

# Experience of a virtual course of pneumonology for Medical students at the University of Buenos Aires during the COVID-19 pandemic

## *Experiencia de un curso virtual de la materia neumonología para alumnos de la carrera de Medicina de la Universidad de Buenos Aires durante la pandemia COVID-19*

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*The sanitary crisis has forced us to rapidly turn to virtual learning, which implies joining efforts and reviewing the work done by each of our institutions on open educational resources to make them available to the different Ministries of Education and support the community of teachers in the extremely important task of training their students on a long-distance basis.*

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### ABSTRACT

Experience of a virtual course of pneumonology for Medical students at the University of Buenos Aires during the COVID-19 pandemic

The COVID-19 pandemic not only affects people's health: schools and universities around the world had to forcibly adapt to a distance education modality. Knowing that the epidemiological situation could continue for several months, the teachers of our Unit, in charge of teaching Pneumonology, had to anticipate and devise a contingency plan to ensure training continuity during 2020-21. The virtual courses took place in four weeks. The classes were given in mp4 format and virtual workshops. Once a week a virtual meeting was held to answer questions related to the content. The students had to be divided into groups to solve practical assignments and a final work with their defense at the end of the course. In addition, they conducted a survey to evaluate the course. The final exam was presential for the 2020 course and virtual for the 2021. All the students who took the exam approved. The experience was enriching, different and challenging. It allowed us to reflect and ask ourselves that the traditional way of teaching can and should be complemented with the resources that technology brings us. Although the total reopening of the University may seem uncertain, this is the opportunity to better plan the way out of the crisis and promote internal reflection on the renewal of the teaching and learning model.

**Key words:** COVID-19; Teaching; Pneumonology; University; Virtual learning

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## RESUMEN

La pandemia por COVID-19 no solo afecta la salud de las personas: escuelas y universidades de todo el mundo debieron adaptarse de forma forzosa a la modalidad de educación a distancia. Sabiendo que la situación epidemiológica de la pandemia podía continuar por varios meses, los docentes de nuestra Unidad, encargada de dictar la asignatura Neumonología, debimos anticiparnos e idear un plan de contingencia para asegurar la continuidad formativa durante el período 2020-21. Los cursos virtuales se llevaron a cabo en cuatro semanas. Se dictaron clases en formato mp4 y talleres virtuales. Una vez por semana se realizaba una reunión virtual para responder preguntas relacionadas con el contenido. Los alumnos debieron dividirse en grupos para resolver trabajos prácticos y un trabajo final con su defensa al completar el curso. Además, realizaron una encuesta para evaluar el curso. El examen final oral fue presencial para el curso 2020 y virtual para el de 2021, y aprobaron todos los alumnos que se presentaron. La experiencia fue enriquecedora, diferente y desafiante. Nos permitió reflexionar y plantearnos que la forma de enseñanza tradicional puede y debe complementarse con los recursos que la tecnología nos acerca. Aunque el momento de la reapertura total de la Universidad pueda parecer incierto, esta es la oportunidad para planificar mejor la salida de la crisis y promover la reflexión interna sobre la renovación del modelo de enseñanza y aprendizaje.

**Palabras clave:** COVID-19; Enseñanza; Neumonología; Universidad; Educación virtual

## INTRODUCTION

The SARS-CoV2 pandemic has affected more than 362 million people and caused more than five and a half million deaths around the world. In our country, more than eight million cases have been confirmed, with more than one hundred and twenty thousand deaths<sup>2</sup>. But the COVID-19 pandemic not only affects people's health: schools and universities all around the world shut their doors in 2020, affecting more than one thousand five hundred million students from 191 countries<sup>3</sup>.

The Hospital General de Agudos Dr. J M Ramos Mejía is associated with the University of Buenos Aires (UBA) and teaches the subjects of the Clinical Cycle of the Career of Medicine. Our Unit is in charge of teaching Pulmonology during the month of May every academic year since 1997, and is the University Center for Respiratory Medicine of the UBA since 2020.

As a consequence of the extension of the social, preventive and mandatory distancing<sup>4</sup>, in April

2020, the Rector of the University decided that course subjects had to be taught virtually<sup>5</sup>. Having projected that the epidemiological situation of the pandemic could continue for several months, we adapted the syllabus and planned different teaching strategies in order to meet the objectives of the educational program. But even though we can anticipate all evident obstacles, teaching medicine virtually is not completely possible: the most important thing this career can teach its students is patient contact, and this can't be transmitted through a screen.

Amid difficulties, in May 2020 and 2021, coincident with the highest workload period at the hospital, the first two Pulmonology virtual courses were carried out, intended for students of the Career of Medicine of the UBA.

The purpose of this manuscript is to tell the first experiences of both teachers and students with the Pulmonology subject taught virtually in our Teaching Hospital Unit (THU) for students of the Career of Medicine of the UBA during the 2020-21 period.

## MATERIALS AND TEACHING METHOD USED

We have one certified teacher, two assigned teachers and two senior teaching assistants for teaching the subject. During April 2020, the syllabus and methodology of the subject were redesigned. The Google Classroom platform and Zoom program were chosen for teacher-student interaction. Between March and April 2021, some of the methods that had been used the previous year were modified. Four days a week, two classes were published. The classes had been previously recorded by teachers in mp4 audio-visual format and supplemented with bibliography. A total of twenty-two classes were taught in 2020 with the most important parts of the syllabus. In 2021, a class in hemoptysis was added. Every day, students could ask questions through the platform, and also graphics and bibliography were added when necessary. In addition, student participation in class was encouraged by asking questions through the platform to generate a debate and exchange of opinions.

Once a week, a virtual workshop on radiology was held for students to start recognizing lesions and patterns. In 2020, there were two Power Point presentations including the most frequent patterns in radiology and chest tomography. In 2021, the workshop was interactive: two Zoom meetings were scheduled, where teachers and students discussed radiological techniques and radiological and tomographic patterns. Practical, face-to-face classes in the pulmonary lab and endoscopy were replaced by tutorial videos. Classes in the pulmonary lab focused on spirometry interpretation. In 2021, a virtual interactive workshop was held about spirometries, where the students were able to analyze studies and relate them to the diseases they had studied.

Once a week, a virtual meeting was held to answer questions related to the topics that had been addressed. In order to encourage team work, the students were divided in groups to resolve clinical cases. Finally, each team carried out a work on a specific topic for which they had to do some bibliographic research and present the work virtually at the end of the course. In 2020, the selected topics were: chronic cough, viral pneumonia, inhalation therapy devices, hemoptysis and electronic cigarettes. In 2021, the strategy changed: the students were given a clinical case and were asked to organize a case conference and develop differential diagnoses supported with bibliography, guided by a teacher assistant. The clinical cases were about real patients: bilateral pneumonia in immunocompromised patient, diffuse bronchiectasis, mediastinal mass, fungus ball and pleural effusion.

Students were expected to submit weekly practical assignments, and then a final work at the end of the course in order to be considered as regular. Each student was graded basing on the level of individual class participation through the platform and the delivered assignments, in accordance with resolution No. 106/2020 of the Board of Directors of the Faculty of Medicine<sup>6</sup>. At the end of each course, the students were asked to answer a survey that allowed us to evaluate ourselves.

In 2020, the final exam was postponed according to the resolutions of the Board of Directors of the Faculty of Medicine<sup>7,8</sup>, and students could be evaluated face-to-face in

March and April, 2021. In 2021, at the end of the course, students were evaluated orally and virtually<sup>9</sup>.

## RESULTS

Virtual courses were directed to 36 students in 2020 and 49 the following year. The proposed activities were 100% completed in both years: twenty-two classes in 2020 and twenty-three in 2021, two diagnostic imaging workshops, three weekly virtual meetings to answer students' inquiries, and one virtual workshop on spirometry in 2021. All the groups submitted weekly practical assignments and also a final work presented in a virtual meeting.

During the four weeks of each course, interaction between teachers and students was observed daily. In 2020, students made 143 comments and questions through the platform; all of them were answered with bibliographic support. In 2021, there were 180 questions. Most consultations took place during weekly virtual meetings that lasted an average of one hour and a half each.

### Course evaluation

The final survey of the course was answered by 100% of the students (36/36) in 2020 and by 90% (44/49) in 2021. Answers to virtual course expectations were similar both in 2020 and 2021 (Figure 1). 16.5% of the students chose to create their own answers: "I was scared I wouldn't learn in the same way as in face-to-face classes", "Curiosity and excitement", "Insecurity and doubts", "I had already done two virtual internships before without such an active participation of the doctors, so I thought the class was going to be quite fruitless".

They were required to rate from 1 (bad) to 10 (excellent) the different aspects of the course, including the selection of Classroom and Zoom applications; the content of the classes; the usefulness of practical assignments and the final work; the bibliography provided to them and the quality of teachers' responses. Each year's responses were different, so we distinguished each one of them (Table 1).

Regarding the fulfillment of the proposed syllabus, 55.6% in 2020 versus 61.4% in 2021 said it was fulfilled completely.

In the comment section of both courses, we received very positive observations. Some criticisms of the first course had to do with the number of

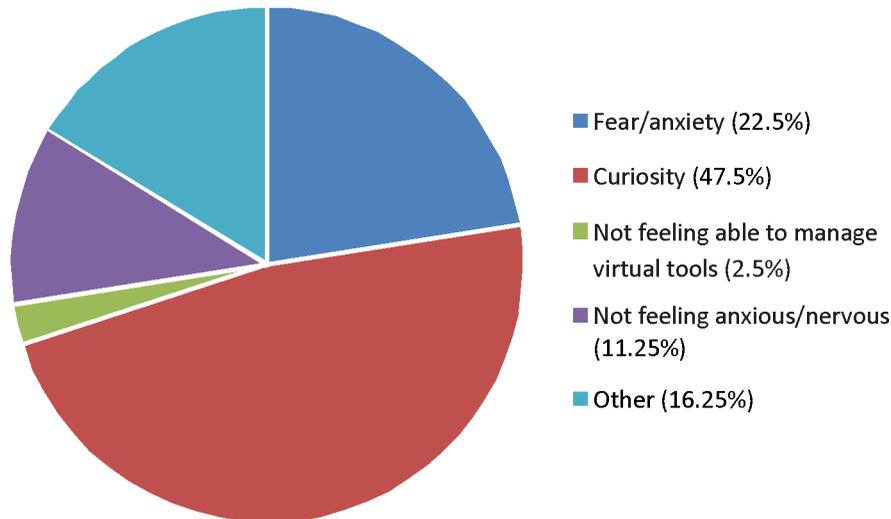


Figure 1. Students' expectations before the course.

TABLE 1. Virtual course evaluated by the student

Questions	2020 (Average score)	2021 (Average score)
How would you evaluate the Classroom application as a means of contact and data repository?	8.2	8.9
How would you evaluate the Zoom application as a means of contact with the teachers?	7.5	9.1
How would you evaluate the content of the classes in general?	8.9	8.8
How would you rate the time taken by the teachers to respond your inquiries?	9.6	9.5
How would you rate the quality of the teachers' answers to your inquiries?	8.9	9.5
Do you think the practical assignments were useful?	7.7	9.6
Do you think the suggested bibliography was useful?	8.6	8.7
Do you think that writing a monograph was important for your learning process?	8	9
What is your general evaluation of the Pulmonology virtual class?	8.5	9.25
How would you evaluate the content of the virtual workshops?	-	8.4
How would you evaluate the Q&A Zoom feature?	-	8.9

Scale: 1 (bad) - 10 (excellent)..

practical assignments, which were useful but too many, taking into account the duration of the course. They suggested the imaging workshop should be more interactive. Regarding the application used for weekly virtual meetings, they suggested other meetings without time limit. However, they considered the meetings very useful to answer their inquiries and suggested they were held more frequently. Many of these criticisms were taken into consideration and were useful for the modifications incorporated the following year.

#### Regularity and passing conditions

100% of the students obtained regularity. In accordance with resolutions in force during the 2020 course, two dates were established for the face-to-face oral final examination (March and April 2021): 28 out of 36 regular students (77.8%) took the exam (9 the first date and 19 the second). All who attended the exam passed, with an average grade of 9 points (range: 6-10).

In 2021, the oral final exam was virtual. 30 out of 49 students took the exam (61%) distributed in

three consecutive days. All of them passed with an average grade of 9 points (range 8-10).

## DISCUSSION

This was our experience with the virtual Pulmonology course, created *a novo*. Strong teacher-student interaction was obtained with a high degree of satisfaction. Different virtual platforms were used with online interaction (synchronous), questions were answered during the day through the Classroom platform, and asynchronous activities were generated with clinical case resolution and bibliography provision. All students obtained regularity, and a high percentage of students took the final exam.

Suspension of face-to-face classes in our country has impacted on almost two million students and more than a hundred and forty thousand university teachers<sup>10</sup>. But closing the doors of the institutions of higher education not necessarily means that academic activities have been suspended too. On the contrary, it implies that universities must forcibly adapt to the modality of long-distance education, and that teachers must do so without affecting quality and keeping social inclusion<sup>11</sup>.

As teachers, this experience has been enriching, different and challenging in many aspects: on one hand, an epidemiological context without precedent, high healthcare demand and little time to prepare; on the other hand, using virtuality as a method of communication between teachers and students for the first time, using technology as the main teaching tool and, concurrently, maintaining good quality. We had to prioritize objectives, redefine content and use virtual modalities that could allow us to forge a bond with our students, not just a mere exchange of information<sup>11</sup>.

All the virtual scheduled activities could be completed in both courses. The evaluation on the part of the students was encouraging and positive, since everyone obtained their regular condition for the subject and 100% of the students who took the oral final exam, (face-to-face in 2020 and virtual in 2021) passed it.

We believe the improved 2021 course grades may be due to the modifications made, which improved the teacher-student interaction by including synchronous virtual workshops, and the encouragement to analyze clinical cases and

organize case conferences, a learning tool widely used among residents.

Regarding teachers' training to be prepared to face a virtual course, during October 2020, the Faculty of Medical Sciences together with the Center for Innovation in Technology and Pedagogy (CITEP), dependent on the Academic Affairs Secretary, and the Teaching Association of the University of Buenos Aires (ADUBA) taught the free online course "Design of a Teaching Proposal within a Virtual Environment". The objective was to provide the tools necessary to allow for the optimization of the online medical science campus and advice on the organization and development of long-distance courses, virtual classroom administration and the design and use of virtual evaluations and exams<sup>12</sup>. Our first particular experience, a course taught in May 2020, was self-taught, guided by intuition and the vocation for teaching. Since 2021, the Faculty of Medical Sciences recommends its teachers to use Google Classroom as their main platform, the same that was used by our THU<sup>13</sup>.

To restructure and transform a purely face-to-face subject into a virtual course allowed us to reflect on how traditional teaching has to be supplemented with the current technology. "Supplemented", not "substituted". William Osler commented: "in the teaching method that we can call "natural", the student starts with the patient, continues with the patient, and ends his/her studies with the patient (...)"<sup>14</sup>. We shouldn't lose sight of the fact that contact with the patient is the cornerstone of teaching medicine: during the clinical cycle the students start to venture into the doctor-patient relationship, learn to interrogate, examine and write medical records. For this subject in particular, practical teaching (in the operating room, pulmonary lab, inpatient ward, pulmonary rehabilitation gym, chest imaging workshops) is impossible to reproduce fully in a virtual manner.

Regardless of the pandemic, having a virtual class archive, bibliographic material and pulmonary clinical cases could be useful for certain situations where the student sees the regularity of his/her career in danger (for example, surgeries with prolonged postoperative time, immunocompromised patients or any unforeseeable circumstance).

During both courses, we observed that not all students knew how to do bibliographic research,

so they were taught the basic management of the PubMed page. Another limitation we found was the poor proficiency with the English language and, to a lesser extent, the use of virtual platforms. Surely these situations will trigger in many of them future questions whether they need further training to complete the career and subsequently exercise the profession.

The epidemiological situation gives us the opportunity to promote thinking about the possibility of renewing the teaching and learning model and allow these experiences to be integrated to the academic syllabus with the purpose of enriching and reinforcing it. The virtual modality has been successfully developed with another subject, highly accepted by students and teachers, who believe this methodology can be added into the syllabus in a virtual/face-to-face format<sup>15</sup>.

It is extremely important that us, as teachers, are trained in the design and management of virtual environments so as to integrate them to the traditional academic model. It is necessary that the University ensures good teaching quality in order to provide feedback on what has been done up to now<sup>16</sup>.

But we should also consider the emotional needs of the students who are taking the Clinical Cycle of the career and can't go to hospitals or have contact with patients and teachers. Many of the students' comments at the end of the course were about the discouragement and lack of motivation generated by virtuality, partially rectified by the methodology we use. We believe it is of crucial importance that the moment we organize a subject that will be taught in a virtual manner we put ourselves in the students' shoes and use tools that help them achieve their final objective as future professionals.

To conclude, the virtual method of teaching Pulmonology allowed for a high degree of teacher-student interaction through the use of different synchronous and asynchronous virtual platforms. All the students obtained regularity and most of them took the final exam.

Our hospital was the first to be associated with the Faculty of Medicine of the UBA more than 140 years ago. It is the environment where patient care, research, and teaching interact permanently. During those weeks, the teachers of the Unit had to keep a balance between the increasing patient care demand due to the pandemic and the virtual method of teaching the course, interacting with

the students through a new technology. This exceptional situation we had to face was and still is a challenge that left us much learning and training for the future of our career as teachers and doctors.

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#### Conflict of interest

Authors have no conflict of interest to declare.

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