# Use Of Technology In Teaching And Learning

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## Abstract

With technology, students are empowered at every point of their journey, redefining education. As we go towards personalized learning, technology empowers students by providing them control over their education and preparing them for their futures. Students are inspired to become problem-solvers, critical thinkers, collaborators, and creators using technology and resources outside the classroom. Students develop a lifetime love of learning when technology is skillfully integrated into the classroom. During the Coronavirus (2019-nCoV) outbreak, most schools and educational institutions were compelled to close due to lockdown. To ensure continuity in teaching and learning in this new standard of offering emergency distant education, synchronous and asynchronous methods were used. On the topic of synchronous versus asynchronous teaching and learning during the COVID-19 pandemic in Malaysia, this chapter presents preservice and in-service teachers' perspectives. Students from three courses at a Malaysian institution were polled for data. On the basis of the course learning outcomes, the e-learning methodologies were carefully created. Assessment strategies, attendance, and student reflection were all considered important factors. Putting the right gadgets in kids' hands helps them develop the career and technical skills needed now and tomorrow. Students can attach meaning to their learning and prepare for future career prospects and employment that have yet to be formed by engaging in STEAM learning experiences. Computational thinking and coding skills are becoming increasingly important in the workplace. Making allows children to develop problem-solving and critical thinking skills. When developed and connected with the correct technology, maker mindsets and maker spaces may be incredibly engaging.

**Keywords:** Technology, Synchronous Mode, Asynchronous Mode, Teaching and Learning.

## Introduction

For organizations, online classes have opened up a whole new world of possibilities. In order to effectively support your learners, whether they are acquiring a new skill or completing mandated training, you as an organization will need to consider one thing before adopting it: whether synchronous or asynchronous learning is the most effective method of supporting them.

Learners can benefit from both synchronous and asynchronous learning methods, depending on the learning aim at hand. Each has its advantages as well as disadvantages, as is to be expected. But which one is the most appropriate for you and your students? When it comes to selecting gadgets and technology models that will assist them in achieving their ambitions of transforming learning, school systems face a difficult decision. Device selection should be made in collaboration with a variety of stakeholders and after considering how educators and students utilise the devices on a daily basis for everyday learning. Consider the proper grade-level curriculum, content requirements, and how the devices will be utilised both inside and outside of the classroom when making decisions about the devices. It's not an easy chore, but factors such as compatible digital curriculum and material, assessment requirements, manageability options, security features, device performance, and the total cost of ownership are all important considerations when selecting the best device for a given situation. It is the cornerstone of a 3600 learning experience that a secure and powerful IT infrastructure delivers. This infrastructure supports digital content, protects important student data, improves operational efficiency, and provides the security and privacy protection that today's schools require. School systems can benefit from Intel's holistic solutions strategy, which focuses on technology to enable individualised learning, connected and efficient classrooms, and a secure, robust IT infrastructure. Intel can assist school systems in enhancing the experience of each student and instructor. Educators must be appropriately taught and supported throughout the process, which includes access to continuous professional learning materials and networks. When it all comes together, it has a profound and long-lasting impact on the academic achievement of all students.

## SYNCHRONOUS AND ASYNCHRONOUS MODE OF TEACHING

When anyone is thinking about teaching online then one need to be considered whether it might be synchronous, asynchronous, or a blend of both.

## SYNCHRONOUS TEACHING

Synchronous teaching refers to when the educators and learners are both present at the same time (s). This is nearly identical to what happens in a face-to-face context. It is also possible to have synchronous teaching take place through online learning, with the use of video conferencing and live chat or instant messaging. Similarly, to face-to-face instruction, students in synchronous online instruction have the ability to ask questions in real time as they progress through the course.

### In Synchronous Teaching there is real interaction with others

synchronous teaching is characterised by the fact that learners progress along the learning path in a group setting, accompanied by their instructor, who is available to provide assistance as students are completing tasks and activities.

It is possible that learners will be restricted in their learning options if the entire course is offered by synchronous teaching methods, such as face-to-face or online. Because everyone must be present at the same time (even if they are participating online), all students must progress through the course at a similar speed, enabling only a limited amount of freedom in scheduling sessions.

Online synchronous teaching may not be that unlike from face-to-face instruction in terms of function of the teacher, depending on the circumstances. Online learning may take the form of webinars (live online lessons), group chats, or drop-in sessions where teachers are accessible to assist students at a specific time and location. Teaching synchronously online, on the other hand, will necessitate the development of new skills, such as the ability to keep up with the rapid pace of this type of learning.

## ASYNCHRONOUS TEACHING

Asynchronous online teaching, in which students work at their own leisure through online resources while interacting with one another and the teacher via discussion forums or even email, is becoming increasingly popular. Audio and video clips, as well as other kinds of communication, should be used in asynchronous education. An asynchronous method of instruction allows students to work at their own pace and on their own schedule. As the teacher learns while working in an asynchronous environment rather than a synchronous one, frequent short trips to discussion boards or forums may be more beneficial to the students than a single longer session. Certain submission dates and a suggested timetable may still remain in effect in order to provide students with a basic idea of what is expected of them and when it is expected.

Online learning is generally asynchronous and only occurs synchronously when there is a special need for live discussion or contact, or as a way to promote the sense of community among the participants of an online course.

## THE IMPORTANCE OF COLLABORATION

Collaboration between students and teachers is an important component of both synchronous and nonsynchronous online learning environments because it promotes the development of a sense of connection among all participants as well as the development of a sense of community and a shared purpose among all participants.
Discussions and group projects can be performed in a synchronous environment in the same way as they would in a typical face-to-face classroom setting. Collaboration may be more challenging in an asynchronous context, but it is still vital to decrease the sense of alienation that students may have when working online. Discussions and group projects can be performed asynchronously just as well as synchronously. In fact, because there are no time

limits, students can invest more time and effort to generating a high-quality reaction while simultaneously contributing to an asynchronous reaction.

Combining asynchronous and synchronous strategies allows us to reap the benefits of each mode while also overcoming their limitations.

**A SUMMARY OF SOME RESEARCH STUDIES CONCERNING THE APPLICATIONS OF SYNCHRONOUS AND ASYNCHRONOUS MODES OF ONLINE TEACHING OVERVIEW**

Several articles, including one by Bonk and Zhang (2006), imparted pedagogical knowledge of both synchronous and asynchronous learning, in which they explore online methods of education and how learners might adapt their thoughts to online instruction.

• Murphy, Rodriguez-Manzanares, and Barbour (2011) did another study of this type, interviewing 42 Canadian high school distance education teachers on their thoughts on synchronous and asynchronous online teaching activities. The authors discovered that synchronous online instruction relied on teacher-centered rather than student-centered approaches.
• The use of asynchronous online instruction can help students complete self-guided, profoundly autonomous sorts of online examinations or acquire an answer to a question later.
• The educators used a mix of synchronous and asynchronous online instruction methods. Some courses were delivered entirely asynchronously. Others combined asynchronous and synchronous teaching methods, such as class scheduling, tutoring, and reacting. asynchronous instruction
• According to the participants, there were also perceived benefits to employing synchronous modes of communication. Some teachers believe that if students are given more time, they will be able to get better answers and benefit from more informal socialising conversations.

**INTERACTING WITH STUDENTS**

The differences between synchronous and asynchronous teaching are based on the way feedback is given, questions are answered, and students are guided through a particular activity.

It is feasible to receive immediate feedback in a synchronous educational setting. The online learning environment, on the other hand, does not always allow for visual cues to be used when providing feedback, and these cues may take on a completely new meaning in the online learning environment.

When feedback is requested in an asynchronous situation, it is supplied within a brief period of time. After a learner has posed a question, you should answer to him or her immediately. When providing feedback in this case, keep in mind that it may take several loops of the dialogue to assist the learner with their issue, so please be patient. Asynchronous peer feedback is widely used in an asynchronous situation because it allows students to assist one another without waiting for the next input from the instructor (Gikandi and Morrow, 2016).

**SELF-MOTIVATION AND SELF-DISCIPLINE**

Motivating students and maintaining their attention are two difficulties that must be addressed in online learning. It is possible that your personal enthusiasm for the subject will be passed on to the pupils if you are teaching in person. Learners who are self-motivated, as well as those who are less confident in their ability to communicate with others, are more at ease in online learning environments. Those students who are less capable of organising their own studies may experience additional challenges as a result of these changes. When it comes to discipline, another difference between the online and traditional learning environments is the possibility of interacting with others outside of the channels in which you are currently participating. Students can be investigated in a respectful manner by engaging in a discourse (in private) with the student himself or herself.

**Fig. showing Self-Motivation**

## DEVELOPING SKILLS AND CONFIDENCE

Remember that assisting learners in an online setting requires a different set of skills than assisting learners in a face-to-face setting, which should be noted. Online teachers should be more concerned with pastoral care than face-to-face teachers, according to a study by Price et al. (2007). Both teachers and learners often need help and training in how to communicate online. This is based on the findings of the study.

It can help the student feel less alone if the teacher has a more "pastoral" presence, which can be done through online conversations. Richardson, a co-author of Price's, did a big follow-up study that looked at how humanities students who got help from tutors online or face-to-face felt about it. He found that, with the right preparation, the online environment doesn't have to be less positive for learners in terms of support: 'With the right preparation, the online environment should not be a less supportive environment for learners:' It is safe to use online tutorial support in humanities courses, as long as tutors and students are properly trained and given support.

Technology, on the other hand, comes with some problems. You need to know about the most common problems that your students might have with technology. As a result, get to know the tools that you will be using. If you plan to use online teaching technology in your classroom, be on the lookout for training events.
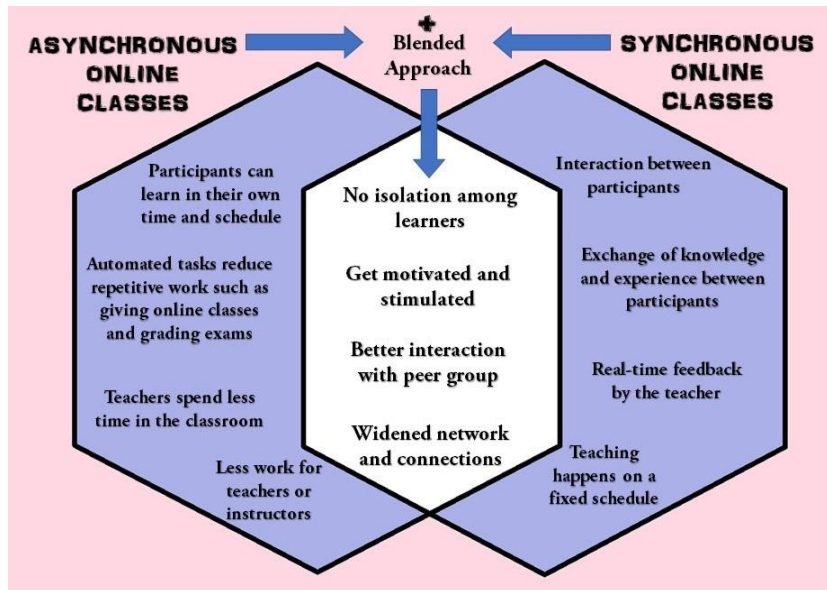
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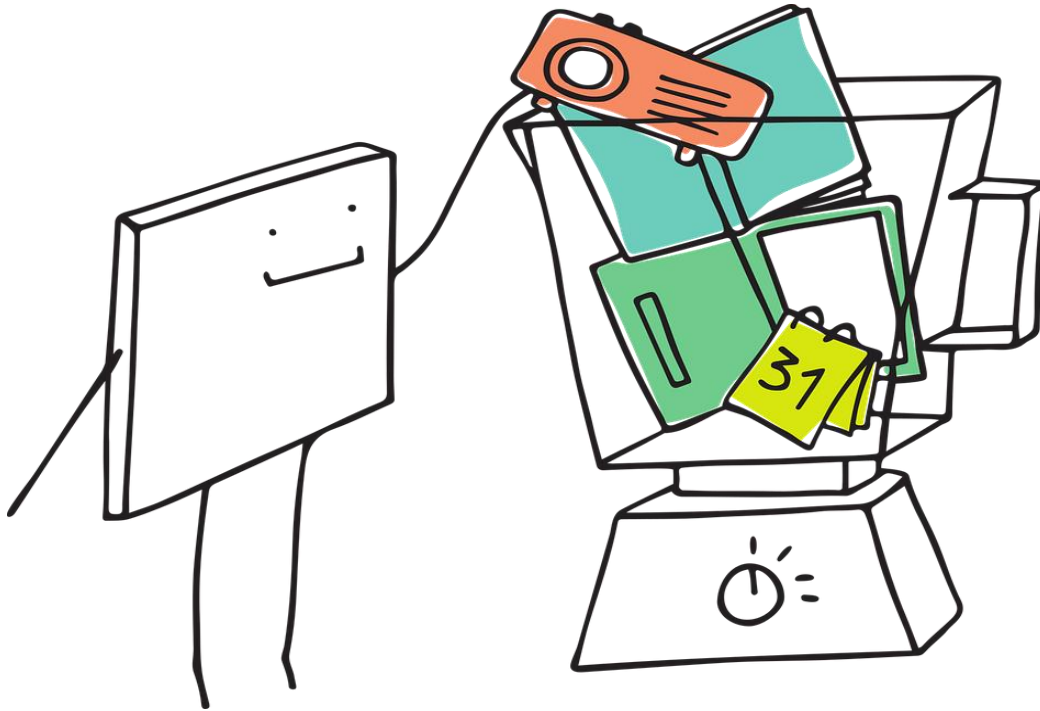
An online course that involves both online and face-to-face instruction is typically referred to as blended learning.

To achieve this, a blended approach includes a combination of classroom-based activities where the teacher is present and internet-based learning materials; independent study where students use materials provided by the teacher, either online or in hard copy, to reinforce concepts or develop skills; and a combination of these elements.

The instructor has a diversified variety of tasks as a result of the wide range of activities available. This includes the addition of the job title "facilitator" since they organise and direct group activities both online and offline. With blended learning, students are given the opportunity to take advantage of the best of both worlds when it comes to learning.

**Benefits of Blended learning**

**Fig: Overview of the benefits of Synchronous, Asynchronous and Blended Online Classes**

## FLIPPED CLASSROOMS

It is an educational method and a sort of blended learning that tries to boost student engagement and learning by having students do readings outside of class while also working on real-world problems in class. Flipped classrooms are becoming increasingly popular.

There are activities in the classroom that are activity-based, and it includes those that may have previously been considered homework. In this scenario, the student is in the active mode, watching online lectures, participating in online discussions, or conducting research at home while participating in discussions in the class roll under the leadership of the teacher.

According to the conventional model of education, a teacher is the principal speaker and disseminator of information. Because the majority of the subject is given in a lecture style, the teacher is active and the students are passive listeners. The traditional form of education has a low level of student participation. The teacher has complete control over the flow of the conversation. Typically, this form of teaching include assigning pupils homework, which is work done outside of the classroom setting.

As a result, the types of actions carried out in each environment are diametrically opposed to the norm. Class has been flipped to make it a more active environment where students and teachers may interact with one another in a more individualised and concentrated manner.

**Refection and Benefits of flipped classroom**

Mixed-mode and flipped classrooms are terms that refer to both online and offline forms of learning, and we may even combine face-to-face instruction with online learning modes. A new technology known as Bichronous will be more advantageous in an entirely online learning environment for people interested in a hybrid technique of only online learning that contains collaborative aspects.

During Covid-19, all of the classes will be held entirely online, with no in-person meetings. The diversity of the student experience has been astounding. Many others use real-time live online meetings to deliver synchronous online instruction. Instructors can choose to teach in asynchronous mode online with no real-time meetings, while others might choose to teach in synchronous mode online with real-time meetings.

In the words of Martin and Oyarzun (2018), asynchronous online learning is defined as "a course in which the majority of the information is delivered online and students can engage in the online course from any location and at any time." It is not possible to participate in live face-to-face or online sessions due to technical constraints." Synchronous online learning, according to the authors, is "a course in which the majority of the information is delivered online and students are able to engage in courses from wherever they may be." Student participation in the course is accomplished through real-time online sessions, with students being able to log in from anywhere at any time to participate in the course."

**BY INTEGRATION OF BOTH, ASYNCHRONOUS + SYNCHRONOUS = BICHRONOUS**

**BICHRONOUS ONLINE LEARNING**

Bichronous online learning is a combination of asynchronous and synchronous online learning in which students can participate in anytime, anywhere learning during the asynchronous parts of the course but then participate in real-time activities during the synchronous sessions. Bichronous online learning is becoming increasingly popular. The amount of online learning blended into a course varies depending on the course and the activities that are included in the course.
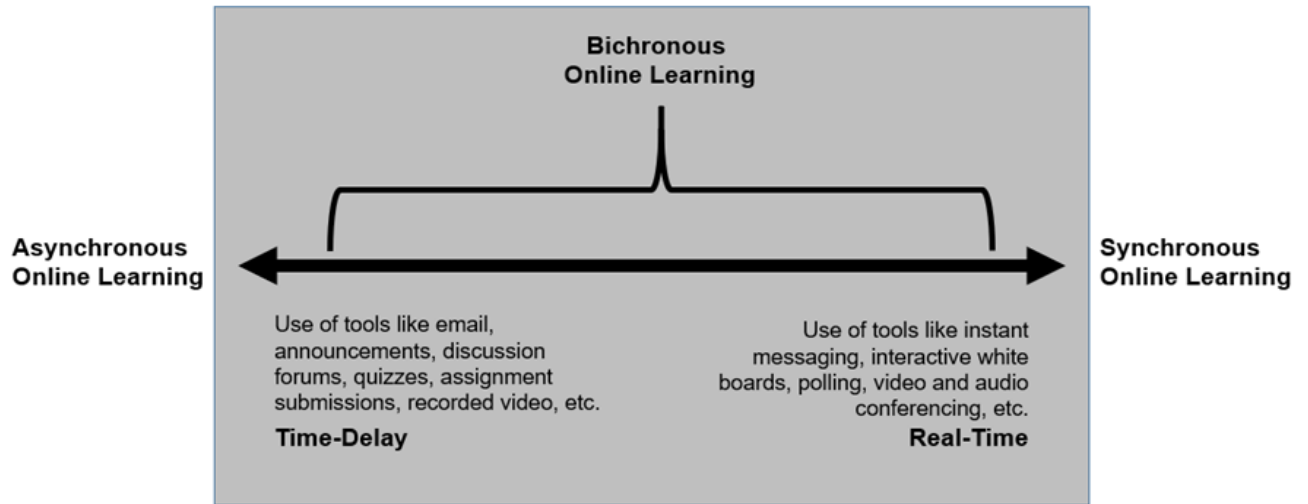
**Fig. Conceptual model for bichronous online learning (Martin et al., 2020, p.1)**

**\*Source:https://er.educause.edu/articles/2020/9/bichronous-online-learning-blending-asynchronous-and-synchronous-online-learning#fnr7**

**RESEARCH STUDIES ON BICHRONOUS LEARNING**

According to a number of studies, it is possible to combine synchronous tools with an asynchronous online course and to incorporate asynchronous components into an online course that is delivered in a synchronous mode too though.

Jesslyn Nicole Farros discovered that including synchronous interactions in an otherwise asynchronous course can improve learning outcomes. Students who participated in any number of synchronous sessions scored much better in the course, according to her findings.

Student success (as measured by grades) increased when synchronous online course orientations were integrated into online biological science courses rather than asynchronous online course orientations, according to another study conducted by Rachel Fowler. The withdrawal rate was 25.5 percent for courses that used asynchronous online orientation but only 9 percent for courses that used synchronous online orientation.

On the whole, research reveals that when the online course incorporates both synchronous and asynchronous communication aspects, it is more effective since it makes teaching and learning more engaging, hence improving learning results as well as positive attitudes and retention.

**REFLECTION ON SOCIAL INTERACTIONS AND LEARNER ANONYMITY**

When information is not provided by default, students can keep their anonymity, which might be an advantage for introverted students or those who are afraid to give an inaccurate answer. Even more problematic is how to manage activities in which participants' identities are kept secret.

Students can aid each other in their grasp of the material by engaging in discussions outside of the approved online learning places. As a result, we can all learn more together.

Padlet and the instructor's collaborative assignment to synthesize and discuss presentations are good examples of how backchannels can be effectively employed (be it online or face to face).

**SUMMARY**

The distinction between synchronous and asynchronous activities is critical in online learning because it distinguishes between the two types of learning. Making the decision about which activities or materials should be used synchronously and which should be used asynchronously is one of the most important competencies that any online instructor should be able to demonstrate. When it comes to teaching, blended learning and flipped classroom tactics could become ingrained in the way that teachers approach their classes, particularly for those who break their sessions into two parts: one face-to-face and one online. If you are providing 100 percent online training, it is possible that a bichronous strategy will be more successful and beneficial. In the coming week, we'll look at the theoretical foundations of learning theories and their integration with technology, as well as how education theories

might influence how we approach online teaching and which theory should be chosen as a starting point for online teaching.

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