

The use of synchronous and asynchronous e-learning and their comparison*

Olivér Izsák

Slovenská technická univerzita v Bratislave
Fakulta informatiky a informačných technológií
xizsak@stuba.sk

15. October 2020

Abstract

People have been trying to prove one method's superiority over the other in order to use the better method for teaching. Although in reality neither one is better than the other. Both methods should be used in e-learning, however in different ways and in different scenarios. The main purpose of this article is to discuss where and when to use asynchronous and synchronous e-learning methods to achieve efficient and effective e-learning. It is based mainly on two studies, Stefan Hrastinski's study of "Asynchronous and Synchronous E-Learning" [Hra08], and the other is Ayesha Perveen's study: "Synchronous and Asynchronous E-Language Learning: A Case Study of Virtual University of Pakistan" [Per16].

1 Introduction

Online learning environments have become widespread phenomenon in 21st century, but their efficiency has been a controversial topic between scientist for decades. Especially in the early days of online e-learning, where online telecommunication application such as Skype, Discord, Google Meet etc... were not widespread nor available for an average person for either technical or financial reasons.

This meant real-time face-to-face communication was not possible, which made e-learning less desirable, since synchronous learning was not available yet. However in the modern days, we have a great amount of online telecommunication applications and improvements in technology and increasing bandwidth capabilities have led to the growing popularity of e-learning, therefore both asynchronous and synchronous e-learning is possible nowadays.

Synchronous learning happens in real-time with immediate interaction between the participants, which has been considered by many as the superior e-learning method, for a while because of the social aspect of learning, even though recent studies suggest that is not entirely accurate.

On the other hand, asynchronous e-learning is self-paced and not time bound, which means that the individual can learn whenever his/her time allows it. This has

* Semestrálny projekt v predmete Metódy inžinierskej práce, ak. rok 2020/21, vedenie: Ing. Jozef Sitarčík

been around for a time in form of distance education or distance learning.¹

The article is based on one small scale study by Stefan Hrastinski and one large scale case study done by Ayesha Perveen, who based study on the Virtual University of Pakistan. The article will also explain the synchronous e-learning method(2). Asynchronous e-learning method(2.1), the different communication types that are available when it comes to e-learning(2.3), Benefits and Disadvantages of both methods,(3,4) and the most efficient way to use them together to achieve high level e-learning(5).

2 E-learning methods

In today's modern society online e-learning was made possible thanks to the technological advancements that society has gone through. E-learning is defined as learning and teaching online through network technologies. This advancement made studying and learning more accessible for the people. Which also made some researchers worried about the learning outcomes for e-learners, though a review of 355 comparative studies revealed no significant difference between the traditional way of learning and e-learning. [Rus99].

E-learning is only possible through different communication mediums, such as the following List of software applications:

Skype, Google Meet, Zoom, Cisco Webex. Discord

Learning Management Systems(LMS):

Moodle, Google Classroom, WizIQ, OpenEdX, Canvas Edmodo, Prezi etc...

Two basic types of e-learning methods that are commonly compared are synchronous and asynchronous e-learning. As e-learning become more significant, it has become an important question whether it is better to study synchronously or asynchronously. That is what lead to the creation of important studies about these e-learning method, such as the study of Hrastinski [Hra08], and Ayesha Perveen [Per16].

2.1 Synchronous e-learning

Synchronous e-learning is a time-bound interaction between the participants, like video calls, chat, face-to-face video calls, online class rooms etc... The main importance of synchronous e-learning is the fast interaction and communication between the participants, which makes the learning more social, and personal.

Synchronous e-learning provides student-teacher and student-student interaction. A number of case studies have shown that synchronous e-learning can develop the sense of community in students on online communication platforms, which increases learning effectiveness and motivates students. [Nic02, MDCJ13, Hra06].

2.2 Asynchronous e-learning

Asynchronous e-learning is a form of education that it is not time-bound, meaning the participants can study whenever their time allows them, and they do not require to adapt to different schedules, such as meetings with teacher or students, or online classrooms. The most common communication mediums for asynchronous e-learning are the following:

¹Distance education : also called distance learning is the education of students who may not always be physically present at school, through mail or other methods.

1. E-mail
2. Discussion boards
3. Learning Management Systems

(a) Which is the most common nowadays.

Even though asynchronous e-learning has been heavily criticized in the past, a great amount of people benefit a lot from asynchronous learning. Mostly because of its flexible feature, since each individual can create his own pace and time of studying, depending on his personal situation. Through asynchronous e-learning it is possible to download material and documents and study them whenever the individual has time.

2.3 Types of communication

According to Haythornthwaite [Hay02], for building and sustaining e-learning communities there are 3 types of communication that is necessary (See Table 1):

1. Content-related - communication related to the course learning is essential.
2. Planning of tasks- When some kind of product has to be created by the students eg.:assignment.
3. Social support - to create an atmosphere that fosters collaborative learning.

Type of exchange	Examples
Content-related	-Ask or answer a content-related question -Share information -Express and idea or thought
Planning of tasks	-Plan work, allocate tasks, coordinate join effort, or review drafts -Negotiate and resolve conflicts
Social support	-Express companionship, emotional support or advice -Use emoticons(such as J,L) -Provide support when problems arise(such as when having technical difficulties -Talk about things other than class work

Table 1: Stefan Hrastinski's table of communication types [Hra08]

3 Benefits,disadvantages of synchronous E-learning

The greatest benefit of synchronous e-learning is clearly the social aspect. People are social beings that is why they create communities through communication platforms too.

Synchronous e-learning provides real-time interaction between participants, which creates a sense of community and strengthens collaborative learning. Synchronous

e-learning sessions can result in high levels of motivation, and makes people longer engaged about the given topic or course. In Stefan Hrastinski's study it was shown that communicating synchronously motivated the participants and they shown increased engagement throughout the sessions [Hra08].

On the other hand one of the biggest disadvantage of synchronous e-learning is that quality learning is less likely to occur, since the participant has less time to think about the problem at hand. Since in synchronous e-learning socialization is more common, it seemed more acceptable to exchange social support and discuss less complex issues about the topic at hand [Hra08].

An other disadvantage is that the students have to be available at the given time, they have to adapt to the schedule. Good internet connection is also needed, since technical problems can make the students frustrated.

4 Benefits,disadvantages of asynchronous E-learning

A major benefit of asynchronous e-learning is its adaptability, students can study depending on their time. Contrary to synchronous e-learning, the content-relatedness in asynchronous communication was more than 90% (see Figure 2), thus proving that when it comes to asynchronous e-learning participants are more likely to talk about the topic at hand, rather than having off topic discussions such as exchange of social support.

Also in asynchronous discussion the number of complex questions were more likely to occur. [Hra08]. Studies shown that when students use asynchronous e-learning they spend more time studying the particular topic, since they are not time-bound to give an answer

[Hra08]. The main disadvantage of asynchronous e-learning is the lack of social motivation. Humans are more likely and more motivated to study in a social scenario. Which means in asynchronous e-learning the individual has to motivate himself, since there are no external social factors that would motivate the individual.

Also another problem is that the individual student is likely to not get questions about the topic answered fast, unlike in synchronous e-learning, which can make the student lose interest after some time.

Type of Communication	Smaller Class (n=8)		Larger Class (n=19)	
	Synchronous	Asynchronous	Synchronous	Asynchronous
Content-related	876 (58%)	369 (99%)	1,816 (57%)	2,438 (93%)
Planning of tasks	507 (34%)	5 (1%)	935 (29%)	131 (5%)
Social support	198 (13%)		572 (18%)	124 (2%)
All sentences	1,507 (100%)	375 (100%)	3,173 (100%)	2,608 (100%)

Figure 1: Stefan Hrastinski's study outcome [Hra08]

5 Efficiency of the Combination of asynchronous and synchronous E-learning

As research shown, both synchronous and asynchronous methods have benefits and disadvantages. To create an effective and efficient e-learning method, hybrid e-learning was created, which is the combination of asynchronous and synchronous e-learning.

In hybrid e-learning both methods are used but each in different scenarios. Stefan Hrastinski created the 3 question to know when, why, how to use the which method to achieve effective e-learning. (see Table 2)

As the table shows, when students have to discuss complex issues, that require more time to think or if the participants cannot attend a meeting or conference call, the asynchronous methods should be used, which can be achieved through discussion boards, or email.

On the other hand, if less complex issues have to be discussed, planning or getting acquainted with other people is the goal, then synchronous methods should be used.

	Asynchronous e-learning	Synchronous e-learning
when	Reflecting on complex issues When synchronous meetings cannot be scheduled because of work, family and other commitments	Discussing less complex issues Getting acquainted Planning tasks
why	Students have more time to reflect because the sender does not expect an immediate answer.	Students become more committed and motivated because a quick response is expected
how	Use asynchronous means such as e-mail, discussion boards, and blogs	Use asynchronous means such as videoconferencing instant messaging and chat, and complement with face-to face meetings.
example	Students expected to reflect individually on course topics may be asked to maintain a blog. Students expected to share reflections regarding course topics and critically assess their peers' ideas may be asked to participate in online discussion on a discussion board.	Students expected to work in groups may be advised to use instant messaging as support for getting to know each other, exchanging ideas, and planning tasks. A teacher who wants to present concepts from the literature in a simplified way might give an online lecture by videoconferencing.

Table 2: Stefan Hrastinski's table of When, Why and How

6 Conclusion

In conclusion, as also shown by the research of Hrastinski, to make e-learning effective both synchronous and asynchronous methods should be utilized.

In this case the teachers have an important role in making e-learning effective, since they have to know when it is effective to use synchronous and asynchronous methods and plan accordingly. The best way to use both of these is through learning management systems which are created especially for e-learning.

References

- [Hay02] Caroline Haythornthwaite. *Building Virtual Communities Learning and Change in Cyberspace*. Cambridge University Press, 2002.
- [Hra06] Stefan Hrastinski. The relationship between adopting a synchronous medium and participation in online group work: An explorative study. *Interactive Learning Environments*, 14:137–152, February 2006.
- [Hra08] Stefan Hrastinski. Asynchronous and synchronous e-learning. er.educause.edu/articles/2008/11/asynchronous-and-synchronous-elearning, 2008.
- [MDCJ13] Oztok Murat, Zingaro Daniel, Brett Clare, and Hewitt Jim. Exploring asynchronous and synchronous tool use in online courses. *Computers & Education*, 60:87–94, January 2013. ISSN 0360-1315.
- [Nic02] Scott Nicholson. Socialization in the “virtual hallway”. *The Internet and Higher Education*, 5:293–410, October/December 2002. ISSN 1096-7516.
- [Per16] Ayesha Perveen. Synchronous and asynchronous e-language learning: A case study of virtual university of pakistan. *Open Praxis*, 8:21–39, January/March 2016. ISSN 2304-070X.
- [Rus99] Thomas L. Russell. *The No Significant Difference Phenomenon*. North Carolina State University, 1999.