Revista Iberoamericana para la Investigación y el Desarrollo Educativo
ISSN 2007 - 7467

https://doi.org/10.23913/ride.v15i30.2248

Scientific articles

La construcción del conocimiento en ambientes híbridos de aprendizaje: fundamentos epistémico-metodológicos

Knowledge construction in hybrid learning environments: epistemic-methodological foundations.

Construção do conhecimento em ambientes híbridos de aprendizagem: fundamentos epistêmico-metodológicos

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Resumen

La situación postpandemia ha impulsado el uso de ambientes híbridos de aprendizaje en las instituciones educativas, al considerarse herramientas puente entre los espacios presenciales y virtuales para la construcción del conocimiento estudiantil. En este contexto, vincular actividades presenciales y virtuales ha transformado significativamente la forma en que los estudiantes adquieren conocimientos. Por ello, esta investigación analizó los fundamentos epistémico-metodológicos presentes en la construcción del conocimiento de estudiantes de nivel superior, basándose en la teoría socioconstructivista. A través de una metodología cualitativa, se realizó una investigación documental con 83 fuentes primarias y secundarias, extraídas de bases de datos como Emerald Insight, Taylor & Francis Online, Scopus, Web of Science, Redalyc y Scielo, así como de la UNAM y el IPN. El análisis permitió identificar que la

construcción del conocimiento en ambientes híbridos se define por las relaciones intersubjetivas entre los sujetos pedagógicos, en sesiones síncronas y asíncronas. Asimismo, se destacó la importancia de la argumentación y el conflicto sociocognitivo en la construcción colectiva del conocimiento.

Palabras clave: construcción del conocimiento, ambiente híbrido de aprendizaje, socioconstructivismo.

Abstract

The post-pandemic situation has driven the use of hybrid learning environments in educational institutions, regarded as bridge tools between face-to-face and virtual spaces to facilitate students' knowledge construction. In this context, linking face-to-face and virtual activities has significantly transformed how students acquire knowledge. This study analyzed the epistemic-methodological foundations underpinning the knowledge construction of higher-level students, grounded in socio-constructivist theory. Using a qualitative methodology, a documentary research approach was employed, reviewing and analyzing 83 primary and secondary sources from databases such as Emerald Insight, Taylor & Francis Online, Scopus, Web of Science, Redalyc, and Scielo, as well as from UNAM and IPN. The analysis revealed that knowledge construction within hybrid learning environments is shaped by intersubjective relationships among pedagogical subjects in synchronous and asynchronous sessions. Furthermore, the importance of argumentation and sociocognitive conflict in collective knowledge construction was highlighted.

Keywords: knowledge construction, hybrid learning environment, socio-constructivist theory.

Resumo

A situação pós-pandemia impulsionou o uso de ambientes híbridos de aprendizagem nas instituições de ensino, reconhecidos como ferramentas de ponte entre os espaços presenciais e virtuais para a construção do conhecimento dos estudantes. Nesse contexto, a vinculação entre atividades presenciais e virtuais transformou significativamente a forma como os alunos adquirem conhecimento. Por isso, esta

pesquisa analisou os fundamentos epistêmico-metodológicos presentes na construção do conhecimento de estudantes de nível superior, fundamentada na teoria socioconstrutivista. Utilizando uma metodologia qualitativa, realizou-se uma pesquisa documental com 83 fontes primárias e secundárias, extraídas de bases de dados como Emerald Insight, Taylor & Francis Online, Scopus, Web of Science, Redalyc e Scielo, além de UNAM e IPN. A análise revelou que a construção do conhecimento em ambientes híbridos é moldada pelas relações intersubjetivas entre os sujeitos pedagógicos em sessões síncronas e assíncronas. Além disso, destacou-se a importância da argumentação e do conflito sociocognitivo na construção coletiva do conhecimento.

Palavras-chave: construção do conhecimento, ambiente híbrido de aprendizagem, socioconstrutivismo.

Reception Date: August 2024 **Acceptance Date:** January 2025

Introduction

The Covid-19 pandemic presented significant challenges for the education sector, particularly in the continuity of knowledge construction for higher education students. In order to ensure this continuity, the return to classrooms in Mexico was carried out gradually, through the implementation of the hybrid modality. This strategy sought to allow students to continue developing study plans and programs, combining face-to-face and virtual activities.

During the implementation of the hybrid modality, some students from the HEIs showed interest in the development of the sessions. According to Suleri (2020), given the possibility of using this type of modalities in future scenarios, it is necessary to prepare integrated learning programs that promote the construction of constant knowledge between technological mediation and face-to-face learning, since the application of the hybrid modality also demands the development of an active life on the part of those who teach and those who learn, identified, for research purposes, as pedagogical subjects in the context of the construction of knowledge.

The curricular adaptation, as well as the need for new learning programs for school content in hybrid environments , has promoted the development of a new line of educational action as preparation for the design of programs and study plans , aimed at

analyzing the construction of students' knowledge in the so-called hybrid learning environments Reyes et al. (2021).

The hybrid learning environment is above the complementarity between face-to-face and virtual spaces, as it seeks to unify both spaces in favor of the construction of knowledge, seeking maximum integration of both modalities. In this way, it is also necessary to establish the roles under which knowledge must be built jointly between teachers and students within classroom spaces in synergy with technology-mediated activities (Osorio, 2011).

The unification of face-to-face and virtual spaces to determine a hybrid learning environment requires not only the reflection of the roles of the pedagogical subjects in terms of interactions and activities (Barbera et al., 2004), but also of those foundations through which the construction of knowledge arises, such is the case of the epistemic foundations, in addition to those that serve as a guide for the construction process, the methodological foundations.

As a result of this growing line of approach to the analysis of the construction of knowledge in hybrid learning environments, various investigations have emerged, for example, Manciaracina (2002) exposes the key elements to consider to innovate the learning environments within which he highlights: the relevance of developing hybrid learning environments focused on the participation of students, the systematic use of pedagogical-methodological strategies as a frame of reference for active teaching practice in spaces where technology is considered as a mediator for the construction of knowledge, in such a way that these learning spaces encourage the constructive participation of students around their needs.

On the other hand, research works such as Rof 's *et al.* (2022) have turned to the analysis of the challenges involved in the construction of students' knowledge in hybrid learning environments, the greatest challenge being the inequality of opportunities for students in acquiring knowledge, coupled with the need for HEIs to adapt to social and cultural changes that challenge educational practices. However, they consider that the resurgence of hybrid learning environments is an innovative stimulus for technology-mediated education in the face of the accelerated technological development currently taking place. Their final proposal refers to a methodological matrix, forms and tools that, in correlation with various learning combinations, lead HEIs to design and offer

value propositions for the construction of students' knowledge, where priority is given to what, when, how and where.

Huang and Lee (2022) identified the importance of social elements present in hybrid learning environments to foster critical thinking when building educational experiences based on social interaction, considering that social elements are key to the integration of teaching and the appropriation of knowledge by students. Another of their important findings is related to the need to create conceptual frameworks that serve as measurement instruments for the learning process, highlighting the *Community Learning model. of Inquiry (CoI)* (Huang and Lee, 2022, p.374), focused on the role of the teacher, the social environment and cognition, where learning is seen as a process of constructing meanings and reflection based on the connection of the three elements mentioned.

In the study by Pandey and Panda (2023), the crucial role of HEIs in promoting educational innovation in the use of technology was emphasized. They highlight the studies carried out on the effect of universities on innovation and point out that research is still needed on issues related to the needs of students, the delivery of courses, and the way in which students are creators of knowledge.

According to Zairul et al. *(2023), the increase in the use of* hybrid learning environments took place with the arrival of the Covid-19 pandemic, being a challenge for pedagogical subjects, due to poor preparation, the presence of the digital divide, infrastructure problems, and even lack of interest in some cases; However, the rapid response to the emergency has promoted reflection and analysis around issues related to technological inputs in order to improve learning. The use of hybrid learning environments could be a useful alternative for the construction of knowledge by promoting the combination of synchronous and asynchronous activities dependent on virtuality and face-to-face presence respectively.

In accordance with the above, the general objective of the research was to analyze the epistemic-methodological foundations that are present in the construction of knowledge of young students enrolled in Higher Education, for which the following research question was raised: what are the epistemic-methodological foundations that, from the socio-constructivist theory , intervene in the construction of knowledge of

students at the Higher Education Level under the context of hybrid learning environments?

Theoretical elements

The analysis related to the construction of knowledge has been taken up from various theories, in which the role of pedagogical subjects in the acquisition of knowledge is highlighted. In the introductory section, the importance of this process in hybrid learning environments has been reflected upon, from which it is possible to identify some elements such as: the use of technology in asynchronous sessions, the strategies implemented during synchronous face-to-face sessions, self-directed learning, tutoring, collaboration between peers, argumentation processes, socio-cognitive conflict, among others. In this environment, basic and complex cognitive-digital skills are developed, self-directed learning is promoted, and the construction of students' knowledge is favored in synergy with the interrelations generated in their group.

In contrast to the unique capacity that each student has for the construction of knowledge, there is the community, the space-time environment, as well as the development of social and cultural links between pedagogical subjects. Together, these elements form a fundamental part of the epistemological bases that underlie Lev Semyonovich Vygotsky's socio-constructivist theory (1989).

For some authors, the epistemological foundations of the socioconstructivist theory 'try to understand how the production of knowledge or know-how works, whether practical, technical, ethical, religious, symbolic, aesthetic, etc.' (Fourez , 2008, p. 18). From this perspective, the construction of knowledge based on Vygotsky's theory is based on four main epistemic-methodological assumptions: (1) the individual and collective construction of knowledge by HEI students; (2) the set of knowledge that must be learned in synergy; (3) the importance of validating these applied and replicable contents in different scenarios; and (4) the central question: what is knowing?

The construction of knowledge in the context of hybrid learning environments, in light of the socio-constructivist methodology and epistemology , is understood as the creative transformation, from which meanings are constructed through the appropriation of meanings that HEI students extract from their reality, in the face-to-face environment,

within classroom spaces and in the virtual space, with activities mediated by technology (Cubero, 2005).

For Vygotsky (1978) knowledge encourages "the internal reconstruction of an external operation" (p. 72), this phrase can be explained from the Vygotskian internalization and appropriation , where both terms are intertwined weaving the individual and collective experiences of the students. Based on the mental activity of each pedagogical subject in synergy with social interactions, the reconstruction of knowledge is promoted, giving rise to appropriation, understood as the process that transforms and generates the pedagogical subject for the knowledge that it constructs.

In this sense, from Vygotsky's sociocultural theory, students are the constructors of their knowledge not only from individuality, but also from the collectivity where the importance of support among their peers is highlighted (Gómez and Rubio, 2017). Thus, knowledge can be understood as the result of circular, reiterative and dialectical processes that, while it is true that they transform the individuality of the students, also go through the mediator of the process.

According to the above, the construction of knowledge involves the connection of multiple variables and is understood as a social and situated process (Cubero, 2005). Specifically, based on the analysis of Vygotskian theory as part of the guiding axis of this research, only four of the intervening variables are taken up to promote student knowledge in hybrid learning environments: argumentation, socio-cognitive conflict, intersubjectivity and the individual-collective relationship.

In order to establish a position on the variables identified for the research, the following lines must theoretically establish how they are understood, which will provide guidelines for their subsequent reflection and analysis in the discussion of this article. The socio-cognitive conflict for the construction of knowledge in the context of hybrid learning environments can be understood as the scenario in which two or more pedagogical subjects exchange positions through dialogue about common activities (Castellaro , 2020), while a change in their cognitive organization reflects a personal construction created based on individual and collective learning experiences where pedagogical subjects put their capacities into practice, expanding them.

Sociocognitive conflict as a generator of knowledge establishes two dimensions from which knowledge is constructed. The first refers to the causal relationship present between those who engage in dialogue, and the second alludes to the sociocognitive relationship derived from the production of new knowledge. From both relationships, what Peralta et al. (2016) calls "sociocognitive regulation" (p.96) occurs. Sociocognitive regulation implies the rearrangement or modification of the cognitive plane of students who participate in a cognitive conflict, whose main element to consider is argumentation, through which students exchange and debate positions or points of view on a common topic.

Castellaro 's (2020) perspective , argumentation refers to the process and product that, through an interactive scenario between one or more people, makes it possible to issue a critical and reflective position directed towards the construction of knowledge. In this sense, argumentative dialogue becomes the scenario where the cognitive modification of students occurs, as a result of a process of co-construction or joint construction between pedagogical subjects in the face of knowledge. In this sense, argumentative discourse highlights collaborative participation in favor of dialogue, promoting reasoning and therefore the formulation of new knowledge and even conflict resolution Delgado et al. (2022). In a hybrid modality, argumentative dialogue can be reflected in the development of virtual chats or forums.

As a result of argumentation and socio-cognitive conflict, knowledge lays the epistemic foundations on which it is possible to generate new knowledge, under the consideration that argumentation as a process involves the cyclical linking of three important elements: argument, counterargument and reply (Leitão , 2000). The argument refers to the position assumed by the student derived from or followed by a justification, which is followed by a counterargument whose main function is to question what has been said in the initial phase of the argumentative process, giving rise to the reply, understood as the mechanism through which reactions are issued against previously established arguments. For some authors belonging to the socio-constructivist current , the argumentative process tacitly entails the intersubjective exchange between those who participate in both the argumentative process and the socio-cognitive conflict.

For Castellaro (2020), intersubjectivity from a socio-constructivist position refers to the socio-relational-cognitive-emotional system that arises from the interaction between two or more people or students who develop a common activity, the purpose of which is to achieve a shared objective. In this way, intersubjectivity is a fundamental element insofar as it reveals the social nature under which knowledge is constructed, through true communication between those who dialogue, originating a relationship between individual and collective. For their part, Peralta and Roselli (2016) distinguish as the backbone of intersubjectivity, the possibility that it grants to construct knowledge based on individual convergences, which, although they arise in a unitary manner, are not reducible to the individual, but instead, the process by which students construct a shared field of meanings when solving activities together is prioritized.

In addition to the above, intersubjectivity has at least two necessary bases to present itself: on the one hand, the plurality of beliefs, perspectives or opinions given, and on the other, the scaffolding and collaboration between pedagogical subjects, from which it is possible to build common objects of knowledge.

The construction of knowledge from individuality and collectivity under the approach of the socio-constructivist theory prioritizes the active role of the student in the apprehension and construction of his/her knowledge (Fourez , 2008). In this sense, it is of utmost importance that the student establishes a logical relationship between his/her beliefs and his/her daily tasks based on the time and physical environment in which he/she performs them. The social factor inherited from the Vygotskian theory to socio-constructivism allows us to point out that both personal interrelations and the intersubjectivity that emerges from them have given rise to standardized knowledge systems, where the principles that lead to the educational system are concentrated, in the same way, the learning that is expected to be developed during the academic training stage is highlighted, as well as the expected graduation profile at the end of their studies, an example of this can be represented by the curricular frameworks of the HEIs.

Methodology

The main objective of this research was to analyze the epistemic-methodological foundations that are present in the construction of knowledge of young students enrolled in Higher Education. In order to address the general objective, the following research question was posed: What are the epistemic-methodological foundations that, from the socio-constructivist theory , intervene in the construction of knowledge of students at the Higher Education Level under the context of hybrid learning environments? In order to answer the question posed, it was essential.

A. Analyze the theoretical and conceptual foundations of the socioconstructivist theory .
B. Analyze the construction of knowledge from the socio-constructivist theory in the context of hybrid learning environments.
C. Outline the epistemological and methodological foundations that arise from socioconstructivism for the construction of knowledge under the approach of a hybrid modality.

The methodology used in this study was based on a qualitative approach, defined by Niño (2011) as a method that seeks 'the comprehensive understanding of phenomena' (p. 30). To collect information and develop the epistemic-methodological analysis, a documentary research was carried out. The data was obtained through recognized databases, such as *Web of Science* , *Scopus* , *ScienceDirect* , *Redalyc* and *SciELO* , as well as the digital libraries of the National Autonomous University of Mexico and the National Polytechnic Institute. In total, 140 articles and books available in digital or printed format were accessed.

The documents were arranged alphabetically, starting with the author's last name, followed by the year and title. They were systematized according to nine categories: state of the art, knowledge, constructivism, sociocultural theory, socioconstructivism , hybrid learning environment, epistemology and education. Once categorized, they were grouped considering five variables related to the study: construction of knowledge, socioconstructivism , hybrid learning environment, epistemology and methodology, generating a database with 83 documents made up of 47 articles and 36 books or book chapters edited and published in countries such as Argentina, Brazil, Colombia, Spain, United States, Mexico, Peru, Russia, Switzerland,

England and Venezuela. The plurality of the documents gave rise to the analysis and understanding of the object of study in a comprehensive way.

According to Niño (2011), document analysis is an iterative process, where 'analysis leads to synthesis and synthesis to analysis' (p.103). For the document review , a record of each document was created, which included the complete reference in APA format, seventh edition , the objective of the text, the summary, as well as the possible contributions that would have an impact on the object of study. The information obtained was coded considering five colors, these, in correlation with the variables involved in the study.

Results

To date, studies conducted on the construction of knowledge in hybrid learning environments have identified contradictions related to the use of information and communication technologies (ICT). Fainholc (2019). One of these contradictions is related to the inconsistency between educational practice and curricular design, exposed in the transfer of directed study plans and programs from face-to-face classroom spaces to hybrid learning environments in an arbitrary manner, without considering the characteristics of hybridization.

In this sense, the analysis carried out allowed us to distinguish two fundamental aspects of hybridization . One of them refers to the so-called hybrid education which , according to Rama (2021), requires the inclusion of computer pedagogies in face-to-face education, as well as the articulation of teaching work and virtual environments.

For this aspect, hybrid education thrives entirely through the use of digital technologies, all of them developed virtually or online, through LMS (*Learning Management Systems*) or MOOC (*Massive Open Online Courses*) platforms , without resorting to face-to-face classroom spaces.

For its part, the second aspect highlights the use of so-called 'hybrid learning environments', which, unlike hybrid education, integrate both face-to-face and virtual learning as essential means for the construction of knowledge (Carbonell, 2021), the above accompanied by the development of technological-cognitive skills.

Starting from the distinction between hybrid education and hybrid learning environments , it is important to highlight that for the purposes of the research that

precedes this article, the proposals of Carbonell (2021) were taken into consideration. Therefore, for the authors, hybridization represents a bridge that intrinsically connects face-to-face learning with virtual learning. Therefore, the linking of face-to-face and virtual classroom spaces seeks to overcome the traditional limits of face-to-face education by articulating face-to-face and virtual activities.

In this context, the hybridization of educational teaching requires the construction of its own framework that acts as a guide for the development of an educational environment that establishes a dialogue with digital culture (Soletic , 2021).

Although it is true that the presence of various foundations in the construction of knowledge is recognized, such as the epistemological, methodological, psychological, social, cultural, political, and even economic in the elaboration of the referential frameworks of a paradigm (Corbeta, 2007); for research purposes and seeking to understand how knowledge is constructed in the so-called hybrid environments, only the epistemic and methodological foundations were considered in light of Vygotsky's socio-constructivist theory .

From an epistemic-methodological perspective, the socio-constructivist theory emphasizes the interconnections and mutual impact between activities developed in the social sphere and those carried out individually by students (Coll, 2014). In this framework, social and individual factors, such as mental mechanisms, interact in the construction of meanings, deeply influenced by the social and cultural context in which they are generated .

The Vygotskian vision on the construction of knowledge in the context of hybrid learning environments requires the identification of three domains that are constantly related to each other: the microgenetic domain , the ontogenetic domain and the sociogenetic domain (Castorina, 2018). The first of the aforementioned domains refers to the result that emerges from social interactions; in the case of the second domain, this is represented from the elaborations of each student based on the meanings that he or she constructs based on culture, while the third domain alludes to the presence of social, historical and cultural productivity that the student shares with others, in his or her role as a social subject.

As can be seen, the variability present in the construction of students' knowledge inevitably occurs in intersubjective environments in which the flow of interrelations and

social interactions with others prevails. The results stated up to this point account for the epistemological shift stated by Martínez (2007), in that "the binomial of individualistic classical psychology, subject-object, becomes a trinomial consisting of subject-object-other" (p. 143). This trinomial is based on the epistemic foundations present in the interaction arranged between one subject and another, in relation to an object of study, through the internalization processes stated by Vygotsky.

It is evident that, when faced with the construction of knowledge, each person or student has their own ways and tools to learn; however, in general, the acquisition of knowledge finds similarities from the socio-constructivist theory , for example:

a) People build their knowledge individually and collectively.
b) The knowledge acquired serves as dynamic arguments when exchanged with others.
c) There is knowledge that is regulated based on the curriculum design.

The application of the points stated above in the context of hybrid learning environments allows us to highlight the importance of interactions mediated by technology as well as those that occur within classroom spaces, where factors such as: a) the cognitive dimension of learning, b) the social and interactive dimension of teaching, c) the interrelation of the cognitive dimension of learning and the social and interactive dimension of teaching with the educational interaction of students with the teacher, peers, content and their own mental activity and d) situated cognition and processes of social interaction in specific educational contexts come into play (Badia, 2006).

The cognitive dimension of learning emphasizes the importance of the students' mental process in relation to the reworking of the initial mental processes in the construction of their knowledge, by assigning meanings that give meaning to what they are learning. For its part, the social and relational dimension of teaching exposes the set of interactions present between students and their objects of study during the development of their mental processes, whose interrelations are usually established between the pedagogical subjects that are within the classroom spaces. The use of hybrid learning environments for this factor becomes the means by which students can self-regulate the construction of their learning as long as learning is developed through collaborative or individual tasks (Badia, 2006).

The third factor mentioned promotes the construction of knowledge as the process of internalization, where some of the knowledge acquired by students at an external level is transferred to an internal level, which results in the integration of inter and intrapsychological processes. The fourth factor highlights the importance of the sociocultural space in synergy with what occurs during the interrelation between the individual cognition of students and their teachers or peers. According to Badia (2006), there are some factors that influence the different educational areas, for example: the task to be developed, the essence of knowledge and the educational level.

Based on the four factors described, for the socio-constructivist theory , the student is considered an active agent in the construction of his reality and, therefore, of his knowledge , which, within the hybrid learning environments, highlights its construction based on the four variables involved in the research, a) socio-cognitive conflict, b) argumentation, and c) intersubjectivity, which, given their relevance, were presented as the theoretical foundation of this research.

From the association of the factors proposed by Badia (2006), and the four variables involved in the construction of students' knowledge based on Vygotsky's socio-constructivist theory , the epistemological foundations emerge first and second, the methodological foundations.

In the first instance, within the epistemological foundations of socioconstructivism for hybrid learning environments, the following was found:

1. The social group and the environment of the students make them an active part in the construction of knowledge.
2. Knowledge is acquired socially through students' interactions with their sociocultural environment.
3. Knowing necessarily has to do with the cognitive structures of students, reflected through inter and intrapersonal processes.
4. The significance that students give to the apprehension of their reality arises from their social and cultural context.
5. The development of intersubjective links turns knowledge into a dynamic process in which the student gives meaning to what he learns.

By transferring the epistemological foundations derived from socio-constructivism to hybrid learning environments, we can account for the relevance of the

interactions generated between pedagogical subjects (students, teachers and those involved in the teaching and learning process), technological mediation, classroom spaces, synchronous and asynchronous activities as well as the relationship between educational learning and students' inclinations, which entails the need to establish clear objectives for the formation of intersubjective relationships between classroom spaces and virtual environments.

Secondly, the methodological foundations of socioconstructivism form the backbone that must guide the understanding of the process that leads to the construction of knowledge, as long as it is built interactively through the sociocognitive connection in favor of the exchange of meanings (Castellaro , 2011).

Castellaro 's (2011) perspective , according to the socio-constructivist theory, there are at least three minimum methodological foundations that must be considered in the construction of knowledge:

1. The link between social interaction and knowledge.
2. The interactions that arise from such a link.
3. Groups seen as social units.

In line with the above, the first foundation symbolizes the study of sociocognitive interaction, as it forms part of the relationships established between pedagogical subjects. The second foundation considers the space in which knowledge is constructed; in the case of hybrid learning environments, this is made up of in-person and virtual spaces. The third foundation highlights the importance of pedagogical subjects as units through which knowledge is constructed.

Therefore, the methodological foundations delimit the route to follow in the construction and acquisition of knowledge, while social interaction is considered as the base on which it is built, by promoting the ideal conditions for its development through not only the creation of social ties, but also interaction processes that involve argumentation and therefore sociocognitive conflict.

The establishment of social ties in the acquisition of knowledge within hybrid learning environments is a key element, given that from the socio-constructivist theory , knowledge is only produced through collaborative scenarios (Castellaro , 2020). In this way, the socio-affective ties established between students, their peers and teachers contribute to the expansion of cognitive skills through the exchange of experiences.

According to Becerra (2006), social interactions, aimed at the formation of socio-affective ties, are considered a dialogical activity for the teaching and learning process, where with the support of others, each student carries out their process of construction, adaptation and variation of their cognitive schemes.

Now, as mentioned in the second methodological foundation, the construction of knowledge requires spaces and/or situated conditions that contribute to its development, such is the case of hybrid learning environments , where there are three possible scenarios: the first places the construction of knowledge within the classroom space, the second is determined by virtuality, while the third considers the existence of a real environment, in which the acquired knowledge must be applied (Rodríguez, 2014).

In the case of the third methodological foundation, it is possible to define that social units become the core part in the construction of knowledge, by identifying the groups of people involved, among which it is possible to find the following relationships: student-teacher, teacher-student, student-student, student-classmates, teacher-classmates (Becerra, 2006).

Each of the interactions mentioned has its own characteristics; however, most of them have elements that converge with each other, for example, the existence of a two-way communication whose particularity is the general exposition of arguments through the elaboration and management of meanings only if the communication is direct, which would favor the presence of sociocognitive conflict.

Once the Epistemic and Methodological Foundations of Socioconstructivism in the construction of knowledge have been identified, in the following section of this article, in order to meet the objectives set out in the research, its link with the hybrid modality will be established in a timely manner.

Regarding the epistemological foundations of socioconstructivism present in the construction of knowledge in a hybrid learning environment, it was found that:

1. The true connection between the reality of the pedagogical subjects and their knowledge becomes knowable every time the student internalizes the knowledge acquired through the hybrid environment and is able to apply it in their daily life.

2. The connection between the reality constructed by students during the construction of their knowledge begins with the adaptation and appropriation of knowledge, by relating and interacting with others in the hybrid environment.
3. The representation built by the student(s) enhances the creation of cognitive and technological skills for their approach to knowledge.
4. The student's learning unit is represented by the interpersonal interaction that he or she has with other pedagogical subjects through synchronous and asynchronous activities, from which he or she will later appropriate knowledge at an intrapersonal level.
5. The dialogue generated by the exchange of arguments or opinions raised between the pedagogical subjects constitutes the empirical basis through which the sociocognitive conflict is made present, which favors the construction and/or adaptation of their cognitive schemes.
6. The construction of knowledge involves approaching key questions, for example: what?, why?, and how? is knowledge constructed.

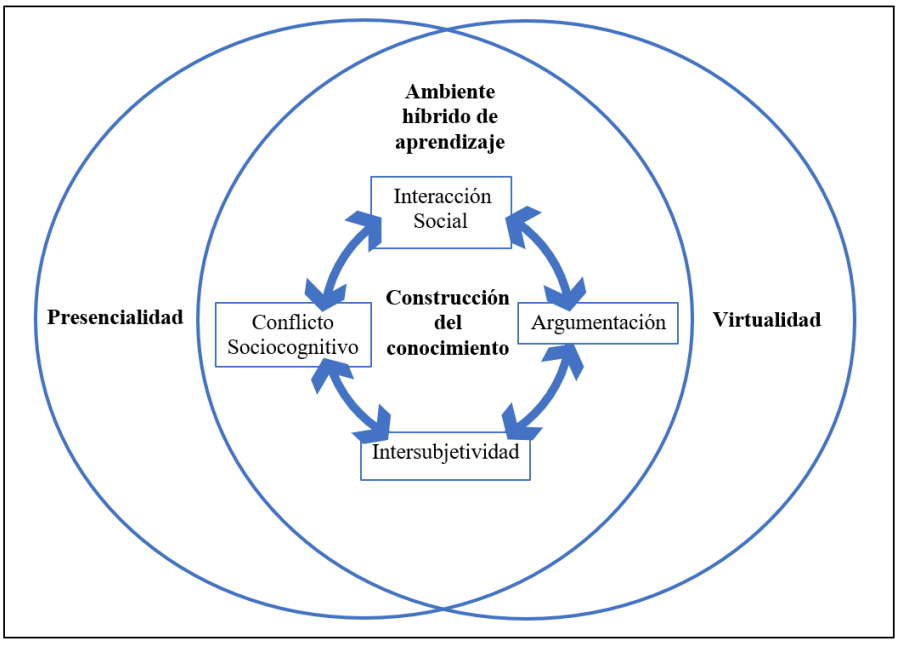
Regarding the methodological foundations of socio-constructivism present in the construction of knowledge in a hybrid learning environment, it was found that:

1. The relationship between the sociocognitive in the construction of knowledge implies recognizing its construction as a result of the appropriation of meanings among students, at a face-to-face and virtual level.
2. There is a relationship between the social space created by students within hybrid learning environments and the construction of their knowledge.
3. Sociocognitive interaction developed on the basis of sociocognitive conflict suggests the exchange of points of view or arguments, based on shared activities.
4. The intersubjectivity developed in hybrid learning environments is part of the dialogic exchange mediated by the argumentation process in the appropriation of knowledge.

5. Three spaces are established for the exchange of arguments: the classroom, the real space, and the virtual space through technological mediation.
6. The modification of students' cognitive structures requires a dialogic, reflective and critical process generated from the social exchange of meanings.

In this context, hybrid learning environments are positioned as spaces conducive to the construction of knowledge, by integrating face-to-face and virtual activities. This connection is based on socio-constructivist theory and on the inter- and intrapersonal schemes identified in the Vygotskian triad . In order to graphically observe the link between the Epistemological and Methodological Foundations for the construction of students' knowledge in a hybrid learning environment, the following scheme was created (see Figure 1).

Figure 1. Interaction of the Epistemic and Methodological Foundations present in the Construction of knowledge under the context of Hybrid Learning Environments.



Note: Own elaboration

The reading of the proposed scheme begins from the outside in, with the two outer circles being the temporary spaces intended for in-person and virtual learning. The

connection between both circles graphically represents a learning environment that seeks to connect in-person activities carried out in classroom spaces with those carried out through the use of technology, promoting their unification .

While it is true that hybrid learning environments imply the union of both scenarios; it is also evident that, based on the socioconstructivist theory , the construction of knowledge requires the intervention and interaction of four foundations: social interaction, argumentation, sociocognitive conflict and intersubjectivity.

Through interaction, pedagogical subjects actively appropriate the meanings and experiences they acquire on a daily basis. Talking about the acquisition of knowledge, based on social interaction, in addition to reflecting the exchange and elaboration of cognitive schemes, also shows the way in which they interact with their sociocultural environment. This relationship manifests the creation of social ties that lead us to the next foundation of the scheme, social interactions, whose conceptualization becomes knowable in two instances, sociocognitive conflict and argumentation.

In the first instance, sociocognitive conflict refers to one of the scenarios in which social interactions materialize. Its development involves the participation of at least two people who, based on personal arguments, promote the cognitive reorganization of one of the people involved. In the case of hybrid learning environments, it is essential that sociocognitive conflict is present in both face-to-face and virtual sessions.

Secondly, argumentation represents another of the scenarios where social interactions between students take place, as long as it is considered as the critical reflexive action through which a possible solution to the conflict in question is presented. In this sense, argumentation requires a solid argument based on which the reconfiguration of the cognitive structures of the pedagogical subjects is possible.

In addition to the above, intersubjectivity preserves a close connection with both sociocognitive conflict and argumentation, given that its interaction and the interaction with others presupposes the formation of affective ties of an intersubjective nature that give strength to the construction of knowledge, whose indispensable tool refers to language.

In line with the above, both language and intersubjectivity are necessary factors for the exchange of arguments that will lead to the reconfiguration of the cognitive

structures of pedagogical subjects, and even represent a collaborative space based on which knowledge is constructed.

Based on what has been presented so far and based on the analysis of the results obtained, the relationship between the epistemological and methodological foundations is summarized as follows:

1. The reality of pedagogical subjects and the construction of knowledge are determined by an intrinsic connection.
2. Pedagogical subjects acquire a leading role in the construction of knowledge.
3. Knowledge arises from the community through the construction of social ties mediated by an intersubjective plane present in classroom spaces and in those mediated by technology.
4. socio-constructivist theory , the knowledge generated in a hybrid learning environment requires the bidirectional linkage of social interaction, socio-cognitive conflict, argumentation and intersubjectivity, as well as language as a symbolic instrument that regulates the cognitive modification of students.

In short, the construction of knowledge in hybrid learning environments is determined by the bidirectional relationships mentioned in the central part of the diagram.

The analysis of the connection between the Epistemological and Methodological Foundations present in the construction of knowledge in the context of hybrid learning environments contributes to the development of plans and programs in six different dimensions. The first dimension is related to the link between face-to-face and virtual learning, since these must reflect the existing duality between face-to-face and virtual spaces , which implies the design of activities that complement each other, favoring the continuity of learning, regardless of the medium used.

The second dimension calls for the promotion of social interaction. Both programs and curricula should include activities that encourage collaboration and interaction between students. The practical application of this dimension is represented through discussion forums developed synchronously and asynchronously.

Sociocognitive conflict and argumentation are the third dimension, promoting the development of structured debates and discussions both in face-to-face and virtual environments, motivating students to defend their points of view or consider alternative perspectives. Another tool that encourages the application of this dimension within hybrid learning environments is the so-called tasks or problem-based learning, through these techniques, students argue and justify their possible solutions in a critical and reflective manner.

The fourth dimension derived from the analysis emphasizes the importance of intersubjectivity, which implies the creation of emotional and intellectual ties between students through integration activities, study groups or tutoring.

Emphasizing the use of language as a symbolic tool based on socio-constructivist theory leads us to consider it as the fifth dimension, given that effective communication requires the inclusion of activities that develop both oral and written communication skills, which can be enhanced through chats, video conferences or collaboration platforms that allow continuous interaction.

Finally, the sixth dimension includes the elaboration and, therefore, the design of bidirectional activities that allow the flow of knowledge between pedagogical subjects. Regular feedback in both directions is vital not only for the construction of knowledge but also for its evaluation.

Discussion

Research on the construction of knowledge in hybrid learning environments is crucial for the emergence of new methodologies specific to the modality. According to Suárez and García (2022), the incorporation of hybrid learning environments drives a reconfiguration of both communication processes and educational interaction. In addition, it encompasses more complex aspects that transcend technological limits and inter- and intrapersonal interactions, such as understanding the epistemological and methodological foundations that guide the construction of knowledge.

For their part, Sacavino and Candau (2022) argue that teaching within hybrid learning environments demands research that contributes to the definition of teaching guides aimed at the construction and access to knowledge and even the way in which relationships are generated between people at the face-to-face and virtual levels, given

that hybrid learning environments integrate the properties of both scenarios under the same concept.

While it is true that research related to the methodological epistemic analysis of knowledge construction in hybrid learning environments is still under development, it is also true that its approach will allow us to reflect on the elements that intervene in its construction.

Conclusion

The presence of the Epistemological and Methodological foundations for the construction of knowledge form a neuralgic point on which it is possible to develop or guide the curricular design for hybrid learning environments, according to their own characteristics, since, for the socio-constructivist theory , the construction of knowledge is conducted through an epistemology that indicates what is going to be built, why it is going to be built and how knowledge is to be built, that is why it is concluded that the knowledge of students within hybrid learning environments is supported by the contributions of pedagogical subjects and their context in synergy with their experiences, their representations as well as the learning acquired through social interactions.

The construction of knowledge seen from the socio-constructivist theory is generated based on the interaction between the internal schemes of the students and their context; under this tenor, the pedagogical subjects are considered constructors and modifiers of their cognitive structures. According to the Vygotskian theory , the trinomial that gives rise to knowledge is complemented when intersubjective relationships intervene in the interaction of the students.

Finally, it is important to emphasize that knowledge from the socio-constructivist theory refers to the active transformation at the cognitive level of students from the meanings that are appropriated and learned from their reality and even from the way they are used in their daily lives, thus promoting that knowledge is the result of the modification and/or configuration of new cognitive skills that arise from social interrelations, which are measured by intersubjectivity.

Hybrid learning environments represent an opportunity to redesign the educational process by integrating the epistemological and methodological foundations of social constructivism . This approach not only emphasizes the importance of social interaction and intersubjectivity in the construction of knowledge, but also promotes the development of technological, communicative and organizational skills in students and teachers. The effectiveness of these environments depends on the continuous training of teachers, adapted curricular design and the strengthening of students' autonomy to manage their learning independently.

Future lines of research

The design and development of this proposal within the elaboration of study plans and programs at the Higher Level, under the support of the findings mentioned above, suggests promoting the development of dynamic research and considering:

- Investigate how teaching-learning strategies and technological tools can improve the quality and effectiveness of learning in hybrid environments.
- Promote student autonomy through strategies that allow them to manage their learning independently and develop self-learning and time management skills.
- Design ongoing training programs for teachers in the effective use of technological tools, the implementation of hybrid teaching strategies, and efficient time management.

In accordance with the above, it is necessary to design a curricular model that considers the characteristics of hybrid learning environments, since these require both teachers and students to have technological, communicative and organizational skills. The successful implementation of hybrid learning environments depends largely on the preparation and willingness of pedagogical subjects to adapt to a dynamic and integrated learning environment.

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