

# A Comparative Study of Synchronous and Asynchronous Learning during COVID-19 Crisis

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## Abstract

E-learning is gaining popularity all around the world particularly after the unexpected COVID-19 pandemic. Two main formats of E-learning are synchronous and asynchronous learning. With the advent of technology, both these formats have been improved tremendously especially after the pandemic. This study aimed to review the literature for comparing synchronous and asynchronous learning in various ways such as their similarities, differences, advantages over each other, and challenges that are faced while employing these modes of learning. To the best of our knowledge, there is a mixed notion between students and instructors regarding which format is better than the other as both formats have their shortcomings. It was also found that synchronous and asynchronous learning approaches could be blended to overcome the shortcomings that are faced separately in both online learning formats. It can be concluded that an instructor should consider course contents, learning outcomes, students' motivation, and needs before deciding on which format of online learning should be applied in the given coursework.

**Keywords:** online learning, synchronous learning, asynchronous learning, comparative study, literature review

## 1. Introduction

The term e-learning has various definitions but generally, it is defined as online learning. Due to various shortcomings of traditional teaching methods, e-learning has caught the attention of educators around the globe [1]. To facilitate learning to learners who are geographically separated from their teachers or education centers, online distance education (ODE) has been provided to them so that they can be able to utilize the educational resources in the best possible way [2]. In several countries, the trend of giving ODE has been increased in recent decades and educational institutions are delivering online education to their students [3] because it has helped them to make education accessible to maximum students at any location and time [4]. In online education, the employment of sensitive and advanced tools allows the e-learners to try those tools which are most suitable to their preference [5]. Two main formats of OED are synchronous and asynchronous learning [6].

In synchronous learning, information and ideas can be exchanged with many participants at the same time. It provides opportunities to both teachers and students by allowing them to utilize various ways of collaborating, networking, and sharing in real-time. Examples include virtual classrooms, Skype conversations, live online instructions of teacher and feedback, live web conferences, and chat rooms where both teacher and students are online and interacting collaboratively [1]. Whereas asynchronous learning employs simultaneous involvement where participants are not dependent on each other for the exchange of information and ideas that is why this mode of learning is self-paced [7]. Participants can complete their coursework on their own time. In asynchronous learning, participants may utilize applications such as wikis, video or audio courses, web-supported textbooks, e-mails, hypertexts documents, blogs, social networking, and discussion boards [8].

## **2. Problematic**

The COVID pandemic has posed a serious impact on all areas of life around the globe including the educational sector [9]. Before the COVID-19 pandemic, most of the educational institutions particularly in third world countries used to prefer only traditional methods of teaching and they were reluctant to change the traditional approach of teaching. However, the unexpected outbreak of the Covid-19 pandemic shook the entire globe [10]. To stop the spread of this deadly virus, lockdown was imposed that resulted in the closure of educational institutions in 107 countries [11]. Owing to this, the situation of educational institutions got worse because more than 1 billion students were on the verge of falling behind in their education. That is why educational institutions were left with no other option other than the shifting of all the educational activities and learning to online mode on an emergency basis [9]. Remote learning has become a lifesaver in this time of crisis. Multiple modes of online teaching have been adopted by educational institutions such as synchronous and asynchronous modes [12]. There is no doubt that this pandemic has made all these educational institutions adopt modern technology when they were not willing to accept change and modernize their teaching approaches earlier [13].

## **3. Literature review**

One of the perks of rapid advancement in technology is that it has made distance education possible and easy [14]. Learning by using various devices such as laptops and mobile phones with internet access is known as web-based learning, blended learning, online learning, e-learning, computer-mediated learning, and open learning, etc. [15]. Through online learning (both synchronous and asynchronous), the process of teaching and learning has become more innovative, more flexible, and more student-centered [16]. Due to the spread of COVID-19, there is a dire need for online platforms where (1) a video meeting with a minimum of 40-50 students is feasible, (2) discussions and exchange of views can be done with students to keep the classes alive, (3) easy access of good internet connection, (4) apart from laptops, lectures can be easily accessed on mobile phones also, (5) opportunities to view recorded lectures, and (6) students can give instantaneous feedback and assignments [17]. Online teaching has now

become a necessity as a major part of the globe is under lockdown. Although both synchronous and asynchronous learning has made online education easy but still there is a dire need to improve the quality of online learning [18]. Here we will discuss the similarities and differences between synchronous and asynchronous learning as well as the strengths, weaknesses, and challenges faced in both learning modes.

### **3.1. Synchronous online learning**

Synchronous learning is becoming an essential part of the communication between students and between students and their teachers. With the advent of technology, asynchronous learning is not the only way to connect students to an online class. Investigators have continued to explore the application of synchronous technology to find out if these types of communication are more advantageous than asynchronous communication in online education [19-21].

Generally, synchronous learning is supported by media like chat, video meetings, and various famous platforms such as Google meet and Zoom meeting, both of which are highly preferred by students [22]. In a recent survey study conducted on students during the lockdown, it was revealed that the majority of the instructors (58.65%) preferred zoom for video classes. [23]. Methods such as presentations, discussion, lectures, and questions-answers can be employed in this online learning approach. This approach has the capacity to support online education in the evolution of the education community [22].

It has been observed in various studies that students like to adopt this approach of online learning because synchronous online learning is more social than asynchronous online learning. Students do not need to get frustrated waiting for an answer because they can raise, and answer queries related to their education or educational problems in real-time. Due to this, students get involved in the process of learning properly and own their education as well as feel less isolated from their fellows. In online learning, feelings of isolation can be controlled through communication in real-time because students are able to see their fellows through video classes [24-28]. Students feel more motivated and stimulated as this online learning approach resembles a lot to person-to-person communication. Thus, they know themselves as a part of the education community rather than independent students who communicate with computers [29].

The synchronous online learning makes it feasible to observe students' responses to a particular message, making them feel more motivated and committed to acquiring education. But in various studies, students revealed that less complex issues should be discussed while video conferencing in synchronous learning because it leads towards “more like talking” rather than productive discussion [26]. In synchronous learning, students get to experience both passive and active learning approaches, but it depends on the teachers and which teaching method they will prefer [30].

Regardless of which technology is employed, one particular problem with synchronous learning is that students are likely to face scheduling issues with the times of live meetings. These problems can develop feelings of frustration among students with the online classes

that can lead to non-serious behavior and less satisfaction towards online learning [25,26,31]. Moreover, according to a recent study, a strong internet connection and continuous supply of electricity are required for synchronous learning [23].

### **3.2. Asynchronous online learning**

It is obvious that in an online learning environment synchronous learning is playing a vital role, but the importance of asynchronous learning cannot be denied [26, 27]. Different forums are used to facilitate online asynchronous learning. These include PowerPoint, PDF, emails, audio, video, and other available online platforms using, Canvas, Moodle or Google classroom. All these patterns are responsible for facilitating and supporting the process of learning. These provide a strong relationship between students and the learning materials in the form of lectures, audio, or videos, etc. One of the best advantages of this online learning approach is that it is not necessary to be online simultaneously [32]. Various studies about the role of asynchronous education indicated that it allows students to reconsider their ideas, engage in educational activities more deeply, and post more ideas on discussion boards [26, 27]. These advantages make this learning process more flexible as learners can access them in their free time or flexible times.

Online courses are best for people that have a busy schedule or have an asynchronous type of nature. Due to the flexibility of asynchronous learning, we can fulfill our commitments and perform multiple tasks like jobs, education, etc. [32]. The educational or learning institutes have online portals where students can log in at any time and communicate with their instructors and other classmates or colleagues. These online learning platforms or portals provide all the essential information regarding the courses or learning objectives, and students can download documents and submit their tasks and assignments. The instructor can check these tasks, comment on the submitted projects, and communicate with the students about their progress. All these things are helpful and more fruitful than synchronous learning because students get a chance to learn a lot of online tools and spend more time understanding the tasks by themselves [30, 33].

There are a lot of asynchronous online learning platforms such as Canvas, Moodle, and Google Classroom. Moodle ( Modular Object-Oriented Dynamic Learning Environment) is a top-rated Open-Source platform among students due to various reasons, and it is also user-friendly [34]. It is a very good platform for communication tools and resources. It was designed to assist teachers in creating customized online courses. Martin Dougiamas created this platform because they observed a dire need to connect the process of learning globally [35]. The instructor or professor posts the lectures that can be in the form of video, audio, or any other file format and announces the ongoing tasks or assignments that must be completed before the due date. Students download these files, read instructions, and communicate with their professor and other classmates about anything. Students upload their work after completing the desired task or assignments, and the professor can check them using the same platform. Edmodo can also be used for group tasks, group assignments, and other helpful information or ideas. The professor can grade all these tasks on Edmodo. The professor can

comment on these tasks that students can read [36, 37]. So, asynchronous learning organizes the students by self-regulated learning and completing the assignments by discovering new ideas independently in flexible timings, [38] but sometimes students get bored by asynchronous online learning because they feel alone and demand a more interactive way of learning [30].

Three case studies were conducted between teachers and students by Griffiths and Graham (2010) in which an asynchronous video approach was used in two separate online subjects. This research was conducted to find out the insight of closeness and immediacy between teachers and students. Student interviews were conducted and came to the notion that students felt more connected to their teachers. According to the teachers, their students were able to deeply comprehend and engage with the course content because they had time to think before the submission of their video recording [39].

Similarly, in another study conducted by Buxton (2014), it was revealed that pharmacy students preferred the asynchronous approach of online learning to synchronous learning. According to these students, they felt more connected to the subject that led them to learn quickly [40].

In a recent study conducted in 2021 by Basri *et al.* in the rural area of Indonesia, almost half of the respondents complained about internet issues in the implementation of asynchronous learning but still, they preferred asynchronous learning due to its advantages [41].

### **3.3. Blended/hybrid learning**

In asynchronous learning, students are not forced to respond immediately, and they have a lot of time to understand and grasp the given tasks or information by reading it again and again. Students have much time to search about it and learn many new ideas before commenting or responding on a given topic. Students feel more confident about what they are saying because they develop a transparent image of the subject. We can say that the asynchronous way of learning develops the ability to understand and process information while synchronous learning increases motivation in the students [42]. To combine the benefits of these two types of learning, there is also the third pattern of learning: a hybrid or blended pattern of learning. The hybrid pattern of learning is the combination of both these types of learning.

In a study conducted by Yamagata-Lynch (2014) it was observed that students felt more satisfied in the blended asynchronous and synchronous approach of learning because it allowed them to participate in class activities more often. When they were unable to attend video classes, they had the option of participating in class activities through an asynchronous approach [43].

The table given below demonstrates how and when these two approaches should be employed in hybrid/blended learning (Table 1).

**Table 1.** Synchronous vs. asynchronous learning approaches

Hybrid learning					
When		Why		How	
Synchronous learning	Asynchronous learning	Synchronous learning	Asynchronous learning	Synchronous learning	Asynchronous learning
- When a discussion on less complex issues is needed. - While designing tasks. - For introducing students and instructors with each other.	- While thinking about complex issues. - When there is a scheduling problem while arranging the online class.	- The instructor expects an immediate answer, so the students need to become more motivated and committed.	- The instructor does not need an immediate answer, so the students have plenty of time to reflect.	- Means such as instant messaging, video meetings, and chats are used.	- Means such as blogs, discussion boards, forums, and e-mails are used.

### 3.4. Summary

Many students preferred the hybrid learning approach because those problems that are faced separately in synchronous and asynchronous learning approaches can be overcome by adopting the hybrid learning approach [30].

**Table 2.** Comparison of asynchronous, synchronous, and blended/hybrid learning

	Approach 1	Approach 2	Approach 3`
<b>Type</b>	Asynchronous	Synchronous	Blended/hybrid (asynchronous & synchronous)
<b>Platforms</b>	Canvas, Moodle, and Google classroom	Teams, Zoom meeting, and Google meet	All platforms in synchronous and asynchronous learning
<b>Media used</b>	PPT's, audio, video, PDF, and active links	Audio, PPT's and video	All media used in synchronous and asynchronous learning
<b>The learning experience of students</b>	Students can make projects, do the given exercises and assignments, work on an individual level, and have flexible timings.	Students can ask and respond to queries directly, listen to lectures, discussions, and explanations through face-to-face communication.	Students are exposed to all the learning experiences narrated in the former two approaches and they have the advantage of switching to any learning mode according to their convenience.
<b>Students' response</b>	Students felt detached from class and demanded more interaction.	Many students faced electricity and internet connectivity problems.	A positive response was given by students.

## 4. Discussion

One of the main concerns of remote education for many years is to create such remote learning methods that can lead to quality interactions between the students and teachers which will ultimately lead to good education, contentment, and a sense of community [16]. Historically, in remote education, asynchronous learning has played a vital role to connect students with their fellows and teachers [26], and still it is preferred by many educators and students. But recent advances in technology have made it easy for remote learners to interact with each other in real-time [44]. Many researchers have highlighted the importance of both synchronous and asynchronous online learning approaches.

According to the literature survey, there is a mixed opinion present among educators and students regarding which approach of online learning should be adopted. All the research papers reviewed for literature gave us a mixed notion regarding when and how to apply synchronous and asynchronous learning approaches. That is why it is difficult to state which online learning approach is better than the other. In many studies, researchers emphasized that the asynchronous learning approach should be adopted when group study is required as well as when the course content is difficult to comprehend and students require time to complete the given tasks [26, 39, 45]. On the other hand, various researchers recommended employing asynchronous learning approach for group studies and projects since, according to them, the tools and media richness offered in synchronous learning helps the students to better comprehend the given tasks [28, 46, 47]. At the same time, many other researchers preferred synchronous learning when discussions on less complex topics, socializing, and planning of activities is required [26, 48].

It has been observed that blending synchronous and asynchronous learning approaches in remote learning has far more advantages than employing synchronous and asynchronous learning alone [49]. Motycka *et al.* (2013) suggested that blended learning should be adopted because it makes students face new challenges experienced in today's society [50]. Similarly, Yamagata-Lynch (2014) also preferred blended learning in her detailed qualitative self-study [43].

Online education is linked with a lot of problems such as high dependency on strong internet connection and electricity, hindrance of social life, non-serious behavior of students, risk of cybercrimes, and effects on overall health especially on eyes [23], but the benefits it has given us in this critical time of COVID-19 pandemic cannot be ignored [18]. This pandemic has forced educational institutions to acclimatize quickly to e-learning and this situation has persuaded people to look into the positive sides of online learning [51]. It has proved to be the best-suited alternative to traditional learning during COVID-19 lockdown. It provides time and location flexibility and can cater to a large number of students. Moreover, the learning processes can be customized according to the requirement of students. More work is needed to be done to improve the quality of online learning and to overcome the challenges and problems faced by students and teachers [18, 52].

## 5. Conclusion

Although a lot of research has been carried out in recent years especially after the COVID-19 pandemic regarding synchronous and asynchronous learning, still more research needs to be done. As it has been discussed earlier that most of the studies are inconclusive, we are unable to have a particular stance in regard to which of which is better than the other, synchronous or asynchronous learning. We can conclude by saying that before deciding which online learning approach should be applied in course work, a teacher should deeply examine students' needs, motivation, course contents, and learning outcomes. Finally, as we know "*Practice makes a man perfect*" and the COVID-19 pandemic is giving us the opportunity to make out the best from online learning and develop more advanced technologies.

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