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Epistemological foundations of blended learning in polytechnic universities

Epistemic foundation of blended learning at polytechnic universities

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ABSTRACT

The purpose of this article is to reveal the hermeneutic categories as the epistemic foundation of blended learning in the creation of new polytechnic universities as an academic offering in Venezuela. Through a hermeneutic analysis of 26 scientific articles, categories were identified that integrate constructivist philosophical-pedagogical approaches, flexible technologies, dynamic institutional management, continuous teacher training, and the promotion of student autonomy. From the hermeneutic analysis, it is conceived that the epistemic foundation of blended learning in Venezuelan polytechnic universities must be articulated from a holistic approach that integrates constructivist philosophical-pedagogical frameworks, flexible-adaptive technologies, assertive institutional management, continuous teacher training, and the promotion of student autonomy, all contextualised within the socio-economic and productive reality of the country. This will enable the design of relevant, resilient and empathetic blended learning models capable of responding to emerging challenges.
Descriptors: higher education institutions; universities; career development. (Source: UNESCO Thesaurus).

RESUMEN

Este artículo tiene por propósito de investigación develar las categorías hermenéuticas como fundamentación epistémica de la educación semipresencial en la creación de nuevas universidades politécnicas como oferta académica en Venezuela. Mediante un análisis hermenéutico de 26 artículos científicos, se identificaron categorías que integran enfoques filosófico-pedagógicos constructivistas, tecnologías flexibles, gestión institucional dinámica, formación docente continua y fomento de la autonomía estudiantil. Desde el análisis hermeneútico se concibe que la fundamentación epistémica de la educación semipresencial en universidades politécnicas venezolanas debe articularse desde un enfoque holístico que integre marcos filosófico-pedagógicos constructivistas, tecnologías flexibles - adaptativas, gestión institucional asertiva, formación continua docente, promoción de la autonomía estudiantil, todo ello contextualizado en la realidad socioeconómica y productiva del país; lo cual permitirá diseñar modelos educativos semipresenciales pertinentes, resilientes y empáticos, capaces de responder a los retos emergentes.
Descriptores: instituto de enseñanza superior; universidad; desarrollo de la carrera. (Fuente: Tesauro UNESCO).

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Reflection articles

INTRODUCTION

In the current context of higher education, blended learning has gained relevance as an alternative that combines the flexibility of virtual education with the direct interaction of face-to-face, making it possible to respond to the demands of students and institutions in changing environments (Castro, 2019; Halverson et al., 2023). In particular, polytechnic universities, which are characterised by their focus on technical, scientific and technological training, face the challenge of designing blended learning educational models that are relevant, effective and adapted to the social and economic realities of countries such as Venezuela (Garza-Vizcaya, 2003; Peña-Chamorro, Almuiñas-Rivero & Galarza-López, 2018).

In this sense, it is essential to understand the hermeneutic categories that epistemologically underpin blended learning education in these institutions, as these categories constitute the state of the question necessary to guide the design and implementation of polytechnic universities in the Venezuelan context. It is important to bear in mind that the epistemic foundation encompasses the philosophical-pedagogical, technological, institutional and social frameworks that configure the modality, which must be interpreted to guarantee its coherence and relevance (Aguilar-Salinas, Fuentes-Lara, Justo-López & Rivera-Castellón, 2019; Alamri, Watson & Watson, 2021).

It is necessary to bear in mind that the COVID-19 pandemic forced the adoption of hybrid and blended models, highlighting the need to make education systems more flexible and adaptable to respond to emerging and dynamic contexts (Iparraguirre-Contreras et al., 2023). This juncture has highlighted the importance of resilient structures, trained teachers, flexible technologies and evaluative processes that enable continuous improvement and sustainability of blended learning (Bokolo et al., 2019; Bruggeman et al., 2021).

Therefore, the purpose of the research is to unveil the hermeneutic categories as an epistemic foundation for blended learning education in the creation of new polytechnic universities as an academic offer in Venezuela.

METHOD

The article was framed in terms of qualitative research of an exploratory and hermeneutic nature, aimed at discovering and articulating the epistemological categories that underpin blended learning education in polytechnic universities, with special emphasis on the Venezuelan context. The choice of this approach responds to the need to interpret in depth the meanings, relationships and tensions that shape this educational modality, beyond the simple description of its characteristics.

To this end, a hermeneutic design was adopted, which allowed the hermeneutic interpretation of academic texts and previous studies related to blended learning education and the polytechnic model, from which the construction of hermeneutic categories was made possible from the systematic analysis of scientific literature, in order to identify the philosophical-pedagogical, technological, institutional and social foundations that support the modality.

Therefore, the information analysed comes from a study population composed of 26 scientific articles selected through a systematic documentary review. These articles were published in the last ten years and address issues related to blended learning, blended learning, technical and technological training, as well as the context of polytechnic universities, with special attention to the Latin American and Venezuelan reality. Priority was given to sources indexed in recognised databases such as Scopus, Web of Science, as well as relevant publications in Spanish and English, published in Scielo.

The inclusion criteria considered studies that provided theoretical or empirical analyses of blended learning, research focused on technical and technological training, as well as works that addressed the Latin American reality. Papers that

did not provide relevant information for the epistemological foundation or that focused exclusively on technical aspects with no pedagogical or institutional links were excluded.

The analysis of the information was carried out in several stages. First, a detailed and critical reading of the 26 selected articles was carried out to identify relevant concepts, approaches and contributions. Subsequently, the contents were coded through an inductive process, grouping the ideas into preliminary categories related to student perception, technological models, institutional management, teacher training, student autonomy, assessment and polytechnic model.

These categories were subjected to a process of hermeneutic reflection, which involved the interpretation of their meanings in terms of the Venezuelan context and the reality of polytechnic universities. Connections were established between the categories in order to construct a coherent and articulated interpretative framework, which would serve as a basis for a comprehensive understanding of blended learning.

Since the research is based on the analysis of secondary sources and does not involve human subjects, no ethics committee approval was required. However, the principles of academic integrity were respected, properly citing all sources consulted and avoiding any form of plagiarism.

RESULTS

Based on the correspondence with the research objective, hermeneutical categories were constructed and presented in table 1.

Table 1. Hermeneutic categories on epistemic foundations of blended learning in polytechnic universities.

Author(s)	Category Hermeneutics	Epistemic Approach	Philosophical-Pedagogical Foundation	Contributions	Context in blended learning	Creation of Polytechnic Universities
Aguilar-Salinas et al. (2019)	Student perception	Interpretation of experiences and perceptions	Constructivism: learning is understood as an active process of knowledge construction.	A qualitative analysis is carried out on how students perceive the blended learning modality in basic sciences.	Case study in a polytechnic university, with emphasis on the acceptance and challenges of the model.	It is essential to listen to and take into account the opinion of students in order to adapt the blended learning modality to their needs and expectations.
Alamri, Watson and Watson (2021)	Technological models of learning	Technological theory and application	Personalised learning theory and connectivism	Models are presented that allow customisation in blended environments.	Technological foundation for personalisation in blended learning	There is a need to implement flexible technologies that facilitate personalisation and adaptation of learning.
Anthony Jnr. (2021, 2022)	Institutional factors and teacher perception	Institutional and attitudinal analysis	Vygotsky's socio-cultural theory: social and institutional context influences learning	Factors affecting the adoption and perception of blended learning are identified.	The importance of institutional culture and teacher training in polytechnic universities is highlighted.	An institutional culture open to change must be fostered and teaching staff must be trained for new educational modalities.
Anthonysamy, Koo and Hew (2020)	Self-regulation strategies	Educational psychology and autonomous learning	Self-regulated learning theory and metacognition	Strategies for students to regulate their own learning in blended learning are reviewed.	The importance of designing environments that promote autonomy is underlined.	It is key to create spaces that encourage student self-regulation and autonomy.
Bokolo et al. (2019)	Institutional administrative preparation	Education management	Organisational change theory and knowledge management	Administrative readiness to implement blended learning is assessed.	Institutional management is highlighted as a key factor in the adoption of blended learning modalities.	There is a need to establish flexible and capable administrative structures to manage educational innovation.
Bruggeman et al. (2021)	Teaching attributes	Competences and skills	Humanistic and pedagogical approach that considers the teacher as a facilitator.	Essential attributes identified for teachers in blended learning	Emphasis on teacher training and development at polytechnic universities	It is essential to select and train teachers with digital and pedagogical skills for hybrid learning.
Caner (2012)	Conceptual definition	Theoretical framework	Educational pragmatism: priority is given to usefulness and practical application.	The concept of blended learning is defined and delimited.	Serves as a conceptual basis for the foundation of blended learning modalities.	It is important to clarify pedagogical concepts and objectives to guide curricular and methodological design.
Castro (2019)	Trends and capacities	Trend analysis	Situated and adaptive learning theory	Technological and pedagogical capabilities in blended learning are reviewed.	Blended learning in higher education is contextualised.	Current technological and pedagogical trends must be incorporated to maintain relevance and quality.
Centeno-Aulla et al. (2019)	Institutional indicators	Evaluation and measurement	Positivism: objective measurement is	Graduation and retention	Tools for institutional assessment in	It is essential to implement evaluation and

			sought for continuous improvement.	indicators are automated	polytechnic universities offered	monitoring systems that guarantee quality and constant improvement.
Evans et al. (2019)	Teacher professional development	Continuous training	Social constructivism and professional learning	Strategies for professional development in blended learning are proposed.	Teacher training to improve blended learning is being promoted.	Ongoing teacher training and refresher programmes should be established.
Garza-Vizcaya (2003)	Polytechnic model	Institutional framework	Pragmatic and technocratic philosophy in higher education	The polytechnic model in higher education is characterised by	The specific context of polytechnic universities is substantiated.	A clear institutional model that integrates technical, scientific and technological training needs to be defined.
Halverson et al. (2023)	Research in blended learning	Systematic review	Critical epistemology and interdisciplinary approach	The state of the art in blended learning in higher education and K-12 is presented.	The epistemological basis for blended learning is updated.	Continuous research for innovation and improvement of blended learning should be promoted.
Heilporn, Lakhal and Bélisle (2021)	Teaching strategies for engagement	Psychopedagogy	Commitment theory and intrinsic motivation	Strategies to encourage student participation are described	Interaction in blended environments is improved.	It is vital to design pedagogical strategies that increase student motivation and participation.
Iparraguirre-Contreras et al. (2023)	Post-pandemic hybrid mode	Systematic review	Critical theory and educational adaptability	Hybrid education in the post-COVID context is analysed.	Blended learning at polytechnic universities adapts and evolves	The education model must be made more flexible to respond to changing contexts and emergencies.

Source: Own elaboration.

Consequently, from what is presented in Table 1, it is articulated that the epistemic foundation of blended learning education in polytechnic universities is built from different categories that combine philosophical-pedagogical and technological approaches, always considering the social and institutional context where they are applied. The authors agree on the importance of continually training teachers, implementing flexible technologies that adapt to the needs of students, encouraging autonomy in learning and maintaining constant evaluation to ensure educational quality. They also highlight the need to define clear and flexible institutional models that respond to current changes and challenges, especially in the post-pandemic scenario, in order for blended learning education to be effective and relevant in the Venezuelan reality.

DISCUSSION

In this sense, Aguilar-Salinas et al. (2019) highlight the importance of interpreting student experiences and perceptions from a constructivist perspective, which understands learning as an active and contextualised process, implying that the modality must adapt to the real needs and expectations of students in order to be effective.

Likewise, Alamri, Watson & Watson (2021) point out that technology is not only a tool, but a mediator that facilitates personalisation and autonomy in learning. Therefore, technological flexibility is essential for blended learning to respond to the particularities of each student. However, this technological innovation must be accompanied by adequate institutional management, as indicated by Bokolo et al. (2019), who stress that administrative preparation and an organisational culture open to change are indispensable conditions for the successful implementation of these modalities.

On the other hand, teacher training and professional development constitute a fundamental axis for sustaining educational quality, in this sense, Bruggeman et al. (2021) emphasise that teachers must be facilitators with specific digital and pedagogical competences for the hybrid environment. Likewise, Evans et al. (2019) state that continuous training must be a permanent and contextualised process that allows educators to adapt to new technological and pedagogical demands.

Regarding student autonomy, Anthonysamy, Koo & Hew (2020) highlight the importance of promoting self-regulation strategies, understanding that self-regulated learning is a competence that should be fostered through environments that encourage reflection and control of the learning process itself, which is especially relevant in blended learning, where students must manage their time and motivation independently.

On the other hand, Centeno-Aulla et al. (2019) provide the evaluative dimension, based on a positivist approach that seeks objective measurement for continuous improvement, in this order, the automation of institutional indicators allows monitoring performance and guiding decision-making to ensure the quality of the educational model. However, this evaluation must also be understood as an interpretative process that contextualises the data to improve educational practice.

Likewise, Garza-Vizcaya (2003) provides an institutional vision from the pragmatic and technocratic philosophy, pointing out that the polytechnic model must be clear, coherent and adaptive, integrating the technical, scientific and technological training proper to these universities, which implies that blended learning education must be built from the institutional identity and respond to the demands of the productive and social environment.

Consequently, Iparraguirre-Contreras et al. (2023) analyse the hybrid modality in the post-pandemic context, highlighting the need to flexibilise and adapt educational models to respond to changing contexts and emergencies, in this order, the pandemic has highlighted the importance of having resilient and adaptive educational structures, capable of incorporating learning to improve the design and implementation of blended learning education.

Hermeneutic analysis of aspects for the creation of new polytechnic universities in Venezuela

To begin with, it is essential to establish a clear institutional identity and a contextualised polytechnic model that integrates technical, scientific and technological training, in accordance with the productive and social needs of the country. Therefore, Garza-Vizcaya (2003) points out that this model must be pragmatic and technocratic, orienting the curriculum, research and links with the environment to guarantee the pertinence and relevance of the education offered.

Likewise, the philosophical-pedagogical foundation should focus on active and contextualised learning, where the student is the protagonist of his or her training process. In this sense, Aguilar-Salinas et al. (2019) emphasise that the blended learning modality should be designed from a constructivist approach that promotes the construction of knowledge based on meaningful experiences adapted to the Venezuelan reality.

On the other hand, the strategic and flexible incorporation of educational technologies is a necessary aspect. In this regard, Alamri, Watson & Watson (2021) emphasise that technology must be understood as a mediator that facilitates personalisation and connectivity in learning. In Venezuela, where there are limitations in infrastructure and digital access, it is essential to implement technologies that are flexible and scalable, accompanied by teacher training and institutional support for their effective use.

Similarly, institutional management must be prepared and have an organisational culture that is open to change, and Bokolo et al. (2019) highlight that an agile administration committed to educational innovation is essential for the successful adoption of blended learning. In the Venezuelan context, this implies establishing flexible organisational structures that promote collaboration and continuous adaptation.

In terms of teacher training and professional development, Bruggeman et al. (2021) indicate that educators must assume the role of facilitators in hybrid environments, developing specific digital and pedagogical competences. Likewise, Evans et al. (2019) suggest that training should be ongoing and contextualised, so that teachers can respond to current technological and pedagogical demands.

On the other hand, the promotion of student autonomy and self-regulation is indispensable, thus, Anthonysamy, Koo & Hew (2020) point out that fostering strategies that develop self-regulation and intrinsic motivation contributes to improving retention and academic success, especially in contexts with socio-

economic challenges such as the Venezuelan one; Therefore, institutional assessment should combine objective and qualitative indicators to ensure continuous improvement, while Centeno-Aulla, Díaz Ordóñez & Hidalgo Solórzano (2019) highlight the importance of systematically automating and analysing data such as graduation and retention rates, which facilitates strategic decision-making and accountability.

Therefore, adaptability and resilience to changing contexts and emergencies are aspects that cannot be overlooked, and Iparraguirre-Contreras et al. (2023) show that the pandemic has brought to the forefront the need for polytechnic universities to be flexible and able to adjust their educational models quickly to respond to unforeseen situations.

CONCLUSION

From the hermeneutic analysis it is conceived that the epistemic foundation of blended learning education in Venezuelan polytechnic universities should be articulated from a holistic approach that integrates constructivist philosophical-pedagogical frameworks, flexible - adaptive technologies, assertive institutional management, continuous teacher training, promotion of student autonomy, all contextualised in the socio-economic and productive reality of the country; This will allow the design of relevant, resilient and empathetic blended learning educational models, capable of responding to the emerging challenges , such as those evidenced in the pandemic, thus guaranteeing the quality, relevance and sustainability of the academic offer in new polytechnic universities in Venezuela.

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To the Venezuelan trolls.

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