RBAAD Revista Brasileira de Aprendizagem Aberta e a Distância

revista científica oficial ABED

Original Article

Simultaneous hybridization in corporate education

A hibridização simultânea na educação corporativa

Hibridación simultánea en educación corporativa

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Abstract

With the extension of remote work after the Covid-19 pandemic, blended learning in corporate education is gaining momentum as a strategy to reconcile the learning of both physically and virtually present workers. This study aims to analyze one of the new approaches to hybrid education: simultaneous education. The methodology used was the case study of the flexibles classrooms at Petrobras University. The text analyzes the results of it implementation, identifying the possibilities for improvement, providing tips and verifying that flexibles classrooms are an effective educational solution to facilitate the process simultaneous learning.

Keywords: Blended Learning; Simultaneous Blended Learning; Flex Rooms; Corporate Education.

DOI: http://dx.doi.org/10.17143/rbaad.v23iEspecial.713

Resumo

Com a ampliação do trabalho remoto pós-pandemia da Covid-19, o ensino híbrido na educação corporativa ganha força como estratégia para conciliar a aprendizagem tanto dos trabalhadores fisicamente presenciais quanto dos virtualmente presenciais. Este estudo objetiva analisar uma das novas formas de se pensar a educação híbrida: a educação simultânea. A metodologia utilizada foi o estudo de caso das salas de aula flex da Universidade Petrobras. O texto analisa os resultados de sua implantação, apontando possibilidades de melhorias, oferecendo dicas e verificando que as salas flex são uma solução educacional eficaz para viabilizar o processo de aprendizagem simultânea.

Palavras-chave: Ensino Híbrido; Ensino Híbrido Simultâneo; Salas Flex; Educação Corporativa.

Resumen

Con la expansión del trabajo remoto tras la pandemia de Covid-19, la enseñanza híbrida en la educación corporativa cobra fuerza como estrategia para conciliar el aprendizaje de los trabajadores tanto presenciales como virtualmente. Este estudio tiene como objetivo analizar una de las nuevas formas de pensar la educación híbrida: la educación simultánea. La metodología utilizada fue el estudio de caso de aulas flexibles de la Universidad Petrobras. El texto analiza los resultados de su implementación, señalando posibilidades de mejora, ofreciendo consejos y comprobando que las salas flexibles son una solución educativa eficaz para permitir el proceso de aprendizaje simultáneo.

Palabras clave: Enseñanza Híbrida; Enseñanza Híbrida Simultánea; Habitaciones flexibles; Educación corporativa.

1. Introduction

With the advent of Covid-19 in Brazil in 2020, education was forced to immerse itself in the digital environment. In the realm of corporate education, trainings began to be delivered almost exclusively online.

With the improvement of epidemiological indicators, more and more companies were able to return to in-person work.

In this context, new forms of work also became diversified. Many companies began to implement hybrid work, with some days in person and others online. People from various cities were hired to work remotely for institutions from different parts of the country. When companies returned to fully in-person work, it was noticed that trainings using technologies had been incorporated and well-received by workers. Data from the Training Industry Report shows that 56% of organizations intend to maintain some level of digitalization in corporate trainings post-pandemic (FREIFELD, 2021).

These are just a few of the myriad factors that have led corporate education professionals to consider educational solutions that are effective in reconciling both in-person and non-physically present workers. One of the solutions found was the adoption or accentuation of hybrid learning.

When we talk about hybrid learning, we refer to "the realization of part of the activities in 'physical spaces' and part in 'virtual spaces' or through the intermediation of virtual spaces" (TORI, 2022, p. 91). This concept has expanded in recent years, encompassing new forms of educational hybridization, breaking old paradigms of time and space. What does it mean to be present? Can a person who is not physically somewhere still be, in a way, present?

In this study, we analyzed one of the new ways of thinking about hybrid education: simultaneous education. How to reconcile people who are physically present with those who are virtually present? Hybridization in corporate education has been growing and breaking barriers of time and space so that everyone can work together and find solutions to the challenges that arise. But before we discuss what simultaneous hybrid education is, we need to redefine what presence means.

2. Reframing presence

According to the Michaelis dictionary, the term "presence" means "the fact of someone or something being present in a place" and can also mean "the participation of someone or something in an activity" (MICHAELIS ONLINE, 2024). A few years ago, talking about presence was directly

associated with being physically in the same space and time. In recent years, we have noticed a new form of presence, virtual presence. Would it be fair to say that in the countless classes, meetings, and trainings conducted via virtual platforms, people were not present?

Virtual presence, reinforced by the use of new methodologies and technologies, gives a new meaning to the word presence. As the dictionary itself suggests, being present is participating. In the context of corporate education, being present means participating, commenting, suggesting, and assisting the group in solving an organization's or society's problem.

Under this new perspective of physical and virtual presence, hybrid learning emerges as an effective educational solution for the corporate environment. According to Horn and Staker (2015, p.18), "it takes the best from both old and new paradigms, preserving the access to the best of in-person teaching and learning while driving disruption."

3. Conceptualizing hybrid education

According to Bacich and Moran (2015, p. 45), "talking about hybrid education means starting from the assumption that there is no single way of learning and, consequently, there is no single way of teaching. There are different ways of learning and teaching." Thus, hybrid teaching provides flexibility and customization of educational actions, making the learner the protagonist of their knowledge (BECKER, 2019).

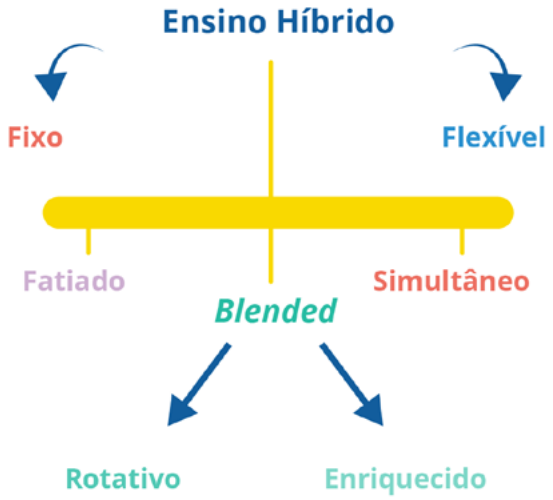
The term in Portuguese comes from another word in the English language, called Blended Learning. It was first used in 2000 by Anderson Cushing, in the sense of connection between the face-to-face classroom and the distance classroom (GRAHAM, 2005). Since then, there has been an expansion of the term, covering various segmentations, and there are still intense academic debates about its definition.

For this study, we used the concept defined by Romero Tori, which describes hybrid teaching as activities, courses, or disciplines that blend activities in physical spaces with activities in virtual spaces. Hybrid teaching can be fixed or flexible. In the fixed form, the student must learn in the way that was previously planned by educators. In the flexible form, the

student can make choices regarding content, formats, or spaces (TORI, 2022).

Hybrid teaching can be divided into three modalities: sliced, blended, and simultaneous.

Figure 1: Modalities of Hybrid Teaching



Source: Representation of hybrid teaching modalities, based on Romero Tori's EsemD taxonomy (TORI, 2022, p. 89).

In sliced hybrid teaching, part of the courses or disciplines is offered online, while another part is offered in a local mode, meaning physically present.

> The blend between physical and digital can occur at the level of the program structure, through the juxtaposition of disciplines, or at the discipline level, through the juxtaposition of activities. The activities and/or disciplines developed in the online mode are independent in planning and execution, not directly articulating with those offered in the physical classroom. Among the various models of sliced hybrid teaching that can be implemented are those in which part of the workload of an in-person course is offered remotely, as Brazilian legislation already provides for higher education courses. Generally, specific weekdays are established for students to attend the classroom and other days for remote study.

> The workload division can be between disciplines, with some offered online and others locally, or by slicing the workload of each discipline between online and local activities (TORI, 2022, p. 91).

One of the most common forms of hybrid teaching is blended learning. In this approach, learning activities involve a systematic combination of face-to-face interactions and technologically mediated interactions among students, teachers, and learning resources (BLIUC; GOODYEAR; ELLIS, 2007). In other words, in this model, time is segmented by modality, experiences consist of both local and remote moments, known as "rotational blended teaching." Examples of this model include station rotation, individual rotation, and flipped classroom. There is also the "enriched" model, where there is a complementation of the virtual in the physical or vice versa (TORI, 2022).

Lastly, we have simultaneous hybrid teaching. In this approach, students can participate in the same activity both remotely and locally. According to Tori (2022):

> These models are still quite experimental and challenging to implement. However, if well executed, they could lead to disruptive innovation, as they would allow students with mobility difficulties or limited access to the physical school, whether temporary or permanent, to participate normally (or nearly so) in in-person classes. Even the teacher could eventually join online to guide the students' activities, whether they are in the physical or virtual classroom. These classes could also be recorded and made available as additional online content (TORI, 2022, p. 93).

Simultaneous hybrid teaching has been relatively underexplored by research, but it is becoming increasingly crucial in corporate education due to the growth of hybrid work. The case presented in this study explores the implementation of this modality in the creation of flexible classrooms, designed to enable educational activities with the synchronous participation of physically and virtually present students.

4. Methodology

In this investigation, we adopted the case study method, which is a research strategy to deeply understand a specific phenomenon in its real--life context. For some time, this approach was seen as less rigorous, but it is now recognized as the most appropriate for investigations of this type (GIL, 2002). According to Ludke and André (1986):

> The case is always well delimited, with its contours clearly defined throughout the study. The case may be similar to others, but it is also distinct, as it has its own unique interest. (...) When we want to study something singular, which has value in itself, we should choose the case study (LUDKE; ANDRÉ, 1986, p.19).

The object of study was the case of the flex rooms at the EXPAMD Lab of Petrobras University. The main objective is to investigate whether these rooms are an effective educational solution to enable simultaneous hybrid learning. For this purpose, we used a semi-structured questionnaire as a data collection instrument, which was administered at the end of the pilot course. This type of questionnaire provides the opportunity to obtain both qualitative and quantitative data, allowing participants to freely respond to some questions, generating rich and comprehensive ideas.

The target audience consists of teachers from different areas of Petrobras. We selected a total of 10 teachers as our sample, all of whom responded to the questionnaire. The criterion used for choosing these participants was their existing use of educational technologies and active methodologies in their daily practice. With this criterion, we believe they can contribute to a critical evaluation of the object of study.

5. The case of the flex rooms at the EXPAMD Lab of Petrobras University

Digital technologies have enabled the establishment of new forms of social interaction and, above all, learning. Therefore, it is essential for us to be receptive to different models, proposals, and approaches that

are relevant to the target audience, taking into account time, space, and available resources.

As Horn and Staker (2015, p.10-11) state:

> Technology provides students with a simple way to take different paths to reach a common destination. It can free teachers to become planners, mentors, facilitators, tutors, evaluators, and instructional guides to reach each student in ways previously impossible.

Furthermore, corporate education has become one of the main drivers of technological change, providing true digital learning ecosystems and challenging educators in the pursuit of the best usability and educational experience (MAIA; ALVARADO DA SILVA, 2022).

In this context, Petrobras University created the EXPAMD Lab, a laboratory for learning experiences and disruptive methodologies. This space is dedicated to the creation and testing of new technologies and educational approaches, with the aim of promoting innovative education aligned with the demands of the contemporary world. This project aligns with the thinking of Maia and Alvarado da Silva (2022), who state:

> Corporate education, when well-designed, can become an ally in the organization's transformation process and promote a lively and dynamic environment that encourages people to incorporate training more naturally (MAIA; ALVARADO DA SILVA, 2022, p. 5).

At the EXPAMD Lab, studies and experiments are conducted to explore the potential of digital technologies such as virtual and augmented reality, artificial intelligence, and gamification. Through these technologies, the aim is to create more immersive, interactive, and personalized experiences that stimulate student engagement and enhance their learning.

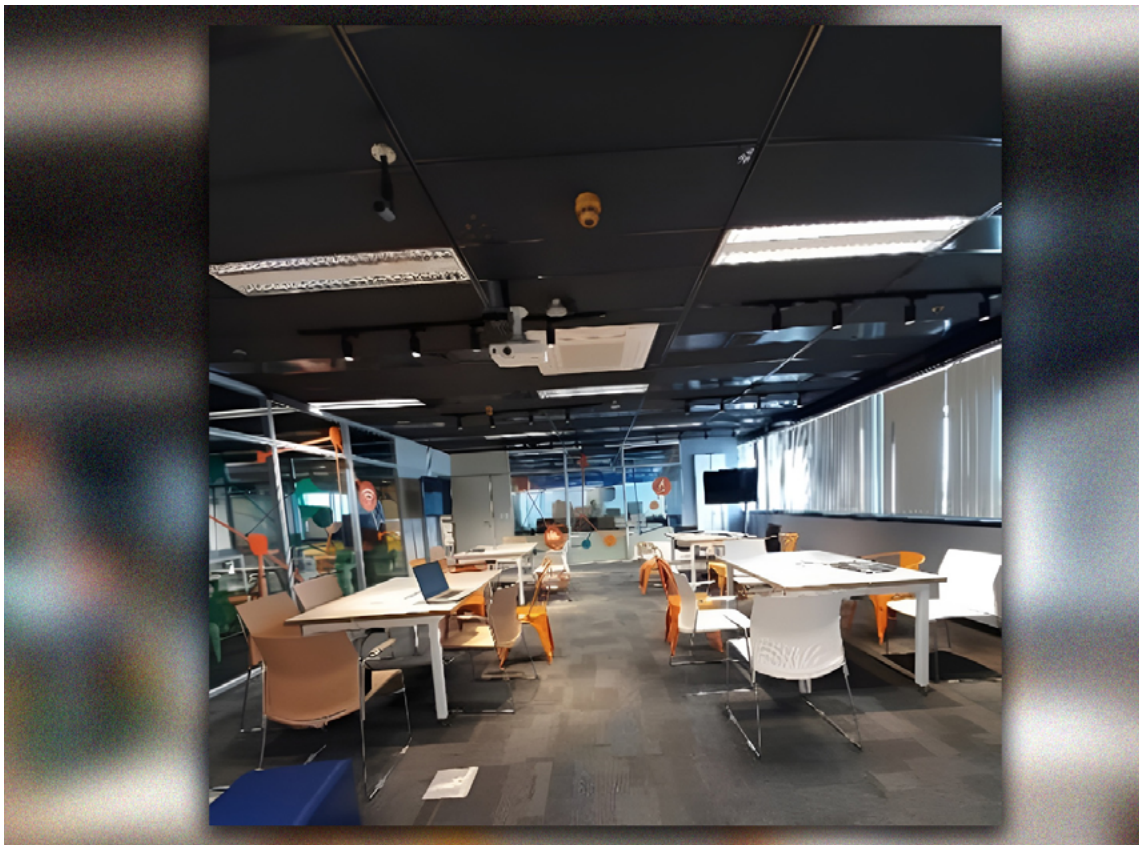
Moreover, the laboratory serves as a space for collaboration among teachers, experts, and any professionals interested in the intersection of education and new technologies. This interdisciplinary approach allows for the exchange of knowledge, the co-creation of projects, and the

development of innovative solutions to current educational challenges.

The EXPAMD Lab also promotes the dissemination and sharing of experiences and results through events, workshops, and publications. In doing so, it contributes to advancing research and transforming educational practice, not only at Petrobras University but also at other institutions interested in adopting more innovative and effective pedagogical approaches.

The flex rooms, the subject of this study, were originally conceived and implemented within the scope of the EXPAMD Lab. These rooms consist of workstations containing equipment such as video projectors, sound amplifiers, cameras, touch screen monitors, live streaming televisions, telepresence robots, and laptops. It is a unique space that expands and flexibilizes the ways of teaching and learning and the various connections between people and technological resources.

Figure 2: Flex Room

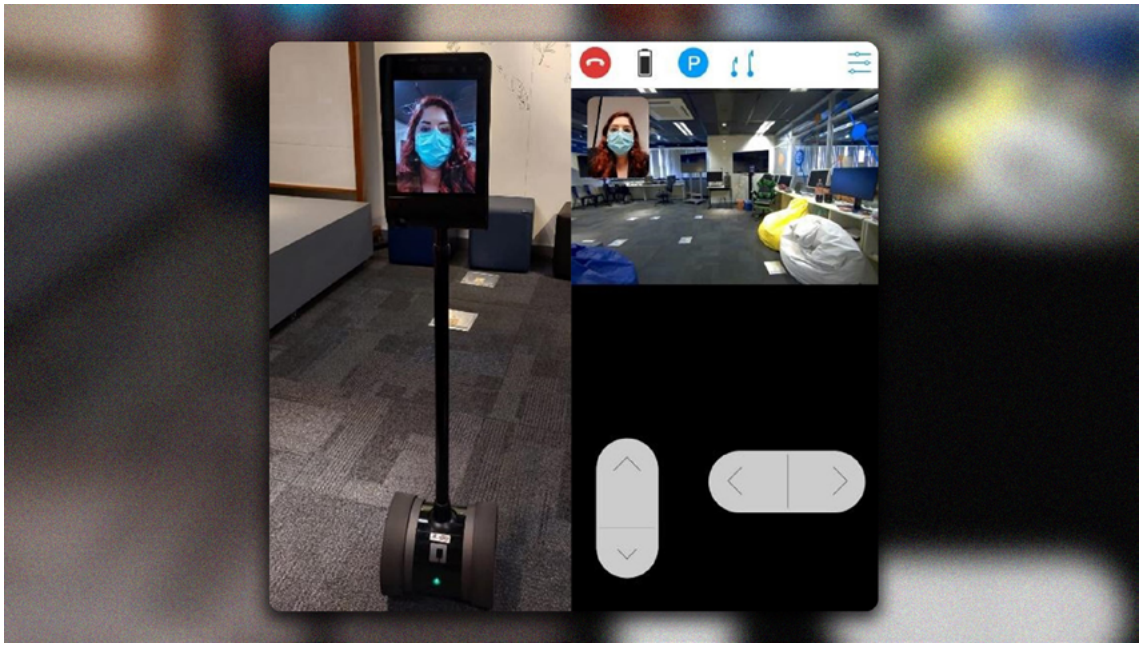


Source: Authors' elaboration, 2024.

The use of monitors connected to the video conferencing system enables the instructor to better monitor the interaction of remotely connected participants, making it easy to see those who contribute through chat comments or request participation via audio.

The telepresence robot is one of the devices present in the flex room. It carries a screen displaying the operator's image and emits their voice, also allowing content sharing on the screen from the device used for connection. The robot can move around the room and stand taller if people prefer to converse while standing. All of this is operated online by someone from anywhere in the world with internet access. The use of this equipment is extensive, as it can be utilized by a student to interact with those present or even by a teacher to conduct the class remotely.

Figure 3: Telepresence Robot



Source: Authors' elaboration, 2024.

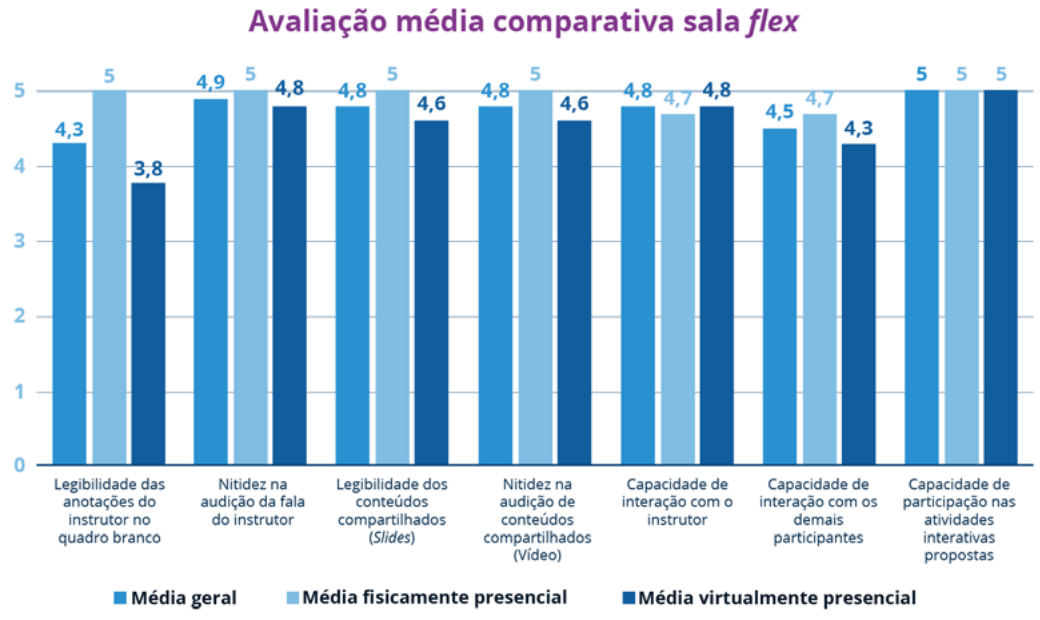
The flex room is a versatile and adaptable space used for training sessions, workshops, design thinking, and World Cafés. These active methodologies foster a more participatory and engaging approach, stimulating collaboration, creativity, and critical thinking among participants. By combining active methodologies with advanced technologies, the flex room enables the effective simultaneous implementation of hybrid teaching.

6. Results

To assess the quality of the flex room, we evaluated the first pilot group. A course on hybrid teaching was conducted for professors from the Corporate University. The aim was for them to learn about hybrid teaching while testing the flex room and its functionalities simultaneously. At the end of the course, we distributed a semi-structured questionnaire where participants were asked to rate various aspects of the hybrid class in the flex room on a scale from zero to five. These aspects included: readability of the instructor's notes on the whiteboard, clarity of the instructor's speech, readability of shared content, clarity of shared content audio, ability to interact with the instructor, ability to interact with other participants, and ability to engage in proposed interactive activities. The questionnaire also included an open-ended question, allowing participants to freely express their comments and considerations regarding the flex rooms.

The following graph depicts the comparison of mean scores between physically present and virtually present participants, along with the overall mean.

Figure 4: Comparative Average Evaluation of Flex Room



Source: Authors' elaboration, 2024.

In this evaluation, we identified some important guidelines. It was observed that both on-site and virtual students reported being fully capable of completing the proposed activities. Regarding interaction and clarity of the instructor's speech, the scores were also equivalent, with no substantial difference among students. However, in terms of clarity of shared content audio and readability of shared content, we noticed a slight decrease in scores among virtual participants. Lastly, in the criteria of readability of instructor's notes on the whiteboard and ability to interact with other participants, there was a slightly more pronounced difference, with lower scores for virtually present participants. These minor issues were also specified in the open-ended section of the questionnaire, where some participants mentioned: "the lighting is an aspect with potential for improvement," or another stated, "the camera positioned above and close seems to hinder complete readability of the whiteboard," and yet another mentioned, "the sound of the instructor during the class had a few (minor) glitches that present room for improvement." Participants also provided some suggestions, such as:

> Some camera positions directed towards the instructor's whiteboard could be adjusted to enhance note readability during the class, or alternatively, students can be briefed beforehand on how and when they can zoom in on the content. Perhaps a quick briefing before the start of the class with these instructions (content sharing in the chat, screen adjustment, microphone on mute, etc.) could be beneficial. (Participant, flex room evaluation).

After analyzing these data, we have identified several issues that could be addressed to enhance the overall experience, such as: optimizing lighting for the whiteboard, using darker-toned markers, making adjustments to the cameras, and developing better communication and integration strategies between virtual and physical participants. Although expected, we were able to confirm that virtually present students require more attention to ensure they are also impacted by the class. It is also necessary to take into account any potential issues with the quality of connection for virtual participants.

In this validation, it was found that 100% of the participants considered the flex room to be a satisfactory educational solution for conducting classes with both physical and virtual students. One of the positive comments was:

> The experience was very enjoyable and meaningful. It opens up opportunities to explore various other needs, such as sharing final stages of prototyping processes and other events involving learning and networking. It was great! (Participant, flex room evaluation).

Since the pilot class in 2022, significant adjustments have been made, resulting in an average evaluation score of 4.5 points in the new classes. Based on tests and evaluations, a guide has been created with all the necessary instructions and tips for educators to fully utilize the resources of the flex room and improve interaction techniques in a hybrid class.

7. Lessons Learned About Simultaneous Hybrid Classes

Errors and successes in the installation of flex classrooms and the implementation of simultaneous hybrid training provided valuable learning opportunities. We highlight some lessons learned that were essential for the success of this project. They are divided into five aspects: adjustments in physical space, lesson planning, communication, engagement, and monitoring.

Adjustments in Physical Space: Both virtual and physically present students need to feel present. To achieve this, online students need to see and be seen by everyone. Equipment such as screens, cameras, and microphones need to be strategically distributed in the classroom to ensure this happens. The teacher also needs to be seen and interact with everyone. At least one screen and one camera at the back of the room are necessary to allow the teacher to interact simultaneously with physically present and virtual students (TORI, 2022).

Lesson Planning: Lessons need to be planned, prioritizing essential

knowledge and skills for the topic. Asking challenging questions at the beginning of the class can be a good strategy to maintain attention throughout the period. Activities should be designed so that all students can fully engage with them. It may be necessary to adapt some activities to be carried out virtually.

Communication: Effective communication is essential for an effective class. Therefore, at the beginning of the class, the educator should align with the class on conduct rules and methods of communication and interaction. They should define whether questions will be asked at all times or at intervals. Aligning expectations will make the students more engaged and attentive.

If the class is small, the teacher can ask everyone to interact via audio at all times. If it is larger, they can reserve time slots during which they will interact with the in-person class and monitor the chat to interact with the remote class. It is important to always keep in mind that some students prefer or can only communicate through the chat. Therefore, the teacher should make an effort to have moments to look at the messages and read them aloud so that everyone can participate. It is important that both in-person and remote interaction be simultaneous so that students see themselves as members of one class.

Engagement: A highly effective strategy in simultaneous hybrid teaching is the use of interactive platforms such as quizzes or other forms of gamification. The planned use of these resources promotes engagement and facilitates interaction among students with the content, the teacher, and their peers.

Monitoring: The person in charge of the class should monitor participation and adherence to agreed-upon rules. It is important to strive for at least one contribution from each student. If possible, having at least one assistant who can help with the flow of the class, addressing access issues, technology problems, doubts, and chat inquiries can be beneficial. This way, the teacher can be more available to focus on teaching and interacting with the students (TORI, 2022).

8. Conclusion

We can teach and learn in numerous ways, at all times and spaces. If we expect everyone to learn, then we must be capable of thinking about different ways to adapt education to diverse needs. Hybrid teaching emerges as an effective response to this challenge and is considered by many as the ideal model for education.

In this regard, this article aims to enrich the dialogue on simultaneous hybridization in corporate education, analyzing the main challenges we face in implementing Petrobras University's flex rooms. The results obtained in this research demonstrate that the flex rooms effectively fulfill the role of assisting in the teaching and learning process for all participants, whether physically or virtually present. The project has been successful and continues to expand. Up to now, 32 flex rooms have been installed at Petrobras University, and 22 training classes have been conducted in these rooms, totaling 801 participations.

We also observed that simultaneous hybrid teaching, coupled with the efficient use of available technologies, and the encouragement of interaction among participants, are essential in enhancing the learning experience for students, making it more engaging and dynamic.

We hope that the lessons learned and the strategies adopted in this process serve as a starting point for discussions and further developments of the methodologies and technologies used in simultaneous hybrid teaching, leading to quality corporate education.

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