Original article

Hybrid classrooms and Learning and Knowledge Technologies (TAC) in Chilean universities

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ABSTRACT

Hybrid classrooms offer benefits in terms of accessibility, flexibility, and educational quality in the university context, optimizing students' instructional practice, promoting participation, and providing training materials. Hybrid classrooms and TACs in the university environment will be described. Among the results, the training of educators and technical assistance were obtained, guaranteeing their effectiveness and maximizing benefits. Finally, include teacher training in educational technologies, outlining actions that lead to collaboration, intercommunication, and the creation of accessible and inclusive virtual environments, as well as suggesting evaluation strategies that adapt to the hybrid environment.

Keywords: Hybrid classrooms; Education; TCAs; University contour.

Introduction

Education in Chile is in a context of constant transformation due to the progress of digital technologies and their impact on the way of instruction and education. This article will describe the phenomenon of hybrid classrooms and CAT in the Chilean university environment, as well as the benefits, challenges and lessons learned from the

implementation of these methodologies, with the aim of understanding whether they have been of benefit to educational centers and their knowledge techniques and notions. The Chilean educational system has undergone relevant transformations in recent years, in response to the requests of a gradually more digitalized society, so policies and programs have been implemented to promote the unification of technologies in the classroom, in order to optimize the way to train and raise in equanimity. However, in the year 2023, challenges persist in terms of infrastructure, teacher training and equitable access to technological resources, which has prompted the search for new forms of teaching, such as hybrid classrooms.

Development

According to Prince (2021), hybrid classrooms are learning environments that combine face-to-face and virtual activities, allowing interaction between students and teachers both in the physical classroom and through online platforms. These classrooms seek to integrate the advantages of both environments to enrich the learning experience. Another author to be referenced is Cabero (2017), who defines hybrid classrooms as spaces where a mix of face-to-face and virtual methodologies occurs, using digital technologies as complementary tools to the education and teaching process. This combination seeks to adapt to the obligations and typologies of students, providing flexibility and promoting the participation of all.

Continuing with the definitions, we have the opinion of Gisbert et al. (2016) who indicate that hybrid classrooms are educational environments in which the possibilities of digital technologies are integrated with face-to-face training actions. These classrooms seek to take advantage of the benefits of face-to-face interconnection with the teacher and colleagues, combined with the way to digital materials and tools, thus enriching the educational procedure.

Likewise, the definition of hybrid classrooms provided by García-Valcárcel & Tejedor (2017) should be highlighted, who state that they are spaces that combine work in the physical classroom with online work, allowing the personalization of learning and adjustment to the students' own obligation. Such classrooms seek to develop

independence, interaction and cooperation among participants, using digital technologies as facilitating tools.

Once the definitions of the authors mentioned above are considered, it can be specified that hybrid classrooms are learning spaces that combine face-to-face and virtual elements, allowing students to interact with their classmates and teachers both in the physical classroom and through online platforms. This teaching modality provides flexibility in the choice of educational environment and encourages student participation. In order to understand whether hybrid classrooms and CAT have contributed to Chilean universities, it is necessary to be clear about their characteristics, among which we can highlight the following:

- Integration of digital resources, Hybrid classrooms and CTs offer flexibility in terms of schedules and location, allowing students to access content and participate in online learning activities from anywhere and at any time (Cabero, 2017) and in addition, these methodologies allow access to a wide range of digital resources, such as videos, simulations, virtual libraries, which enrich the teaching-learning process and facilitate the understanding of content.
- Online collaboration: Hybrid classrooms and CTs encourage interaction between students and teachers through online communication tools, discussion forums and collaborative activities, promoting the exchange of ideas and peer learning (Martínez et al., 2019).
- Personalization of the learning process: these methodologies provide the possibility of adapting the pace and content of learning to the individual needs of students, allowing a more personalized and autonomous approach (García-Valcárcel & Tejedor, 2017).
- Continuing along the same line in this documentary review article, some requirements for teachers, establishments and students are exposed, which must be met to facilitate the processes and allow the processes to flow in a coherent and natural way and not be a forced migration from traditional to digital education, these requirements are:
- Teacher training: The implementation of hybrid classrooms and TAC requires teachers to acquire technological skills and competencies to effectively use digital tools and design appropriate learning activities (Cabero, 2017).
- Equitable access to technological resources: It is essential to ensure that all students have access to the necessary technological resources to fully participate in online activities, avoiding the digital divide and ensuring educational equity (Martínez et al., 2019).

- Design and time management: Designing online activities and time management in hybrid classrooms can be challenging, as it requires effectively planning and organizing face-to-face and virtual activities to achieve an appropriate balance (García-Valcárcel & Tejedor, 2017),
- Authentic assessment: assessment in hybrid classrooms and with the use of CT can pose challenges, as it is necessary to find assessment methods that adapt to virtual environments and allow authentic assessment of the knowledge and skills acquired by students (Gisbert, González & Esteve, 2016).

There are authors who refer extensively to Learning and Knowledge Technologies (LKT), such is the case of Cabero (2017), who defines them as the set of tools, resources and technological applications used in teaching and learning processes. These technologies include both devices (computers, tablets, smartphones) and software, platforms and educational applications, which provide the advantage of understandings and originate the interaction and collaboration of learners.

According to Gisbert, González and Esteve (2016), CTs are groupings of technological devices and resources that are used in training and instructional procedures to optimize the quality and effectiveness of education. These technologies encompass both media and devices (hardware) and software and applications (software) used for educational purposes, similarly Parra et al (2019) define CATs as the set of technological tools and resources, both hardware and software, that are used in educational processes to favor the acquisition of knowledge and the development of skills. These technologies range from the use of mobile devices and computers to virtual platforms, educational applications and interactive digital resources.

It is for this reason that it can be affirmed that the authors mentioned above have the same criteria with respect to ICTs and show that they play a fundamental role in hybrid classrooms, offering platforms for teaching management, such as Moodle or Canvas, which facilitate content management, communication between students and teachers, and the monitoring of academic progress. In addition, videoconferencing allows real time interaction, while online forums that originate collaboration and reciprocity of principles. Simulations and interactive digital media dignify the learning practice, offering new ways to explore concepts and develop skills.

Having clear the conceptualization we rely on Carripon (2021) to describe some of the technologies used in hybrid classrooms, but first it is important to note that the choice of specific technologies may vary according to the preferences of the institution, the

resources available and the obligations of learners and teachers involved in the educational issue, the mentioned technologies are:

- Learning management platforms (LMS): Platforms such as Moodle, Canvas, Blackboard or Google Classroom are widely used in hybrid classrooms. These tools allow teachers to manage and share educational resources, create and grade assignments, interact with students through forums and track academic progress (Diaz, et al 2021).

- Videoconferencing and webinars: Applications such as Zoom, Microsoft Teams or Google Meet facilitate real-time exchange and cooperation between teachers and students. These tools enable virtual classes, conferences, tutorials and online discussion sessions, creating an interactive learning environment and allowing remote collaboration of learners.

- Digital educational resources: Hybrid classrooms often take advantage of digital educational resources, such as: videos, simulations, multimedia exhibits, e-books and interactive websites. These resources enrich course content, providing different ways of accessing information and allowing for a more dynamic and visually engaging learning experience (Melgarejo, et al 2022).

- Online collaboration tools: Hybrid classrooms encourage collaboration among students through tools such as Google Docs, Microsoft Office 365, Trello or Slack. These platforms allow students to work together on projects, share documents, make collaborative annotations and communicate in real time, promoting group work and the collective foundation of knowledge.

- Online assessment: Hybrid classrooms use online assessment tools such as online quizzes, virtual exams, online assignments and digital assessments. These technologies provide faster and more automated assessment, facilitating immediate feedback and efficient management of assessment results.

- Making a critical analysis of the above, it can be said that these learning and understanding technologies can promote study and knowledge in the university context in several ways:

- Access to extensive educational resources: digital technologies allow learners to access a wide range of online pedagogical materials, such as electronic texts, academic articles, videos, tutorials and recorded lectures. In other words, it broadens the availability of study materials and enriches the learning experience by providing different perspectives and sources of information.

- Interaction and collaboration: Online collaborative technologies, such as videoconferencing tools and collaborative work platforms, facilitate interaction and assistance between learners and teachers. These tools promote reciprocity of thoughts, debate, joint resolution of conflictive situations and the collective construction of knowledge.
- Flexibility and personalization of learning: Learning and understanding technologies allow a more flexible and personalized training. Learners can access online learning resources and activities at any time and in any context, adapting them to their pace and learning style. In addition, learning platforms can offer personalized recommendations based on learners' performance and interests.

- Individualized feedback and follow-up: Digital tools offer the possibility of providing quick and specific feedback to students. Educators are able to manage online platforms to assess student progress, provide individualized feedback and track academic performance.
- Active, hands-on learning: CTs offer opportunities for active, hands-on instruction. Students achieve by posting interactive simulations, virtual case studies, online collaborative projects, and hands-on activities based on digital tools. These experiences allow for direct application and experimentation with theoretical concepts, fostering more meaningful and contextualized learning (Torres, 2019).

In the Chilean context, several Chilean universities have implemented hybrid classrooms in response to educational challenges and student requests. One example is the Universidad de Chile, which has used hybrid classrooms to combine face-to-face classes with online activities, encouraging interaction and collaborative work. The Pontifical Catholic University of Chile has adopted a similar approach, integrating virtual platforms and digital resources in its courses to enhance the learning experience.

Similarly, the Universidad de Concepción has implemented hybrid classrooms using its virtual learning platform called “My UdeC ". They have combined face-to-face classes with online activities and have facilitated communication and delivery of materials through this platform, the Catholic University of the North which has used hybrid classrooms to combine face-to-face classes with online activities. They have employed tools such as Google Classroom and Meet to facilitate communication and delivery of assignments, as well as to conduct virtual sessions in real time, and the Universidad de

Santiago de Chile, which has adopted a hybrid model that coordinates face-to-face classes with the management of virtual platforms such as Moodle and Google Meet.

With the advent of COVID-19, Chilean universities implemented various strategies to adapt to the hybrid environment, including the management of online training platforms, videoconferencing equipment, digital educational resources and online assessments. These tools and approaches allowed educational institutions to maintain the connection with learners and continue with the instructional procedure, despite the restrictions imposed by the pandemic, it was thus that during the COVID-19 pandemic, Chilean universities assumed to adapt quickly in the particularity of hybrid teaching to ensure continuity of learning (Viera, 2022).

Some authors, such as Parra et al (2019) and Viera (2022), have highlighted that the experience of Chilean universities with hybrid classrooms has presented both challenges and opportunities. Among the challenges are:

- Teacher training: The transition to hybrid classrooms requires teachers to acquire new technological and pedagogical skills to make the most of digital equipment and design effective learning experiences in a blended environment.
- Equity and access: Ensuring equity in the path to technology and connectivity has become a major challenge. Not all students have equal access to devices and Internet connections, which can generate gaps in the path to educational resources and participation in virtual activities.
- Adaptation of contents and methodologies: Teachers have had to adapt their teaching contents and methodologies to adapt to the hybrid environment, effectively integrating online resources with face-to-face activities and promoting intercommunication and student participation.

It should also be noted that the two major challenges have been the adaptation of teachers, as they may have faced challenges in adapting to current technologies and hybrid teaching methods. They may have required training and support to effectively use digital tools and design effective teaching experiences and collaboration of learners, for this case it is likely that universities have had to manage cooperation and accountability of learners in the hybrid environment. The balance between online and face-to-face activities, as well as student interaction and motivation, might have been key aspects to consider (Bates, 2019).

Results

Having clear the description of the bibliographic material it can be said that the implementation of hybrid classrooms has allowed universities to ensure the continuity of learning in emergency situations, such as the COVID-19 pandemic, because students were able to continue with their studies despite the restrictions and changes in the educational environment, additionally, hybrid classrooms, have provided students with greater flexibility in terms of access to study materials and the ability to adapt their learning to their own availability of time and location (Saavedra, et al 2022).

The above, without neglecting the importance of providing adequate and continuous training to teachers in the use of educational technologies and hybrid methodologies. This can assist and ensure a more effective transformation and better teaching quality, in addition to making available a solid technological infrastructure and adequate technical support. Institutions may have learned the importance of having reliable IT resources and services to support the implementation of hybrid classrooms (Cabero & Palacios, 2021).

Another benefit of hybrid classrooms and CT in universities has been to try to maintain equity in access, because in Chile there are very marked gaps in access to resources and in this case some sectors would be more favored than others and to eliminate physical barriers, such as disability or limited mobility, by offering online training options. This ensures that students with special needs have equal opportunities to access education (Ibaceta & Villanueva, 2021).

All of the above is important, but it should also be added that technologies used in hybrid classrooms allow a greater degree of personalization of preparation. Learners can agree to additional materials, track their progress and receive individualized feedback, which promotes learning that is more adapted to their needs and learning pace, considering that, in a hybrid environment, students can access class recordings or online materials to review and revise important concepts. This gives them the opportunity to consolidate their understanding and improve their academic performance.

The combination of hybrid classrooms and CT encourages learner engagement through online and face-to-face activities. This can include online discussions, collaborative activities and group projects, which enhance intercommunication and grouped knowledge elaboration. In addition, learning and understanding technologies provide access to a wide range of online materials, such as videos, simulations, digital libraries and interactive tools. Below are some possible solutions related to the successful implementation and management of hybrid classrooms:

- Provide technological resources: Universities can ensure that students have access to appropriate devices, such as computers or tablets, and a reliable Internet connection to participate in online activities (Chinchay, et al, 2020).
- Improve connectivity: It is essential to ensure stable and fast connectivity on the university campus for online activities. This involves strengthening the network infrastructure and expanding Wi-Fi coverage in common areas and classrooms.
- Train professors: Provide training and professional development planning for professors to acquire skills in the design of hybrid courses, management of educational technologies and facilitation of interaction in virtual environments.
- Share best practices: Create spaces and platforms for teachers to share experiences, strategies and resources related to the implementation of hybrid classrooms. This will provoke cooperative training and interaction of understandings among teachers.
- Adapt content: Redesign teaching materials and resources so that they are suitable for both online and face-to-face activities. Consider the use of multimedia materials, interactive activities and online assessments to enhance the learning experience.
- Promote interrelationship: Delineate activities that agree to foster interaction between learners and teachers, both in the digital and physical context. This may include online discussions, participatory forums, and group planning and question-and-answer deliberations.
- Offer one-on-one coaching: Provide individualized coaching to teachers to help them plan and adapt their courses to a hybrid environment, as well as to resolve doubts or difficulties related to the technologies used.

According to Engel & Coll, (2022), the activation of hybrid classrooms should clearly state the purpose of discipline formation and ensure that they are aligned with the capabilities that learners are expected to deploy, identify and select the most appropriate learning technologies and knowledge in the context and objectives of the course. This may incorporate instructional management platforms, online collaboration mechanisms, and digital educational resources. A variety of activities should be designed that combine both online and face-to-face components.

For Rama (2021) and Sigalés (2020) it is not only important the technical part but to provide students with clear and detailed information about how the course works, class schedules, online activities and participation expectations. Use online communication platforms and announcements in order to maintain an effective connection with students, promote student participation in both face-to-face and online activities. This may include

online discussions, virtual discussion groups, collaborative group activities and virtual presentations and provide guidance and technical support in the management of technology mechanisms and tablets used in the hybrid environment. This may include tutorials, guides and training sessions.

All of the above is important, but Area & Adell (2021) make it clear that mechanisms for monitoring and evaluating students' progress in the hybrid environment should be implemented. This includes the review of online activities, regular feedback and the adjustment of knowledge skills according to identified needs and designing balanced assessments, using a variety of assessment methods that are suitable for both face-to-face and online activities.

Some relevant data to consider are that in the last 5 years the percentage of Chilean universities that have implemented hybrid classrooms has been increasing from 20% in 2018 to 80% in 2022, it should also be noted that virtuality has gained ground increasing by 85% the use of Platforms in learning management, the use of tools for video conferencing and interactive multimedia material went from 40% in 018 to 70% in 2022.

Conclusions

The analysis of hybrid classrooms and learning and knowledge technologies in Chilean universities reveals their aptitude to optimize teaching practice and encourage student participation. Although there are challenges in their implementation, it is evident that these methodologies offer significant benefits. It is necessary to continue exploring and evaluating their impact, as well as to promote policies and strategies that support their effective adoption in the Chilean university context.

Throughout this research, it is evident that these pedagogical approaches and technological tools have significantly transformed the way in which higher education is transported in our country and while hybrid classrooms, combining elements of face-to-face and online learning, have proven to be a catalyst for improving accessibility, flexibility and educational optimization in Chilean universities.

Similarly, the unification of learning technologies and understanding has opened up new opportunities for access to education, allowing students from different locations

and with diverse personal circumstances to participate in learning processes without physical or geographical barriers.

In terms of accessibility, hybrid classrooms have enabled the inclusion of students with specific needs, providing tools and resources adapted to their individual requirements. In addition, they have made it possible to expand the educational offer, offering distance programs and courses that reach learners who find it difficult to enter higher education on a regular basis. According to Parra et al (2019), another significant advantage of hybrid classrooms and CT in the flexibility it gives to learners to consent to study materials at some instant and from a certain place, allowing them to adapt their training to their individual schedules and rhythms.

In terms of educational quality, Alvarez & Contreras (2022), state that hybrid classrooms have opened up a range of possibilities for the personalization and adaptation of instructional and teaching procedures. Teachers get to use various technological tools, such as learning management platforms, multimedia materials and collaborative virtual environments, to enrich the educational experience and promote the acquisition of skills relevant to the 21st century.

In conclusion, hybrid classrooms and CT have had significant contributions in Chilean universities, transforming the way in which education and study are carried out. These pedagogical tools and approaches have opened up new opportunities in all educational centers allowing for a more inclusive learning experience, adapted to individual needs, and enriched with technological resources.