

SYNCHRONOUS AND ASYNCHRONOUS LEARNING IN ONLINE EDUCATION

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Abstract: Due to the global COVID-19 pandemic, many different aspects of health, society, business and economy have already been affected in terms of fast and effective adaptation to new circumstances. As a strategic resource of every society/country/region, education is one of the fields that is presently exposed to a very intense transformation from classical to new ingenious models of delivering knowledge and raising it to another level. The main motivation for this publication was the comparison between synchronous and asynchronous learning in online education on university level. It includes the analysis of the transition from classical to online teaching, as well as pros vs. cons analysis of both models with their subsequent challenges. An overview of experiences about synchronous and asynchronous learning during of COVID-19 pandemic at particularly chosen universities in Serbia and United States is also presented in this publication.

Keywords: synchronous learning, asynchronous learning, modern technologies, online teaching

1. INTRODUCTION

Today we live in a digital era and consequently, we are overwhelmed by new learning technologies. The importance of the use of modern technologies in the education system came to the fore especially in 2020. As it is known, during last year the whole educational system from elementary to university level has collapsed during the global pandemic that is caused by coronavirus disease (COVID-19) [1] not only in Serbia but across the globe. Therefore, teachers and students, both find themselves in a situation where they felt compelled to embrace the digital academic experience as the summum bonum of the online teaching-learning process [2].

In general, the educational system in the world is in a situation to gravely rethink, revamp, and redesign the education system is a very demanding need. Both aspects of education, informal and non-formal, are tremendously affected. It is obvious that there is no model that can replace full potential of direct teacher - student interaction in formal education. COVID-19 crises shifted the educational practice from the traditional classroom environment to Zoom (Google Meet, Microsoft Teams), from live to online lessons, from personal to virtual, from seminars to webinars. Previously, distance learning and online courses were commonly perceived as a part of non-formal education, but now it seems that it would gradually replace the classical educational system if the circumstances continue to develop in the same direction. Some of the most popular online communication platforms that would change the destination and direction of the whole education system across the world in post-COVID-19 circumstances are: *Start.me*, *Neo*, *Classtime*, *Classwise*, *Ted-Ed*, *Coursera*, *Google Classroom*, *DataCamp*, *Bakpax*, *Pronto*, *Skillshare*, *ClassDojo*, *Edmodo*, *Blackboard Learn*, *Parlay*, *Docebo*, *Feedback Fruits*, *Udemy*, *WeVideo*, *WizIQ*, *Flipgrid*, *Codecademy*, *Gynzy*, *Adobe Captivate*, *Edx*, *GoGuardian*, *Elucidat*, *Kami*, *Floop*, *Future Learn*, and many more [3].

Appropriate use of technology can improve learning by facilitating us to carry out our established practice more effectively or to innovate practice. Nowadays social media in learning and teaching in education at the university level are also very important [4].

Facing these challenges, many faculty members needed to adapt their materials, methods, preparation, class assignments, quizzes, tests and exams in a very short time, literally within a few weeks. They also needed to acquire many new skills in respect to manipulating learning materials in electronic form, organizing online classrooms, administrating online platforms and providing opportunities for students' feedback. All of this being mentioned raises a big question: Who is an online instructor and what are his/her responsibilities?

Beside the usual set of duties, the answer leads us to an expanded list:

- *Teacher* who properly uses internet and other online tools;
- *Educator* who uses e-mail, organizes message boards, forums, chat rooms, breakout sections etc.;
- *Lecturer* who's course material is translated in ways that will be delivered through the online platform;
- *Faculty member* who creates, edits and posts video materials and lecture slides;

These roles should not be understood separately one from another. They are in most cases strongly connected and mutually inclusive, so faculty members need to manage the optimal timing and weight of duties above.

Second important component in an online teaching-learning correspondence are students. It is crucial to design an online course such that students don't become apathetic, passive or disconnected from the learning process and continual class dynamics. This burden is not solely on faculty shoulders since it also depends on the level of student engagement, literacy and motivation. But the common sense is telling us that the faculty member is the one who sets the tone for the online course and defines its further flow. To provide a better grip on their work, we offer these principles based on good online teaching and learning practices.

Good practice in online education [7]:

1. Improves the contact between students and faculty;
2. Encourages cooperation among students;
3. Emphasizes active learning;
4. Provides prompt feedback;
5. Considers diverse learning talents and capacities.

These practices work for many different kinds of students, no matter of their race, ethnicity, nationality, religion, socio-economic status, age, gender or pre-knowledge. Of course, different institutions may implement these practices in different ways depending on their resources and other circumstances. In times of global hardship, faculty members, academic advisors, university program administrators, and student personal staff put all their efforts in trying to understand students' needs, challenges and difficulties with transition to online learning. Along with good practices, we recognize the complex interaction between the content and pedagogy. Content refers to *what is taught* and pedagogy to *how it is taught*. Balanced fine tuning of these aspects determines the quality of students' learning outcome.

In the following, we are going to explain what is synchronous and asynchronous learning. Also, we will compare synchronous and asynchronous learning in online education on university level. This includes the analysis of the transition from classical to online teaching, as well as pros vs. cons analysis of both models with their subsequent challenges.

2. SYNCHRONOUS AND ASYNCHRONOUS LEARNING

In this section, we closely explain the meaning of synchronous and asynchronous learning with the focus on their similarities and differences, advantages and disadvantages. There are several definitions in the literature that introduce the terms synchronous and asynchronous learning. Below we formally introduce these terms:

- **Synchronous Learning (SL)** -- Synchronicity means doing something at the same time. Therefore, SL means that the professor and the students in the course engage with the course content and each other at the same time, but from different locations. The professor interacts with students in real-time by means of tools such as Zoom to live stream audio, video, and presentations, chat feature to engage in live conversations, Google Docs to simultaneously edit documents, and more [5].
- **Asynchronous Learning (AL)** -- Asynchronicity means doing something not simultaneous or concurrent in time. Therefore, AL means that the professor and the students in the course all engage with the course content at different times and from different locations. The professor provides students with a sequence of units which the students move through as their schedules permit. Each unit might make use of assigned readings or uploaded media, online quizzes, discussion boards, and more. The instructor guides the students, provides them with feedback, and assesses them as needed [5].

It is natural to ask the question: Which of the above methods is better in terms of efficiency, organization and results that are presented through student success? There is no single answer to this question. In fact, SL and AL have their advantages and disadvantages, here are some of them:

- **Advantages of SL:** Students can ask questions and get answers in real-time, as the session is proceeding; The professor can gauge the students understanding in real-time, and adjust the session accordingly; Students feel an increased sense of the instructor actually “being there”; Professor can facilitate workshop-style classes and run breakout group activities; Live chats or office hours allow for real-time interaction, like a conversation; Provide a schedule to help students who struggle with task initiation to stay on track.
- **Disadvantages of SL:** Some students might not be able to participate at the required time due to technical or scheduling problems. They may be in different time zones; Accessibility requirements may be more difficult to meet - for example, providing captioning for a live presentation.
- **Advantages of AL:** Recorded sessions allow students time to better understand the session content and/or conduct further research before posing questions in a discussion group; Students can access the course content, and initiate or respond to interactions with the professor and other participants when it suits their schedule; Students can re-watch recorded sessions to deepen their learning, or to review content prior to a final exam; In an online discussion group, all students can pose questions or make comments, while during a live session only a small number of students will be able to ask.

- **Disadvantages of AL:** Students might feel less connected to a professor; Students might feel less connected to the course since they do not see their classmates; Students might put off engaging with a recorded session because they can always "do it later"; Requires skills like responsibility and self-initiative since none of the class time is scheduled, only the assessment deadlines; Requires a higher level of commitment and independent learning skills.

Since practice has shown that both SL and AL have good and bad sides, the next natural question is: Can we get a "perfect" model for online learning if we combine these two kinds of learning? Of course, we can combine SL and AL such that we take the advantages of each while reducing the limitation of each. One good example of mix SL and AL learning is:

- The lack of direct communication in asynchronous learning can be avoided by learning with and from others in synchronous learning.
- The adaptability obtained through asynchronous learning aids the inadaptability of live synchronous learning.
- The characteristic time limitations of synchronous learning can be resolved by involving asynchronous learning, which allows time for deeper processing.
- There is much less urgency in asynchronous learning because it provides the access to learning material at all times. By adding synchronous activities that can use the asynchronous elements, asynchronous learning becomes more urgent [6].

Utilizing benefits from both ways of distance learning is essential for providing the greatest possible value of online classes. It might be challenging to select an optimal blend, but once we understand when to use each modality, it becomes much easier to do.

3. SYNCHRONOUS AND ASYNCHRONOUS LEARNING DURING LOCKDOWN PERIOD OF COVID-19 PANDEMIC AT UNIVERSITY IN SERBIA AND UNITED STATES

In this section we will present an overview of experiences about synchronous and asynchronous learning during of COVID-19 pandemic at particularly chosen universities in Serbia and the United States.

Since the beginning of the COVID-19 pandemic in March 2020, many universities in Serbia and US have been pushed in a hasty transition from classical teaching-learning model to online classes. It is common to all that in the first week of the crises, deans, department chairs, faculty boards, together with administration and IT departments, contributed with their expertise, experience and good practices to find the best possible solution for the problem they have never faced before. It turned out that shifting from one model to another was successfully done much faster than they first expected, literally within a few weeks. They provided proper training and equipment for all faculty members and other supporting staff in order to reduce the organizational stress that occurred so unexpectedly and overcome all difficulties. This level of readiness comes from the fact that some universities across the country have already set the fundamental logistics for online learning and many of them have been already providing online classes for their students.

3.1. SERBIA Experience: One of the brightest examples of educational institutions that successfully responded to the new circumstances is the Faculty of Technical Sciences (FTS), University of Novi Sad (UNS). In 2020, its faculty members were using SL, combined with AL through the SOVA and Microsoft Teams online platforms (MS Teams). SOVA is an e-learning platform at the UNS. Its initial development was supported by the Erasmus+ project MILETUS, which UNS was one of the partners. From 2018, the platform is used for various trainings within that project, and from the summer semester 2018/2019 in regular classes in certain subjects at FTS and Faculty of Technology. Today, this service is available to all interested teachers, associates and students of UNS. By switching to an online learning system in March 2020, FTS teaching staff initially used SOVA platform, mainly as an AL model. Microsoft Teams is a business communication platform developed by Microsoft. From September 2020 FTS uses MS Teams for online learning, where multiple teams were created (based on subjects). Professors were able to provide the class material to students before the official start date and also to record their lectures on MS Teams platform. It has been empirically shown that combination of these two models accomplished very good results and positive student feedback. Currently, the general problem is the organization of examinations, because they cannot be taken outside higher education institutions. Representatives of the Conference of Serbian Universities state that it is necessary to create pilot projects for taking the exam online. Then, when a solution is found, it will be incorporated into the Law on Higher Education, which will then enable exams to be taken outside the higher education institution under controlled conditions.

3.2. US Experiences: First example is the University of Maryland Global Campus (UMGC). This university branch offers opportunities to many students across the globe for pursuing their higher education. Many of them are in the military service so they can use the accessibility of UMGC programs even while being deployed to remote military bases in other countries and continents. Online classes are administered through the asynchronous learning with the intense turn-based correspondence between the instructor and his/her class roster. Students take an 8-week online course where they are guided through the learning materials by completing assignments from the online learning platform. They get their "take home" quizzes, midterms and final exams together with deadlines for their

completion and all testing is organized asynchronously, with no live proctoring. In case of math classes, they use the platform called ALEKS. ALEKS stands for Assessment and LEarning in Knowledge Spaces and it is an online-based learning system which monitors and guides student learning. Unlike a traditional web-based homework system, ALEKS uses an advanced artificial intelligence system to gauge how well students understand the material. It checks for mastery of prerequisite skills before allowing them to advance, and it also checks their work at each step providing the immediate feedback. As they complete assignments in ALEKS, their scores are updated to an online classroom called LEO, specifically created for the class they belong to. Beside the regular email, LEO is the place where the multi-way correspondence takes its place: between the teacher and students, and among students themselves. Having that said, LEO provides them access to chat rooms and discussion boards, class calendar, assignments, scores and grades, teacher's and university's announcements, as well as many other online resources such as library, effective writing center and tutoring assistance. Since the system is designed for students from all meridians, adult learners, 9-5 professionals and public servants, it seems that its asynchronicity brings them a lot of benefits with a perfect work-school-life balance.

Next example is California State University San Marcos (CSUSM). This university offers synchronous online classes on *Zoom* meeting app, bundled with their online classroom platform called Cougar Courses (CC). This platform existed even before shifting to distance learning. It provides access to chat rooms, discussion boards, assignments, gradebooks, teacher's and university's announcements, and posted materials provided by faculty members. CC has gone through many changes over the years and it is continuously evolving to provide the best possible support for remote and in-person classes. *Zoom* meeting app provides breakout rooms and polling where participants can work in groups and vote on different topics launched by the moderator, which is usually the instructor himself. While *Zoom* is widely accepted by many users around the world, it was not initially created for online classes. Its main purpose was to provide remote meetings and webinars, so the only feature that can be fully utilized in online classes is sharing the computer or tablet screen. Moderator has a very limited control of muting/unmuting participants, switching on/off their camera and has no access to more than one breakout room at the time. Some universities understood these constraints so they started developing apps and platforms that will provide more control and classroom management tools for the instructor. Quizzes, midterms and final exams on CSUSM are usually administered through the live *Zoom* proctoring, with the help of a lockdown browser called *Respondus*. Beside synchronous, some faculty members exercised their freedom to apply a hybrid online teaching model. These instructors used a "flipped classroom" approach where they assigned the pre-recorded material to be watched before the class, and then learnt from the lecture, practice problems and class discussion during the *Zoom* meetings. This model has its pros and cons that are mostly contingent on the self-engagement level of each student.

4. CONCLUSION

As a general conclusion, online education has grown in popularity and accessibility because students like its schedule-friendly options. Distance learning will never be capacitated to fully replace classical education. However, in 2020, COVID-19 propelled the traditional teaching-learning model to evolve towards e-learning, hence incorporating the distance correspondence and becoming more associated with online platforms. Therefore, federal and state regulations should be up to date in providing a maximal support for the future developments of a new system. In fact, the future growth of distance learning and its ability to substitute in-person learning is positively correlated with the following measurable parameters: longevity of pandemic crises, students learning outcome, enrolment rates, and further development of modern technologies. The greater these parameters are, the more favourable distance learning becomes. Eventually, the method of learning where faculty members/professors choose for students will depend on a number of factors: learning objectives, the types of course content that is created, how training is delivered, and the availability of students. However, if there are good resources, using both synchronous and asynchronous learning is a winning formula.

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