# EXPERIENCES OF SYNCHRONOUS DISTANCE TEACHING IN CREDIT COURSE FOR IN-SERVICE NURSING DURING PANDEMIC

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**Abstract**

In response to the uncertainty of the Coronavirus disease 2019 (COVID-19) pandemic, schools of all levels in Taiwan complied with the Ministry of Education's principle to postpone the start of the semester. To facilitate the "Suspending Classes without Stopping Learning", a university in northern Taiwan implemented various digital learning programs as substitutes for conventional courses. Asynchronous distance teaching (such as prerecorded videos for online teaching) was commonly used in the past. One nursing course of Adult Nursing Case Evaluation and Analysis (ANCEA) was conduct WebEx online by using Synchronous Distance Teaching (SDT) based on the particular teaching strategies, during this COVID-19 pandemic. The course teaching strategies contain lectures, case method teaching, team-based learning, and concept mapping. In this article, we described and shared the experiences from in an extension education credit class for in-service nursing staff in April 2020. This was a rare and valuable experience for both the students and the teachers. The article provides 'real time' synchronous teaching detail procedure and suggestions for the future implementation and promotion of synchronous distance teaching, which will enable us to approach or even surpass classroom teaching in terms of effectiveness.

*Keywords:* Synchronous distance teaching (SDT); Continuing Nursing Education; Team-based learning (TBL); Case method teaching

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## Introduction

The Coronavirus 2019 (COVID-19) pandemic outbreak happened suddenly. The first case in Taiwan was recorded on January 21, 2020, which was during students' winter vacation and Taiwan's Lunar New Year holidays. Because of the uncertainties that the pandemic may bring, the Ministry of Education (MOE), of the R.O.C. (Taiwan) ordered all levels of education to postpone the upcoming semester by two weeks to avoid students from transmitting the virus in classrooms. As a result, adjustments had to be made to ensure that the students will still be able to learn despite the circumstances. In order to help students to further their education, various preparatory measures in response to the possible spread of infection were implemented. The traditional classroom lessons were hence replaced by digital learning projects, including online makeup class platforms, course recordings or videos, asynchronous distance teaching (with no face-to-face teaching), preview and review materials and homework, and assessment methods. Each substitute method was required to be taken into consideration and be adjusted for course characteristics, learning material, timings, and the physical environment (Locatis, Berner et al. 2010). At the time, synchronous online teaching became a hot topic (Roberts, Malone et al. 2020). In this paper, we shared the experience taken by using the WebEx online distance synchronous teaching (SDT) for the Adult Nursing Case Evaluation and Analysis credit course (ANCEA) for in-service nursing staff in northern Taiwan in April 2020.

## Continuing Nursing Education

New empirical scientific knowledge is emerging from rapid advances in the field of medicine and nursing around the world. The latest clinical evaluation and treatment guidelines for illnesses are being modified constantly. Continuing Nursing Education provides the latest knowledge and skills as a core component of healthcare professional development (Dowling, Last et al. 2018) (Jackson, Jowsey et al. 2019, Jones-Schenk 2019). As clinical nursing practices advance, nursing departments in several Taiwanese universities have begun to provide a two-year technical program nursing courses for in-service nursing associate degree staff. This education program increase clinical skills, individual maturity and obtain a university degree for in-service nursing staff. Furthermore, our in-service and continuing education department have utilized the alliance resource exchange system and supported the nursing departments of many hospitals to provide clinical nursing staff with diverse supports and channels for learning (Graue, Rasmussen et al. 2015) (Ross, Barr et al. 2013). One university in northern Taiwan (thereafter referred to as: NS) offers in-service training nursing credit courses and provides resources to retain nursing staff at the hospital for professional development.

**Adult Nursing-Case Evaluation and Analysis Credit Curriculum (ANCEA)**

The ANCEA is a compulsory subject at the NS's *two-year nursing program.* Clinical medical cases are not often with single symptom or illness. When a patient exhibits various problems or symptoms, the students are required to provide comprehensive evaluation and individualized holistic care. To enhance the students' clinical employability, ANCEA uses real clinical cases materials. The course focuses on guiding students to integrate basic biomedical knowledge, and clarifies the case of physiological pathology and physical, mental, and social reactions of the cases. The course is designed to provide opportunities to practice in the application of critical thinking and problem-solving skills in the nursing process, for the provision of patient-centered care. The teaching strategies include (1) lectures, (2) case analysis, (3) Team-based learning (TBL), TBL group discussion and reports (4) concept mapping multimedia teaching in the **ANCEA** course **(Figure 1).**

*1. Case method teaching (CMT)*

Inspired by the success of CMT of the Harvard University School of Law in the United States, this method requires students to read and analyze facts from a case circumstances and the court's jurisdiction (Austin 2009). It is a great tool to bridge gaps that often exist between what they learn, what they are tested on, and what they should and can apply. Students are then required to reflect on their own solutions and action plans (Austin 2009). In order to trace conceptual developments in the medical field, students must read materials first and reflect on questions regarding the respective case. CMT enables learners to think independently and practice participation in real cases (Austin 2009). Instructors are experts but rarely impart their professional knowledge directly. Rather, they ask questions at appropriate moments and provide feedback on students' answers to continue the discussion on cases. It enables students to learn both how to utilize knowledge and how to face problems in similar cases in the future (Ellet 2007).

*2. Concept mapping*

Concept mapping was first developed by the scientific educators Novak et al. (1972). Thereafter, its research applications have become numerous, and have been widely applied in educational practice. Novak, Gowin, & Johansen (1983), guided by cognitive learning assimilation theory, compared mechanical learning and meaningful learning as well as the role of existing knowledge in learning, and they developed the concept mapping strategy (Novak 1983). Drach-Zahavy, Broyer, and Dagan (2017) studied clinical nurses' use of concept mapping to establish mind maps during handovers to the nurses for subsequent shifts (Drach-Zahavy, Broyer et al. 2017). The results showed that, when nurses shared their mind maps, their understanding of a case improved. Garwood, Ahmed, and McComb (2018) used meta-analysis to study 17 papers, and they discovered that the use of concept mapping as the teaching strategy improves the critical thinking abilities of university students in the nursing department (Garwood, Ahmed et al. 2018). Students also experienced the benefits of concept mapping on their studies. The concept mapping method

evidently facilitated effective learning and the highlighting of major points, the breaking down of content, and the stratification of studies (LaNoue, Mills et al. 2016, Wilson, Mandich et al. 2016, Stoyanov, Jablokow et al. 2017).

### 3. Team-based learning (TBL)

The TBL is a *student-centered* instructional strategy. It has been widely applied within teaching in numerous academic and professional fields. It has been proactively used in medical education and healthcare-related departments (Dearnley, Rhodes et al. 2018). Studies have shown that TBL can substantially increase the students' autonomous learning ability and classroom activity participation; in addition, their academic performance also substantially improves (Ouellette and Blount 2015) (Betihavas, Bridgman et al. 2016). The before-class preview design of TBL has improved students' independent learning abilities and cultivated responsible attitudes (Lanken, Novack et al. 2015). TBL promotes the extent of in-class discussion which currently accompanied in the ANCEA course. The main teaching Strategies of ANCEA curriculum showed below in Figure 1.
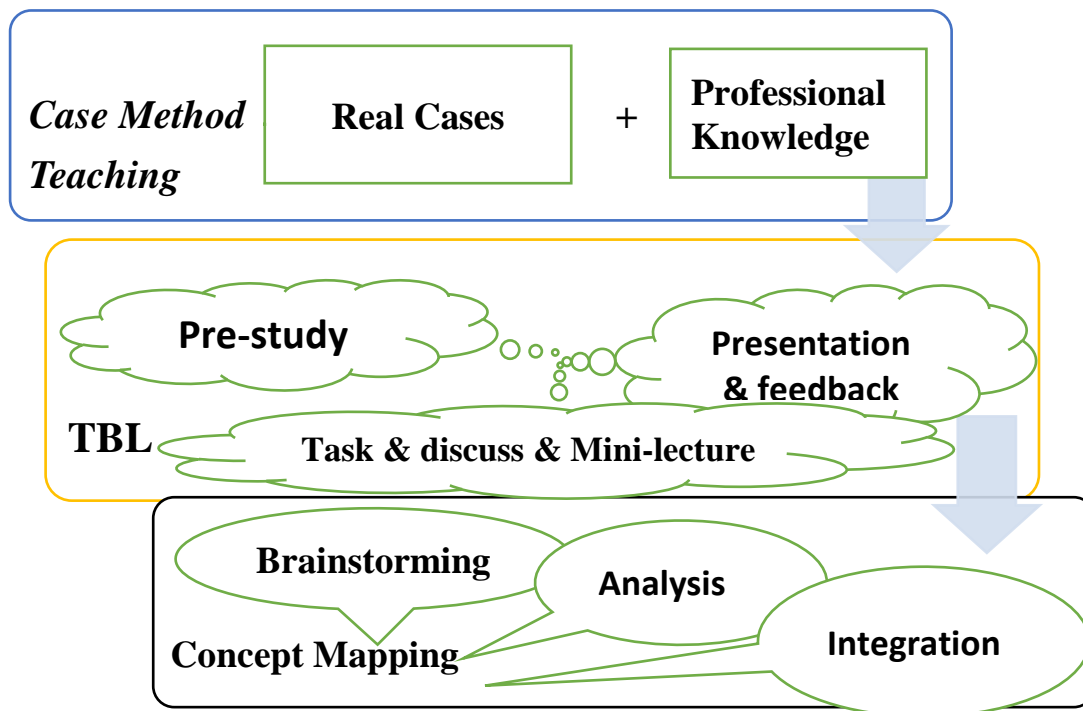


Figure 1: Teaching Strategies of Synchronous Distance Technology in the curriculum

**Online Synchronous Distance Technology (SDT) decision**

In order to meet the aforementioned needs in clinical Nursing Education, the ANCEA course was scheduled for the credit class in-service nurses in March to April 2020. During the pandemic, medical and nursing staffs at the frontline have been subjected to the pressure of heavy workload and the risk exposure to infection. To accommodate the schedules of the students who originally signed up for the credit course, we conducted the course officially by using synchronous online teaching to meet the student's expectations. Synchronous interaction is more compatible to ANCEA teaching strategies. To ensure the effective implementation of the curriculum, NS held several online teaching seminars and workshops, facilitating teachers' and students' familiarity with platforms WebEx and i-Learning et.al to achieve optimized learning efficiency (Berndt, Murray et al. 2017) (Button, Harrington et al. 2014) (Rouleau, Gagnon et al. 2019).

The rise of online classes as a result of the COVID-19 pandemic has rendered higher education more flexibility and, in turn, become more inclusive. As contrast to the asynchronous distance teaching (such as prerecorded videos), synchronous learning requires the simultaneous participation of all students the teacher in "real time" (Cook and Steinert 2013). Duo to the synchronous teaching can also take place via online learning, through the use of video conferencing and live chat or instant messaging. As with the face-to-face environment, the learners in synchronous online teaching can ask questions in real time. Nevertheless, whether online syncing multiple students (rather than one-to-one) of joint online learning can achieve effective learning, in terms of preparations in terms of software and hardware readiness.

**Procedure of SDT in ANCEA**

The present methodology was related to teacher's involvement, recording of the whole procedure of Synchronous Distance Technology in the Adult Nursing-Case Evaluation and Analysis Credit Curriculum (Procedure of SDT in ANCEA). Figure 2 presents the scheme of synchronous distance technology in the curriculum. The procedure outlines the necessary steps in order to plan an online course including the precautions, notes and suggestions. We present the teacher's provision and suggestions before SDT performing and the setting up of students' arranged. We provided some ways for safeguard the learning quality adjustment act according to circumstances during course running. Finally, we indicated our impressions after SDT. Since the on line synchronous manner, that could accepted students' feedback directly. The information of students' feedback during and after SDT is organized.
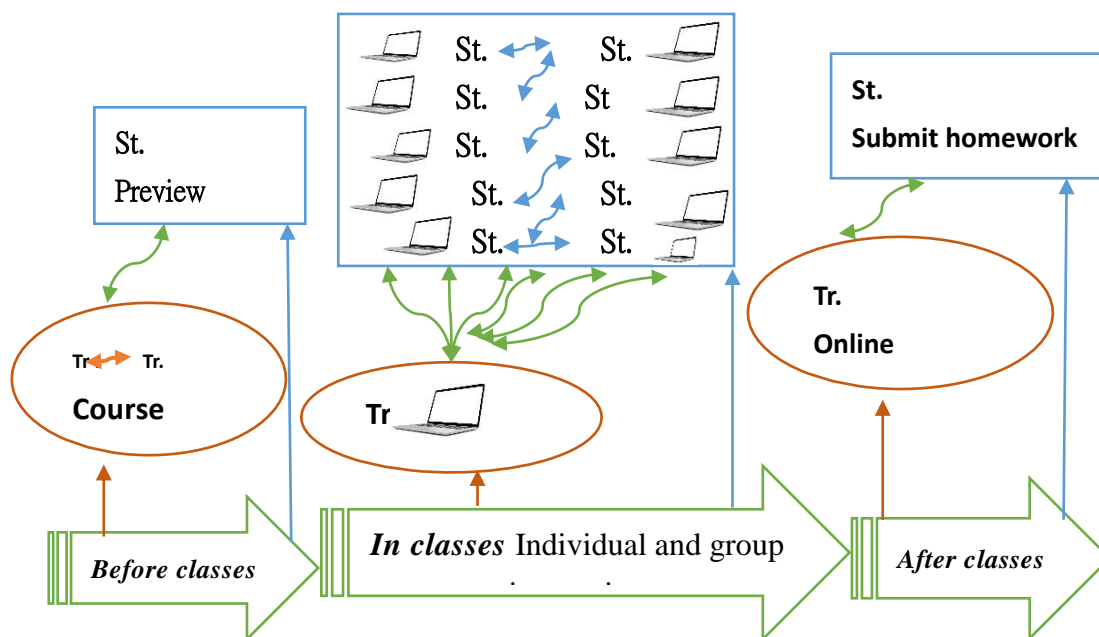
Figure 2: Procedure of Synchronous Distance Technology in curriculum

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**A、 <u>Before</u> Synchronous Online Classes -- *Teacher's Provision***

(1) Teachers should familiarize themselves with WebEx software.

(2) Teachers must conduct thorough device testing for the webcam system WebEx, campus network traffic, Internet equipment, and personal tools. This test requires considerable time. In addition to the tests required by teachers and teaching assistants, the anticipation of problems from the students' end is also expected: various tools were used in distance teaching, such as applications and hardware including iPads and computers; the locations of the students (in open spaces or indoors) should be considered as well. All problems potentially causing lags in voice transmission and in video uploading required identification.

(3) In accordance with the ANCEA course design, teachers must upload the reference literature and case analysis files to E-campus/Online Platform in advance, and students are expected to preview the materials prior to the class.

(4) One *class monitor* will be assigned as the main contact for message delivery among the in-service students and teachers.

(5) Before the first class, teachers should prepare the syllabus, course teaching method, assessment method, group list, and examples of concept mapping which will be used in the class.

(6) The plan, including timings, for each 3-hour class are expected to meet the learning objectives and tasks for students and to enable both teachers and students to control the

timings for each class. For example, the key theme for each group's presentation regarding concept mapping and the time limit for each presentation were clearly stated.

(7) When a written test is required, students should be notified in advance through E-campus/Online Platform.

(8) The evaluation methods should be diverse. For written exams, arrangements should be done on E-campus/Online Platform prior the class to set appropriate test items and specific time limits for answering. Each item will be shown randomly. To ensure fairness, each student will be required to respond within a limited time, reducing the possibility of unnecessary interaction or that answers would be copied from others. For example, 10 multiple-choice items were designed to be completed within 8 minutes. The items appeared randomly, and students answered them in various orders.

## B、Before Synchronous Online Classes -- *Teacher's suggestions*

1. When preparing for each class, teachers should use experiences from the previous class and take into account the characteristics of the following course unit to adjust the teaching material to maximize teaching and learning effectiveness.

2. One of the drawbacks of distance teaching is the absence of face-to-face interaction between the instructor and the students unlike in traditional classrooms. Some practice videos such as capillary filling tests, foot sensory perception assessment can be presented in class using short video clips or uploaded to E-campus for students' independent learning

3. When the audio-video materials are not created by the instructor that utilized should be careful conforms to the academic ethics (Cummings 2005, AlMahmoud, Hashim et al. 2017, Azim and Shamim 2020). When found appropriate, teachers can also send YouTube links or other relevant links to the Chat column for students' independent learning or after-class reviews. This method is convenient.

4. The number of TBL group members is to be reduced. In traditional classes, the whole class is divided into four groups, each containing approximately 15 people. Following the COVID-19 control requirement and to maintain adequate social distancing, the number of people in a group should be reduced to two to three.

## C、Before Synchronous Online Classes -- *Students' Provision*

Election of *class monitor: The role of the class monitor is to ensure that* the *curriculum is running smoothly*; it serves as the means of communication between the in-service students and teachers before the class begins. Using the information relevant to the curriculum outline, WebEx was downloaded and registered into to familiarize themselves with the basic Ecampus interface and operations. Table 1 list two tips for student's engagement.

**Table 1 two tips for students preparing in SDT**

| Students' Provision |
| --- |
| 1. Before the students' confirm their participation in this credit course, students are expected to familiarized themselves with the teaching regulations and objectives of the course and have evaluated their ability to participate during the class hours. |
| 2. Before each unit, the students have to preview the literatures uploaded by the teacher. |

## D、**During** Synchronous Online Classes-- *Teaching views*

1. The teacher has to save all the files containing the day's teaching materials to the computer hard drive and opened them online by using the share function in WebEx. Flash drives were avoided to speed up file reading during lectures.

2. Uncertainty or disturbances due to the presence of background noises, which may come from the computer hardware or student's external surroundings, are estimated. To avoid/remedy the situation, students will be asked to mute their microphones and turn on their video cameras instead.

3. To record the students' attendance, the Chat column will be used in order to avoid unnecessary activities that may lead to postponement. The credit class in-progress will have twenty-one students. The author used the method of calling names one by one, asking student to reply "y" in the Chat column upon hearing their names. The students are expected to reply "y" within a minute. For students who failed to respond "y" immediately, other students may help contact them using the official LINE group and assist them to respond on the Chat column in order to inform the teacher to respective student's status. An example message may look like the following: "Student OO is still connecting to the Internet, and might be 5 minutes late", or "they are still at work and will finish soon."

4. Consistent participation is crucial for distance online synchronous teaching (ref). Based on the experience of former scholars, maintaining the students' participation and preventing them from becoming inactive in the digital classroom, the writer implemented the following four measures:

   (1) In the first class, the teacher clearly explained to the students that, when they hear their names being called for attendance or nominated to answer a question, they must first respond yes (or y) in the Chatroom and then wait for permission to turn on their microphones.

   (2) During the class (during the mini-lectures or after a group presentation of a concept map), the teacher should encourage the students to actively speak up, ask questions, or make supplementary comments in in the Chatroom to share various clinical experiences, clinical procedures, or personal experiences. Students were informed at the beginning of the first class that they would receive credit during the evaluation for active class participation.

   (3) The students were informed that the written exam content and scope after the course must be done for each of the topics discussed during class. This was also emphasized and

hinted at by teachers during the group concept map presentation. We found this method to improve the students' concentration during lectures, group sharing, and the answering of questions.

(4) Students' names were mentioned at appropriate times. When students hear their names during online classes, they became more engaged in the discussion.

5. When students wanted to go to the washroom, they should leave a message before and after in the Chatroom. All students quickly adjusted to this system. During the class, students were not asked to turn on their webcams to ensure privacy and a relaxed learning atmosphere.

6. This TBL teaching model requires in-group interactions and discussions among students and presentations for assigned questions in relation to each case. The two main teachers of the class felt that, compared with the in-person, and on-site presentations, students' verbal presentations were more successful and improved fluency during the distance synchronous teaching. This could have been due to the students that were on-the-job clinical students are experienced with some clinical knowledge. In addition, students revealed on the Chat column that, without face-to-face interaction, they were able to relax more while presenting the content they had prepared, and they felt more confident.

**E、 During Synchronous Online Classes-- *Teacher's adjustment and suggestions***

We listed three tips that suggested and help teachers maximize student engagement in the *synchronous online* ANCEA course.

1. We strongly support that the teacher plays a key role in the achievement of learning goals, the promotion of enthusiastic student participation, and monitoring the teaching quality (Boulos, Taylor et al. 2005) (Moule, Ward et al. 2010). In accordance to the teacher's comprehensive accurately time planning before class, adequate course content adjustment in real-time, guidance and student's response that enabled favorable two-directional interaction opportunities (between teachers and students and between groups). Due to the current involvement of the teachers that had ample teaching experience in ANCEA for in-service nursing continuing education courses previously. Therefore, teachers can rapidly perceived student demands and received much positive feedback from the students (details presented in next paragraph) from this mixed teaching model using SDT.

2. For the Distance Synchronous Teaching, showing facial expressions or eye contact are not possible, therefore, information exchange with teachers relies primarily on language, words, and verbal emotional cues (Button, Harrington et al. 2014). Therefore, after the teacher and students were familiarized with the online interactive platform and were able to reduce any noise, students were advised to activate their webcams. The teacher could also call on students, making those who were called to use symbols or emoticons with a "V" sign or an "OK" sign.

3. One of the disadvantages of distance teaching is – unlike in physical classes, the teacher is able to engage actually demo physical assessment and practice interacted with students. Alternatively, we suggested to prepare make short video before class such as the capillary refill time test, and then arranged slides clips links presented during class.

## F、 **After** Synchronous Online Classes -- *Teaching reviews/ Teachers criticisms*

1. The online quiz or evaluation at the beginning of a class facilitated by the teachers' understanding on how effective students' class material previews will be conducted. The teacher could then provide timely feedback regarding misunderstandings or gaps in their knowledge.

2. The course length is for three hours. During the three-hour course, both teachers and students can experience exhaustion. The teacher must monitor timings, effectively present prearranged lecture content, capture online students' concentration, and provide timely responses. In addition, the teacher must adjust according to the real-time feedback from group members, members of different groups. Most students participate in credit courses after work. These experiences provide a reference for the future timetabling of class times or improvements in the design of appropriate teaching activities.

3. The teachers and students' skills and preparation for lessons can be enhanced through relevant knowledge of online teaching. They are encouraged to participate in in-depth digital teaching online conferences.

4. Due to the number of students participating in this synchronous credit course, the teacher was able to monitor the students' participation better than in physical classes with more students.

## G、 **During and After** Synchronous Online Classes

This was the first time WebEx has been used for university Continued Nursing Education classes. Students were asked to provide satisfaction ratings from 1 (*strongly dislike*) to 10 (*strongly like*) for the synchronous distance teaching method and to provide reasons in the Chat column. The average score from the 21 students was 9.2. This result is *quite similar with previous report* (Moule, Ward et al. 2010) 。Their qualitative feedback was lively and diverse, the main feedback are shown below from Students.

*(1) "This method saves time; I don't need to leave my home and can get up later."*
*(2) "Sometimes the video lagged, and the voice was muffled."*
*(3) "I don't need to worry about cluster infection, and I have more space."*
*(4) "The course content shares the latest knowledge on medicine and nursing. The literature keeps up with international trends."*
*(5) "The learning effects are not different from being in the classroom."*
*(6) "The teacher's voice and the slides are clearer than in the classroom."*
*(7) "I am more willing and likely to speak up."*

*(8) "Compared with face-to-face teaching, I find this approach easier for expressing my thoughts."*

**Evaluation for ANCEA learning effect**

The learning effectiveness of this online 2-credit ANCEA course conducted through WebEx was assessed per the same standards as those used for the two-year technical program. The learning evaluation approaches includes (1) Case teaching (involving four cases) accounted for 40% of the overall evaluation. For each case scenario, evaluation content included a written test accounting for 5% of the overall assessment and a group presentation accounting for 5% of the overall assessment. (2) A case report (two cases; one case is shared by two groups) accounted for 48% of the overall assessment. The oral examination accounted for 20% of the overall assessment, the written report (in the form of slides comprising approximately 10 pages) accounted for 20% of the overall assessment, and the in-group evaluation accounted for 8% of the overall evaluation. (3) In-class performance (assessed on the basis of attendance for the six cases and active participation) accounted for 12% of the overall assessment. The average score of this class was 85, and the highest and lowest scores were 91 and 80, respectively.

**Conclusion**

The COVID-19 pandemic provides an opportunity for educators to use various tools and technologies to achieve the uninterrupted learning despite suspension of classes (Ortiz 2020, Roberts, Malone et al. 2020). The author and the students both gained significant and rather unusual experiences of teaching and learning, respectively. Overall, this experience of online synchronous distance learning involved the efficient use of TBL interactive models and learning through case analysis. To achieve success in synchronous webcam distance teaching, careful planning before class by the teacher, comprehensive two-way communication with students, simulation, and support from the school's teaching system are absolutely necessary. As uncertainty exists regarding future learning and teaching environments, distance teaching has become a crucial contingency plan for educators. This article provides a future reference for educators who use synchronous webcam distance teaching to improve students' learning proficiency.

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