

Artigo Original

The Role of Active Learning in Hybrid Teaching in a Post-Pandemic World: Reflections and Perspectives

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Abstract

The emergency brought by the Covid-19 pandemic, imposed changes in virtually all contexts of human life - and it could not be different in Education, at all levels. In the context of higher education in Brazil, the year 2020 was mostly marked by closed universities and the adoption, at different scales, of remote emergency solutions to replace face-to-face classes. This movement has arisen latent discussions that have been forwarded in years regarding the adoption of hybrid teaching strategies in this educational segment. This is a scenario that could have been distant a few months ago, but which now seems to be approaching with enormous urgency. In this context, this paper aims to discuss lessons learned in the context of emergency remote education and its impacts on a possible future adoption of hybrid models, as well as to shed light on how educational practices based on Active Methodologies can assist in this transition, in order to provide effective learning experiences in a brand new educational model.

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I. Introduction

The discussion on hybrid teaching (the most adopted translation in Brazil for the English term Blended Learning) is nothing new: there are embryonic works that date back thirty years at the time of writing this article - a good example is the seminal article by Bonwell and Eison (1991). The world has seen the evolution of technological devices and all the new possibilities related to mobility, connectivity and access to such devices and their technologies. Numerous aspects of human life - not to mention, virtually all of them - have been impacted by one or more of the technological achievements of the last few decades.

It is a recurring point, however, that the field of Education has always presented a certain slowness or resistance in relation to the possibilities brought about by technological advances: while many sectors of society have undergone structural changes in recent years, the steps of Education, in the eyes of many, seemed too slow. Even all the transformations driven by Distance Education (EAD) still ran into certain fears, prejudices or ignorance by a considerable portion of the population. It was like that until March 2020.

The end of the first half of that month in Brazil was marked by movements never seen by the current generation: the Covid-19 pandemic led to the closure of schools and universities and an extremely fast, although initially not massive, adoption of techniques, knowledge and infrastructure already common to EAD, but adapted to a new and uncertain scenario. Thus, based on a mixture of accumulated knowledge, a sense of urgency, innumerable uncertainties and a high level of improvisation, Emergency Remote Education was implemented - one of the numerous nomenclatures for this temporary substitute for Face-to-face Teaching, made possible by an amalgam of formerly underutilized virtual environments, videoconferencing tools unknown to many and a myriad of just-in-time appropriate software by teachers and students. However, more than a “buffer modality” of teaching, this appears to be not only a test of what may emerge in the very near horizon, but, rather, itself a materialization of the acceleration of the transition process to scenarios in which the Hybrid Teaching becomes the reality in fact.

Given this context, the present article intends to bring reflections on the lessons learned until the moment of its writing, gathering perspectives of future evolutions and presenting some strategies that may be useful in processes of adoption – total or partial – of Hybrid Education in the context of Higher Education in Brazil.

2. The Covid-19 pandemic and the emergence of hybrid educational models

The balance between two forms of seemingly antagonistic teaching offerings (face-to-face and distance), synthesized in the broad concept of Hybrid Education, aims to consolidate a type of offer in which the advantages and potential of each model are combined, mitigating or avoiding their individual disadvantages and weaknesses. Several authors, such as Chan, Lee and Yang (2017) or Bennett, Knight and Rowley (2020), by way of example, pointed to Hybrid Teaching as an almost natural consequence of the maturing of the distance learning models already tested and in execution in several parts in the world - Pérez-Sanagustín *et al.* (2017), for example, detail how to adapt MOOCs (Massive Open Online Courses) for Hybrid Education.

However, from the series of events at a global level caused by the pandemic of the new coronavirus and that had a direct impact on all aspects of human life, which includes Education, Hybrid Teaching is now considered by authors such as Kuklinski and Cobo (2020) and Araújo *et al.* (2020), for example, as a strong trend towards higher education in a post-pandemic world. With regard to global interest in the topic, Figure 1, below, shows the evolution of interest in the term hybrid learning based on Google searches in the period from 2016 to 2020 (the peak of interest was in the first week of August 2020):

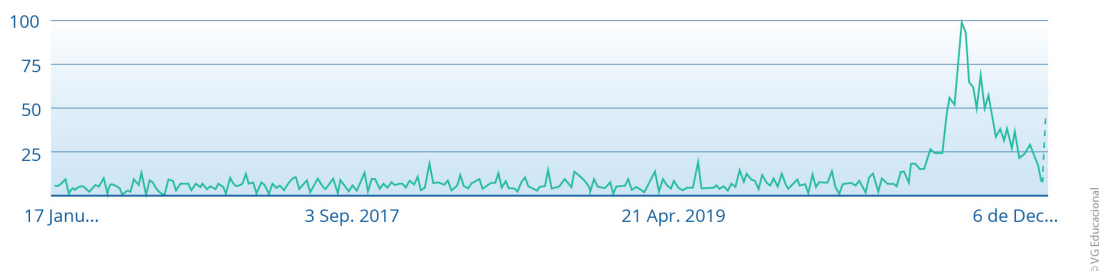
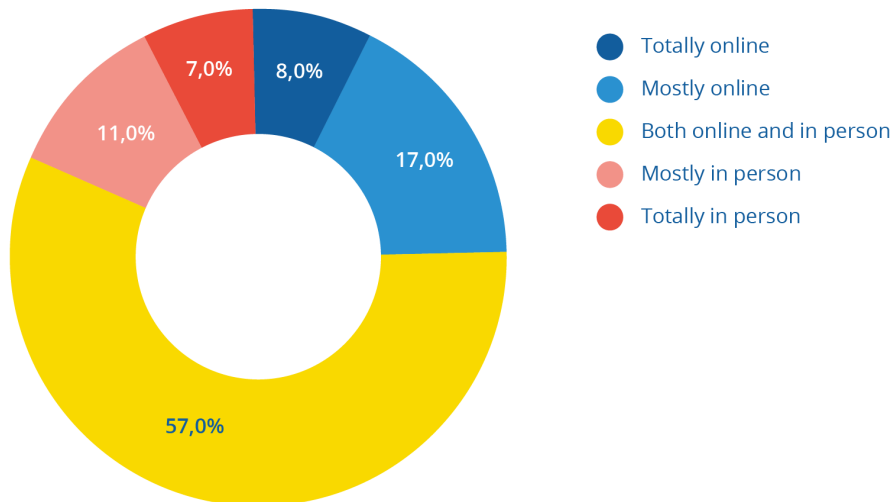


Figure 1 - Interest in the term hybrid learning in Google searches

Source: Adapted from Google Trends (on-line).

The emergency imposed by the pandemic - and the adoption of remote education solutions to replace face-to-face classes by many higher education institutions - necessarily leads to a change in the perception, on the part of the population, regarding the classic dichotomy involving the modalities of education provision - in the context of this article, we limit ourselves to Higher Education (with emphasis on graduation), although many reflections can be adapted to other levels of education.

Corroborating this statement, a recent survey conducted by the Ipsos Institute for the World Economic Forum identified, in a universe of 29 countries, that almost one in four (23%) adults worldwide believes that, in five years, Higher Education in your country it will be entirely or mainly online; however, almost half (49%) of respondents think that Higher Education will be offered both online and in person (WEF, 2020). For Brazil, the survey data are presented in the graph below (Figure 2):



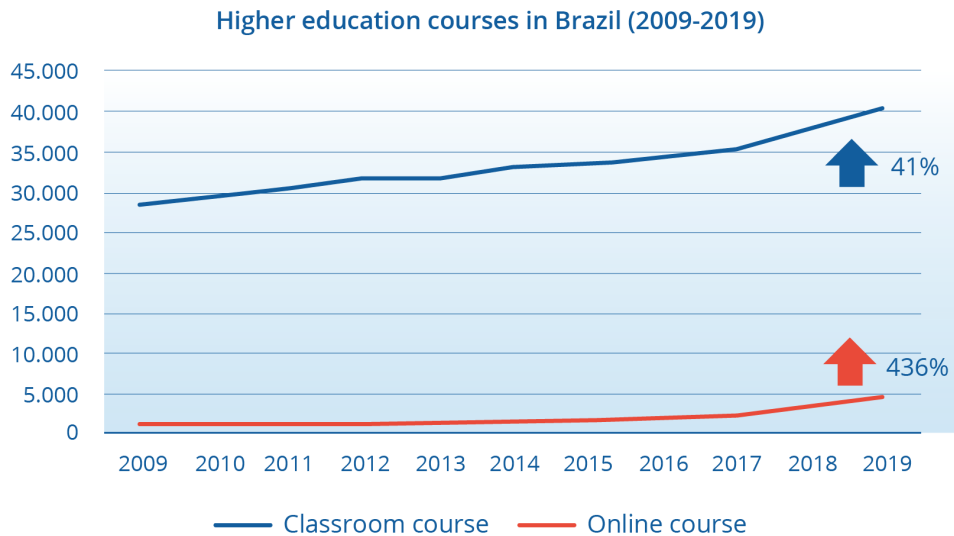
e-VG Educacional

Figure 2 - Perception of Higher Education provision in Brazil in a post-pandemic scenario

Source: Adapted from WEF (2020).

The data present in WEF (2020) indicate a correlation between the impacts of the Covid-19 pandemic in the countries and the perception of the trend towards the adoption of online practices for Higher Education: while the eastern countries that had a relatively lesser impact of the pandemic point to a perception of little or no change in the role of face-to-face education: the responses obtained in Japan and China are over 40%. In turn, the countries of America and Europe (where the pandemic still has the greatest impact at the time of writing this article) present data of 25% of perception of greater adoption of online education - there are two outliers, Arabia Saudi and India, which present data close to 40% in this regard.

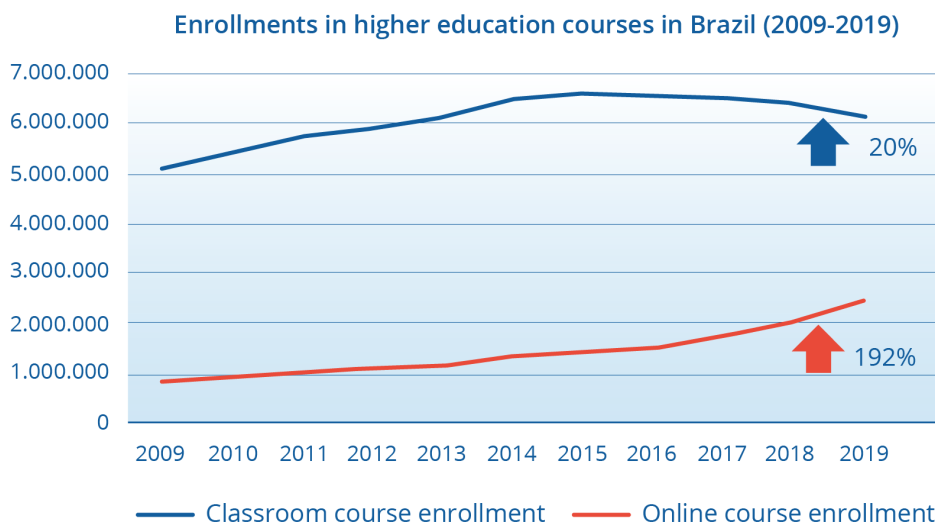
However, it is necessary to emphasize that this perception does not match the scenario of Higher Education in the pre-pandemic period: despite the expressive growth in the offer of higher distance courses and the number of enrollments in these courses, they represented just over 10% of the courses offered and 28.5% of enrollments in 2019, as can be seen in the graphs of Figures 3 and 4, below.



eVGEducacional

Figure 3 - Higher education courses offered in Brazil

Source: Adapted from INEP (2020).



eVGEducacional

Figure 4 - Enrollments in higher education courses offered in Brazil.

Source: Adapted from INEP (2020).

However, it is important to highlight the growth levels of distance learning courses in relation to face-to-face: enrollment in distance learning courses almost tripled in 2019 (in relation to 2009), while the offer of these courses has more than quintupled in these 11 years. It should be noted that the offer of classroom courses increased by 41% and enrollment, only 20% in the same period - it is worth mentioning that the

population had an increase of 8% in the period and 12% in the period of the previous 11 years (1999-2009) -, in which most of the 2019 freshmen were born. However, the drop in bias, starting in 2005, of enrollments in face-to-face courses - stands out in 2019 - in 2019 there were 7% fewer enrollments than in 2015.

3. Emergency Remote Education: a laboratory for Hybrid Education?

The emergence of Remote Education (HODGES *et al.*, 2020) sooner or later became a reality for a large part of Higher Education Institutions in Brazil - despite the issues of inequity of access on the part of students and the various emotional and load impacts teachers' work (ARAÚJO *et al.*, 2020).

During this period, still in effect at the time of writing this article, the inability to hold face-to-face meetings, or the great limitations brought about by the pandemic, led to reflections on which learning experiences could be successfully carried out with the platforms and strategies originating from years of research, investments and experiences in Distance Education. At this point, each institution and each professional was challenged not only in technological aspects, but mainly with regard to didactic strategies (on the part of teachers) and organizational structures and processes (on the part of institutions). Likewise, it was necessary to think that other learning experiences had to be radically adapted or could not even be offered, given the absence of presence.

Kuklinski and Cobo (2020), as well as Kelly (2021), discuss the different phases of evolution of the responses of Higher Education institutions to the Covid-19 pandemic, ranging from the adoption of Emergency Remote Education to post-pandemic scenarios Hybrid Teaching:

- **Phase 1 (Emergency Remote Teaching- ERT):** adoption of Remote Education solutions, based mainly on long synchronous activities, almost always expository, supported by videoconferencing systems. Araújo *et al.* (2020) show that, in the Brazilian context, Microsoft Teams, Google Meet and Zoom were, in this order, the digital tools

that had the most adherence by teachers as a result of remote activities. Obviously, this scenario also brings instability related to the performance and availability of technological infrastructure on the part of the institution, which in general tries to solve the problems as they arise. In the North American context, Kelly (2021) points out that this phase, being the first, was reached in March 2020. This is also true for some Higher Education institutions in Brazil, although, in a considerable number of cases, the adoption of Remote Teaching strategies took some months (ARAÚJO *et al.*, 2020). This phase is marked by an almost immediate and direct transposition, when possible, of the on-site educational processes to remote activities, which includes using practically the same methodologies, the same materials and possibly the same evaluation mechanisms.

- **Phase 2 (Adapted Remote Education):** at this stage, there is less scope for improvisation - although there may be no clear institutional pedagogical planning, infrastructure problems become punctual and quickly resolved. The evaluation processes begin to be rethought and the long videoconferencing sessions gradually give way to shorter sessions, interspersed with activities that require the students to act. At the time of writing this article, amid the almost complete adoption of activities solely remote due to the Covid-19 pandemic, it can be said that many institutions have not reached this stage, leaving teachers, through individual efforts and voluntarism, to reach this level.
- **Phase 3 (Partially Hybrid Teaching):** this is a phase in which institutions must be prepared to, even if they return to face-to-face activities, experience situations of Hybrid Teaching, with part of teachers and students returning to university life, while part remains depending on remote activities. At the time of writing this article, some institutions are going through this phase (albeit incipiently and without fully experiencing the previous phase), with the return of some students and teachers to face-to-face activities, such as laboratory practices. At this stage, especially in a post-pandemic scenario, with little or no restriction, a resignification of the teacher's role as a designer of learning experiences is expected (KUKLINSKI; COBO,

2020). Institutions, in turn, must think about how to integrate face-to-face moments and remote activities - these are balanced between synchronous and asynchronous moments.

- **Phase 4 (Hybrid Teaching):** at this stage, it is expected that all learning processes whose face-to-face execution does not add value will be converted to remote ones. In the same direction, synchronous remote expository classes that have little or no interaction should be replaced by asynchronous content. In addition, face-to-face and remote experiences (synchronous and asynchronous) must be part of the same learning experience design - this, in turn, preferably personalized, with the support of adaptive software (UNESCO, 2020). The levels of adoption of remote solutions are unclear, but they will certainly be more intense and broader than before the Covid-19 pandemic.

Figure 5 summarizes these phases (numbered from 1 to 4), indicating a possible ideal evolution path (red curve), identifying the extent to which it is established, in each phase, from institutional actions and policies or from teacher voluntarism and students (vertical axes), and the degree of dependence on strategies based on remote teaching or hybrid approaches (horizontal axes).

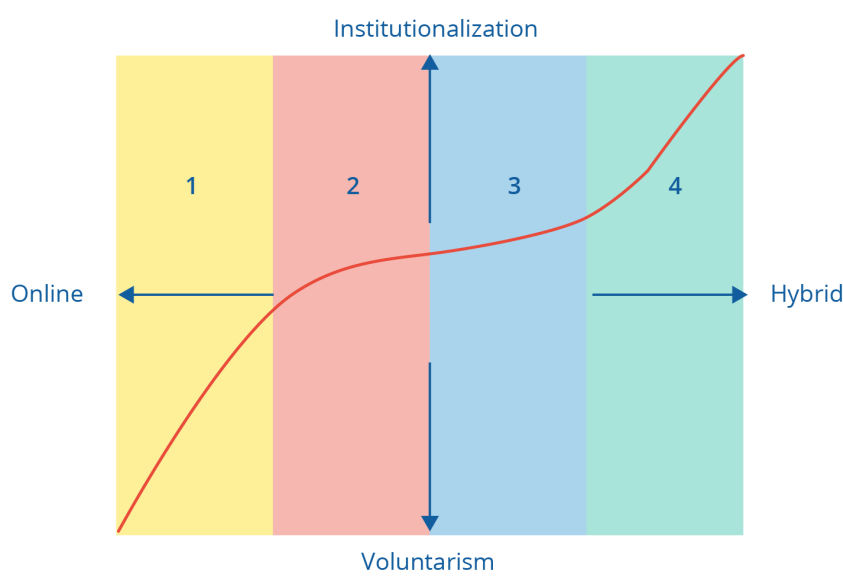


Figure 5 - Evolutionary path between the four phases of the transition from Emergency Remote Education to Hybrid Education

Source: Prepared by the author.

The post-pandemic scenario is clearly uncertain; however, as previously argued, there is a tendency for hybrid possibilities to be considered among the range of options of course offering mechanisms, especially with regard to Higher Education, given the greater degree of maturity of the target audience, when compared to previous school levels. In this sense, discussions about Hybrid Teaching models are necessary.

Considering the classic definitions of Hybrid Education (BARCELOS; BATISTA, 2019; ALAMMARY; SHEARD; CARBONE, 2014), arising from the initial discussions of what is conventionally called Blended Learning - a term that, sometimes, can take on different meanings (HRASTINSKI, 2019) -, Ferri, Grifoni and Guzzo (2020), as well as Araújo *et al.* (2020) point out challenges of different dimensions with regard to aspects involving remote activities. Such challenges are summarized in Figure 6 and detailed below.

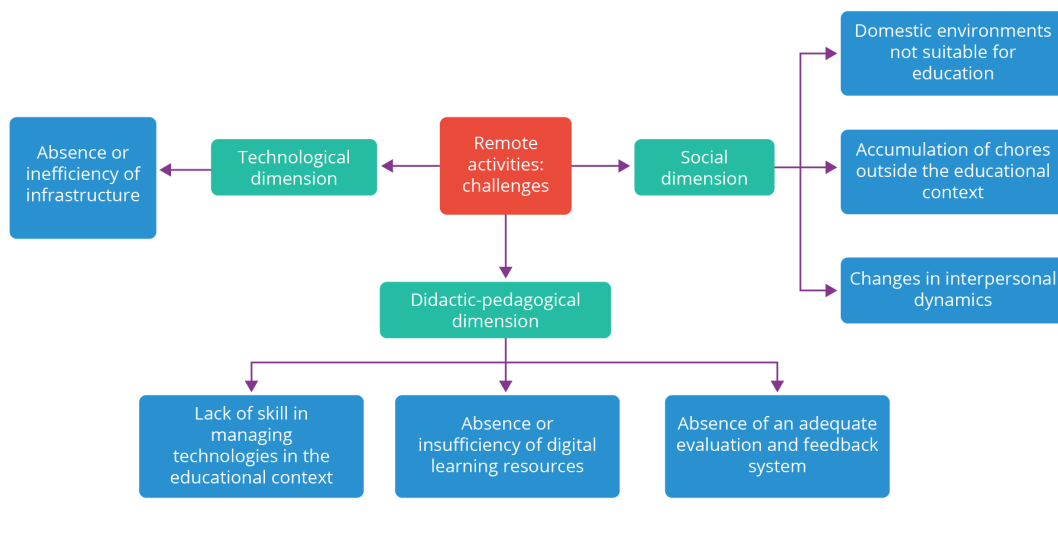


Figure 6 - Challenges associated with remote activities

Source: Prepared by the author.

The challenges summarized in the previous figure apply to remote activities in general, whether in the context of Emergency Remote Education or Hybrid Education. While many of these challenges have been leveraged in the context of the Covid-19 pandemic, they remain open to Hybrid Education scenarios in a post-pandemic world. Below,

they are detailed, and for each challenge, their impact at three levels is discussed: educational institutions, teachers and students.

- **Technological dimension**
 - **Absence or insufficiency of infrastructure**
 - **Institutions:** some institutions, especially those that have no tradition in distance learning, still do not have the necessary infrastructure for servers, software (in particular, virtual environments and videoconferencing tools) and technical support teams.
 - **Teachers:** although not as many as the students, in the context of the Covid-19 pandemic, Araújo *et al.* (2020) reported a considerable number of cases in which at least one in four teachers had to acquire some type of technology for remote activities - which shows that a considerable part of the teaching staff did not use technology in their teaching or supported by infrastructure existing in the institutions.
 - **Students:** a considerable number still do not have sufficient infrastructure for remote activities - especially when considering the discussions about what is conventionally called the “Post-PC era” (PRESS, 1999) - and uses cell phones, often on slower networks than 4G, for remote activities. According to the survey ICT Domiciles (CGI, 2020), internet access via computer (desktop or notebook) in Brazil, which was 80% in 2014, increased to 42% in 2019. Petrie *et al.* (2020) show, however, that the problems related to the digital gaps are not exclusive to Brazil and that they were shown to be potentiated during the Covid-19 pandemic period.
- **Didactic-pedagogical dimension**
 - **Lack of skill in managing technologies in the educational context**
 - **Institutions:** many institutions continue with the mission of training their teachers and students for the proper use of

technologies, even though the emergence of Remote Education has accelerated part of this process.

- **Teachers:** the data brought by Araújo *et al.* (2020) show that 37% of Higher Education teachers in Brazil perceive themselves with a skill level between reasonable and low in the management of technologies.
- **Students:** even if common sense brings the idea that students have an easier time using technologies, studies in the context of digital literacy (TOMCZYK *et al.*, 2019; SANTOS; SERPA, 2017; RADOVANOVIĆ; HOGAN; LALIĆ, 2015) show that there is a lot to be worked on in order to develop skills for the appropriate use of technologies in the educational context, in order to go beyond social networks.
- **oAbsence or insufficiency of digital learning resources**
 - **Institutions:** many institutions do not have their own repositories of digital educational resources or do not have policies to encourage production or sharing among teachers.
 - **Teachers:** as pointed out by Silveira (2016), many teachers are unaware of the main repositories of digital educational resources, nor are they aware of the concepts related to OER (Open Educational Resources), which could facilitate the adoption of such resources as part of the planning of remote activities, since they can be adapted to different educational needs.
 - **Students:** although students, in general, have a positive attitude towards digital material - as presented by Rodés *et al.* (2012) in the context of textbooks in the format of open e-books -, without the proper mentoring of teachers with regard to the indication and sequencing of learning resources, access to the resource can become disconnected from the educational process as a whole.

- **Absence of an adequate evaluation and feedback system**
 - **Institutions:** in the Brazilian context, institutions that have developed or acquired systems to support assessment in remote contexts are exceptions. However, more than systems to guarantee academic integrity and the smoothness of the evaluation process, institutions must pay attention to their own evaluation processes, placing greater emphasis on formative evaluation (RAHIM, 2020) and self-regulated evaluation (LIMA; PIMENTEL, 2013). Considering the context of Hybrid Education, many institutions choose not to consider the possibilities of remote assessment, bringing this process, in a conservative way, only to the face-to-face moments.
 - **Teachers:** the great challenge of evaluations in the remote context of Hybrid Education is the need to rethink evaluation processes beyond the elements traditionally employed (RAPANTA *et al.*, 2020). By assigning clear goals to assessment within the context of learning, going beyond the summative or even punitive character, it can be expected that students engage in the assessment process as part of their learning processes (SILVEIRA; OMAR, 2015).
 - **Students:** as pointed out by Silveira and Omar (2015), the evaluation process must be presented to students as an integral part of their individual learning path. Unless they are immersed in this context, students will wait for diagnostic or summative evaluation activities, in which there are many possibilities for the elements of academic integrity to be left out.
- **Social dimension**
 - **Domestic environments not suitable for Education**
 - **Institutions:** even though this aspect does not directly concern institutions, they must implement policies of flexibility in relation to remote activities, considering that teachers and students may not be able to maintain appropriate environments for teaching and learning activities.

- **Teachers:** the lack of appropriate places in the context of homes for teaching - in terms of sound conditions, lighting or distracting elements, for example - was pointed out as a difficulty factor by Hodges *et al.* (2020).
- **Students:** as well as teachers, many students also face difficulties with the inadequacy of domestic spaces for study, as pointed out by Ferri, Grifoni and Guzzo (2020).
- **Accumulation of chores outside the educational context**
 - **Institutions:** another issue in which institutions are not directly involved. However, they are expected to exercise the aforementioned flexibility, considering students' domestic and work chores, in conflict with remote activities.
 - **Teachers:** Martins (2007) already pointed out a series of factors of personal life - among them, the different domestic chores - that acted as components of stress in Brazilian teachers. With the pandemic and the accumulation of domestic functions in the environment that is forced to become professional, these factors tend to aggravate, especially on the female public, which still falls a large part of domestic tasks. This scenario tends to be no different in Hybrid Teaching situations with extensive use of synchronous experiences.
 - **Students:** in addition to the fact that some students can, like teachers, accumulate domestic chores, the reality of working students who managed to maintain their internships and jobs during the Covid-19 pandemic showed that their working hours were affected by the exceptionalities of the period, so that many found themselves unable to participate in synchronous experiences, due to conflict with the new working hours. In these cases, many resorted to recording synchronous sessions, when available. In hybrid contexts, synchronicity should be inserted into the pedagogical proposals sparingly, since the conflict with other extra-academic activities brings this situation closer to that experienced by students of distance learning courses today.

- **Changes in interpersonal dynamics**
 - **Institutions:** it is known that the interpersonal dynamics mediated by technology are substantially different from those possible in the face-to-face context. In the context of Hybrid Education, institutions should plan face-to-face activities in order to enhance the integration between students and their teachers.
 - **Teachers:** according to Kjaergaard (2017), face-to-face moments in the context of Hybrid Teaching should consider the classroom as a highly collaborative space, in which the active participation of students is sought, with teachers assuming the role of facilitators, instead of responsible for conducting the learning processes. With appropriate teaching strategies, among which those based on Active Methodologies (which will be discussed later), the time spent in expository classes can be replaced by richer interactions with students.
 - **Students:** Hybrid Teaching requires, first of all, a change in the students' posture, in the sense of rethinking the importance of face-to-face moments as possibilities to live experiences that, remotely, would be impossible, limited or would have different outlines. In this context, ties with peers and teachers must be strengthened, both in person and in remote activities, especially synchronous activities.

Beatty (2019) points to four important principles in the implementation of a Hybrid Teaching strategy he calls Hybrid-Flexible (HyFlex), as opposed to typical hybrid courses, in which the teacher / instructor (or the educational institution) is responsible for most decisions, such as forms of presentation of content or learning experiences and when face-to-face meetings should take place. According to the author, the principles mentioned would be:

- **Escolha do aluno:** provide alternatives for ways of participating in learning experiences (daily, weekly or by topic).
- **Equivalência:** provide learning activities in all modes of

participation that lead to equivalent learning outcomes.

- **Reutilização:** use artifacts from learning activities in each mode of participation as educational resources for all modes.
- **Acessibilidade:** develop technological skills, ensuring equitable access to all modes of participation. In this sense, all educational resources must be possible for all students to use.

Clearly, different aspects of the author's proposal encounter a series of technical or methodological barriers to its proper implementation - in particular, if the didactic proposal is centered on content and interventions only by the teacher. In this sense, the proper use of Active Methodologies can have important impacts in the context of Hybrid Education.

In this sense, UNESCO (2020) presents a rationale that can be an important guideline for the implementation of Hybrid Education scenarios, with or without limitations regarding presence. In the proposed framework, the organization suggests a set of pedagogical strategies that have their roots in the wide range of techniques grouped under the nickname Active Methodologies or Active Learning. These techniques, in the context of Hybrid Teaching, will be discussed below.

4. Active Learning and Hybrid Teaching

It was agreed to name as “Active Methodology” or “Active Learning” technique any experience in which students are actively involved in the learning process (BONWELL; EISON, 1991). More than the active engagement of students in their own learning processes, they are expected to take responsibility for these processes and, on certain occasions, to be equally involved in the learning processes of their peers. In this context, there can be different levels of Active Learning, depending on the degree of involvement of each student.

Thus, it is expected that the teacher provides learning experiences that enhance Active Learning. Misseyanni *et al.* (2018) bring a comprehensive overview of Active Learning techniques in different situations, different educational contexts, involving a reasonable range of knowledge areas.

Different authors make a direct association between Hybrid Teaching and didactic strategies inserted in the broad spectrum of Active Methodologies - as is the case of Moran (2017), Colvara and Espírito Santo (2019) and Cummings *et al.* (2017). This relationship is supported by the evidence brought by the study by Baepler, Walker and Driessen (2014), which showed that Active Learning approaches lead to a more efficient use of physical space, since they reduce the need for contact between students and teachers - being potentially suitable for remote moments in the context of Hybrid Teaching, while maintaining or improving learning outcomes compared to those achieved in traditional face-to-face classrooms. The same study showed that students' perceptions of their own learning are better.

In this sense, it is proposed here (Chart 1) a rationale of techniques related to Active Methodologies and their adherence to the transition phases between Emergency Remote Education and Hybrid Education after the pandemic. Details on the techniques mentioned in the table can be found in Misseyanni *et al.* (2018).

Chart 1 - Active strategies for different phases of evolution of Hybrid Education

Active Learning Strategies	Tools	Phase			
		1	2	3	4
<i>Quizzes and surveys</i> : enhance student participation, breaking long remote lectures.	Kahoot, Outgrow, Quizizz, iClicker, TopHat.	+	+	+	+
<i>Peer evaluation</i> : encourages collaboration between remote peers and the development of critical processes.	Peergrade, Teammates, PeerStudio, PeerAssessment.	+	+	+	+
<i>Brainstorming</i> : it allows the generation and linking of ideas in a collaborative way.	Miro, Mindmeister, Ideaboards, MindMap, Freeplane, Mentimeter.	+	+	+	+

<i>Flipped classroom</i> : with the gradual replacement of long video conferences for shorter moments of interaction, this well-known strategy allows such moments to be used for discussions on the topics studied.	Edpuzzle, Loom, OBS Studio, Panopto.	-	+	+	+
<i>Role-reversal</i> : in this technique, students are encouraged to create media artifacts (animations, videos, infographics) and briefly assume the role of instructors on a given topic.	Piktochart, Powtoon, Animaker, Wistia, Typito, Renderforest.	-	+	+	+
<i>Peer instruction</i> : this technique allows students to articulate learning on their own terms and check their understanding with other students. In the case of coexistence between classroom students and remote synchronous students, this technique can seek to integrate both modes of participation.	Video Conferencing tools (Zoom, Meet, Teams etc.) and video production (Loom, OBS Studio etc.). Clicker tools (iClicker, Kahoot, TopHat etc.) can be interesting for Concept Tests.	-	-	+	+

Source: Misseyanni et al. (2018).

Clearly, all suggested techniques (marked with +) for any phase are also suitable for subsequent phases; however, the opposite is not always true, since techniques considered appropriate for a phase may be difficult to implement in previous phases, given the degree of maturity in relation to Hybrid Teaching. However, it is noteworthy that this data is not intended to be exhaustive or limiting - several other techniques can be used in different phases, and, with the proper preparation, techniques indicated for one phase may work in another.

5. Final considerations

The need for an urgent response on the part of educational agents to the limitations and challenges imposed by the Covid-19 pandemic

has given rise to a modality of educational offer, here called Emergency Remote Teaching, strongly based on synchronous interactions through video conferencing software. Initially, strategies were used to transpose media content, teaching strategies and mechanisms arising from face-to-face teaching in much of the country, made impossible by the serious health issues resulting from the pandemic. Initially thought of as a temporary model, the remote strategies adopted in an emergency way present themselves, in fact, as a laboratory for future educational scenarios, in which Hybrid Teaching emerges as a real possibility, since the barrier of remote interaction was broken abruptly and accelerated.

Clearly, many aspects of today's remote education also bring alerts about the need for equitable access to education. Concerns arise with populations with greater degrees of social vulnerability; problems related to the increase in stress factors and teachers' workload; weaknesses with regard to infrastructure issues - not just the institutions, but also the infrastructure available to students and teachers, which raises public policy issues; among other questions that emerged most strongly in the year 2020, many of which remain unanswered.

In this sense, the present article intended to bring a discussion about possible paths of Education in a post-pandemic scenario. He presented a possible systematization of phases for the transition from Emergency Remote Education to Hybrid Education, discussing the challenges involved and listing some active learning strategies appropriate for each phase.

It is hoped that the lessons learned in this period of so much suffering and uncertainty can shed light on new paths, so that everyone can have equal access to quality education and, as a result, liberating and transforming.

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