

DIGITAL TRANSFORMATION OF UNIVERSIDADE DE SÃO PAULO: FROM FACE-TO-FACE TO VIRTUAL LESSON

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Abstract

Online learning has been around for a while, but it's never been more important than it was in 2020 and 2021. While many students have been able to complete their degree requirements, the pandemic has presented new challenges for educators, students, and administrators alike. E-Aulas (Virtual Lesson in Portuguese) is a platform that helps teachers, students, and colleges adapt to the new challenges presented by COVID-19. The platform helped the management of the Universidade de São Paulo (USP) undergo a process of digital transformation to offer online classes for students. USP has served students since 1934 and is a leading educational institution in Brazil.

The platform, which enabled professors to upload, with automatic metadata generation, registration, storing, and streaming video lessons, was implemented in 2012 with the aim of serving professors and students at USP. This platform, developed by a research group at the USP Polytechnic School, is currently managed by the pro-rectory of undergraduate studies. It can be used to support new teaching methodologies such as Flipped Classroom or Blended Learning, or for students to review face-to-face recorded lessons or as supplemental material for teacher' classes. Before the pandemic, there were several e-Aulas users who used the platform on a regular basis. However, during the pandemic, this number increased dramatically.

During the period 2020-2021, there were an average of 1.030 videos published per month, and 91.660 new users. There were as well 95 million hits during this same period, that is an average of 7 million accesses per month. E-Aulas has helped USP to make the transition to remote learning much easier. Therefore, it's clear that E-Aulas has been an invaluable resource for teachers who had to adapt their lessons to accommodate remote learning during the pandemic. In this case study we'll look at how E-Aulas helped USP navigate COVID-19 and still modernize the teacher methodology, enabling the use of learning active methodologies, by providing a safe way for educators to teach classes online while still maintaining high quality standards and student engagement levels.

Keywords: *E-Aulas, video platform, digital transformation, teaching-learning modernization, remote learning.*

1. Introduction

Two decades ago transmitting videos over the Internet was a big challenge. Until the emergence of streaming video distribution services like Youtube and Vimeo, platforms that use a specific network architecture called Content Distribution Networks, or CDNs (Pathan, Buyya, and Vakali, 2010).

More recently, platforms specific for teaching purposes have emerged in which it is possible to publish video lessons of complete courses, such as MOOC (Massive Open Online Course) (Zhang, 2013), EdX (Chen, 2016), and Coursera (Knox et al., 2012), bringing great benefit to people who wish to qualify, and for whatever reason, had no access to face-to-face teaching. These platforms have brought thousands of people together, democratizing access to information.

In 2012, inspired by these two movements, a platform was developed by a research group at the Polytechnic School of University of São Paulo (USP), Brazil, to store and distribute the video classes produced at the USP. This platform, which received the name e-Aulas, made it possible to create a repository of videos, and also making these video lessons available to students of the university, and also people outside it. e-Aulas architecture is based on CDN, which promotes a better video stream distribution over the Internet, guaranteeing the content delivery to those who are accessing it remotely. The platform did not have the same purpose as a MOOC, since it does not offer certification services, but

it serves mainly to preserve the educational assets, which is the academic production of the institution's professors while making it accessible.

During these last two years, we could see that this platform was very helpful for faculty to be able to maintain their classes, even with the restrictions imposed by the pandemic. And that it can still play a fundamental role in the continuity of teaching activities, allowing even the modernization of the teaching-learning process at USP.

To show this, this article will bring in section 2 details about the platform, section 3 will show the use observed during the pandemic, section 4 teaching models that can continue to benefit from the platform and the content already produced, and finally in section 5 we show our final considerations.

2. e-Aulas Platform

The e-Aulas platform was implemented in the technological development project context, funded by RNP (National Education and Research Network), with the goal of creating a national academic CDN for Brazilian public Universities (Cunha et al., 2015). Thus, in addition to the national teaching network version, called Eduplay (Sant'ana, 2021), which is currently used by all federal public universities, a smaller version was adapted and installed for the University of Sao Paulo.

In this way, e-Aulas could be adapted to USP's needs, being integrated to the administrative systems and to the central library system so that it could automatically register the videos recorded as academic production of the lecturers. From 2015 to 2021 the platform was managed by the pro-rectory of undergraduate studies.

2.1. e-Aulas Functionalities

When uploading and registering their video lesson, the faculties must provide information for the creation of metadata, such as title, abstract, key words, course, subject, version, guest teacher. In addition, the teacher will be able to define the license to use the content produced by him/her and define if that catalog record should be included in his/her list of academic productions.

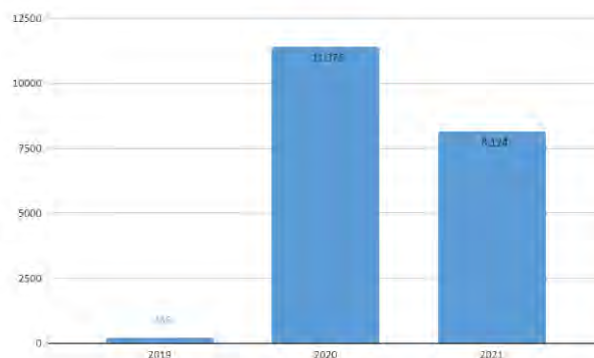
Besides allowing faculty to register and publish their video lessons, e-Aulas has other features such as account configuration, my lesson, playlist management, favorites management, video notes management, and mailing.

In the administration area, there are functionalities like user account configuration with publisher permission, servers configuration, statistics, portal pages configuration, mailing list, reporting, among others. In addition, there are some features for interacting with the published videos, such as creating a favorites list and playlist, liking, sharing, embedding, annotating, recommending, bug reporting, and denouncing.

2.2. Pre-pandemic use of e-Aulas platform

Although e-Aulas has been up and running since 2012, its use was still very limited to a few teachers who offered videos as additional content to students. However, some faculties used e-Aulas to offer their students videos with:

Figure 1. Videos published in 2019, 2020 and 2021.



- Recordings of the lectures already taught: allowing the student to review lectures already taught or watch the missed lecture.
- Records of practical demonstrations made in laboratories: allowing students to have the perception of a practical activity without going to the laboratory.
- Record made by the teacher of contents not yet taught: allowing students to watch the content before going to the classroom.

The small volume of videos published in 2019, in comparison of 2020 and 2021, can be seen in the graph of figure 1. From 2012 to 2019, only 4,300 videos were published. Nevertheless, we could observe that a large number of external users, that means, people outside of the university, from different states of Brazil, making video access was surprising. This means that people are searching for high quality content, and USP is a Brazilian reference. This is a stimulating fact considering USP's leadership role and the possibility of contributing to the democratization of information, knowledge and education.

3. Remote class at isolation period

COVID-19 presented to us new challenges. With the pandemic outbreak, the courses started to operate in remote mode, which required a great effort of adaptation from all the educators in order to achieve an adequate level of teaching.

Initially, insecurity was the feeling of part of the faculty, because they did not feel able to do teaching-learning activities in the remote mode. Others quickly adapted to the new model. This is a reflection of a university that has 5,800 faculties.

Therefore, the Pro-rectory of Undergraduate Studies immediately started a process of faculties support by offering:

- a website with videos with recommendations on how to conduct classes, use teaching tools, and create digital didactical materials,
- online workshops, using Google Meet, for hundreds of faculties.

The classes started to be held by videoconference using Google Meet or Zoom tools, with which it is possible to have visual contact between the faculty and the students. However, due to the adverse conditions imposed by the pandemic, it was defined by the USP rectory that all classes should be recorded, so that students who could not watch the class in synchronous mode, could watch it at another time (in asynchronous mode). This has benefited students with lack of internet connection or with health problems. Associated to online classes, other tools were also used to assist the learning process, such as the e-Disciplina system, an LMS (Learning Management System) based on Moodle and customized for USP, that offers files repository, chat, forum, etc.

Thus, a large volume of video records were generated, with the faculty's lectures. And some of them were published on e-Aulas, so that students could watch them. The big boom in video lesson publications can be seen in the graph shown in figure 2, which also shows the seasonality of academic production, according to the academic period in our country. The volume of new videos registered on the platform went from a few hundred in 2019 to a little over eleven thousand in 2020, and eight thousand in 2021. In terms of video production, that volume may not be much if you consider the number of faculty at the institution.

However, we observed that the number of new registered users, and the number of video accesses increased abruptly, which allows us to infer that there was an intense consumption of the videos published and an accentuated search for content that would add to the professional and intellectual formation of the users.

Therefore, we can observe the significant role of the platform during this period by comparing the number of new users registered and the video number accessed in 2019, 2020 and 2021, as shown in figure 3 and 4. As we can see in fig. 3, about 130,000 new users were registered in the system, and in terms of video access, shown by fig.4, we had in 2020 more than 6 million accesses per month, on average about 211,000 accesses per day.

4. Digital transformation of the teaching-learning process

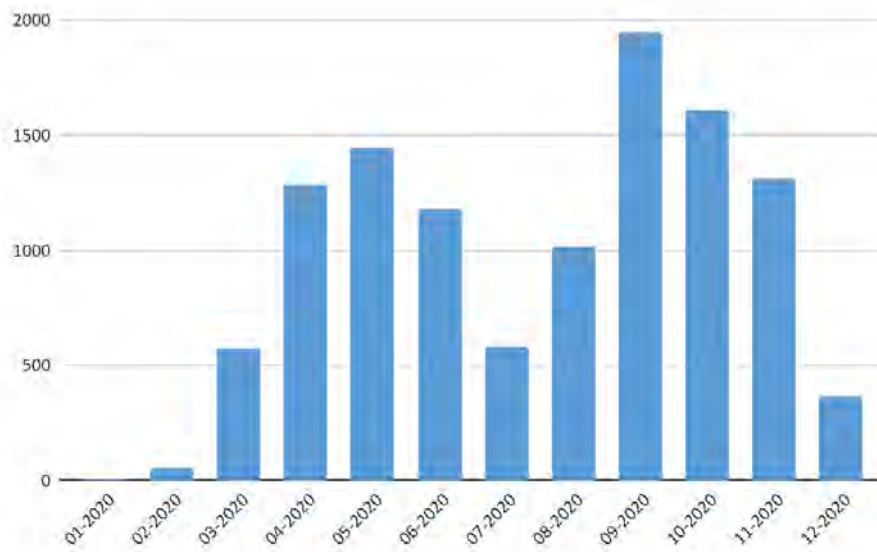
The concept of digital transformation (Lanzolla, Anderson, 2008) is understood as a process of improving an activity through the use of technological tools. It is a structural change in organizations, which no longer see technology as a one-time resource, but as part of their daily routine.

The uptake of digital technologies in schools and universities is changing the ways in which people interact and students consume content. The increasing number of available tools to produce digital content means that the academic community will have more opportunities to create and consume them, when and how they want.

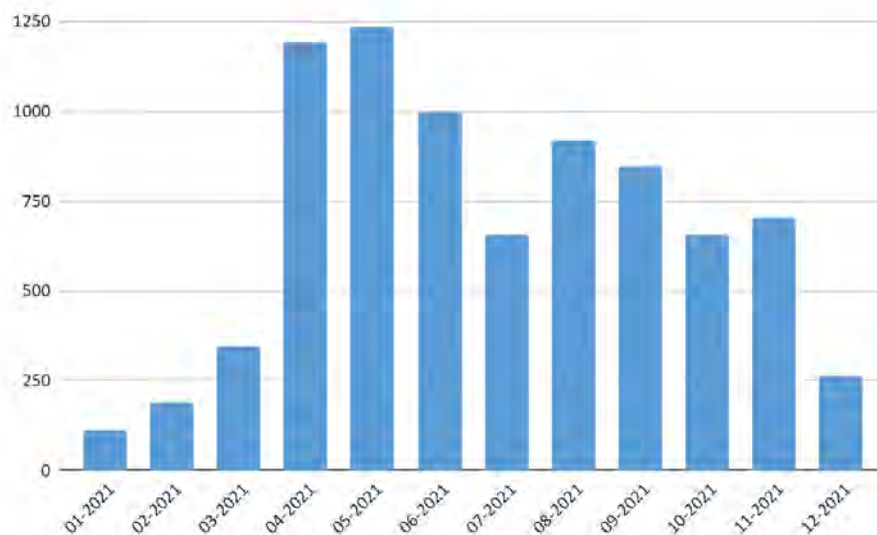
We observed that the period of social distance served as a springboard for the faculties to acquire new skills, discovering many new possibilities for producing their own content.

Overmore, some teachers, who had produced video lessons in 2020, started using this material differently in 2021, implementing other pedagogical methods and adapting them to the social distance scenario. This was the case of teachers who started using a modified form of the flipped classroom. But at this moment being used in remote classes, that is, “flipped virtual classrooms”.

Figure 2. Video lessons published month by month in 2020 (a) and 2021 (b).



(a)



(b)

These observations made it clear that e-Aulas can leverage the University of São Paulo's digital didactic transformation, supporting new teaching methodologies such as Flipped Classroom (Akçayır, Akçayır, 2018) or Blended Learning (Sharma, 2010), besides their use for students to review face-to-face recorded lessons or as supplemental material for teacher' classes.

5. Final considerations

With digital transformation, preserving an institution's intellectual assets becomes very important. The modernization of teaching is key to the continuity of a mature and efficient teaching-learning process. For this reason, digital transformation also applies to universities.

The use of pedagogical methodologies that are aligned with this transformation will be very enriching for students and faculties, who will reap the rewards of a more intense and engaged interaction with the didactic content, and between themselves, in the modern world. For this reason we are confident that the use of methodologies such as flipped classroom, and blended classroom, that integrate the use of videos to explain, demonstrate or exercise concepts, will be beneficial to USP. Each video produced by faculties, in their didactic activities, becomes an asset to be stored and distributed with copyright and patrimonial rights guarantees. In this way, e-Aulas plays an important role in this process, and also contributes to the democratization of information, since 50% of the video lessons are openly available.

Figure 3. New Users in 2019, 2020 and 2021.

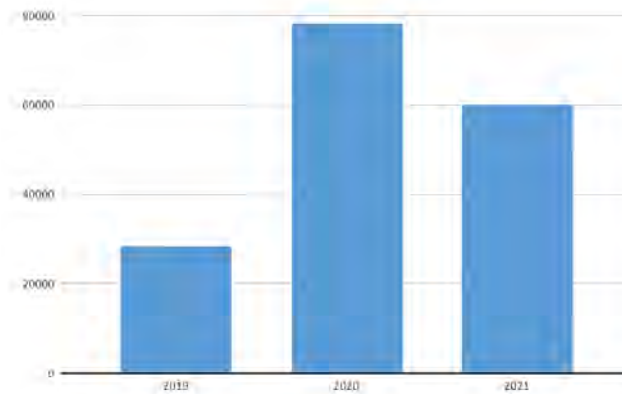
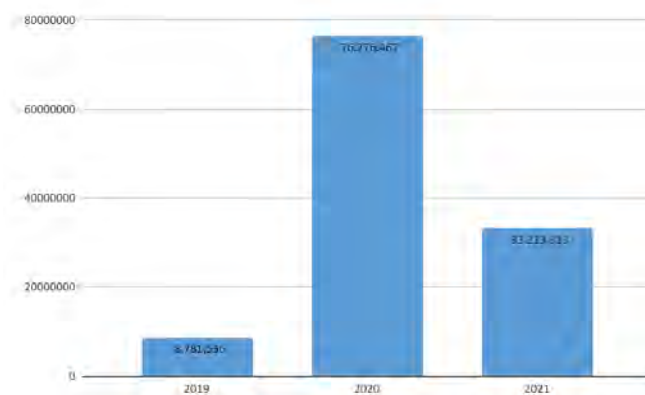


Figure 4. Number of videos accessed in 2019, 2020 and 2021.



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