, the participants explained that whole class discussions were planned for the students to share their ideas or clarify doubts. The student explained, *"The instructors held discussions and encouraged us to share our answers."* (Student 12)

The co-instructors used a few online learning tools throughout the four weeks to improve student engagement and enhance their learning. For instance, three students explained,
"They used Padlet to collect students' ideas" (Student 15)
"The teachers use some technologies in the classroom, such as video, slides, Kahoot, and Padlet, to get us involved. (Student 20)
"They conducted learning activities such as Padlet and put us in breakout rooms discussion in Zoom." (Student 23)

Drawbacks of Online Co-teaching

The research findings showed the advantages of co-teaching outweighed its disadvantages. 19 participants perceived that online co-teaching worked well. The only drawback highlighted is the possibility of students being confused by the difference between the two co-instructors in their thinking, perspectives, and ways of handling students. For example, three students expressed the view that,
"There could be a different opinion regarding certain topics. This could lead to confusion among the students." (Student 5)
"They may have a difference in style and thinking". (Student 12)
"Two supervisors might have different approaches to students." (Student 24)

Suggestions for Improving Online Co-teaching

Though the participants perceived that they benefited from co-taught lessons, there was still room for improvement. The participants provided some suggestions to improve the students' online co-teaching experience. The suggestions were providing more learning resources, integrating interactive activities, and sharing real-life experiences (Figure 9).

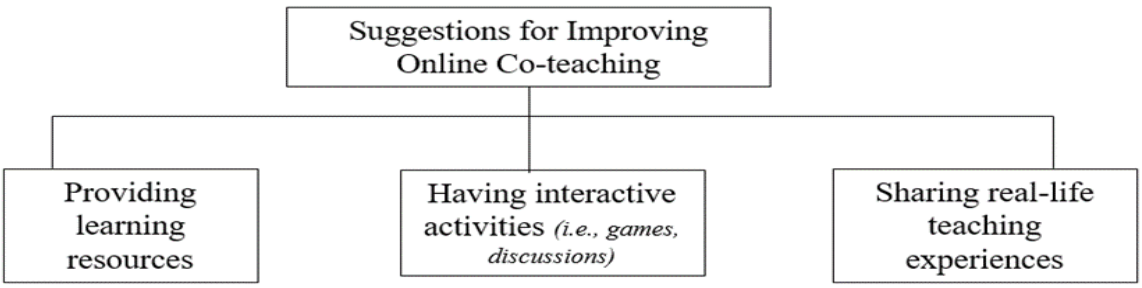

Figure 9. Participants' suggestions to improve online co-teaching

Student 18 suggested the instructors prepare more learning materials with better quality, *"I hope the instructors can provide more and better learning resources."*. However, she did not give an example of her desired learning resources.

The students suggested the co-instructors include more interactive activities to promote cognitive and emotional engagement. They explained,
"I think that incorporating more activities that are more inclusive and more interesting can help benefit the classes. Using different games that promote critical thinking skills can help the students to answer the questions based on their own opinions better." (Student 19)
"Gamification activities such as Quizzizz or Kahoot would be nice and fun." (Student 24)

Student 26 thought that classroom discussions were necessary to develop his content knowledge. He explained, *"The instructors can include slightly more discussions based instead of just focusing on assignment questions. There can be discussions on certain topics to enhance our knowledge."*

The participants, especially the students without teaching experience, thought sharing real-life experiences would help complete this practice-based module. They mentioned that,
"As I have never taught before, it will be helpful if the teachers or our peers can share their teaching experiences with us." (Student 17)
"Sharing real-life teaching experiences will be good. We can know what happens in other classrooms. We can learn from their experiences." (Student 22)

Discussion

This study investigated the postgraduate students' perceptions of their engagement during online co-teaching lessons, the prospects and drawbacks of online co-teaching, and suggestions for future improvement. Generally, the postgraduate students appreciated co-teaching and had positive feedback about their experiences in co-taught classrooms. These findings are consistent with a few previous studies, which showed that students rated co-teaching settings higher than silo-teaching settings (Bacharach et al., 2018; Caprio, 2019). Similar to the previous studies (Eschete, 2015; Harter & Jacobi, 2018; Rahmawati & Koul, 2016). In agreement with the previous studies (Ben-Eliyahu et al., 2018; Latorre-Navarro & Meier, 2019; Lochner et al., 2019; Nutt, 2021; Pilotti, 2017; Tonelli, 2019), the research findings indicated that the students were engaged cognitively, behaviourally and emotionally during online co-teaching. All close-ended items in the questionnaire were rated high. Regarding behavioral engagement, the students actively participated in the classroom activities and invested time to complete academic tasks. They employed thinking skills to solve task-related problems. They enjoyed co-taught lessons and felt comfortable asking for assistance from the co-instructors. Conversely, student involvement did not improve in the research conducted by Hayward (2017), even though the participants had positive perceptions of co-teaching. A plausible explanation is that co-teaching can only benefit students if co-instructors adopt effective teaching methods (Hayward, 2017).

The students in this study explained that their active engagement was supported by a few good co-teaching practices, such as adopting a combination of student-centered and teacher-centered teaching methods, providing timely feedback, and showing adequate pre-lesson preparation. This research finding elaborates Hayward's (2018) study that a lack of student-centered teaching approaches and collaborative opportunities for students affected student involvement in co-

taught lessons. The students expressed the view that co-teaching instructors' accommodative attitude towards each other could be another contributing factor to the positive impacts of co-teaching. Similarly, the participants in the previous studies (Bacharach et al., 2018; White, 2020) argued that mutual respect between co-teachers is the most important element for effective co-teaching. Another reason for students' high engagement could be that with co-teaching, there is more room for their diverse learning needs to be attended to (Kelly, 2018). In co-taught lessons, students wait less for teachers' help as two co-teachers can attain their needs more quickly (Bacharach, Heck, & Dahlberg, 2010).

Similar to the research conducted by Hayward (2018), the students in this study reported some differences between their learning experience in co-taught lessons and non-co-taught lessons. The research findings suggest that co-taught lessons bring a few advantages, most importantly the richness that can be gained from varying perspectives and opinions from two instructors (Bacharach et al., 2010; Kelly, 2018). Another advantage highlighted is the distribution of labor to manage students when they are put in small groups. Supervision is more effective as the order of a class is better maintained with the presence of two instructors (Bacharach et al., 2010; Caprio, 2019). Since there are two teachers in a class, teachers can differentiate their instruction to meet the diverse needs of students (Downey, 2017). They can assist struggling learners, challenge advanced students, and adapt instructional methods to accommodate different learning styles. In addition to the existing literature, the participants in this study added that they gained knowledge about co-teaching models, which might benefit their practice. Co-teaching models apply to all grades and curricula (Bacharach et al., 2010). Therefore, there are opportunities for the participants to implement co-teaching in their class future.

From the aspects of the drawbacks of co-teaching, consistent with the previous study (Lusk et al., 2016), the students thought that co-teaching would be less effective if two instructors had different opinions and teaching styles. Since co-teachers have different personalities, they commonly have different viewpoints (Harter & Jacobi, 2018). In some cases, instead of adding variation to a lesson, this phenomenon might lead to confusion. There might also be some degree of resistance from students who have well-adapted to traditional silo-teaching lessons (Lusk et al., 2016). Thus, communication among co-teachers and students is essential to ensure co-teaching's effectiveness. The structure of co-teaching lessons, co-teachers' roles and responsibilities, and co-teaching rationale must be communicated to students.

Due to the nature of this module, the instructors spent most of the time guiding the students to complete their assignments based on their teaching or learning experiences. The findings showed that there needed to be more clarity between the student's expectations and the activities conducted by the co-instructors. The participants suggested ways to improve online co-teaching practice, including more interactive activities and sharing sessions on teaching experiences. Interactive activities allow co-instructors to understand their students and adapt lessons to accommodate their learning needs. For these students, sharing real-life experiences with veteran teachers or experts could help them connect what they learned in the module with the real world. Small group and individual instructions can also be integrated into co-teaching classrooms to provide additional support or remediations for needy students. Private virtual chat rooms may be scheduled if students want to discuss a learning issue with a co-teacher (Lusk et al., 2016).

Collaborative challenges such as insufficient planning and unfamiliarity with co-teaching methods mentioned in the literature (Chitiyo, 2017) should have been reported by the

participants in this research. A plausible reason is that the two instructors had invested time in planning the instructions and activities together before the lessons. Furthermore, both instructors had been co-teaching this module for five semesters. Thus, the instructors were familiar with the structure, procedures, and co-teaching techniques. This is in line with Kelly's (2018) study that highlighted Community of Practice (CoP) as a principle for co-teaching which refers to the establishment of mutually agreed co-teaching practices that will be implemented in the classroom for successful co-teaching.

Co-teachers' collaborative relationship is crucial when implementing co-teaching (Brendle et al., 2017; Hayward, 2017). If co-teachers have good working partnerships, they can play equal roles and collaborate well during co-teaching. Teachers may feel stressed and overwhelmed when they do not see themselves as equal to their co-teachers, such as content knowledge and experience (Downey, 2017). Therefore, it is suggested that the Faculty consider the pairing issue as some teachers may not feel comfortable with different personalities. Aldabas (2018) reported that co-teachers readiness and belief related to the use and implementation of co-teaching impact the effectiveness of this practice. Thus, it is also necessary for the Faculty to ensure that co-teachers are ready regarding attitudes, knowledge, and co-teaching skills to implement co-teaching successfully (Aldabas, 2018).

Conclusion

The research findings of this study showed that co-teaching is a potential practice to engage students during online learning. The students reported that they benefited from online co-teaching in broadening their views, setting examples for co-teaching models, and effective classroom management. Student engagement in co-taught classrooms is influenced by how well instructors can grasp their attention and the amount of help they receive (Lersch, 2012). The irony is differences in the point of view between co-teachers may have favorable and unfavorable consequences for student learning. While some students benefit from co-teaching to broaden their knowledge (Bacharach et al., 2010), some may be confused by the presence of two teachers (Harter, 2018). Thus, it is crucial to communicate the structure of co-teaching to students. The development of online co-teaching practices during the Covid-19 pandemic faced different possibilities and challenges when individual teachers joined forces to facilitate student learning. Moving forward, research and evidence-based practices in co-teaching can further inform professional development programs for the benefit of students and teachers. This happens when educators and researchers work collaboratively to collect empirical data on the co-teaching practices in various classroom settings, effective co-teaching practices to support diverse learners and refinement of co-teaching strategies. Collaboration might extend beyond the traditional co-teaching model to include interdisciplinary teams and partnerships with specialists, such as counselors, therapists, or technology integration experts, to enhance the teaching and learning experience.

Implications of the Study

This study has practical implications for the professional development of teachers and teacher education. The research findings indicate that co-teaching is a potential teaching approach to support online learning. Thus, co-teaching can be a training model for professional development programs. Promoting systematic collaboration between teachers can strengthen the link between professional development and teacher practice (Eschete, 2015). Co-teaching allows

teachers to access mentorship and modeling, get opportunities to collaborate with colleagues, and reflect on their pedagogical approaches (Lusk et al., 2016). Reflective discussions among co-teachers are vital for analyzing their teaching experiences, teaching outcomes, and collaboration processes. This will lead to professional growth and increased quality of teaching skills. The findings also suggest that school administrators must provide supportive culture such as allocating resources, facilitating classroom visitations, and establishing a systematic structure to support co-teaching initiatives.

Considering the benefits of the co-teaching model as revealed by this study, teacher training colleges or universities can consider the possibility of incorporating co-teaching models into their teacher training programs, including practicum (Latorre-Navarro & Meier, 2022; Lochner et al., 2019). This will allow student teachers to learn essential teaching skills better to prepare them for independent teaching in the future. Student teachers can also be exposed to the co-teaching practices highlighted by the participants, such as turn-taking and the adoption of various teaching methods to provide a better learning experience for their future students.

Limitations and Recommendations for Future Study

Although this study has practical implications for practitioners' professional development, a few things could be improved regarding instruments and data collection methods. The first limitation is related to the instrument, particularly the questions about student engagement. All questions were closed-ended, so the participants could not explain the reasons for their ratings. The second limitation is the data collection method, which only involves a questionnaire. This is the only source for data triangulation to create an in-depth picture of online co-teaching. For example, there needed to be more consistency in the participants' views on the impacts of the instructors' different opinions and teaching approaches on their learning. The reasons behind these discrepancies were not explored since the participants' responses were only collected using the questionnaire. The third limitation is the small sample size, which only involved 26 postgraduate students from one university. Thus, the research findings cannot be generalized to other educational contexts.

For future studies, the researchers can add open-ended questions about student engagement in the questionnaires. Open-ended questions allow students to articulate their opinions about the impacts of online co-teaching on their engagement and the predetermined items. Besides, students can elaborate on how online co-teaching impacts their engagement. The researchers can collect data from multiple sources, such as student interviews and video recordings, to delve deeper into how co-teaching is conducted online. Conducting convergent and discriminant validity during the pilot test and excluding invalid items from the questionnaire during data collection is also recommended. To increase the sample size, future studies can involve postgraduate students from different cohorts who have also experienced co-teaching under the same co-instructors.

Since two groups of students with different amounts of teaching experience enrolled in this module, future studies can adopt a more sophisticated quantitative data analysis method to compare the impacts of co-teaching on these students. In addition, previous studies suggest school administrators need to pay attention to the issue of pairing or assigning co-teachers (Downey, 2017; Lersch, 2012). Future research can explore co-teachers lived experience in practicing co-teaching to understand the challenges they face in co-teaching and suggest ways

for professional development. Lastly, this study was conducted during the Covid-19 pandemic outbreak. Thus, the co-teaching study was conducted in an online setting. In this post-Covid-19 era, hybrid learning is commonly practiced to ensure a smooth transition from fully online learning to physical lessons. It is recommended to extend this study to a hybrid setting to explore how this practice can be capitalized in this setting for the benefit of student learning.

References

Aldabas, R. A., (2018). Co-teaching in Classrooms: Literature review of teachers' perspective, readiness, and knowledge. *Journal of Education and Practice, 9*(9), 156-161.

Bacharach, N., Heck, T. W., & Dahlberg, K. (2010). Changing the face of student-teacher through co-teaching. *Action in Teacher Education, 32*(1), 3-14. doi: 10.1080/01626620.2010.10463538

Bacharach, N., Heck, T. W., & Dahlberg, K. (2018). Co-teaching in higher education. *Journal of College Teaching & Learning, 5*(3), 9-16.

Badiali, B., & Titus, N. E. (2010). Co-teaching: Enhancing student learning through mentor-intern partnerships. *School-University Partnerships, 4*(2), 74-80.

Ben-Eliyahu, A., Moore, D., Dorph, R., Schunn, C. D. (2018). Investigating the multidimensionality of engagement: Affective, behavioral, and cognitive engagement across science activities and contexts. Contemporary Educational Psychology, *53*, 87-105.

Brendle, J., Lock, R., & Piazza, K. (2017). A study on co-teaching identifying effective implementation strategies. *International Journal of Special Education, 32*(3), 538-550.

Boland, D. E., Alkhalifa, K. B., & Al-Mutairi, M. A. (2019). Co-teaching in EFL classroom: The promising model. *English Language Teaching, 12*(12), 95-98.

Caprio, C. (2019). *Student perceptions on the effectiveness of co-teaching: Do students perceive co-teaching to be beneficial?* (Publication No. 13881001). [Doctoral dissertation, Illinois State University]. ProQuest Dissertations and Theses Global.

Chitiyo, J. (2017). Challenges to the use of co-teaching by teachers. *International Journal of Whole Schooling, 13*(3), 55-66.

Christenson, S. L., Reschly, A. L., Appleton, J. J., Berman-Young, S., Spangers, D., & Varro, P. (2008). Best practices in fostering student engagement. In A. Thomas & J. Grimes (Eds.), *Best practices in school psychology* (pp. 1099–1120). Washington, DC: National Association of School Psychologists.

Clancy, E. (2022). *An investigation into the relationship between co-teaching and student statement*. [Doctoral dissertation, University of Maryland]. DRUM. https://drum.lib.umd.edu/handle/1903/28986

Cordie, L. A., Brecke, T., Lin, X., & Wooten, M. C. (2020). Co-teaching in higher education: Mentoring as faculty development. *International Journal of Teaching and Learning in Higher Education, 32*(1), 149-158.

Dougan, A., Corcoran, L., & Lane, A. (2022). A case for clinical co-teaching: Challenges and opportunities. *Teaching and Learning in Nursing, 17*(2), 245–248. https://doi.org/10.1016/j.teln.2021.11.002

Downey, J. M. (2017). *Perceptions of co-teaching in the middle school English language arts classroom.* (Publication No. 2376). [Doctoral's Dissertation, Rowan Univeristy]. Rowan Digital Work Theses and Dissertations Database.

Eschete, C. L. (2015). *Engagement levels during implementation of co-teaching models.* (Publication No. etd-07102015-120911). [Doctoral's Dissertation, Louisiana State University]. LSU Digital Commons.

Friend, M., Columbia, D., & Clarke, L. (2014). Co-teaching versus apprentice teaching: An analysis of similarities and differences. *Teacher Education and Special Education: The Journal of the Teacher Education Division of the Council for Exceptional Children, 38*(2), 79-87. doi.org/10.1177/08884064145293

Gillespie, D., & Israetel, A. (2008, August). *Benefits of co-teaching in relation to student learning.* Paper presented at the 116th Annual Meeting of the American Psychological Association, Boston.

Gokbulut, O. D., Akcamete, G., & Guneyli, A. (2020). Impact of co-teaching approach in inclusive education settings on the development of reading skills. *International Journal of Education and Practice, 8*(1), 1-17. doi: 10.18488/journal.61.2020.81.1.17

Hart, S. R., Stewart, K., & Jimerson, S. R. (2011). The student engagement in schools questionnaire (SESQ) and the teacher engagement report form-new (TERF-N): Examining the preliminary evidence. *Contemporary School Psychology, 15*, 67-79.

Harter, A. (2018). *"We considered ourselves a team:" A view of co-teaching from the perspectives of graduate teaching assistants and students.* [Master's thesis, Minnesota State University]. Cornerstone. https://cornerstone.lib.mnsu.edu/etds/799

Harter, A., & Jacobi, L. (2018). "Experimenting with our education" or enhancing it? Co-teaching from the perspective of students. *Inquiry in Education, 10*(2), Article 4. https://digitalcommons.nl.edu/ie/vol10/iss2/4/

Hayward, A. A. M. (2018). *Students' perceptions of co-teaching in the inclusive classroom.* (Publication No. 165038246). [Master's thesis, University of Jyväskylä]. Semantic Scholar.

Hellier, S., & Davidson, L. (2018). Team teaching in nursing education. *Journal of Continuing Education in Nursing*, 49(4), 186–192. doi:10.3928/0022012420180320-09

Holbrook, J. (2017). *The effects of an online coaching model on secondary co-teaching teams in algebra.* (Publication No. 5561). [Doctoral's dissertation. University of Central Florida, Orlando] STAR Electronic Theses and Dissertations.

Hussin, M. K., & Hamdan, A. R. (2016). Challenges of co-teaching in Malaysian Inclusive Classroom: Administrators', teachers' and parents' overview. *Procedia - Social and Behavioral Sciences, 217*, 477–486. https://doi.org/10.1016/j.sbspro.2016.02.019

Keeley, R. G. (2015). Measurements of student and teacher perceptions of co-teaching models. *Teaching Models, The Journal of Special Education Apprenticeship, 4*(1), Article 4.

Keeley, R. G., Brown, M. R., & Knapp, D. (2017). Evaluation of the student experience in the co-taught classroom. *International Journal Of Special Education, 32*(3), 520-537.

Kelly, A. (2018). Co-teaching in higher education: Reflections from an early career academic. *Journal of Learning and Teaching in Higher Education, 1*(2), 181-188. doi: 10.29311/JLTHE.V1I2.2798

Kursch, M., & Veteška, J. (2021). Co-teaching: Advantages and disadvantages. *Learning Never Ends... Spaces of Adult Education: Central and Eastern European Perspectives*. https://doi.org/10.31338/uw.9788323552062.pp.93-107

Latorre-Navarro, E., & Mierr, E. L. (2022). (2022, June 26-29). Exploring a co-teaching model to improve classroom engagement. Paper presentation. ASEE 2022 Annual Conference, Minneapolis, Minnesota, USA.

Laughlin, K., Nelson, P., & Donaldson, S. (2011). Successfully applying team teaching with adult learners. *Journal of Adult Education*, 40(1), 11–18. https://files.eric.ed.gov/fulltext/EJ961997.pdf.

Lersch, M. (2012). *Student Perceptions of Co-teaching: What do students think about co-teaching?* [Master's thesis, Arizona State University]. CORE. https://core.ac.uk/display/79564138?utm_source=pdf&utm_medium=banner&utm_campaign=pdf-decoration-v1?

Lindgren, P. S. (2021). Co-teaching strategies and student engagement in a secondary math class [Master's thesis. Saint Mary's College of California] MATL Action Research Projects. https://digitalcommons.stmarys-ca.edu/matl-action-research/10

Lochner, W. W., Murawski, W. W., Daley, J. T., (2019). The effect of co-teaching on student cognitive engagement. *Theory & Practice in Rural Education (TPRE). 9*(2), 6-19. https://doi.org/10.3776/tpre.2019.v9n2p6-19

Lock, J., Rainsbury, J., Clancy, T., Rosenau, P., & Ferreira, C. (2018). Influence of co-teaching on undergraduate student learning: A mixed-methods study in nursing. *Teaching & Learning Inquiry*, *6*(1), 38–51. https://doi.org/10.20343/teachlearninqu.6.1.5

Loh, C. Y. R., & Teoh, T. C. (2017). Understanding Asian Students Learning Styles, Cultural Influence and Learning Strategies. *Journal of Education & Social Policy*, *7*(1), 194–210. https://doi.org/ISBN 2375-0790

Lusk, M., Sayman, D., Zolkoski, S. M., Carrero, K., & Chiu, C. L. (2016). *Playing well with others: Co-teaching in higher education.* https://www.researchgate.net/publication/309151956_Playing_well_with_others_Co-Teaching_in_higher_education/citations

McHugh, M. L. (2012). Interrater reliability: the kappa statistic. *Biochem Med (Zagreb)*, *22*(3), 276–282.

Pratt, S. (2014). Achieving symbiosis: Working through challenges found in co-teaching to achieve effective co-teaching relationships. Teaching and Teacher Education, 41, 1–12. https://doi.org/10.1016/j.tate.2014.02.006

Rahmawati, Y., & Koul, R. (2016). Fieldwork, co-teaching, and co-generative dialogue in lower secondary school environmental science. *Issues in Educational Research, 62*(1), 147-164.

Schleicher, A. (2020). The impact of COVID-19 on education - Insights from Education at a Glance 2020: OECD.

Scribner-MacLean, M., & Miller, H. (2011). Strategies for success for online co-teaching. *MERLOT Journal of Online Learning and Teaching, 7*(3).

Strogilos, V., King-Sears, M. E., Tragoulia, E., Voulagka, A., & Stefanidis, A. (2023). A meta-synthesis of co-teaching students with and without disabilities. *Educational Research Review*, *38*, 100504. https://doi.org/10.1016/j.edurev.2022.100504

Tang, K. H. D. (2022). Movement control as an effective measure against Covid-19 spread in Malaysia: an overview. *Z Gesundh Wiss*. *30*(3). 583-586.

UNESCO. (2021). COVID-19: Reopening and reimagining universities, Survey on Higher Education through the UNESCO National Commissions. https://unesdoc.unesco.org/ark:/48223/pf0000378174

United Nations. (2021). *Teachers are driving force behind "global education recovery" from Covid-19 | UN News*. United Nations. https://news.un.org/en/story/2021/10/1102132

Veiga, F. H., Reeve, J., Wentzel, K., & Robu, V. (2014). Assessing students' engagement: A review of instruments with psychometric qualities. In F. H. Veiga (Ed.), *Students' Engagement in School: International Perspectives of Psychology and Education* (pp. 38-57). Lisboa: Instituto de Educação da Universidade de Lisboa.

White, L. (2020). *A basic interpretive study of co-teaching perceptions: Collaboration of general and special education elementary school teachers.* (Publication No. 377). [Doctoral's dissertation, University of the Incarnate Word]. The Athenaum Theses & Dissertations database.

Wiesenberg, F. (2004). Designing and co-facilitating online graduate classes: Reflections and recommendations. *Canadian Journal of University Continuing Education, 30*(2), 39-57.