

Did Virtual Replace Classroom Teaching? Lessons Learned after COVID-19

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Abstract

What did we learn after two and a half years into the COVID-19 pandemic and variants regarding Brazilian higher virtual education? This article revisited the issue, providing an overview of lessons about the challenges and pitfalls of virtual learning and the challenges faced by teachers, and executive education professors in Brazil, regarding live online classes via the Zoom platform through archival research and qualitative interviews. Key findings pointed out (a) a drastic increase in the offer and the number of enrollments and admissions in distance courses instead of classroom teaching, but with fewer conclusions; (b) internet connection issues, (c) increasing absenteeism, (d) distractions, (e) dispersion, (e) lack of interest, and (vi) limited pedagogical resources as barriers to online live classes dispensed with the Zoom platform. This study aims to provide the academic community with a perspective regarding the online live education experience after COVID-19 in Brazil. Finally, this work provides ten lessons learned during the pandemic.

Keywords: COVID-19, education, pandemic, virtual, classroom, teaching.

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INTRODUCTION

World Health Organization (WHO) declared the COVID-19 pandemic on 11 March 2020 [1]. As this article is written, there are 635 million cases worldwide, with 6.61 million deaths registered, including the coronavirus variants [2].

Lockdowns, quarantines, social isolation, house confinement, and the home office became prominent and helped to promote virtual education worldwide.

In Brazil, on 13 March 2020, the Ministry of Education suspended all classes in Brazil [1]. Lockdown was declared on 17 March in the principal Brazilian cities [1]. The Brazilian medical service collapsed in many regions [4].

Many professors and teachers in Brazil (including the authors) had fifteen days to learn how to

use the Zoom® virtual platform and Microsoft® Teams, respectively.

At that time, the crucial challenge teachers and professors faced was adapting classroom teaching to virtual teaching. Unfortunately, some classroom dynamics only made sense in face-to-face classes and needed to be changed, suppressed, or readapted to be replicable in live-streaming technology, representing an additional challenge.

Figure 1 illustrates the spread of the COVID-19 pandemic worldwide. This research investigated the current panorama of Brazilian higher virtual education through a qualitative multiple-methods approach, described in the upcoming section. We also explored how the adaptation process occurred and what lessons to share.

The subject has attracted the attention of researchers recently [1, 3, 5-7]. Finally, the research methods are outlined in the upcoming section.



Figure 1: COVID-19 case distribution
Source: [17]

RESEARCH METHODOLOGY

This article combined archival research, direct observation, and N=120 qualitative interviews conducted from January to October 2022. We adopted interpretive and inductive reasoning. The primary data were collected through semi-structured interviews after virtual invitations via instant messaging applications (such as WhatsApp®) during the classes, with a 100 percent response rate. The identities were preserved due to ethical reasons. Finally, quotations were allowed.

Raw data were coded through descriptive and In Vivo codes [8], supported by Goffman's drama

theory [9, 10]. The research is limited to Brazilian Higher Education. Other countries may convey distinct understandings and should be investigated in additional studies.

The panorama of Brazilian Higher Education over the past two decades: before the COVID-19 pandemic

Firstly, over the past two decades, Brazilian Higher Education Institutions jumped from a balance between private and public educational institutions to nearly 75 percent of private educational institutions in 2020, as illustrated in the following Figure 2.

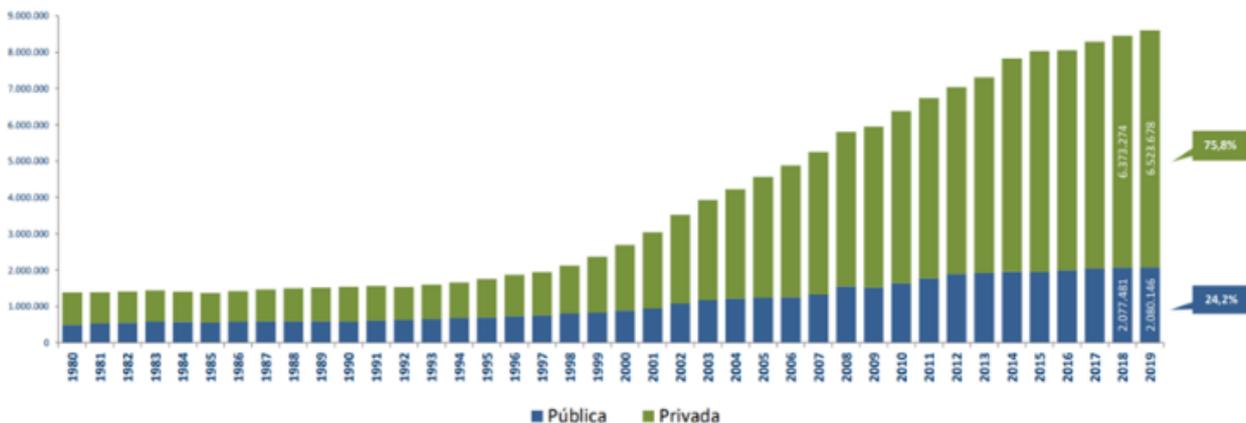


Figure 2: Distribution of enrollments in Brazil
Source: [14, 15]

The shift is explained due to the entrance of stock exchange companies in Brazilian private higher education [11, 12] from 1998 on, after the issuance of the Law of Guidelines and Bases [13], allowing the entrance of stock exchange companies in Brazilian

Higher Education. In 2020, private educational institutes controlled approximately three-quarters of Brazilian Higher Education.

The emergence of stock exchange companies in Brazil helped to promote online courses instead of classroom ones [11, 12].

Figure 3 displays the evolution of the student distribution in Brazilian Higher Education:

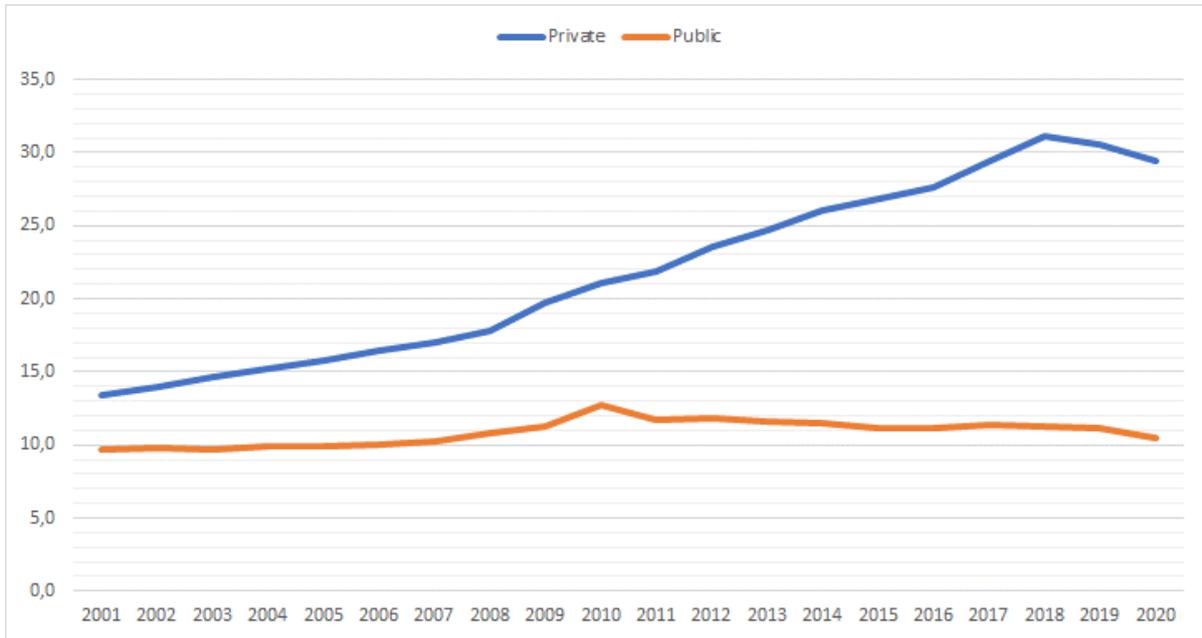


Figure 3: Private and Public Higher education Student-teacher ratio from 2001 to 2020
Source: [14, 15]

On the one hand, the entrance of stock exchange companies in Brazilian Higher Education

helped to promote a drastic increase in the number of courses offered and enrolments, as depicted in Figure 4.

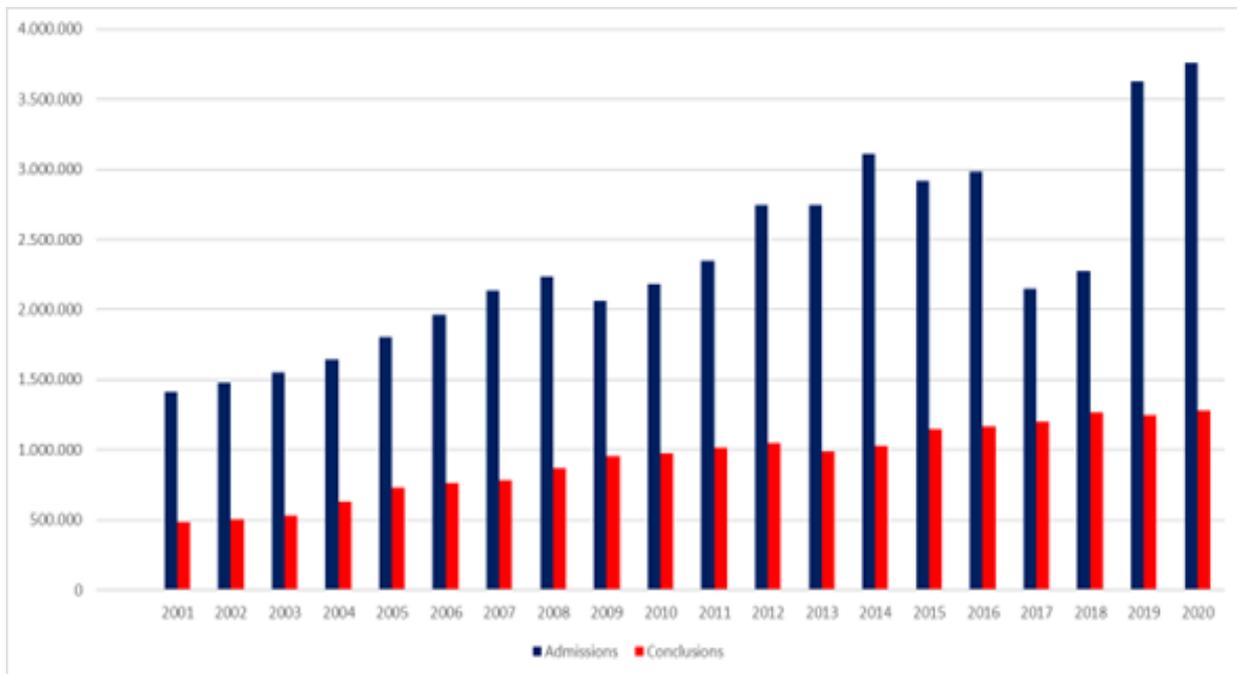


Figure 4: Admissions x Conclusions (2001 to 2020)
Source: [14, 15]

Conversely, Figure 4 shows how the number of conclusions has decreased drastically due to student evasion [11, 12]. As this work is written, Ministry of Education statistics regarding the impact of the

coronavirus pandemic on the ratio of admissions versus conclusions in Brazilian Higher Education need to be updated.

First challenges after the COVID-19 pandemic

During the coronavirus pandemic, private higher education invested heavily in virtual classes. Contrarily, only ten percent of the Federal Universities adopted virtual learning to respond to sanitary restrictions and social isolation. As a result, approximately 960 thousand students were left without classes from the 1.1 million students enrolled in Brazilian public education after several months after the beginning of the COVID-19 pandemic [16].

Brazilian private education institutions, nevertheless, responded quickly to the sanitary restrictions, adopting virtual classes in all courses nearly 15 days after the lockdown and quarantine were declared on 23 March [1].

The first challenges many professors faced were not limited to (a) learning how to use virtual classroom platforms, such as Zoom or Teams; (b) adapting the course from a classroom setting into virtual presentations, substituting face-to-face exercises and dynamics with virtual assignments; (c) changing the exams for final written assignments, abiding by sanitary restrictions; (d) dealing with internet connection issues, including power failures, loss of shortage of signal, for instance; (e) dealing with streaming technology (audio and video settings, audio and video recordings, including illumination setting scenarios for students); (f) virtual classes should follow the exact timetable as classroom settings. Finally, teachers and professors should adapt quickly to the “new normal,” an expression that has emerged occasionally [2].

In our case, the Zoom® platform was chosen because of the number of students allowed per session: each meeting supported 100 students [1].

An additional challenge to which the teachers' bodies were submitted refers to the workload of classes taught in the sitting position: in some courses, the modules are 24 h, conducted over several days, on average six long hours being taught in the sitting place, for a day. As this article is written, most classes are still dispensed in such a manner. Additional studies on ergonomics are very welcome. A question remained at that time to 100 percent face-to-face teachers and professors: how to be prepared for the classes to be dispensed in that format?

Comparison between virtual and classroom classes

Figure 5 illustrates the main differences between virtual and classroom settings:

Feature	Virtual	Classroom
noise	background noise	conversation noise
parents interruption	yes	-
pedagogical resources	limited	unlimited
group dynamics	-	five
role-play simulation	five	five
Preparation mapping	yes	yes
connection stability	crucial	-
security online issues	crucial	-
video recording	allowed	-
cloud storing	allowed	-
theoretical content	full	full
communication channel	intermittent	continuous

Figure 5: Comparison of virtual vs. classroom classes

Source: [1]

First experiences and impressions

The first experiences revealed that audio was more critical than video settings. For example, one supports poor video transmission, but no one promotes noisy audio.

Moreover, with lockdowns, the company's delivery time increased drastically. The first classes, therefore, had to be improvised with a notebook or desktop camera, with cons. We endured and survived to that occasion. The final virtual classroom setting, one year after the pandemic, is displayed in Figures 6 and 7.



Figure 6: Virtual classroom setting

Source: author's picture.

¹ Virtual classes had an average of 40 students per cohort.



Figure 7: Virtual classroom setting

Source: author's picture

In sequence, the next challenge regarded the internet bandwidth and speed: with the massive entrance of newcomers into home offices and streaming, the signal could have worked better for the students or the professor. To solve this problem, WhatsApp groups were created in parallel to assist with any power failure or loss of signal. It worked fine because we had an extra channel to communicate with the students in case of failure.

Closed Cameras

Most students in Brazil have kept their cameras turn off during synchronous Zoom classes. Immediately, the professors got confused because they could not recognize who was talking, present or absent: "It is frustrating when the students turn off their cameras. In my opinion, they are not there, and I feel like talking to no one." (I#1)

Some professors felt discredited and disrespected: "When the students turn off their cameras, they disrespect and discredit me. And cannot say a word, because everyone is susceptible right now due to the pandemics" (I#23).

However, in the first months of the pandemic, no one was prepared to deal with such circumstances, and each one reacted the best way they could. Contrary to those who advocate the massive use of virtual classes, experience has shown that most students resent the lack of face-to-face contact between students and the teacher: "I prefer much more face-to-face classes than virtual ones. I like the interaction between my peers and with the professor." (I#14) Also, the absence of face-to-face contact in virtual classes left teachers without non-verbal language cues, especially when the students turn off the camera.

Professors also had to face the challenge of teaching to the family, not only to the student: "countless times I saw children, cats, dogs, people passing behind the student, strange noises, parallel conversations, and had to deal with these situations with extra patience." (I#46)

"I am teaching the family, and if they do not cooperate, it is impossible to dispense a virtual class" (I#93)

"The interaction with the professor is much lower in the virtual class than in the classroom." (I#32)

Commentaries such as "I do not have patience" (I#2, I#5, I#34, I#35) were the most frequent. "One day, the class was interrupted five times, and I simply disconnected and gave up." (I#77)

The loss of quality of the signal is partially explained by the increase of 43 percent in new subscribers during the pandemic, totaling 152 million people in Brazil, almost three-quarters of the Brazilian population [17].

ANALYSIS AND DISCUSSION

After careful revision and content analysis, evidence suggests that virtual education is not engaging because the absenteeism rate is relatively high. Moreover, it is virtually impossible to control who is there or not with the camera turned off.

Second, virtual classes can be recorded, stored, shared, and watched multiple times. However, the students who decided to take courses only after the end of the synchronous courses [2], could not clear their questions, only their classmates': "When I watch a recorded class, I continue with my doubt, while learning through the questions of my classmates, with no professor to answer." (I#39)

Evidence also points out that virtual classes can be dispensed to more students than face-to-face classes. However, it is hard to prove the effectiveness of learning effectiveness in virtual environments. In these

Next, In Brazil, virtual classes are highly dependent on the internet connection signal and speed. Therefore, independent of the quality of the virtual courses, lags, distortions, noises, signal failure, or interruptions may jeopardize the best-organized and most interesting virtual class ever.

Exhaustive analysis revealed a more significant number of group dynamics impossible to be replicated in a virtual classroom.

Next, the analysis indicated that the student-to-student interactions were less effective in the virtual classes than in classroom ones because the students are apart from each other.

²Allowed by some Brazilian educations Institutions.

The analysis of our findings indicated less interaction between teacher and student in the virtual environment compared to face-to-face.

Ultimately, the answer to the research question is that there is massive adoption of virtual teaching in Brazilian Higher Education, accentuated by the COVID-19 pandemic; when the sanitary restrictions were relaxed and further withdrawn in April 2022, we registered three types of learning: (a) virtual; (b) classroom, and (c) hybrid, with some students in the classroom and some at home.

At this moment, the Ministry of Education did not publish the census of Education in Brazil, with the pandemic's impact on Brazilian education.

COVID-19 currently

The impact of the coronavirus worldwide, with red spots marking the areas of greater incidence (see Figure 1), updated to November 2022, is depicted in Figure 8.

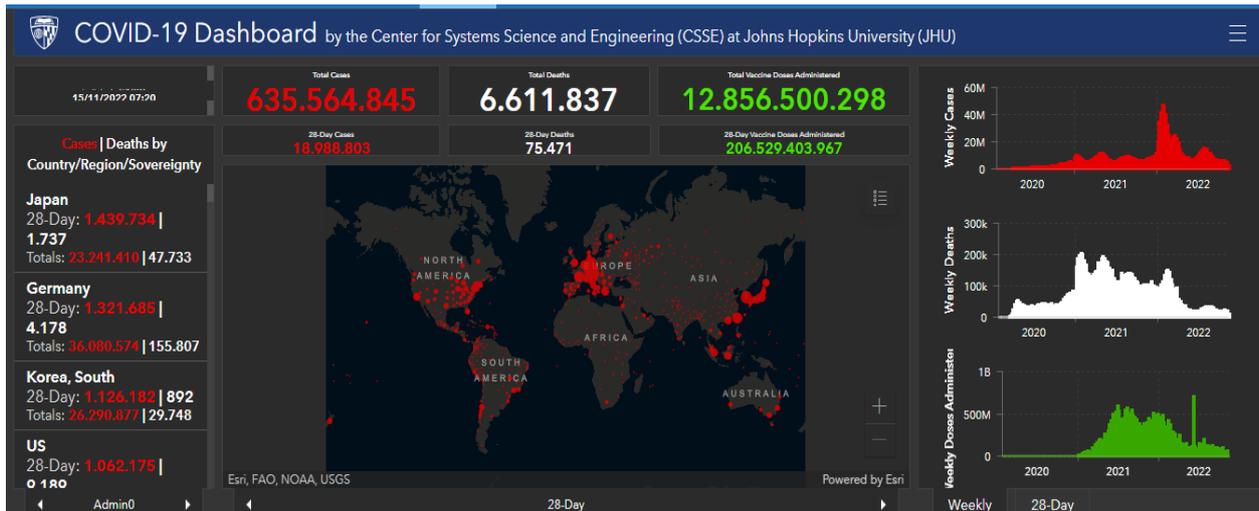


Figure 8: COVID-19 case distribution
Source: [17]

After waves of variants (delta and omicron, for instance), the situation seems controlled. At this time, there is no cure for COVID-19, which is an infectious disease caused by severe acute respiratory syndrome

coronavirus 2 (SARS-CoV-2) [1, 2]. There are currently 1,094 immunization vaccines tested and approved worldwide [19], as illustrated in Figure 9.

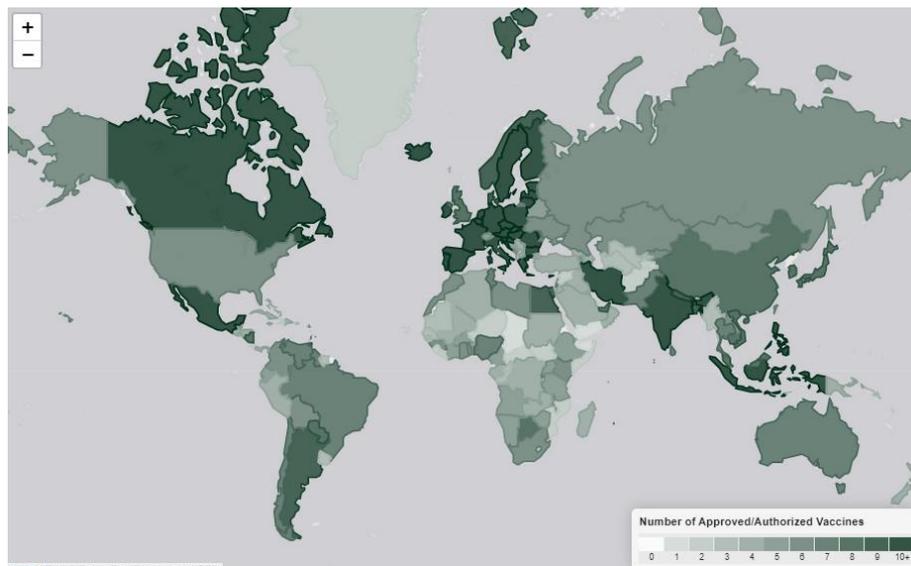


Figure 9: Vaccine Approvals/Authorizations
Source: [19]

Figure 9 shows North America's highest number of clinical trials and vaccine approvals/authorizations.

What did we learn from COVID-19?

First, teachers had to deal with their own domestic issues, anxieties and stress. Some lost parents or relatives, and many students were unable to complete the course because they contracted Covid during the course. In all cases, the Educational Institutions were flexible with the condition status. Thus, building empathy was the lesson learned.

Second, many students reacted against virtual classes and preferred to wait until the pandemic is over to complete their courses. After one year of the pandemic, some decided to take virtual classes. Therefore, teachers had to learn how to deal with risk tolerance to a greater extent.

Third, teachers had to learn new teaching methods from observing students' behavior. "In my case, I often repeated the same explanation to a given subject many times after the classes were off. Then, one student told me: - why not record the explanation in a video? Then, I learned how to produce and upload videos on the YouTube® platform, and now I have dozens of videos uploaded. The students like and save me much rework." (I#1)

Fourth, with lockdowns and social mobility restrictions, many professors reported the necessity for reinvention: "I saw the pandemic as a huge opportunity for reinvention. I studied new ways of teaching, and it is working fine. It is a new challenge every day." (I#2). Thus, the lesson learned is to take advantage of every opportunity for reinvention and learning, which helps to maintain mental health, which has been dramatically affected by the pandemic.

Fifth, the virtual classes favored those students that live far away from the educational institution. "It was tiring to face roads, heavy traffic after a full day of work, and a few hundred kilometers separating them from the educational institution." (I#118) In this sense, virtual teaching was perceived as a help facing displacement issues.

Sixth, professors and teachers had to learn to be more tolerant of connection issues, students' excuses for postponing deadlines, mental and health issues, and technological aspects, and yet, to deliver an outstanding service to their students.

Seventh, professors had to learn how to maintain mental health, even when outdoor activities were banned because of isolation. The affluent population became increasingly sedentary, spending more than 70 percent of their time sitting [20]. Therefore, the lesson learned was how to deal with

sedentary behavior and the wonders of Netflix, for instance [21-23].

Eight, professors also have the opportunity to test new methodologies and assess them by trial-and-error or new teaching methods [24-30]. The lesson learned relates to testing new teaching methodologies respecting the imposed sanitary restrictions.

Ninth, to master Conflict Resolution. We learned ho to live one day after the other. Taking care of our health and our familiars brought sometimes three generations together, with its pros and cons. Conflict resolution skills development became mandatory.

Tenth, the lesson is to build faith and believe in God, or a greater Force, or yourself. When we face the imponderable, only faith helps to endure. Finally, developing resilience, or "having what to do when nothing else is left to be done" (I#108), was the lesson to be learned.

IMPLICATIONS

This work was designed to provide a perspective on Brazilian higher education during and post-pandemic.

The research has the merit of revisiting the subject after the worst pandemic crisis of our generation thus far and bringing lessons to be shared and learned in the academic community.

This article has direct implications in several fields of research, such as (i) virtual teaching [1, 2, 24-30]; (ii) health care services [31]; (ii) overall waterway touristic services [32]; (iii) air cargo transportation [34-38]; (vi) teaching materials in negotiations [24-28, 39, 40] (vii) craft beer industry [40, 42], among others.

Finally, this study is limited to Brazilian higher education. Other countries and levels of education may convey incorrect or distinct findings and are not investigated here.

Future Research

Future research is encouraged to assess the impact of virtual classes on the Brazilian higher education learning curve. For example, is virtual teaching more effective than classroom teaching? That is the question to be answered in future studies.

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