

CONEXIONES UG

REVISTA CIENTÍFICA
INTERNACIONAL



e-ISSN: 2960-8147 | **No. 1**
ENERO-JUNIO 2026



Vol.
4

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***Ecosystemic logos. Emerging cartographies for a complex rationality.
Interdisciplinary dialogues between science, technology, nature, and culture in
shaping horizons of sustainability***

*Logos ecosistémico. Cartografías emergentes para una racionalidad compleja. Diálogos
interdisciplinarios entre ciencia, tecnología, naturaleza y cultura en la configuración de
horizontes de sostenibilidad*

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Received date: 26/03/2026

Acceptance date: 11/04/2026

Abstract

Ecosystemic logos is proposed as a novel epistemology of highly advanced culture, thus requiring the innovative transdisciplinary conceptualization of knowledge. By developing a 'transdisciplinary' perspective that maintains as analytical frameworks the theories of complexity (Morin, 2006), the ecology of knowledge (Santos, 2009) and relational ontologies (Descola, 2013), it is possible to build a conceptual map that goes beyond reductionist logics. The study analyzes knowledge interfaces, revealing methodological strategies to constitute a complex rationality that produces sustainability horizons. The entanglements of different forms of knowledge are criticized, also emphasizing the coproduction and disruption of traditional epistemological divisions. The findings confirm the value of a comprehensive approach that recognizes the multidimensionality of knowledge systems, suggesting an emancipatory reappropriation of the relationships between the human and the non-human. The study concludes by affirming the need to find a planetary ethics of co-responsibility and a radical ecosystemic intelligibility.

Keywords: transdisciplinary epistemology, complex systems, knowledge cartography, relational ontologies, planetary ethics.

Resumen

Se propone el logos ecosistémico como una epistemología novedosa de cultura muy avanzada, requiriendo, por lo tanto, la conceptualización transdisciplinaria innovadora del conocimiento. Desarrollando una perspectiva 'transdisciplinaria' que mantiene como marcos analíticos las teorías de la complejidad (Morin, 2006), la ecología del conocimiento (Santos, 2009) y las ontologías relacionales (Descola, 2013), es posible construir un mapa conceptual que va más allá de las lógicas reduccionistas. El estudio analiza las interfaces del conocimiento, revelando estrategias metodológicas para constituir una racionalidad compleja que produzca horizontes de sostenibilidad. Se critican los entrelazamientos de diferentes formas de conocimiento, enfatizando también la coproducción y la disrupción de las divisiones epistemológicas tradicionales. Los hallazgos confirman el valor de un enfoque comprensivo que reconoce la multidimensionalidad de los sistemas de conocimiento, sugiriendo una reapropiación emancipadora de las relaciones entre lo humano y lo no humano. El estudio concluye afirmando la necesidad de encontrar una ética planetaria de corresponsabilidad y una inteligibilidad ecosistémica radical.

Palabras clave: epistemología transdisciplinaria, sistemas complejos, cartografía del conocimiento, ontologías relacionales, ética planetaria.

Introduction

Dialogue as the Foundation of Ecosystemic Logos

Today's civilizational crisis calls for a fundamentally new way of thinking about how different fields of human understanding intersect. This paper argues that dialogue serves as the essential foundation for an ecosystemic logos—a framework in which knowledge emerges from the integrative and transformative intersections across disciplines. Inter- and transdisciplinary discussion extends science, technology, nature, and culture to the generative core of how sustainable horizons become possible in a globally divided world marked by overspecialization and narrow disciplinary perspectives. As Edgar Morin (2006, p. 143) points out, “hyperspecialization obstructs the vision of the global (which breaks down into fragments) and of the essential (which becomes diluted).” Against this complex reality, the ecosystemic logos emerges as an integrative epistemological proposal.

Building on this integrated framework, this paper investigates the dialogical encounters that arise between disparate bodies of knowledge, perceiving dialogue as more than merely juxtaposing knowledge, but rather as a transformation during which (disciplinary) boundaries become malleable and new patterns of thought emerge. For as Santos (2009, p. 182) argues, “knowledge worthy of the name has always been inter-knowledge,” and it is impossible to separate any genuine knowledge from dialogical relationships with others.

The proposition of an ecosystemic logos means that science, technology, and nature—or culture—are not distinct spheres but rather intertwined dimensions of the same complex reality. According to Castro-Díaz et al. (2022), interconnections of this nature require “emergent cartographies”: ways of seeing and shaping these relationships, tensions, and possibilities in contact zones through knowledge systems.

As Barth et al. (2023) demonstrate, transdisciplinary approaches and multimodal algorithms have proven to be powerful tools. They make these dialogues possible by forging hybrid epistemological spaces where different perspectives can meet without completely collapsing into one another. This dialogical mode “opens up a space” that is essential for transcending the oppressive determinism of the dominant models of monological communication that have generally prevailed in modern science, playing a major role in producing the current global socio-ecological crisis.

Science and Nature: dialogues for a situated epistemology

The first dialogue in this series emerged as we explored the relationship between science and nature. It challenges the Cartesian division between subject and object, which has been a hallmark of modern scientific thought. This becomes particularly clear when considering the limitations of any science that is detached from the natural systems it seeks to understand.

The objectification of nature becomes one of its themes

Nature understood purely as an object has been deeply questioned. As Descola (2013) states, this is only one of many possible ontologies—specifically, Western naturalism. Numerous indigenous and traditional cultures, in contrast, conceive of nature as a subject with intrinsic meaning. They establish dialogical relationships, as nature possesses energetic capacities for action and response at all times. Policies that effectively support their own sustainability have never been implemented.

This shift toward viewing nature as a subject with whom to have a conversation is one of the challenges in reformulating scientific practice. Charting its course in health policy, the journal publication by Anchea-Monreal et al. (2015) argued in favor of this ecology-health approach: the minor roles played by natural systems and their capacity to respond to human interventions did not behave as expected or predicted.

Scientific Awareness of Ecology

If science wishes to communicate with nature, it must develop a “scientific awareness.” According to Morin (2006), this is not a self-indulgent whim of academia; rather, it acknowledges its own limitations more frankly than mere reflection. Science that takes its own context into account transcends the supposed neutrality of positivism to assume responsibility for a more sustainable future. The moral impetus and the means to build new futures in a sustainable way are quite evident.

Expanding on this approach, Capra and Luisi (2014) developed a comprehensive vision of the life sciences. This alternative, which reconciles modern scientific findings with a contemporary ethical vision of the human-nature relationship, is perhaps a prerequisite for overcoming what Val Plumwood (2002) calls an “ecological crisis of reason.” Speciesism is the radical separation of human rationality from natural processes and animals.

The dialogue between science and nature also involves understanding that there are multiple ways of knowing that can contribute to our understanding of natural systems. In his work on spiritual ecology, Berkes (2018) has shown that knowledge. Traditional ecological knowledge provides important insights into ecosystem dynamics that Western science is only beginning to appreciate.

Technology and Culture: sociotechnical reconfigurations

The second thematic area examines the interface between technological systems and cultural configurations; both co-produce a mutual influence on dynamic processes. In the era in which we live, digital technology is changing all our lifestyles for better or for worse. Therefore, this dialogue is particularly relevant today, as we can investigate how technological systems themselves can catalyze efforts toward sustainability or, alternatively, present major obstacles in their path.

Beyond Technological Determinism

Technological determinism is a misconception that attributes to technical artifacts the autonomous capacity to shape society. On the other hand, extreme social constructivism holds that humans make technology rather than the other way around. In contrast to these two one-sided views, thinkers such as Yuk Hui (2019) propose a “cosmotecnia”: this term implies the materialization of specific cosmologies, or how science functions in conjunction with different parts of the social order. It has been proposed that, in fact, ideologies, worldviews, and social relations are all mapped onto technology as material structures, but technology also incorporates certain material characteristics that condition its possible uses and appropriations.

I emphasize this point to highlight the importance of Bratton (2016), since contemporary technological infrastructures are in fact meta-structures that mix and recompose humans and non-humans, creating contracts that encompass new forms of sovereignty and control of authority.

Situated Technologies, Technical Pluriverse

The dialogue between technology and culture allows us to consider the existence of what Escobar (2018) termed a ‘technical pluriverse,’ that is, many possible technological paths, rooted in different cultural contexts. This perspective challenges the supposed universality and neutrality of conventional technological systems, revealing the situated and contingent nature of technology.

Cases of appropriate technology development, free software, or participatory design show that it is possible to build technical artifacts that respond to the specific needs and values of diverse communities. As Lagunas Vázquez (2021) argues, transdisciplinarity offers both conceptual tools for this project and methods to facilitate ways in which local knowledge can interact with specialized scientific knowledge.

This dialogical approach, therefore, recognizes the technology-culture interface as a privileged space in which to imagine and construct alternative socio-technical futures, where technological innovation emerges from a perspective of sustainability and social justice. A realization of this premise is that participatory methodologies allow for the integration of a variety of types of knowledge in the evaluation and design of socio-technical systems. In this way, they help foster solutions that are both localized and culturally appropriate, as discussed by Castro-Díaz et al. (2022).

Nature and Culture: relational ontologies

Regarding this third axis of dialogue, it influences how modern Western thought has engendered what Descola (2013) called the “great ontological divide,” a phrase that highlights the antagonism in that philosophy that separates the human world from the rest of nature, with disastrous results for both.

Beyond the Nature-Culture Divide

One of the main areas criticized by the ecosystemic logos is the nature-culture divide. As Descola (2013) has shown, this divide, rather than being truly universal in nature, is merely a particular ontology that emerged with modern Western thought. Their comparative research on animism, totemism, naturalism, and analogism reveals the multiple frameworks available for understanding the relationship between human society and its environment. The relational ontologies of many indigenous cultures offer an alternative to the nature-culture divide. The approaches of Castro-Díaz et al. (2022) bear witness to this. They recognize that non-human agencies can have an effect, with the result that life becomes for them simply a series of connections in which the event or occurrence is just another point among many others.

Hybrid Territorialities and Multispecies Assemblages

This hybridization of nature and culture has given rise to what we might call “hybrid territorialities,” areas where human activity and ecological processes intermingle in all sorts of complex ways. These are what Latour (2007) refers to as “hybrid assemblages,” where human and non-human actors work together to produce certain socio-ecological realities.

The framework of “multispecies studies” (Tsing, 2015) provides tools for analyzing such assemblages, revealing the complex interplay of symbiosis, competition, and coevolution among different forms of life. This is particularly relevant in the Anthropocene era, when human influence now extends to nearly all ecosystems on Earth, giving rise to diverse socio-ecological configurations. As Arenas-Monreal et al. (2015) discovered in their research on ecosystem health, these hybrid territorialities require knowledge from diverse disciplines and cultures to come together in order to be explained. It is an admission of impossibility

Science and Culture: toward cognitive justice

The fourth theme of the dialogue delves into an analysis of the scientific systems that permeate cultural environments. It challenges the hierarchies of knowledge that have favored knowledge derived from Western scientific practices over other ways in which people know and are in the world. For Santos (2009), this dialogue is fundamental to advancing toward what he calls “cognitive justice,” a necessary condition for any genuine project of social justice.

Ecology of Knowledge and Intercultural Translation

The notion of the “ecology of knowledge” (Santos, 2009) is a basic framework that allows us to reevaluate the relationship between scientific knowledge and cultural diversity. It recognizes the irreconcilable plurality of knowledge and advocates for its pragmatic articulation around concrete problems, so that no set is reduced to another.

The dialogue between science and culture also requires what Santos calls a “process of translation.” It is necessary to facilitate communication between different universes of meaning, without reducing them all to a common language that would inevitably lose its specificity. As Castro-Díaz et al. (2022) argue, this work of translation is crucial in Latin American contexts characterized by great cultural and ecological diversity.

Citizen science and situated knowledge

Initiatives in citizen science and people-centered science are promising spaces for a broader dialogue between scientific systems and diverse cultural environments. These approaches recognize the value of local and experiential knowledge, integrating it into the cooperative process of studying questions relevant to the community.

As demonstrated by the work of Arenas-Monreal et al. (2015) on participatory health assessment, the combination of scientific and community knowledge allows for a richer, more situational understanding of problems and their causes. It can lead to more effective interventions that are better adapted to the culture in which they are implemented. The concept of “situated knowledge” proposed by Donna Haraway (1988) offers a valuable perspective for this dialogue, recognizing that all knowledge is produced from particular positions within social, cultural, and ecological networks. This perspective challenges the supposed neutrality and universality of scientific knowledge, revealing its partiality and situated nature, without falling into absolute relativism.

Cartographic Methodologies for Interdisciplinary Dialogue

Knowledge cartographies are tools for visualizing and facilitating the complex dialogues surrounding the thinking that is shaping the ecosystemic logos. These methodologies allow us to capture connections, conflicts, and emerging possibilities at the interfaces between different knowledge systems. They create spaces for navigating complexity.

Mapping Complexity

Mapping complexity involves efforts to explain the multiple dimensions and interrelationships that characterize today’s socio-ecological systems. As Morin (2007) points out, complex thinking posits that we need tools that represent both unity and diversity, continuity and discontinuity, and the emergence and necessity of these systems. These cartographies go beyond linear and reductionist logic, adopting reticular, rhizomatic, or fractal formats that show multiple levels of organization and nonlinear processes. As explained by Castro-Díaz et al. (2022), such visualizations allow for the identification of critical points where small interventions can trigger major systemic changes that emerge from them.

Participatory Mapping and Territorial Knowledge

Participatory mapping is a methodology that combines various types of knowledge in the description and understanding of a geographic region. These approaches recognize that territory is not an impartial physical space, but rather a socio-cultural construct imbued with many meanings, values, and power structures.

As Arenas-Monreal et al. (2015) have demonstrated in their research on community health, such participatory maps reveal socio-environmental determinants of health that are not visible from standard technical perspectives. These approaches integrate local experiential knowledge of the landscape with scientific data, providing more comprehensive and contextualized representations that are also more user-friendly.

Mapping Controversy and Dialogue of Knowledges

Mapping controversy is an important tool for visualizing the conversations, tensions, and contradictions that characterize any field of knowledge. In line with Latour (2007), in these methodologies, each party maps its perspectives, arguments, and evidence within complex socio-technical conflicts.

These approaches are particularly useful for fostering constructive dialogues in fields characterized by significant epistemological, ontological, or axiological differences. As Barth et al. (2023) note, transdisciplinary learning thrives on such divergences; it uses them as a resource for innovation and transformation.

Horizons of Sustainability: ethics as the foundation of dialogue

The interdisciplinary dialogues that make up the ecosystemic logos go beyond epistemology and methodology; building meaningful horizons of sustainability requires an ethics. Recognizing basic interdependence, this dialogical ethics fosters both reciprocity and co-responsibility.

Planetary Ethics and Interspecies Co-responsibility

In the face of the modern socio-ecological crisis, the proposal for a planetary ethics is necessary. As Hans Jonas (1984) argues, new ethical concepts are needed because humanity's technological powers require moral principles regarding future generations and non-human life.

Based on the recognition of the fundamental interrelationship of all living systems, this ethics goes beyond abstract individualism or homogenizing collectivism. In the words of Arenas-Monreal et al. (2015), an ecosystemic approach to health reveals how human well-being is inseparable from the well-being of the ecological systems of which it is a part.

Cognitive justice as the foundation of sustainability

Cognitive justice, a term coined by Santos (2009), is essential to any authentic sustainability project. It asserts that the epistemological foundations of our contemporary sustainability crisis run deep. One aspect is that established knowledge systems have separated nature and culture rather than integrating them into a single unit; another aspect concerns the value and politics of science.

Engaging in sustainable action means recognizing that there are different forms of knowledge and other modes of existence—that is, cognitive justice. This idea was verified by Castro-Díaz et al. (2022): by integrating a diverse range of knowledge types and perspectives, we arrive at a more comprehensive and locally grounded understanding of complex problems, thereby giving rise to new solutions.

From Anthropocentrism to Pluralist Biocentrism

The emphasis on the intrinsic value potentially possessed by all forms of life is a key feature in the shift from anthropocentrism to the ecosystemic perspective. This does not destroy human specificity nor does it overlook differences to arrive at an undifferentiated monism; rather, it emphasizes the plural compendium of beings and ways of being.

Plumwood (2002) adopted a pluralist biocentrism that distanced itself from both hierarchical anthropocentrism and abstract biocentric egalitarianism. This position emphasizes both censorship and difference in interventions regarding forms of life. It is particularly useful for rethinking the relationship between humans and other species in terms of reciprocity and mutual respect.

Methods

The research employed qualitative methods involving a hermeneutic-dialectical approach, based on the complex systems paradigm (Morin 2006) and transdisciplinarity. The methodological design took the form of theoretical research of an analytical-interpretive nature that applied a dialogical perspective to facilitate the integration of various fields of knowledge. Its three main theoretical and conceptual frameworks were:

1. Complexity Theories (Morin, 2006, 2007)
2. Ecology of Knowledge (Santos, 2009)
3. Relational Ontologies (Descola, 2013)

Data Collection and Interpretation Procedures

Systematic Literature Review A systematic literature review was conducted of primary and secondary sources related to: 1) Transdisciplinary Epistemologies, 2) Complex Systems and Complexity Theories, 3) Knowledge Mapping, 4) Relational Ontologies, and 5) Planetary Ethics. The selection was based on theoretical relevance, recency (publications predominantly from the last 15 years), academic impact, and epistemological diversity.

Analysis of Epistemological Interfaces

To analyze the interfaces, four basic dialogical axes were adopted: 1) Science and Nature, 2) Technology and Culture, 3) Nature and Culture, and 4) Science and Culture. For each axis, the following points were distinguished: 1) Key concepts and emerging patterns, 2) Epistemological tensions and contradictions, and 3) Points of convergence and possibilities for integration.

Conceptual Cartography

This is a cartographic methodology designed to visualize and study the subtle interrelationships that exist between various knowledge systems. This mapping was organized into three levels: 1) Mapping the many dimensions and interconnections of modern socio-ecological systems, 2) Complexity Cartographies—Integration into territorial descriptions and understanding of various types of knowledge in participatory cartographies, and 3) Controversy Cartographies.

Research Methodology and Case Studies

In “The Common Units,” the researchers sought to examine the development of a global consciousness. To ensure methodological rigor, the following criteria were applied: 1) Theoretical coherence: Logical articulation between the different conceptual frameworks used, 2) Reflexivity: Explicit acknowledgment of the researcher’s position within the field of study, 3) Transparency: Clear explanation of procedures and criteria for analysis, and, 4) Validation through interdisciplinary dialogue: Comparison of perspectives from different disciplines and traditions of thought.

Results

Ecosystemic Logos Configuration

An analysis of the interdisciplinary dialogues revealed the emergence of an ecologically balanced logos characterized by: 1) Epistemological integration: Overcoming dichotomies inherent in modern Western thought, 2) The interaction of different beings and systems can be called “ontological relationality,” 3) The ability to think on many levels and in many dimensions at the same time—multidimensionality, 4) An athletic (processual) dynamism: emphasizing process and change rather than the person and the state.

Table 1

Characteristics of the ecosystemic logos contrasted with Western modern rationality

Dimension	Western Modern Rationality	Ecosystemic Logos
Epistemological	Disciplinary fragmentation	Integrative transdisciplinarity
Ontological	Nature–culture dualism	Relational continuity
Methodological	Analytical reductionism	Systemic complexity
Ethical	Anthropocentrism	Pluralistic biocentrism
Temporal	Progressive linearity	Emergent circularity
Spatial	Universal homogeneity	Situated diversity

Note: The table is based on an own elaboration derived from the analysis of the epistemological characteristics of the ecosystemic logos in contrast with Western modern rationality. Source: Pérez-Villafuerte, R. (2025).

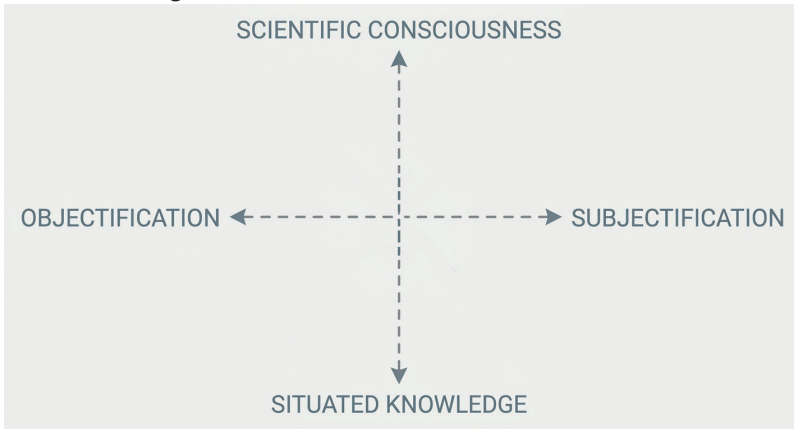
Emerging Cartographies in Dialogic Axes

Science-Nature Axis

Analysis of the dialogue between science and nature revealed the following emerging patterns: 1) Overcoming the objectification of nature: Transition from a conception of nature as a passive object to its recognition as a subject with agency and internal meaning; 2) Scientific awareness of ecology: Development of a reflective science that acknowledges its limitations but assumes responsibility for its effects; and 3) Integration of traditional ecological knowledge: Recognition of the epistemological value of indigenous and local knowledge about ecosystems.

Figure 1

Mapping the Science-Nature Dialogue



Note: Author's own work. Conceptual map of emerging dimensions in the Science-Nature dialogue. Source: Pérez-Villafuerte, R. (2025).

Technology-Culture Axis

The analysis of the dialogue between technology and culture revealed: 1) Overcoming technological determinism: Recognition of the mutual interaction between technological systems and cultural configurations, 2) Emergence of the concept of cosmotechnics: Materialization of specific cosmologies in technological development, and 3) Technological pluralism: Identification of multiple possible technological trajectories rooted in different cultural contexts.

Table 2

The content of different contexts in which the technical pluriverse is evident

Context	Technological Approach	Distinctive Characteristics
Modernity	Universal technology	Standardization, scalability, Western orientation, centralized control
Communities	Appropriate technologies	Local adaptation, low impact, indigenous knowledge, traditional knowledge
Alternative movements	Open technologies	Participatory design, collaboration, accessibility
Emerging approaches	Ecotechnologies	Biomimicry, circularity, regeneration

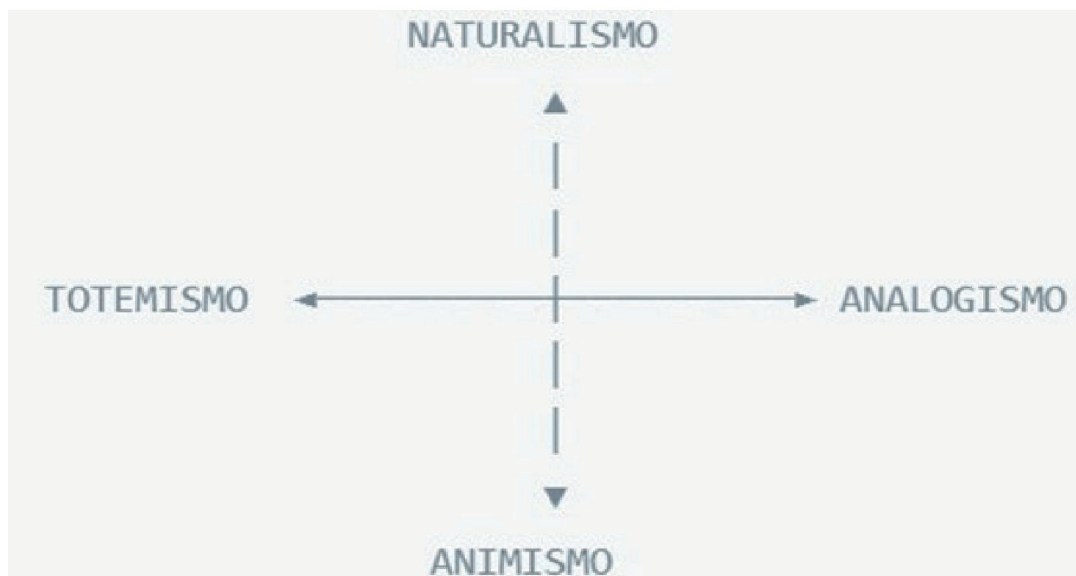
Note: Own elaboration based on the analysis of different manifestations of the technical pluriverse in diverse cultural contexts. Source: Pérez-Villafuerte, R. (2025)..

Nature-Culture Axis

An analysis of the dialogue between nature and culture revealed: 1) A challenge to the ontological divide: A critique of the conceptual boundary between nature and culture as a specific construct of Western modernity, 2) Multiplied Being: Recognition of the many ways in which humans can form relationships with nature (animism, totemism, naturalism, analogism), and 3) Transition Zones: Creation of spaces where human activities and ecological processes intertwine to create unique patterns.

Figure 2

The mapping of relational ontologies under Descola's analysis



Note: Adapted from Descola (2013). Schematic representation of the four fundamental ontologies. Source: Pérez-Villafuerte, R. (2025).

Science-Culture Axis

The analysis of the dialogue between science and culture revealed: 1) Ecology of knowledge: Striking a balance between the recognition of the irreducible plurality of knowledge and its practical application, 2) Intercultural dialogue: Designing and initiating forms of dialogue that can facilitate relationships between different universes of meaning, and, 3) Citizens for Knowledge: An opportunity to create knowledge in a space where experiential wisdom and science blend equally.

Table 3
Intercultural Dialogue of Knowledge

Process	Characteristics	Concrete Examples
Dialogue of knowledge	Horizontal exchange among different forms of knowledge	Incorporation of Indigenous knowledge into ecosystem management
Epistemological hybridization	Creation of new forms of knowledge through the integration of diverse traditions	Agroecology as a combination of scientific agronomy and peasant knowledge
Co-laboratory	Spaces for collaborative experimentation between scientists and communities	Citizen science projects for environmental monitoring
Participatory mapping	Collective construction of territorial representations	Community-based mapping of socio-ecological resources and vulnerabilities

Note: Own elaboration based on the analysis of intercultural translation processes identified in the research. Source: Pérez-Villafuerte, R. (2025).

The Spectrum of Modern Sustainability Viewed Through Ecosystemic Logic

An integrated examination of the four dialogical axes allows us to identify three main areas for new sustainable development: 1) Planetary Ethos: Based on a recognition that all forms of life are interconnected and interdependent, 2) Cognitive Justice: recognition and celebration of the diversity of forms of knowledge regarding how people live in the world, and, 3) Planetary Biocentrism: The recognition of the intrinsic values of life is one of the modes of pluralistic biocentrism. And it is human-centered.

Discussion

Ecosystemic Logos as a Response to the Civilizational Crisis

The results of this research suggest that ecosystemic logos is a coherent epistemological response to the contemporary civilizational crisis as outlined in the introduction. As Morin (2006) noted, “Hyper-specialization obstructs a vision of the whole and the essential,” and the resulting fragmented knowledge is incapable of capturing current challenges.

In this context, the ecosystemic logos emerges as an integrated proposal that transcends modern dichotomies and creates new conceptual maps. The relevance of this epistemological proposal is perhaps best illustrated by considering what Santos calls “interknowledge” (2009), that is, that “knowledge worthy of the name always occurs among knowledgeable people.” This dialogical perspective is quite different from the monological models of communication that have prevailed in modern science and that, as noted at the outset, have played “an important role in producing our current global socio-ecological crisis.”

Implications for the Science-Nature Relationship

Findings regarding the science-nature axis fundamentally challenge René Descartes’s division between person and object, which has dominated Western scientific thought for four centuries. This challenge corresponds to that of the “objectification of nature” raised in the introduction, and to the idea that Western naturalism is merely one ontology among many possible ontologies (Descola 2013).

The emergence of an approach in which nature is regarded as a subject with whom to communicate marks a radical shift in scientific practice. This transformation corresponds to the “scientific consciousness of ecology” described in the introduction—according to Morin (2006), it is not merely a self-indulgent academic

exercise but also the realization that science has limitations and bears responsibility for our existence on Earth for future generations. The approach proposed by Berkes (2018), which integrates traditional ecological knowledge, offers a concrete example of this new dialogic exchange between science and nature. In this sense, from the perspective of Western science, it is the first time in history that we are beginning to understand some important facts about ecosystem dynamics.

Tensions and Contradictions at the Technology-Culture Interface

The spirit of inquiry at the technology-culture interface reveals tremendous tensions between thinking that follows technological determinism and the most extreme forms of social constructivism. It is these tensions that point to what Yuk Hui (2019) calls “cosmotekhnika: The process of materializing specific cosmoses in technology,” a concept that transcends the one-sided view of technology as either an autonomous entity or a mere social product.

With this dialogical approach working within this perspective, we agree here with Bratton (2016), who argues that new metastructures are emerging around technical infrastructures: “...metastructures that mix and recompose humans with non-humans.” The emergence of new metastructures inevitably leads to new forms of governance and control. As a result, this poses new ethical and political challenges for all of us. The emergence of the concept of the “technical pluriverse” (Escobar, 2018) in these findings thus establishes a new horizon for considering technology from the perspective of cultural diversity. This concept critiques the so-called universality and neutrality of traditional technologies and offers opportunities for the development of technical artifacts that adapt to the particular needs and values of each society, as suggested by Lagunas Vázquez (2021) from a transdisciplinary perspective.

Cognitive Justice: The Foundation of Sustainable Development

The findings related to the nature-culture axis confirm Descola’s (2013) critique of “the great ontological divide”: the separation between the human world and the rest of Nature. This emerges as an idiosyncrasy of Western naturalist ontology that is rooted in history. The relational ontologies found in the results also propose concrete alternatives to this chasm, as noted by Castro-Díaz et al. (2022), each of which recognizes that non-human agents help shape the world. From this perspective, life itself shifts the dramatic South, giving us a new meaning: “life is just a long series of connections in which an event (or occurrence) is right in between.”

The concept of “hybrid territorialities” identified in the results directly responds to Latour’s (2007) idea of “hybrid assemblages”—situations in which human and non-human agents interact together to produce complex sociopolitical ecologies. This concept is particularly important in the Anthropocene era, where human influence reaches virtually every ecosystem on Earth.

Cognitive Justice: The Foundation of Sustainable Development

Analysis of the science-culture axis reveals that cognitive justice lies at the heart of genuine sustainability projects. This form of justice, presented by Santos (2009), is a necessary condition for any genuine project of social justice; it challenges the hierarchies of knowledge that have placed Western scientific knowledge at the top and other forms of knowing and being in the world.

But the “ecology of knowledge” highlighted in the results does indeed offer an indispensable general framework for rethinking the relationship between scientific knowledge and cultural diversity. This perspective acknowledges, as stated in the introduction, that “knowledge worthy of the name has always been inter-knowledge.” No system of knowledge can be reduced to another without significant loss.

“Intercultural translation” processes emerge as essential tools for facilitating dialogue between different universes of meaning. As Castro-Díaz et al. (2022) argued, translation is an integral part of the work of biologists and anthropologists; these processes take on particular vitality in fields where cultural diversity conflicts with ecology, as in Latin America.

Emergent Cartographies as Tools for Reorienting Knowledge

This fundamental epistemological framework represented by the emergent cartographies in the results is a mechanism for going beyond the scientific concept of socio-ecological systems and provides a broader lens through which to interpret the modern world. Moving away from linear ideas of relationships, these cartographies represent a shift toward non-linear thinking: they are networked, like rhizomes, or fractals, and can represent multiple levels of organization along non-linear paths.

As noted by Castro-Díaz et al. (2022), such visual representations illustrate “key control points where a small intervention can produce major systemic changes.” Identifying these critical points is crucial in contexts of systemic crisis, where resources are scarce and strategic interventions are required. Participatory mapping, in particular, offers valuable approaches to territorial understanding by integrating diverse types of knowledge. According to the study by Arenas-Monreal et al. (2015) on community health, these participatory mappings.

Horizons of Sustainability and Planetary Ethics

Expose socio-environmental determinants invisible to conventional technical analysis. Looking toward the future of sustainability, the horizons mentioned in these results go beyond technical or methodological dimensions and position ethics as a crossroads for interdisciplinary dialogue. The proposal for a planetary ethics grounded in the realization of this fundamental mutual dependence responds to what Hans Jonas (1984) saw as the need for new moral principles in the face of humanity’s technical powers.

This ethics of the planet is grounded in the idea that “human well-being is not separate from the well-being of the ecological systems in which it flourishes,” as noted by Arenas-Monreal et al. (2015). An ecosystemic perspective on health rules out any artificial separation between humans and other types of life systems.

Valle’s normative framework for biocentrism takes on a pluralistic character, in line with Plumwood’s (2002) view that rejects both hierarchical anthropocentrism—which is ethically unacceptable—and generalized biocentric egalitarianism, which reduces nature to an abstraction rather than respecting individual creatures. By emphasizing both the commonality and the differences among various forms of life, this perspective offers a particularly fertile ground for ethical reflection on how interspecies relationships should be restructured from a standpoint of pure reciprocity and mutual aid.

Limitations and Future Challenges

Although ecological logos holds transformative potential, it also faces clear limitations and challenges. The first is the immense difficulty of putting these epistemological frameworks into practical action within an institutional context that remains dominated by fragmented discursive logics. Today’s academic, political, and economic structures tend to resist transdisciplinary approaches that break down established boundaries.

Second, transforming these conceptual frameworks into actual operational methodologies requires extensive experimentation and validation across different settings. The new cartographies promised by the above could indeed be useful tools, but they still need to be tested in the field as mechanisms for constructive dialogue between different forms of knowledge.

Finally, the proposal for an ecosystemic logos faces the challenge of not becoming a new totalizing metanarrative. As Stengers (2018) has urged, we need an “ecology of practices” that recognizes the unique pluralism present in all the different ways of being—without attempting to assimilate them all into a system that would instantly give rise to so many new ways of epistemologically excluding its own Creation.

Conclusions

Interdisciplinary dialogues between science, technology, and nature with culture form the boundaries of a radical ecosystemic intelligibility: an emerging way of understanding and inhabiting this world that, for better or worse, transcends those old dichotomies of Western modernity. A new complex rationality, horizons of sustainability waiting to be built against the backdrop of a civilizational crisis.

The ecosystemic logos of these dialogues is not a closed system or a new overarching metanarrative, but rather an open space for conversation among vastly different forms of knowledge and life that have yet to coexist without translating one another. As Isabelle Stengers (2018) proposes, we need an “ecology of practices” that recognizes, without hierarchizing, the incommensurable pluralism of modes of existence.

The emerging cartographies we have explored offer ways to navigate this complexity; tools to make visible connections, tensions, and possibilities at the interfaces across various knowledge systems. These mappings do not merely seek to depict pre-existing landscapes, but to participate in the ongoing creation of new ways of thinking and acting.

Sustainability means building horizons from the ecosystemic logos, which does not conceive of sustainability as a final state to be attained, but rather as a continuous process of conversation, learning, and transformation. As Barth et al. (2023) have demonstrated, transdisciplinary learning is a lever for meaningful transformations, providing a space where different perspectives can engage in productive dialogue with one another.

At a historical moment marked by multiple overlapping crises, the ecosystemic logos offers us not only analytical tools for understanding complexity, but also ethical and political resources for imagining and beginning to realize more just and sustainable worlds. As Morin (2006) notes, we need an “ethics of understanding” that is both realistic and attuned to human needs, mindful of our intrinsic interdependence and the shared responsibility that all living beings on Earth bear for its future.

The radical ecosystemic intelligibility emerging from these interdisciplinary dialogues calls for a new sensibility. What is needed is to keep the doors open even in the face of surprise and uncertainty; to remember the limits of human knowledge without faltering in our quest for understanding. Perhaps this is where our future lies—the most precious thing that ecosystemic logos, as horizons of sustainability, can offer to the people living in this century.

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Translation Note: Special thanks to professor Eva Mascaró (University of Guayaquil) for the academic translation of this manuscript into English.

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Neurodiversity in the academic iniverse. STEAM as the spaceship and comics as the compass

Neurodiversidad en el universo académico: STEAM como nave y el cómic como brújula

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Received date: 26/03/2026

Acceptance date: 26/04/2026

Abstract

Current times demand an educational prism that is transformative for true inclusion in university spaces where neurodivergent students coexist. This social commitment is addressed through hermeneutic research of theoretical-philosophical content, framed within the research line: Integrative and Inclusive Educational Strategies from a Trans-complex Kaleidoscope. The metaphor of the "Knowledge Universe" conceives the university as a multidimensional cosmos where each student is an explorer with unique cognitive abilities. The STEAM approach constitutes the spaceship for this journey, offering multiple points of entry to knowledge through its interdisciplinary nature. Complementarily, the comic functions as a visual navigation chart, providing a sequential structure that facilitates the decoding of complex content, reduces anxiety, and clarifies academic expectations. The proposal transcends the adaptive model to redesign the learning ecosystem based on the appreciation of cognitive diversity, allowing for the construction of collective knowledge. It concludes by highlighting the need for institutional policies that strengthen this inclusive approach, essential for contemporary higher education.

Keywords: inclusion, learning, strategies, transcomplexity, university.

Resumen

Los tiempos actuales exigen un prisma educativo transformador para una verdadera inclusión en los espacios universitarios donde conviven estudiantes neurodivergentes. Este compromiso social se aborda mediante investigación hermenéutica de contenido teórico-filosófico, enmarcada en la línea de investigación: estrategias educativas integradoras e inclusivas desde un caleidoscopio transcomplejo. La metáfora del "Universo del Conocimiento" concibe la universidad como cosmos multidimensional donde cada estudiante es un explorador con capacidades cognitivas únicas. El enfoque STEAM constituye la nave espacial de este viaje, ofreciendo múltiples puntos de entrada al conocimiento mediante su carácter interdisciplinario. Complementariamente, el cómic funciona como carta de navegación visual, proporcionando estructura secuencial que facilita la decodificación de contenidos complejos, reduce la ansiedad y clarifica expectativas académicas. La propuesta trasciende el modelo adaptativo para rediseñar el ecosistema de aprendizaje desde la valoración de la diversidad cognitiva, permitiendo la construcción del conocimiento colectivo. Se concluye destacando la necesidad de políticas institucionales que fortalezcan este enfoque inclusivo esencial para la educación superior contemporánea.

Palabras clave: aprendizaje, estrategias, inclusión, universidad y transcomplejidad.

Introduction

Contemporary higher education faces the imperative to move beyond a homogenizing paradigm toward a learning ecosystem that recognizes and values cognitive diversity. Neurodivergent students—those with conditions such as Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), or specific learning difficulties—often encounter significant barriers within traditional instructional approaches, which can limit their full participation and academic success. This reality calls for educators to develop new competencies and adapt their teaching practices, acknowledging that each brain processes and learns at its own pace.

In the Latin American context, the inclusion of neurodivergent students in university settings presents an even greater challenge. Institutions have been slow to respond to growing social demands for more inclusive practices, often attempting to “normalize” students rather than embracing and valuing their differences (Amador et al., 2021).

In response to this need, this article proposes a holistic, integrative, and complementary strategic framework based on the metaphor of the “Knowledge Universe.” Within this framework, the STEAM methodology (Science, Technology, Engineering, Arts, and Mathematics) functions as the spacecraft, while the comic serves as a stellar navigation chart. Together, these tools are designed to empower neurodivergent students throughout their academic journey.

It is essential to move beyond labeling and instead foster classroom practices that address individual learning needs. As noted by Judy Singer, who originally coined the term neurodiversity, this concept was not intended as a mere diagnostic category, but rather as a political and social construct grounded in the principles of biodiversity and intersectionality. Drawing from her personal experience as a neurodivergent woman with autistic traits and ADHD, Singer emphasizes that neurodiversity represents a natural variation in human brain functioning, analogous to biological diversity. She challenges interpretations that reduce it to a euphemism for “normality” or confine it within a deficit-based medical framework.

This perspective supports the reconceptualization of the university as a cognitively diverse ecosystem, where each student’s unique mental architecture does not require “correction,” but rather an educational design that values diverse ways of processing and contributing to knowledge. Furthermore, Singer’s critique of the commodification of the neurodiversity movement—and its appropriation by corporate interests—highlights the risk of institutions adopting neurodiversity as an empty slogan, without implementing meaningful transformations in their pedagogical structures.

Finally, Singer’s vision of a well-being system centered on individual needs rather than labels aligns directly with the proposed flexible STEAM–comic model. This approach enables each “cognitive explorer” to navigate the universe of knowledge through tools and scaffolding that honor their uniqueness, moving beyond rigid categorical frameworks.

Neurodivergent students can be understood as epistemic agents with differentiated cognitive capacities within the academic cosmos. Their engagement with knowledge follows legitimate neurofunctional patterns rather than pathological ones. From the philosophical perspective of Judy Singer (1998), who introduced the concept of neurodiversity, these differences represent another expression of natural human variation, analogous to ecological biodiversity.

For instance, a student with ADHD may exhibit what can be described, in Deleuzian terms, as rhizomatic cognition—an ability to establish transversal connections across disciplinary domains. At the same time, such learners may benefit from temporal and structural scaffolding to sustain executive attention (Jordán & Vergara, 2020). Similarly, autistic students often demonstrate a remarkable hermeneutic capacity to decode complex systems and abstract patterns; however, they may experience uncoded social interactions as disruptive semiotic interference. Consequently, their development is better supported through predictable environments and visual supports that function as cognitive-social prostheses (Lobos et al., 2024).

The social model of disability, reinterpreted through the lens of liberation philosophy proposed by Enrique Dussel (2011), shifts the focus from the “remediation” of the student toward a decolonial redesign of the educational ecosystem. Within this framework, pedagogical tools, pathways, and structures must be configured to enable a plurality of cognitive styles to flourish and co-construct knowledge, in line with the principles of the pedagogy of autonomy advanced by Paulo Freire (1997).

This perspective also resonates with the epistemologies of the South articulated by Boaventura de Sousa Santos (2010), which recognize the value of subaltern knowledges and diverse forms of embodied consciousness. From this standpoint, neurodiversity is not framed as a limitation, but rather as a condition of possibility for educational innovation, particularly within a Latin American perspective.

Methods

This study adopts a theoretical–philosophical hermeneutic approach as its central method, aimed at uncovering the deeper meanings and conceptual structures underlying neurodivergent inclusion in the university context. Rather than limiting itself to a conventional literature review, this approach advances toward a dialectical interpretation that connects the analyzed theoretical frameworks with lived educational experience. It is situated within the research line Integrative and Inclusive Educational Strategies from a Transcomplex Perspective.

Transcomplexity, understood as an epistemological horizon, enables the study to move beyond fragmented views of knowledge and to conceive education as a dynamic, interdependent system in constant reconfiguration. From this standpoint, the research does not seek linear answers; instead, it aims to weave meaningful relationships among neurodiversity, the STEAM approach, and the use of comics as tools for cognitive and affective mediation.

The hermeneutic process was carried out in three interrelated phases:

1. Contextual immersion phase: A comprehensive review of specialized literature was conducted, focusing on neuroeducation, inclusive pedagogies, STEAM education, and visual narratives, with particular attention to the Latin American context. This phase enabled the identification of key tensions, gaps, and potentialities in the theoretical and practical articulation of neurodivergent inclusion.
2. Relational interpretation phase: Through an emergent categorical analysis, connections were established among authors, pedagogical approaches, and documented experiences. The aim was not merely comparative, but interpretive—building conceptual bridges that deepen the understanding of the educational phenomenon under study.
3. Transcomplex synthesis phase: The partial interpretations were integrated into a coherent and theoretically grounded proposal, in which the metaphor of the “Knowledge Universe” operates as an integrative meta-model capable of embracing the diversity of voices, knowledges, and cognitive modalities present in the university classroom.

This methodological pathway does not seek generalization; rather, it aims for an in-depth and nuanced understanding of a complex educational phenomenon. It assumes that all interpretation is situated, partial, and open to future reinterpretations. From a transcomplex perspective, hermeneutics thus emerges as a guiding compass for navigating the multidimensional nature of educational inclusion in the 21st century.

Results

The implementation of the STEAM–comic neuroinclusive model generates measurable transformations that extend beyond academic outcomes, reconfiguring the university ecosystem through a logic of cognitive navigability and affective educational mapping. These results can be interpreted as milestones within the exploratory journey of the “Knowledge Universe”:

1. Increased participation of neurodivergent students

The STEAM “spacecraft,” with its multiple entry points and modes of interaction, enables a greater number of neurodivergent students to actively engage in the academic journey. Multimodal strategies function as systems of cognitive alignment, recognizing and valuing diverse styles of mental navigation.

As demonstrated by Zavala and Becerra (2024), “a multimodal approach can facilitate the integration of technologies in teaching, thereby improving educational quality and teaching performance” (p. 17). This finding highlights how the universal design of the “STEAM spacecraft” responds to the diversity of “cognitive vessels” undertaking the educational journey.

From a philosophical perspective, this aligns with the ethics of recognition proposed by Axel Honneth (1995), where inclusive education represents a form of reciprocal affirmation of cognitive differences. In this regard, Espiter Villa (2021, p. 3), drawing on Honneth’s framework, explains that reification can be understood as a forgetting of recognition grounded in three interconnected dimensions. From a Heideggerian perspective, it emphasizes the primacy of the precognitive, where interactive experiences constitute the condition of possibility for cognitive development. From the standpoint of developmental psychology, it argues that subjectivity is formed through symbiotic relationships with significant others who demand recognition, and whose disregard produces moral fractures. Finally, experiences of dispossession, violence, or dishonor give rise to social struggles aimed at constructing an ethical framework that enables individual self-realization within a universal normative order based on mutual recognition.

Therefore, the multimodal STEAM design not only accommodates but also epistemically celebrates the diversity of minds, positioning itself as a practice of cognitive justice (De Sousa Santos, 2014). In this regard, Mandujano (2015, p. 194), drawing on the work of Boaventura de Sousa Santos, highlights that his central claim is grounded in a dual conviction: first, that the understanding of the world extends far beyond the limits imposed by Western epistemology; and second, that human diversity manifests in infinitely plural ways of being, thinking, and feeling. This includes alternative conceptions of time, relationality, and knowledge production, thereby validating multiple ways of inhabiting the “universe of knowledge.”

The Theory of Mind (ToM), understood as the capacity to infer the mental states of others, finds in comics an especially effective medium for its development and application in educational contexts. Graphic narratives, by visually representing characters’ intentions, emotions, and beliefs through facial expressions, gestures, and sequential action, function as visual scaffolds that externalize typically implicit mental processes.

This is particularly valuable for neurodivergent students who experience challenges related to ToM—such as some individuals on the autism spectrum—since they can decode these mental states through the explicit visual cues that comics provide in a structured manner (Zapata-Téllez et al., 2021).

The STEAM approach further expands this potential by integrating Theory of Mind (ToM) and comics within a multidimensional learning ecosystem. For example:

- Arts (A) and Sciences (S): The creation of comics based on scientific concepts enables students not only to understand disciplinary content, but also to engage ToM by representing the perspectives of different actors (e.g., a historical scientist or a character addressing an environmental issue).
- Technology (T) and Engineering (E): Designing interactive digital comics, where user decisions influence the narrative, fosters perspective-taking and the anticipation of others' reactions—key competencies associated with ToM.
- Mathematics (M): Presenting mathematical problems in comic format can incorporate characters with motivations and conflicts, thereby integrating logical reasoning with socio-emotional understanding.

The intersection of Theory of Mind (ToM), comics, and STEAM thus creates a pedagogical space in which cognitive diversity becomes an asset. In this context, students not only acquire disciplinary knowledge but also develop socio-emotional competencies through a medium that respects diverse processing styles, while simultaneously promoting educational inclusion from a multimodal and neuroaffirmative perspective.

2. Comics as a Multimodal Narrative Technology

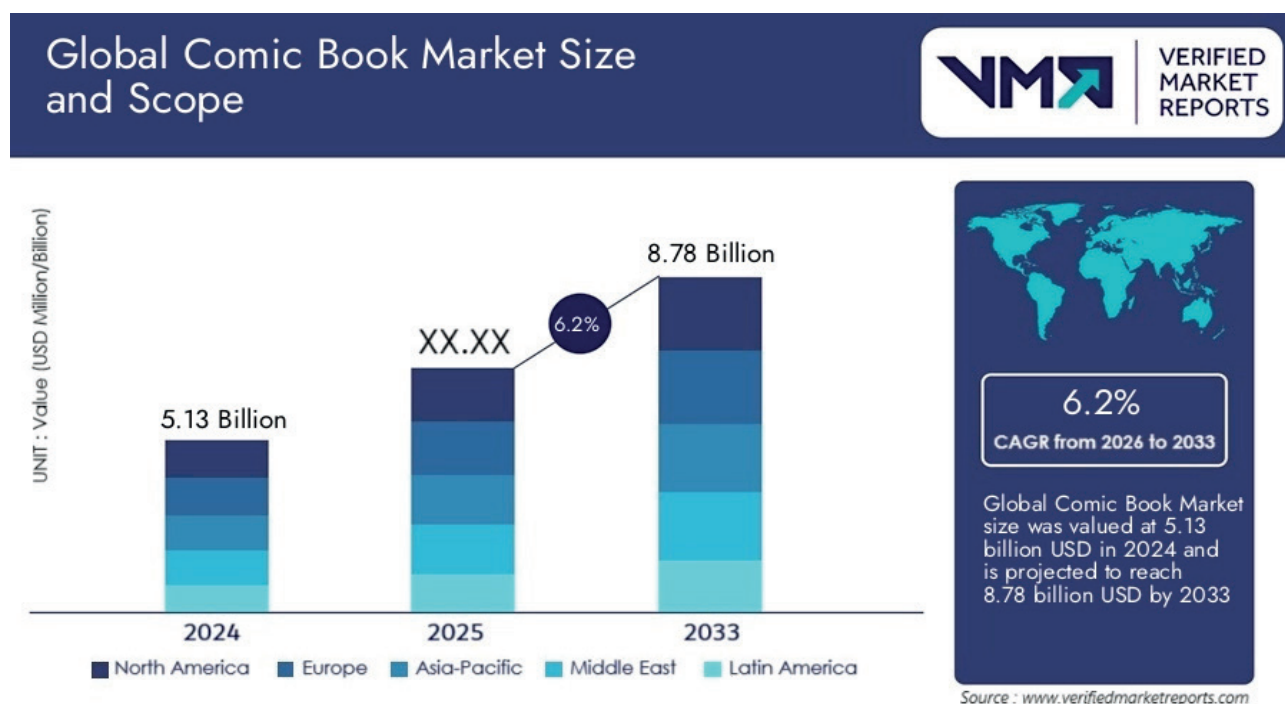
Comics have moved beyond their traditional perception as a form of entertainment to become a strategically valuable educational tool within higher education. As demonstrated by Becerra-Romero et al. (2023) in their study on the implementation of the “Comic Corner” at the Library of Education Sciences of the ULPGC, comics possess “broad potential for the development of key competencies and direct applications in teaching and research” (p. 2).

This study highlights how the integration of comics into higher education settings responds to their capacity to structure knowledge in a visual and sequential manner, thereby facilitating complex learning processes through a dialectical synthesis of image and text that functions as cognitive scaffolding. The versatility of comics as a multimodal narrative technology extends beyond the educational sphere, positioning them as impactful resources in communicative and therapeutic contexts.

The report by Verified Market Reports (2023) documents this multifaceted expansion, noting their growing application in “education, marketing, and mental health” as evidence of their sociocultural relevance (see Figure 1). This cross-sector applicability reinforces the argument advanced by Becerra-Romero et al. (2023) regarding the semiotic value of images as an “essential element in the creation and transmission of information” (p. 1), now extended to new contexts of use.

Figure 1

Market research report on comics (comic books) by type, application, region, and forecast, 2023–2030



Source: Verified Market Reports. (2023)

The convergence of these sources—academic and market-based—reveals the consolidation of comics as a hermeneutic device with transdisciplinary scope. In this regard, the experience of University of Las Palmas de Gran Canaria (ULPGC) demonstrates their effectiveness as a structured didactic resource within formal educational settings, while market data confirm their adaptability across diverse social domains. Together, these perspectives validate the conceptualization of comics as tools for cognitive mediation and complex communication in contemporary society.

Furthermore, it is important to highlight that contemporary Hispano-American comics have moved beyond their traditional role as entertainment, establishing themselves as a medium for narrative experimentation and sensory experience. This evolution expands their pedagogical potential within inclusive educational environments. Research compiled in the monograph indicates that comics are no longer confined to classical sequentiality, but instead explore formats that engage multisensory and embodied dimensions (Hague, 2014; Szép, 2020, as cited in Cabero & González, 2024). These authors further argue that:

Within experimental comics, the use of narrative multilinearity, the disruption of sequential structure, and the creative use of the page—through form, layout, color, and visual elements—as a representational resource invite readers to reconsider how graphic narratives are approached. These features challenge conventional reading practices by blurring the boundaries between artistic and literary forms (p. 10).

Building on the above, this perspective aligns with the creation of diversified neurocognitive pathways within the classroom. In addition, there is a growing body of academic interest in comics as a medium for representing marginalized experiences and non-hegemonic identities, reinforcing their value as tools for epistemic justice and identity recognition in university contexts. This capacity of comics to give voice to situated and diverse experiences makes them particularly well suited for designing learning environments that celebrate—rather than merely accommodate—neurodiversity.

Finally, formal experimentation with narrative multilinearity, the disruption of sequential structures, and the expressive use of the page offers flexible scaffolding that can reduce anxiety associated with extended linear tasks, particularly benefiting students with ADHD or ASD. This confirms that comics are not merely a didactic resource, but a versatile narrative technology with the potential to pedagogically redesign the “Knowledge Universe.”

3. Reducing Evaluation Anxiety through Visual Scripts in the Latin American University Context

In the Latin American university context, where pedagogical transitions from traditional models to inclusive approaches often generate uncertainty among neurodivergent populations, comics function as technologies of participation. They embody the principle of problem-posing education proposed by Paulo Freire (1970), transforming assessment from a mere instrument of measurement into a tool for cognitive dialogue.

From the perspective of the ecology of knowledges advanced by Boaventura de Sousa Santos (2018), visual scripts can be understood as a form of intercultural translation between hegemonic academic languages and the diverse cognitive processing styles present in Latin American university classrooms. This approach aligns with the principles of the pedagogy of autonomy (Freire, 1996), where the clarification of expectations through graphic narratives strengthens student agency and reduces the asymmetry inherent in traditional assessment processes.

Los organizadores gráficos constituyen herramientas de mediación cognitiva que permiten procesar, estructurar y priorizar información compleja mediante operaciones mentales como la clasificación, comparación y detección de patrones conceptuales. Estas herramientas se convierten en andamios neurocognitivos fundamentales para la práctica docente, al facilitar que el estudiante construya conocimiento de manera sintetizada, accesible y significativa (López-Martínez, 2023).

En el contexto de la neurodiversidad universitaria, estas herramientas operan como sistemas de decodificación visual que se alinean perfectamente con la metáfora del “Universo del Conocimiento.” Así como el cómic funciona como brújula narrativa, los organizadores gráficos actúan como cartografías cognitivas que permiten a estudiantes neurodivergentes navegar territorios académicos complejos mediante representaciones espaciales que reducen la carga cognitiva y potencian la metacognición.

This approach is closely aligned with the principles of Universal Design for Learning (UDL), in which multimodal representation—particularly through visual structures—provides alternative entry points to knowledge. These are especially valuable for students with ADHD, autism, or dyslexia, who often process information predominantly through visual-spatial channels.

It is important to emphasize that graphic organizers function as tools of cognitive mediation, enabling learners to process, structure, and prioritize complex information through mental operations such as classification, comparison, and the identification of conceptual patterns. As such, these tools become essential neurocognitive scaffolds in teaching practice, facilitating the construction of knowledge in ways that are synthesized, accessible, and meaningful (López-Martínez, 2023).

Within the context of neurodiversity in higher education, these tools operate as systems of visual decoding that align closely with the metaphor of the “Knowledge Universe.” Just as comics function as a narrative compass, graphic organizers act as cognitive maps that enable neurodivergent students to navigate

complex academic territories through spatial representations that reduce cognitive load and enhance metacognition. This approach is also consistent with the principles of Universal Design for Learning (UDL), where multimodal representation—particularly through visual structures—provides alternative entry points to knowledge. These are especially valuable for students with ADHD, autism, or dyslexia, who tend to process information predominantly through visual-spatial channels.

Discussion

The results validate the effectiveness of the STEAM–comic neuroinclusive model as a transformative pedagogical ecosystem capable of reconfiguring the university experience through the recognition and appreciation of cognitive diversity. The metaphor of the “Knowledge Universe” is substantiated by demonstrating how the STEAM approach—conceived as a multidimensional spacecraft—facilitates multiple entry points to knowledge, acknowledging diverse cognitive styles and fostering active and meaningful participation among neurodivergent students.

Complementarily, comics—functioning as a visual compass—not only help structure complex content and reduce anxiety associated with academic tasks, but also contribute to the development of socio-cognitive skills such as Theory of Mind. At the same time, they operate as tools of epistemic justice by making visible non-hegemonic narratives.

This dual approach moves beyond mere methodological adaptation to establish a learning ecology grounded in universal design, multimodality, and reciprocal recognition, where neurodiversity is positioned as an epistemological value rather than a deficit to be compensated.

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Translation Note: Special thanks to professor Ingrid Urgiles (University of Guayaquil) for the academic translation of this manuscript into English.

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Critical dialogues in complex systems. Epistemic-educational redefinition from philosophical didactics

Diálogos críticos en sistemas complejos. Redefinición epistémico-educativa desde la didáctica filosófica

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Received date: 26/03/2026

Acceptance date: 26/04/2026

Abstract

This article proposes a radical redefinition of education through Philosophical Didactics, challenging Cartesian and colonial paradigms that fragment knowledge. Confronting instrumental rationality and necropolitics — which mark certain bodies and knowledges as disposable— it articulates a decolonizing pedagogy that reclaims marginalized epistemologies (such as the Andean *sumak kawsay* or African *Ubuntu*), destabilizing modern individualism and advocating an ethics of interdependence. Methodologically grounded in philosophical hermeneutics, the theoretical framework integrates Morin (complexity as dialogue of irreducible tensions), Freire (education as a political act of liberation), and De Sousa Santos (ecology of knowledges) to transcend educational homogenization. Philosophical Didactics emerges as a praxis of the impossible: a hermeneutic art that inhabits chaos, challenges epistemic hierarchies, and coconstructs knowledge from the margins. By merging critique and hope, the text redefines education as a metabolic act that sows alternative futures —a ritual of resistance where the classroom becomes a space for cognitive justice, biocultural reciprocity, and the memory of the excluded. Thus, it transcends enlightened neutrality to become an ethical ferment of possible worlds.

Keywords: critical dialogues, complex systems, philosophical didactics.

Resumen

Este artículo propone una redefinición radical de la educación desde la Didáctica Filosófica, cuestionando los paradigmas cartesianos y coloniales que fragmentan el saber, frente a la racionalidad instrumental y la necropolítica que marcan ciertos cuerpos y saberes como desechables, se articula una pedagogía de la descolonización que recupera epistemologías marginadas, desestabilizando el individualismo moderno y proponiendo una ética de interdependencia. Esta producción deviene desde una hermenéutica filosofía que permitió metodológicamente configurar el entramado teórico que integra a Morin (complejidad como diálogo de tensiones irreducibles), Freire (educación como acto político de liberación) y De Sousa Santos (ecología de saberes), para superar la homogeneización educativa. La Didáctica Filosófica se revela como praxis de lo imposible, un arte hermenéutico que habita el caos, cuestiona jerarquías epistémicas y co-construye conocimientos desde los márgenes. Al fusionar crítica y esperanza, el texto redefine la educación como acto metabólico que siembra futuros alternativos; es decir, un ritual de resistencia donde el aula deviene espacio para justicia cognitiva, reciprocidad biocultural y memoria de los excluidos. Así, trasciende la neutralidad ilustrada para erigirse en fermento ético de mundos posibles.

Palabras clave: diálogos críticos, sistema complejo, didáctica filosófica.

Introduction

In the complex and multifaceted context of the labyrinth of late modernity, education faces a fundamental dilemma that places its essential functions in tension: on the one hand, the uncritical and almost automatic reproduction of hegemonic paradigms that sustain established power structures; and on the other, the urgent need for collective emancipation that problematizes, questions, and transforms these dominant schemes. This critical juncture raises a radical and profoundly philosophical question, situated at the heart of philosophical didactics: is it feasible to reimagine educational praxis not as a mere act of content transmission, but as a conscious and deliberate act of epistemic resistance?

This questioning invites us to rethink education from a perspective that transcends the neutrality traditionally attributed to the classroom and teaching-learning processes. Epistemic resistance, in this sense, is configured as the capacity to confront and dismantle the official and hegemonic modes of knowledge production and circulation that have historically been used to reproduce social and political hierarchies by promoting alternative, critical, and plural knowledges. Therefore, philosophical didactics must then assume a strategically subversive role, turning educational praxis into a space where rigorous dialogue, critical reflection, and epistemological self-awareness become tools for the decolonization of thought and the recovery of cognitive agency of learning subjects.

Likewise, this reimagining must integrate and articulate ethical and political dimensions, understanding that education shapes subjects from a cognitive point of view, contributing to the formation of identities, values, and capacities for transformative action. In this sense, educational praxis implies a profound commitment to epistemological justice, the recognition of epistemic diversity, and the democratization of access to knowledges that legitimize the experiences and knowledge of subaltern, marginalized, or silenced groups by dominant discourse.

Thus, philosophical didactics responds to the challenge of late modernity by proposing a critical pedagogy that interrogates installed certainties, promotes constant questioning, and enables an educational practice that is, in itself, a liberating and revolutionary act. From these considerations, the radical question about the possibility of an educational praxis as epistemic resistance opens new paths for theoretical reflection, demanding concrete innovations in methodologies, curricula, and pedagogical relationships aimed at strengthening critical autonomy and active participation of learners.

This vision reveals itself as a critical manifesto that, from the foundations of philosophical didactics, interrogates the complex systems that configure and constrain teaching-learning processes. In such a way that the intention goes beyond a critical analysis, reaching a deeply disruptive approach, from the decolonizing search of the pedagogical imaginary through a critical dialogue that recognizes education as an ontological battlefield; an approach based firstly on the postulates of Morin (1990), in his principle of dialogics, warning that "every complex system harbors irreducible tensions"; and on the ideas of Freire (1970), from the pedagogy of the oppressed, recalling that teaching is a political act of re-existence; however, this approach transcends the limit of a theoretical synthesis by invoking Giroux (1988) and his critique of instrumental rationality that reduces education to technical simplicity at the service of capital, or the paradigm of complexity and its transdisciplinary commitment that dissolves the boundaries between knowledges to think the improbable.

Under this panorama, the article unfolds a critical cartography that exposes how educational systems have operated as homogenizing devices, denying situated knowledges and epistemologies of the South. This act deploys complexity as a gesture of insubordination; that is, a call to overflow the limits of the sayable, to

weave dialogic networks where knowledge surpasses imposition, co-constructing from the tension between the local and the global, the singular and the collective. This perspective questions the colinearity of knowledge, activating an epistemology of languor, where learning intertwines with the memory of the excluded and the urgency of knowing justice. It is, in short, an act of rebellion against the monocultural logic that hijacks the transformative potential of education in this present era.

Ultimately, this text transforms into a Philosophy in Motion, where critique transcends its role as an analytical tool to become a threshold of possibility. Therefore, by articulating these dialogues, the aim is to redefine education from a radically relational episteme that, by recognizing its intrinsic politicity, activates its metabolic potential; as a ferment in alternative cosmoses, where the educational reveals itself as an ethical seed and a space for collective invention.

From this context, philosophical didactics becomes a praxis of freedom; an art of inquiry that, instead of offering answers, cultivates the ideal questions to inhabit and transform the complexity of the real. It is here where critical thinking, by breaking with dichotomous logic, invites a foundational act; that is, educating to awaken consciousness that every pedagogical act is, in itself, a gesture of creation and resistance, which is inexhaustible as it feeds on hope, the hope that allows us to build, from the cracks of the system, an education that names the unnameable and sows, in the heart of the existing, the seeds of the future.

Method

The epistemological foundations of this research are based on a postpositivist episteme, starting from the premise that every vital process must be oriented towards a clear purpose and meaning. Consequently, the research adopts a qualitative approach, specifically the methodological line of the hermeneutic-dialectical method, which, according to Martínez (2011), "is indispensable and practically essential when human action or behavior lends itself to multiple interpretations" (p. 102).

The hermeneutic-dialectical method promotes a deep and contextualized understanding of human phenomena through dialogue between different interpretations and the constant tension between parts and the whole. This methodology allows unraveling the intrinsic complexity of human experience, integrating contradictory and complementary dimensions to achieve a broader and more critical vision of the object of study. In this way, interpretation becomes an essential methodological key to understanding the most significant and complex structure within the global system of personality, allowing analysis to transcend superficial appearances and reveal the deep meanings that guide human action.

Results

This level of analysis focuses on two major emerging dimensions of this research: the theoretical framework grounded in the philosophical didactics of education, and philosophical didactics as decolonization of knowledge and praxis of the impossible. Figure 1 illustrates these aspects visually, facilitating understanding of the relationship between the different perspectives involved.

In this analysis, the conceptual horizons of key informants, the position of theorists, and the intersubjective vision of the researcher are contrasted, allowing the construction of a hologrammatic vision. This vision is characterized by integrating multiple dimensions and perspectives, thus offering a deeper, more complex, and dynamic understanding of the area studied, overcoming linear or one-dimensional approaches and enriching the research discourse with a plural and contextualized approach. Therefore, the application of a hologrammatic vision in research implies recognizing and articulating diverse dimensions and perspectives simultaneously, as if each part reflected the whole and the whole were present in each part.

For example, in the analysis of philosophical didactics, it involves integrating the experiences and knowledge of key informants together with current theoretical frameworks and the critical interpretation of the researcher, to generate a complex and multifaceted understanding of the educational phenomenon.

A practical case of this application is highlighted in the study of how philosophical didactics promotes the decolonization of knowledge. From the informants' perspective, personal experiences and pedagogical practices are gathered; from theory, philosophical and epistemological concepts are contrasted; and from the researcher's vision, a critical interpretation is made that unites these dimensions into a single analytical framework. Thus, a fragmented approach is avoided and an integral understanding is privileged that reflects the richness and complexity of the studied field, allowing the identification of tensions, complementarities, and agreements that enrich the research process and its contribution to knowledge.

This approach expands the depth of analysis and also favors the generation of more inclusive and transformative educational proposals, since it is based on a plural understanding that recognizes the diversity and complexity of knowledge and human practices.

Theoretical framework grounded in the philosophical didactics of education

Philosophical didactics, in its essence, beyond being conceived as a method, is an ontology in motion, a challenge to the very foundations of what is understood by educating. Its genealogy is rooted in the critique of enlightened modernity that reduced knowledge to an instrument of control (Horkheimer & Adorno, 1944/1998), but it is radicalized in the Introduction to Complex Thinking, proposed by Morin (1990), when he states that "education must be a journey towards organized uncertainty, where each answer generates new questions" (p. 37). This vision destabilizes Cartesian epistemology, demanding a fractal didactics, where the learning context is conceived as a living, autopoietic system, constantly reorganizing itself in the face of tensions between order and chaos.

In this framework, Paulo Freire's critical pedagogy (1970) acts as a decolonizing trigger, stating that "Education is an act of love and, therefore, of courage; it is a practice of freedom that denies imposed silence" (p. 91). For Freire (1970), literacy is an exercise of conscientization, a dialectical process where the oppressed cease to be objects of history to become subjects of their own transformative intellectual narration, a figure that alters the neoliberal logic that reduces education to banking. Meanwhile, Giroux argues that "radical pedagogy is an act of historical memory, where excluded voices are recovered to question the present" (p. 67). In this way, philosophical didactics rises as a living and active element, where Basarab Nicolescu's transdisciplinarity (1996) provides an essential epistemic dimension, centered on the definition of this approach as "the art of inhabiting the spaces between disciplines, where the real reveals itself in its inexhaustible fullness" (p. 29). This principle allows questioning the compartmentalization of knowledge by proposing an epistemology of thresholds, where the educational transcends subject-object, theory-practice dichotomies.

Based on these considerations, philosophical didactics is interconnected with the ecology of knowledges of Bonaventura de Sousa Santos (2009), who in his work "An Epistemology of the South" affirms that "there is no total ignorance, but knowledges denied by colonial reason" (p. 45). The author insists that cognitive justice as epistemic dignity of ancestral knowledge constitutes a microcosm where multiple forms of understanding the world coexist without hierarchies. However, this theoretical framework would be incomplete without the ethics of liberation of Enrique Dussel (1998), who postulates that "All education is an act of exteriority, which emerges from the excluded to challenge the hegemonic totality" (p. 154). This ethics is irreducible to compassion; on the contrary, it materializes in an anti-systemic pedagogical praxis where Freirean dialogue is enriched by listening to historical silences.

Reviewing the manuscripts of Dussel (1998) and Freire (1970), an ethical event is glimpsed, a commitment to alterity that rejects the objectification of the other. Complementing Morin (1990): "teaching the human condition is teaching the unity of the diverse and the diversity of the one" (p. 102), a principle that challenges cultural homogenization and celebrates fractality. In this constellation of ideas, philosophical didactics reveals itself as a Metaphor of chaos, seeking to inhabit disorder creatively; its power lies in its capacity to generate questions that dismantle certainties; as Giroux (1988) warns, when he notes that "education is not neutral; it serves either to domesticate or to liberate" (p. 89).

In this sense, opting for the second approach implies assuming education as an act of insurgency, where knowledge is co-created from a dialogic encounter with the unexpected; that is, a call to reimagine education as a libertarian cosmos exercised through the collective practice of resistance and hope.

Philosophical Didactics as Decolonization of Knowledge and Praxis of the Impossible

Education, at its contemporary crossroads, goes through an "Epistemic Crack"; hegemonic educational systems, anchored in modern colonial logic, have perpetuated an ontology of separation, from the dissociation between reason and emotion, the human and its nature. Faced with this vision, the epistemic-educational redefinition from philosophical didactics is far from a theoretical adjustment; therefore, it requires a categorical earthquake that dismantles the pillars of the enlightened paradigm, articulated as a project of cognitive disobedience, where philosophy beyond an eidetic corpus becomes a gesture of insurgency against instrumental rationality, as Horkheimer (2013) argued.

In the words of Paulo Freire (1970), "education functions as an instrument of liberation, or becomes a weapon of domestication" (p. 67). Here, philosophical didactics constitutes itself as a praxis that transcends the pedagogical to question the very matrix of knowledge production, focusing its core on revealing that every educational act is an act of power. Therefore, traditional education, under the myth of neutrality, has operated as a normalization connector (Foucault, 2002), subordinating knowledges in hierarchies that privilege the Eurocentric, the masculine, and the utilitarian.

Faced with this panorama, we consider what Edgar Morin (1990) outlined, from complexity, by unmasking this fallacy, pointing out that "knowledge is a construction crossed by chaos and uncertainty" (p. 43), which allows us to interpret the real, beyond ordering it, to inhabit it from its fractures. This implies a radical turn; that is, replacing the logic of epistemological control (watertight curricula, standardized evaluations) with an "Epistemology of Encounter", where knowledge is co-constructed in dialogue between antagonistic horizons of meaning.

Under this optic, Philosophical Didactics, in its decolonizing aptitude, surpasses questionable appreciations of knowledge contents, dismantling the very matrix of production of the knowable, that radicalized and Eurocentric structure which, as denounced by Aníbal Quijano (2000), turned coloniality into the dark side of modernity.

This act of epistemic insubordination defined by Walter Mignolo (2011) as "decolonial disobedience", demands transgressing the limits imposed by imperial reason, to open educational space to what Bonaventura de Sousa Santos calls "epistemologies of the South"; that is, dependent knowledges, silenced by cognitive violence, that spring from the cracks of abstract universality. In this sense, the task here transcends the pedagogical towards the metaphysical, where one unlearns the extractivist logic of knowledge that reduces the world to a resource, to learn to listen to the murmur of the denied, the excluded, and the impossible.

In this horizon, education transforms into a praxis of the impossible, understood beyond an unattainable utopia, as that which the colonial-capitalist order has declared unthinkable. As Slavoj Žižek (2014) points out, the Real—that which resists symbolically—erupts as a fracture in the possible; Philosophical Didactics, then, constitutes itself as an expanded element of the realizable, an exercise of “radical imagination” that challenges the regimes of feasibility imposed by instrumental rationality. Hence, Paulo Freire’s pedagogy converges with Enrique Dussel’s philosophy of liberation, where educating is uncovering the material conditions that naturalize oppression, but also activating the capacity of subjects to re-exist, to reinvent other worlds. Likewise, the learning context becomes a liminal space, as Homi Bhabha (n.d.) puts it, a frontier where the colonized and the decolonial confront each other in a struggle for meaning, and where the impossible—such as epistemic justice or biocultural reciprocity—is rehearsed in an almost perfect act and order.

Now, this decolonization goes beyond the intellectual plane; it is an embodied revolution, as Frantz Fanon (1961) notes in his work *The Wretched of the Earth*, warning that coloniality refers to something beyond territoriality, alluding to bodies and subjectivities. Therefore, Philosophical Didactics must be a somatic pedagogy, a practice that, following Gloria Anzaldúa (1987), recognizes “border knowledge”, rooted in the wounded flesh of the excluded. In this sense, Achille Mbembe’s (n.d.) critique of necropolitics reveals how certain bodies are marked as disposable under the designs of colonial-modern power; in response, decolonial education becomes a ritual of epistemic resurrection, a political act that recovers silenced memories, knowledges annihilated by cynical reason, and ancestral practices erased from hegemonic records. In this framework, philosophies such as “good living” or “I am because we are” transcend folkloric expressiveness, projecting themselves as radical epistemologies that, from community interdependence and reciprocity with the Earth, crack the possessive individualism of modernity, proposing ontological alternatives where life in its plurality ceases to be a commodity to become a sacred relational fabric.

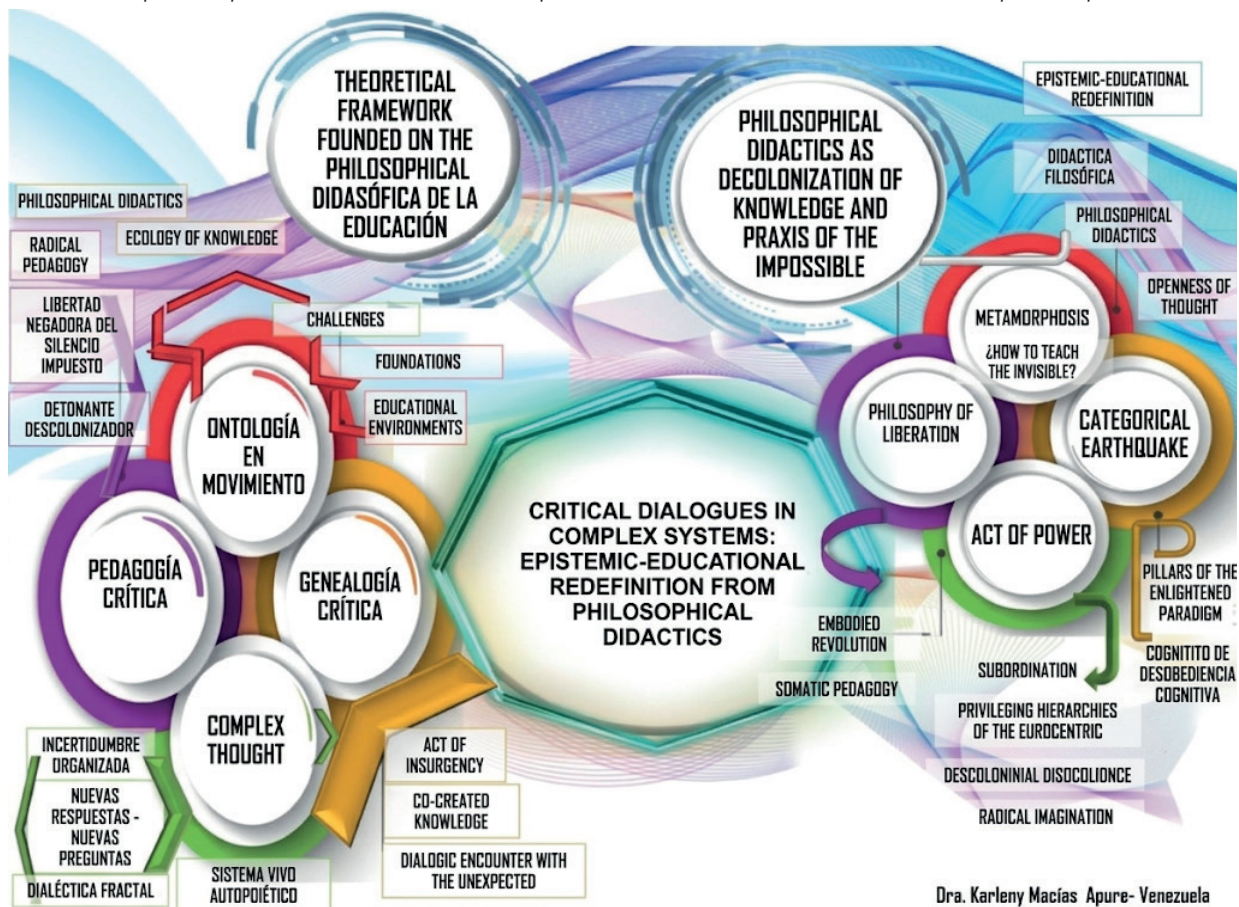
Now, how to teach the impossible? To answer this concern, the mystical dimension of Philosophical Didactics emerges; for Georges Bataille spoke of the impossible as a limit experience, that which overflows utility and the logic of calculation. Meanwhile, educating from this vertigo implies adhering to the right to opacity; that is, rejecting homogenizing transparency and praising the irreducible density of the diverse. In Adorno’s words, it is an act of “negative aesthetics” that, instead of offering answers, cultivates wonder before the inapprehensible. Therefore, the praxis of the impossible transcends idealism; it is insurgent materialism, which Silvia Rivera Cusicanqui (2010) calls the “potency of the small”, in the micro-resistances that crack power from the everyday.

Under this argumentative plane, Philosophical Didactics, in this anagram, is a pedagogy of the fragment; using parody, performance as strategies of situationism and conceptual art to dismantle master narratives. Here, educational Zapatismo merges with Mark Fisher’s capitalist realism (2009), which denounces how neoliberalism has kidnapped the imagination. Ultimately, this Philosophical Didactics is an act of love in the Freirean sense and of danger; love, because only from ethical vulnerability can deep listening emerge; danger, because decolonizing is always a subversive gesture that threatens the privileges of the canon.

As Aimé Césaire (1950) wrote in his *Discourse on Colonialism*, there is no true encounter without the risk of metamorphosis. Thus, educating the impossible is, then, betting on that metamorphosis, a leap into the void where the decolonial is neither a destination nor a place; on the contrary, it is a journey, where Philosophical Didactics reveals itself as the art of navigating uncertainty, of sustaining the question without giving in to the easy answer, of inhabiting the abyss without ceasing to weave, from there, networks of insurgent hope.

Figure 1

Theoretical-philosophical framework on the epistemic-educational redefinition from philosophical didactics



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Source: Own elaboration.

Discussion

Education, in its essence, is a living system, an organism of meanings in perpetual friction, and as such, is condemned to complexity. Edgar Morin warns us that living systems cease to be governed by linearity, opening the field to paradox; where they grow while disintegrating, they order themselves while becoming disordered. Under this logic, Philosophical Didactics, beyond being seen as a method of transmission, is conceived as an exercise of radical listening to the murmur of the multiple. Thus, the learning context, beyond being a container of certainties, is transfigured into a battlefield where temporalities, memories, and futures collide. Now, how to teach in a world that, as Zygmunt Bauman points out, dissolves into liquid before we can name it? The answer lies in the ability to inhabit questions as acts of ethical courage.

The decolonization of knowledge, the backbone of this reflection, more than a benevolent gesture of inclusion, is an insurrection against the ontology of extractivism, an approach that Bonaventura de Sousa Santos summarizes bluntly; knowledge has been instituted as a knowing vacuum cleaner, sucking up knowledges to turn them into inert commodities under the label of "universality." But how to weave in the midst of chaos? From this concern, the central paradox arises; complex systems teach us that disorder is not the enemy, but the fertile ground where the new germinates, a vision supported by Ilya Prigogine's theory of dissipative structures, reminding us that it is in collapse that unprecedented patterns emerge. From this panorama, pedagogy implies embracing uncertainty not as failure, but as potency.

This position was intuited by Paulo Freire when he stated that liberating education faces conflict, because it knows that it is in dialectical tension that critical consciousness is forged. But today, faced with the ecological crisis and the necropolitics described by Achille Mbembe, this tension acquires existential urgency; for it is about thinking the world, and feeling it in the guts, recognizing that knowledge inhabits the mind, but also the wounded body of the excluded, the forgotten rites of indigenous peoples, the silent resistance of those who have been erased from the cognitive map.

However, this task transcends all romanticism; it is deeply uncomfortable, since decolonizing hurts, because it demands confronting epistemic privileges, cognitive habits, the comforts of a knowledge that has been imposed on us, becoming an internalized neurosis. Therefore, Philosophical Didactics must also be an existential therapy, a slow and painful detoxification process. There are no shortcuts, as in mourning; on the contrary, one must go through the fog of denial, the rage of deconstruction, to reach a place of fragile reconstruction.

Consequently, the epistemic-educational redefinition from complexity is undoubtedly a path that, as Eduardo Galeano would say, is made by walking, and by walking it unravels. Therefore, we must visualize the steps, those small gestures of daily rebellion, like Silvia Rivera Cusicanqui's micro-resistances, which crack the walls of power from below, where the moss of the possible-impossible grows.

And it is there, in that fertile humidity, where Philosophical Didactics sows its seeds, not to harvest certainties, but to learn to live with uncertainty, to dialogue with chaos, to finally live education as an act of entry towards a more humble, more interdependent, more alive humanity, because educating, ultimately, allows us to free the present from the chains we carry within; those that made us believe that knowledge is power, instead of understanding ourselves as a fragile and glorious part of a whole that exceeds us. That is true complexity, knowing ourselves, at the same time, insignificant and essential, ephemeral and eternal. And from there, keep walking.

Conclusion

Philosophical didactics, grounded in critique and decolonization, emerges as a robust framework to redefine educational epistemology in complex contexts, driving the transition from hegemonic paradigms towards liberating, plural, and emancipatory approaches, where complex thinking and critical genealogy enhance both pedagogical action and the production of contextualized knowledges.

The proposed model articulates diverse ontological, pedagogical, epistemological, and political dimensions, generating a hologrammatic and systemic vision of education; this allows confronting dominant categories, reconfiguring formative practices, opening dialogue with the unexpected, and favoring processes of educational metamorphosis that amplify critical agency and transformative creativity of teachers and learners.

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Translation Note: Special thanks to professor Mary Ochoa Gómez (University of Guayaquil) for the academic translation of this manuscript into English.

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Bridging languages and cultures. Project-based learning in english teacher training

Conectando lenguas y culturas. Aprendizaje basado en proyectos en la formación de docentes de inglés

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Received date: 26/03/2026

Acceptance date: 26/04/2026

Abstract

This study explores the impact of implementing Project-Based Learning (PBL) as an innovative pedagogical approach in Ecuadorian English as a Foreign Language (EFL) classrooms through a professional training program designed for in-service teachers. The initiative arises from the need to enrich English teaching practices beyond textbook-driven methods by integrating authentic content aligned with the principles of Global Citizenship. Conducted in collaboration with ECUATESOL and Yachay Tech University, the program sought to address persistent gaps in teacher preparation, such as overreliance on traditional instruction, limited training in active methodologies, and minimal student engagement in meaningful communication. Fifteen English teachers from the province of Imbabura participated in a three-phase process: (1) diagnostic assessment, (2) teacher training workshops, and (3) classroom implementation with mentoring. Mixed-method data collection included surveys, interviews, lesson-plan reviews, and classroom observations. Preliminary findings indicate increased teacher confidence, improved classroom management through collaborative projects, and heightened student motivation and participation. The program's long-term goal is to scale the initiative nationwide through a Massive Open Online Course (MOOC) reaching over 2,500 teachers.

Keywords: english teaching, innovation, project-based learning, teacher training.

Resumen

Este estudio explora el impacto de la implementación del Aprendizaje Basado en Proyectos (ABP) como un enfoque pedagógico innovador en aulas ecuatorianas de inglés como lengua extranjera (EFL), a través de un programa de formación profesional diseñado para docentes en servicio. La iniciativa surge ante la necesidad de enriquecer las prácticas de enseñanza del inglés más allá de los métodos tradicionales centrados en el libro de texto, integrando contenidos auténticos alineados con los principios de la Ciudadanía Global. Desarrollado en colaboración con ECUATESOL y la Universidad Yachay Tech, el proyecto buscó responder a tres problemáticas persistentes en el contexto educativo ecuatoriano: la dependencia de métodos transmisivos, la falta de capacitación en metodologías activas y la escasa participación estudiantil en prácticas comunicativas reales. Quince docentes de inglés de la provincia de Imbabura participaron en un proceso dividido en tres fases: (1) diagnóstico y orientación (2) capacitación docente y (3) implementación en el aula con acompañamiento continuo. La investigación utilizó un enfoque mixto con instrumentos como encuestas, entrevistas, observaciones y análisis de planes de clase. Los resultados preliminares revelan una mejora significativa en la confianza docente, en la planificación de proyectos colaborativos y en la motivación estudiantil. El proyecto tiene como objetivo escalarse a nivel nacional mediante un curso abierto en línea (MOOC) que beneficiará a más de 2.500 docentes.

Palabras clave: aprendizaje basado en proyectos, enseñanza del Inglés, formación docente, innovación.

Introduction

Education in Ecuador faces the challenge of adapting to the demands of a globalized, multilingual, and technologically interconnected world. Traditional approaches to English language teaching, focused on memorization, translation, and mechanical repetition, have historically limited the development of communicative competence. This situation is further exacerbated by the lack of up-to-date professional development for teachers, which often prioritizes theory over practice and fails to provide tools to foster creativity, autonomy, and collaboration (Barragán & Newman, 2023).

Within this context, Project-Based Learning (PBL) emerges as a transformative methodology that addresses the current needs of language teaching process. Grounded on constructivist theory (Piaget, 1972; Vygotsky, 1978), PBL conceptualizes learning as an active process in which learners construct knowledge through the resolution of authentic problems. This methodological approach promotes essential 21st-century skills and competences such as critical thinking, communication, collaboration, and the responsible use of technology (Trilling & Fadel, 2009).

Numerous studies (Stoller, 2006; Beckett & Slater, 2020) demonstrate that PBL enhances learners' motivation, academic performance, and communicative competence by situating learning in meaningful and real-world contexts. Nevertheless, its implementation in Latin America has been limited owing to structural factors, including lack of resources, institutional resistance, and insufficient methodological training.

This current study originates from the collaboration between ECUATESOL and Yachay Tech University, with the aim of strengthening teacher education in the use of PBL as both, a pedagogical tool and a vehicle for Global Citizenship. According to UNESCO (2015), Global Citizenship Education seeks to empower learners to actively participate in building fair and sustainable societies. Integrating these principles into English language teaching allows educators to move beyond the linguistic dimension and connect learning with the country's social, cultural, and environmental realities.

Similarly, this project aligns with the objectives of the Ecuadorian Ministry of Education (MINEDUC, 2022) to promote inclusive and innovative educational practices that fortify the quality of English language teaching in the national public system. In this context, PBL is not only presented as a teaching methodology, but also as an educational philosophy that positions teachers as facilitators of knowledge and learners as active agents during the learning process.

Therefore, this study seeks to demonstrate how the implementation of PBL in teacher formative process can transform traditional educational practices, promote professional reflection, and contribute to the development of global competencies within the Ecuadorian context.

Methods

The current research study adopted a mixed-methods design, combining qualitative and quantitative approaches to obtain a comprehensive view of the impact of Project-Based Learning (PBL) on teaching practices and student motivation. Denzin (1978) and Patton (1999), state that methodological triangulation enhances the validity of findings by cross-checking data from multiple sources.

Participants

The sample consisted of fifteen English teachers from public and private institutions in the province of Imbabura, all female except for one participant. Each teacher demonstrated a B2 level of English proficiency according to the Common European Framework of Reference for Languages (CEFR) and was part of the "Ecuador Habla Inglés" program. Indirectly, the project impacted approximately 450 students aged between 13 and 18.

Study Design and Intervention Phases

The training process was conducted into three consecutive phases:

- Diagnostic and orientation phase: Surveys and semi-structured interviews were administered to identify teachers' perceptions, needs, and level of knowledge regarding PBL.
- Training phase: Participants attended 13 virtual seminars led by local and international experts. These sessions addressed the theoretical foundations of PBL, the design of interdisciplinary projects, and the use of digital tools for English language teaching.
- Implementation and mentoring phase: Participants designed and implemented PBL projects in their classrooms, receiving ongoing feedback from academic mentors. Reflective journals, photographic records, and classroom videos were collected as part of the data.

Instruments

Multiple instruments were used for data collection:

- Questionnaires and surveys: To measure levels of teacher confidence and perceptions of PBL effectiveness.
- Lesson plan analysis: To evaluate the alignment between PBL principles and pedagogical practice (Larmer et al., 2015).
- Classroom observations: To identify interaction patterns, student participation, and the application of collaborative strategies.
- Focus groups and reflective journals: To gain deeper insight into teachers' experiences and professional self-evaluation processes.

Data Analysis

Qualitative data were thematically coded following the framework proposed by Braun and Clarke (2006), identifying categories such as teacher empowerment, student agency, and meaningful learning. Quantitative data were analyzed using descriptive statistics with SPSS version 26, enabling pre- and post-training comparisons.

Ethical Considerations

Participant confidentiality was ensured through the use of pseudonyms. All participants signed informed consent forms, and the study was approved by the Ethics Committee of Yachay Tech University (code 2024-EFL-PBL-02).

Results

The findings reveal a substantial shift in both pedagogical practices and teachers' perceptions of their role in the classroom.

Teacher Professional Development

Post-program survey results indicated a 45% increase in teachers' confidence in designing and implementing project-based activities. Participants reported a transition from a teacher-centered model to a more student-centered approach. As one teacher noted, "My students now speak more than I do; they are the protagonists of their own learning."

Student Motivation and Participation

Students demonstrated higher levels of enthusiasm, collaborative work, and willingness to be communicated in English. In projects such as "Our Environment, Our Responsibility," learners produced short films addressing local environmental issues, integrating research, writing, and oral storytelling in English. These experiences strengthened both linguistic competence and social awareness.

Professional Collaboration Networks

One of the most remarkable outcomes was the spontaneous creation of a professional learning network (PLN) among participating teachers. Through platforms such as WhatsApp and Google Classroom, these professionals shared materials, strategies, and reflections. Such horizontal collaboration has contributed to the consolidation of a sustainable community of practice over time.

Identified Challenges

Among the main challenges identified were the lack of time, restricted access to technological resources, and large class sizes. However, mentoring sessions supported teachers in adapting PBL to their specific contexts without compromising its core principles.

Quantitative Indicators

Eighty percent of the teachers reported having reached an “advanced” level of proficiency in Project-Based Learning (PBL) after the training program (compared to an initial 25%). In addition, student participation increased by an average of 35%, and lesson plans showed a greater use of authentic assessment tools, such as rubrics and self-evaluations.

Discussion

The findings of this research study confirm that Project-Based Learning not only enhances teaching practices, but also transforms classroom culture. Teachers shifted from being basic transmitters of knowledge to becoming facilitators of the learning process, in alignment with the principles of social constructivism (Vygotsky, 1978; Bell, 2010).

On a global scale, these findings are consistent and support other studies about the impact of PBL on the development of 21st-century skills (Wilkinson & Zegers, 2017; Beckett & Slater, 2020). Nevertheless, the Ecuadorian context introduces important nuances: limited resources and curricular rigidity entail a contextualized adaptation, rather than a mere adoption of external models. The mentoring strategy implemented in this project proved to be an effective mechanism for supporting this adaptation process.

From a sociocultural perspective, PBL fosters the collective construction of knowledge. Interaction between teachers and students creates learning communities where all participants learn from one another, thereby promoting professional reflection (Schön, 1983). Furthermore, the integration of Global Citizenship into the projects established a meaningful link between English language learning and social action, enabling students to use the language as a tool to foster change.

Notwithstanding, challenges remain. The sustainability of PBL requires institutional support, administrative flexibility, and continuous professional development. Despite these challenges, the model implemented in this study provides a scalable and replicable framework for other regions of the country.

Conclusions

- The current study demonstrates the transformative potential of Project-Based Learning in Ecuadorian teacher education. Participants developed a great deal of autonomy, creativity, and intercultural awareness, strengthening their role as agents of educational change.
- Among the pedagogical implications, the need of including PBL as a core component in both pre-service and in-service teacher education programs is particularly noteworthy. Regarding practical recommendations, it is proposed to strengthen professional learning networks, integrating technology into hybrid teaching models, and expanding access to open online courses (MOOCs).
- In terms of educational policy level, it is recommended that authorities incorporate PBL into national English teaching standards, in alignment with the Education Agenda 2030.
- In summary, this research study contributes to reimagining teacher education in Ecuador. By connecting innovation, collaboration, and citizenship, PBL emerges as a bridge between languages, cultures, and communities, transforming classrooms into spaces for meaningful learning and social engagement.

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Translation Note: Special thanks to professor Oswaldo García Brito (University of Guayaquil) for the academic translation of this manuscript into English.

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Work and education in children and adolescents as human rights. An Ecuadorian referendum

Trabajo y educación en niñez y adolescencia como derechos humanos. Un referente ecuatoriano

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Received date:: 26/03/2026

Acceptance date: 26/04/2026

Abstract

The economic situation contributes to increased poverty in the lowest social strata, forcing families, including children and adolescents, to seek means of subsistence in both urban and rural areas. This situation is worrisome, as children are unable to attend school or access protection programs. Poverty is directly linked to child and adolescent labor. Minors are observed on public roads, selling goods, "watching cars," and suffering verbal or physical abuse, without achieving the full development of their human rights. This protection can be achieved through appropriate institutions, without depriving them of their childhood. This aspiration is for an effective process, ensuring justice for this group of minors, who will be the future Ecuadorian workers contributing to the country's economy. This study is documentary, analytical, and hermeneutical in nature. It is important to consider that international organizations such as the ILO and UNICEF have dedicated themselves to promoting the prohibition of child labor, monitoring progress with the support of their respective governments, with the goal of ending child labor.

Keywords: social strata, poverty, economic situation.

Resumen

La situación económica incide en el aumento de pobreza en estratos sociales del más bajo nivel, obligando a la familia, contando a niños, niñas y adolescentes buscar recursos de subsistencia, tanto en zonas urbanas como en zonas rurales, sin poder asistir a clases ni aplicar programas de protección a este grupo minoril, por lo que se torna preocupante. La pobreza verifica relación directa con el trabajo infantil o adolescente. Se observan menores en vías públicas, vendiendo mercancías secas, "cuidando vehículos", sufriendo maltrato verbal o físico, sin alcanzar pleno desarrollo de sus derechos humanos. Esta protección se logrará con adecuados organismos, sin privar su infancia. Este anhelo como proceso eficaz, con justicia para este grupo minoril, quienes serán los futuros trabajadores ecuatorianos, que contribuirán con la economía del país. Este estudio es de tipo documental, analítico y hermenéutico. Hay que considerar que organismos Internacionales como la OIT y UNICEF, se han abocado a impulsar la prohibición del trabajo infantil, haciéndole un seguimiento con apoyo de los respectivos gobiernos, aspirando poner fin al trabajo infantil.

Palabras clave: estratos sociales, pobreza, situación económica.

Introduction

The economic situation in nearly all Latin American countries, of which Ecuador is part within the regional geopolitical context, contributes to rising levels of poverty among the lowest social strata. This condition compels families including children and adolescents to seek means of subsistence in both urban and rural areas, often at the expense of school attendance. In some cases, there is a lack of adequate protection programs targeting this vulnerable population, which raises significant concern and demands urgent attention.

Poverty is closely linked to child and adolescent labor, shaping the daily realities of many young people. In both urban and rural settings, children are often seen in public spaces carrying out informal activities such as selling small goods or “watching cars” not as a choice, but as a response to economic necessity. In these environments, they are frequently exposed to verbal and physical abuse, as well as conditions that place their safety and well-being at risk.

This reality also extends to domestic labor arrangements, particularly live-in domestic work, where children and adolescents may experience isolation, excessive workloads, and limited access to education. Such conditions can compromise their dignity and restrict the full exercise of their fundamental human rights.

A significant proportion of children engage in intensive domestic labor. In this regard, it is important to note that the Childhood and Adolescence Code of Ecuador establishes 15 years as the minimum age for employment. For definitional purposes, a child is considered any person under twelve years of age, while an adolescent refers to individuals of both sexes between twelve and eighteen years old, who have not yet reached the full realization of their human rights. Such protection should be guaranteed through effective and well-coordinated institutional mechanisms that safeguard children’s rights without compromising their right to a safe and meaningful childhood. This aspiration, understood as an effective and equitable process for this vulnerable group, requires the Ecuadorian State to further strengthen its public policy by promoting a comprehensive and effective program aimed at reducing this social problem. By doing so, it can provide meaningful protection to those who will become the country’s future workforce and contributors to the national economy.

For this reason, it is identified as a survival-driven social phenomenon, which should be understood within the framework of child and adolescent labor. This concept is defined as any activity involving physical or mental exertion, performed daily or on a regular basis, in a specific or undefined location, and most often under the supervision of another person whether a family member or not frequently without any form of remuneration.

Viewed from this perspective, such activities do not fundamentally differ from the general concept of work as a human activity. However, in this context, they are carried out under conditions that border on deceptive exploitation and even coercive practices, whether within the formal or informal economy, thereby exerting a detrimental impact on the psychosocial development of this minoritized population. This reality prompts the following critical reflection: Under what circumstances, and to what extent, should children or adolescents receive economic compensation derived from their own efforts, given their status as “citizens in a position of vulnerability” due to their age?

It is a matter of serious concern that the country’s prevailing economic crisis directly exacerbates poverty levels among the most vulnerable socioeconomic strata. Consequently, families are compelled to rely on the contribution of all members including children and adolescents to secure the income necessary for household sustenance.

It can be observed clearly and publicly that children and adolescents, often at night and together with other individuals, search through garbage as a means of subsistence. As a result, many of these minors do not attend school and do not live in even minimally adequate housing conditions, leaving them with little or no effective protection. This situation highlights the urgent need to strengthen and ensure the effective implementation of existing protection programs aimed at this vulnerable social group.

In response to this social phenomenon, national and international organizations have both the obligation and the mandate to protect working children and adolescents as part of their core objectives. At the global level, one of the leading institutions in this regard is UNICEF.

It is important to emphasize that the economic exploitation of this vulnerable population is deeply concerning. These groups represent a significant, often unquantifiable proportion of the population in Latin America and worldwide. Even more troubling is the risk that, in the absence of effective protection and social inclusion policies, such conditions may contribute to environments that foster future involvement in delinquent activities.

Child and Adolescent Labor from an Educational Perspective

According to Pérez (2021), "work represents any activity carried out by human beings with the purpose of producing goods and services that enable them to satisfy their own needs and those of others." It may be added that, in most cases, such activity is remunerated and should be protected by the State in which it is performed. Nevertheless, in alignment with the definition established by the International Labor Organization (ILO), 'child labor' is conceptualized as work that deprives children of their childhood, their potential, and their dignity, while proving detrimental to their physical and psychological development. Furthermore, The International Labor Organization and UNICEF have indicated that the global objective of eradicating child labor by 2025 has not been achieved, despite a 47% reduction since the year 2000.

The International Labor Organization and other organizations promote awareness-raising campaigns and play a key role in regional initiatives such as The Latin America and the Caribbean Free of Child Labor, aimed at accelerating the elimination of child labor. According to recent data from The International Labor Organization and other sources, approximately 370,000 children and adolescents in Ecuador are engaged in child labor, representing a 37% increase compared to 2022. These figures equivalent to 8% of the child population vary significantly across provinces, with rural areas being the most affected. The most common sectors involving child labor include agriculture, services, and domestic work.

The same report highlights that Indigenous, Afro-descendant children and adolescents, those with disabilities, and those living in rural areas face a higher risk of exclusion or educational lag. There is a stark disparity between the quality of education received by children in rural areas and those with internet access in urban settings. This reveals the vulnerability of the education system, not only in terms of infrastructure, but also due to serious deficiencies in teaching staff and access to technological resources necessary for delivering classes through online platforms even when limited to low-quality connections or applications such as WhatsApp. Educational exclusion at every stage further perpetuates conditions of poverty and constitutes one of the main drivers of the global learning crisis.

The analyzed data show that, in several countries, school attendance among the population of secondary-school age falls below 50% in rural areas. They also reveal a clear link between child labor and school absenteeism: students aged 12 to 14 who are engaged in work, although many remain enrolled, display lower attendance rates compared to their non-working peers.

It should be noted that a large proportion of children and adolescents work within the informal sector, often in public spaces, engaging in activities such as selling fruits and vegetables, dry goods, “watching cars,” and many other forms of labor that are difficult to fully capture. In doing so, they are exposed to adverse environmental conditions—rain, intense sunlight, noise, and vehicle emissions—as well as verbal and physical abuse from third parties.

As can be observed, these findings allow for critical reflection on the complex social reality under study and its implications for the protection of the human rights of these highly vulnerable groups. Due to their age, children and adolescents are particularly susceptible to violations of their fundamental rights. In this context, the State, together with families and society as a whole, plays a decisive role. Through legal frameworks and regulatory systems, these actors bear the responsibility to guarantee, enforce, and ensure the effective realization of such rights, both in terms of normative regulation of social behavior and within a broader ontological understanding of human dignity and development.

Child labor in contexts of vulnerability

The foregoing discussion constitutes a conceptual framework to demonstrate that the enforceability of legal provisions issued by those institutions responsible for safeguarding working children and adolescents is a practice rooted in the very origins of law. Effective protection requires an in-depth analysis of the real conditions under which protective bodies operate, as they must act with the utmost urgency to prevent further exploitation and suffering, as well as to safeguard children from being deprived of their childhood and future prospects.

This objective remains an aspiration shared by all human societies, yet it has not been fully achieved. Despite the strong conviction that such protection should exist, legal scholars and social theorists have consistently recognized the critical importance of establishing truly effective procedures as an essential condition for the proper and just application of laws concerning working children and adolescents.

In summary, although the legal processes designed to protect this vulnerable group are inherently instrumental, they are of paramount importance. They ensure that the defense of human rights does not become a mere abstraction or “dead letter” in the face of potential non-compliance. To better understand the significance of this protection, one might envision an ideal scenario in which citizens are fully aware of their rights, duties, and legal obligations; under such circumstances, individuals would be genuinely committed to defending their rights.

From the perspective of protection, minors engaged in productive activities whether providing goods or services should receive appropriate support. This includes fair compensation for their labor, understood as remuneration that allows them to meet basic economic needs and secure essential goods and services. Remuneration thus becomes a crucial factor in ensuring minimum standards of well-being.

However, this labor modality is often characterized by various forms of abuse, violence, and both direct and indirect violations affecting moral integrity and psychological well-being. Such conditions frequently generate stress and undermine the value of the child's or adolescent's effort, regardless of their willingness or efficiency in performing assigned tasks. For this reason, it is essential to examine the legal framework that protects this vulnerable group, recognizing that child labor constitutes a global phenomenon where the reality of facts often prevail over formal legal appearances.

Considering the above, it must be emphasized that working minors are typically engaged in precarious, low-quality jobs, which are commonly performed by the most vulnerable sectors due to limited qualifications and the urgent need to accept any available work. Consequently, it is necessary to progressively withdraw children and adolescents from such activities, as the priority should not be economic gain but rather the full enjoyment of childhood and adolescence, fostering their moral and integral development as individuals who require significant protection from the Ecuador State.

Since the year 2000, child labor has been reduced by nearly half, from 246 million to 138 million in 2024. Nevertheless, progress remains too slow, and the global goal of eliminating child labor by 2025 has not been achieved. According to The International Labor Organization (2025), current rates of progress would need to be eleven times faster to eradicate this phenomenon within the next five years. Despite continued improvements, recent data also reveal a concerning increase in child labor between 2016 and 2020. The agricultural sector remains the largest contributor (61%), followed by services (27%) including domestic work and market sales and industry (13%), such as mining and manufacturing.

It should also be noted that, in most cases, working minors are either underpaid or receive no remuneration at all. As a result, they remain trapped in poverty, and their potential contribution to their families is often minimal, leading to a loss of both time and future opportunities.

Efforts led by organizations dedicated to protecting children and adolescents have promoted systems aimed at achieving equality, which has become a central paradigm in their advocacy. These initiatives seek innovative and inclusive solutions to facilitate school integration; however, such efforts often face social barriers, including limited awareness of existing protection mechanisms and a lack of political will to implement effective integration strategies.

Paradoxically, although the Ecuador State constitutionally and legally recognizes work as a social process, there remains a significant number of unemployed adolescents with limited access to formal employment. When employment is obtained, it is often characterized by minimum wages and, in some cases, the absence of legally mandated benefits.

In this regard, The Constitution of the Republic of Ecuador, specifically Article 46(2), establishes the principle of special protection against any form of labor or economic exploitation of adolescents. It explicitly prohibits employment for children under the age of fifteen and stipulates that any permissible work must be exceptional, non-hazardous, and must not interfere with the right to education or the individual's comprehensive personal development.

Accordingly, it is important to highlight that the national legal framework designed to protect this specific social group is The Organic Code of Childhood and Adolescence (2014), which regulates, under Title V "On the Work of Children and Adolescents" (Articles 81 to 95) the conditions and legal parameters governing such activities, with particular emphasis on the provisions set forth in Article 81

Article 81. Right to Protection against Labor Exploitation.

"Children and adolescents have the right to be protected by the State, society, and the family against labor and economic exploitation, as well as against any form of slavery, servitude, forced labor, or work that is harmful to their health or to their physical, mental, spiritual, moral, or social development, or that may hinder the exercise of their right to education."

This implies that no child or adolescent should be engaged in labor; however, if there is an unavoidable necessity to work, such activity must be carried out under special conditions that do not affect their physical or mental health, nor restrict their right to attend school. Furthermore, they should receive fair remuneration consistent with their work in order to meet their own needs and those of their family.

Under these principles of protection, the hiring of persons under fifteen years of age is prohibited in Ecuador, in accordance with Article 82 of The Organic Code of Childhood and Adolescence, which establishes: "Article 82. Minimum Age for Employment.

The minimum age for all types of work, including domestic service, is set at fifteen years, subject to the exceptions provided in this Code, as well as in other laws and international instruments with legal force in the country." It is also important to note that the working day must not exceed six hours per day, nor more than five days per week, and must not interfere with the right to education.

Although decent work is a fundamental element for personal development and the respect for human dignity, in the case of children and adolescents, education plays a central role in achieving their integral development. It is through education that they can grow, mature, and fully develop their intellectual and cognitive abilities, enabling them to reach their full potential in a holistic and sustainable way.

As established in Article 44 of The Constitution of the Republic of Ecuador: "The State, society, and the family shall prioritize the integral development of children and adolescents and ensure the full exercise of their rights; the principle of their best interests shall be upheld, and their rights shall prevail over those of others." From this perspective, it is necessary to formulate propositions grounded in the underlying semantic framework of this issue.

For this to occur, educational institutions, industry, and government must work collaboratively to ensure an equitable workforce. In this regard, Ramírez (2014) emphasizes that this social space is highly relevant for academia, society, and the workers involved, as they constitute the future generation that will contribute to national development. These theoretical contributions encourage continued reflection and reaffirm the importance of upholding their rights across all spheres political, economic, social, legal, and cultural, alignment with principles of social justice.

To achieve this structural transformation within the Ecuadorian educational system, the relevant authorities must design and sustain a high-quality academic plan.

Poverty as a driving force of child and adolescent labor

It is both relevant and illustrative to recall the position of UNICEF regarding child labor, which states that not all tasks performed by a child constitute child labor. Rather, it refers to activities that demand excessive hours, are inappropriate for the child's age, pose risks to their health and well-being, deprive them of playtime, and hinder their access to education. This doctrinal perspective is grounded in The Declaration of the Rights of the Child, which has been ratified by Ecuador and is reflected in its constitutional framework.

Accordingly, this study invites reflection on this social problem, which is not limited to developing countries but is a global phenomenon. Therefore, it is essential to continue striving to ensure that, at least within Ecuador, children and adolescents are no longer deprived of their aspirations and fundamental rights.

Concluding considerations and reflections

In Latin America, and particularly in Ecuador, child and adolescent labor persists across multiple sectors. This social reality demands programs, public policies, and regulatory frameworks that effectively guarantee the rights of working minors. Despite existing legal protections, many are still subjected to exploitation by individuals or legal entities that employ them, even on a part-time basis, and in some cases, by their own families. These circumstances reflect a deeply complex social condition.

In the absence of effective implementation of government programs at both national and regional levels, organizations representing these minors have taken on the role of promoting their integration, recognizing the severity of the issue. Institutions such as UNICEF and International Labor Organization has played a central role. In Ecuador, The Ministry of Economic and Social Inclusion has developed action plans for the prevention, awareness, and eradication of child labor, as well as for promoting dignified working conditions for adolescents (2022–2026), including initiatives implemented by the Municipio del Distrito Metropolitano de Quito.

This concern is framed within compliance with constitutional and legal principles established in Ecuadorian legislation, emphasizing equality and the need to ensure living conditions that enable children and adolescents to achieve integral development and fully enjoy their childhood and youth.

Therefore, it is essential to develop mechanisms of social coexistence that define how members of society interact with one another, engage with their environment, and access the resources necessary to guarantee their survival and well-being, through age-appropriate activities that do not compromise their future.

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Translation Note: Special thanks to professor Michelle Plaza Martínez (University of Guayaquil) for the academic translation of this manuscript into English.

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Strengthening education in entrepreneurship and management through a virtual classroom for first-year BGU students

Fortalecimiento de educación en emprendimiento y gestión mediante aula virtual para estudiantes de primero BGU

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Received date: 26/03/2026

Acceptance date: 11/04/2026

Abstract

The objective of this study is to optimize the educational process in the subject of Entrepreneurship and Management for first-year Unified General Baccalaureate students during the 2023-2024 school year, through the incorporation of Information and Communication Technologies (ICT). Both qualitative and quantitative approaches were used, conducting surveys with first-year Unified General Baccalaureate students via Google Forms to collect data and obtain statistical results. The study focused on the integration of ICT and Learning and Knowledge Technologies (LKT), evaluating digital resources such as videoconferences, online platforms, video tutorials, and discussion forums. The results showed a limited understanding by students when using information obtained through traditional methodologies. However, the creation of a Virtual Classroom with specific and engaging content for the subject of Entrepreneurship and Management increased student interest. A virtual learning classroom was designed to meet the needs of students in the area of Entrepreneurship and Management, generating interactive activities through the virtual classroom to improve academic performance and analyze the impact of the virtual classroom on students in this subject. In summary, establishing a Virtual Classroom is essential to overcome the limitations of traditional methodologies, as ICT and LKT facilitate information and improve understanding and effective learning. The creation of a Virtual Classroom with educational material enhances the teaching process in the subject of Entrepreneurship and Management.

Keywords: virtual classroom, ict (information and communication technologies), entrepreneurship and management.

Resumen

El objetivo de este estudio es optimizar el proceso educativo en la asignatura de Emprendimiento y Gestión para los estudiantes de primer año de Bachillerato General Unificado durante el año escolar 2023-2024, mediante la incorporación de Tecnologías de la Información y la Comunicación (TIC). Se utilizaron enfoques tanto cualitativos como cuantitativos, realizando encuestas a los estudiantes de primer año de Bachillerato General Unificado a través de Google Forms para recopilar datos y obtener resultados estadísticos. El estudio se centró en la integración de TIC y Tecnologías del Aprendizaje y Conocimiento (TAC), evaluando recursos digitales como videoconferencias, plataformas en línea, tutoriales en video y foros de discusión. Los resultados mostraron una comprensión limitada por parte de los estudiantes al utilizar la información obtenida mediante metodologías tradicionales. Sin embargo, la creación de un Aula Virtual con contenido específico y atractivo para la asignatura de Emprendimiento y Gestión aumentó el interés de los estudiantes. Se diseñó un aula virtual de aprendizaje que se ajusta a las necesidades de los estudiantes en el área de Emprendimiento y Gestión, generando actividades interactivas a través del aula virtual para mejorar el rendimiento académico y analizar el impacto del aula virtual en los estudiantes en esta asignatura. En resumen, establecer un Aula Virtual es esencial para superar las limitaciones de las metodologías tradicionales, ya que las TIC y TAC facilitan la información y mejoran la comprensión y el aprendizaje efectivo. La creación de un Aula Virtual con material educativo mejora el proceso de enseñanza en la asignatura de Emprendimiento y Gestión.

Palabras clave: aula virtual, tic (tecnologías de la información y la comunicación), emprendimiento y gestión.

Introduction

Within the contemporary educational landscape, online learning environments have gained considerable relevance in secondary education, particularly due to the COVID-19 pandemic and ongoing technological advancements in academic instruction. These digital classrooms, as educational resources, have been widely embraced by educational communities. This study aims to optimize cognitive development in the subject of Entrepreneurship and Management through the implementation of a Virtual Learning Environment.

Macías et al. (2021) indicate that Information and Communication Technologies (ICT) have enhanced global productivity by facilitating the transmission of vast quantities of information worldwide. Consequently, their integration into pedagogical methodologies has proven highly significant (p. 26).

The current educational curriculum emphasizes the development of competencies that extend beyond conventional content delivery, such as textbooks or standardized assessments. Accordingly, the strategic incorporation of ICT in academic instruction is prioritized, particularly within the subject of Entrepreneurship and Management, which cultivates essential competencies enabling students to perform effectively in professional contexts.

In contrast, Tancan Meneses (2023), in the publication *Social Imaginary Regarding Technological Tools*, argues that the use of technological tools in educational settings is fundamental to progress and transformation in instructional strategies. Students construct knowledge through self-directed learning and collaborative practices, both within and beyond institutional boundaries (p. 32).

To enhance student competencies, Virtual Learning Environments are employed, enabling continuous education unrestricted by temporal or spatial constraints, thereby stimulating creativity throughout the educational process. Furthermore, educators consolidate knowledge through appropriate scaffolding, assuming an essential role in inspiring and guiding students throughout their learning journey.

This research was conducted during the 2023-2024 academic period, from October 2023 to March 2024, and focused on developing a Virtual Learning Environment for the subject of Entrepreneurship and Management in the first year of the Unified General Baccalaureate. This VLE enables students to interact dynamically and engagingly with reinforcing content related to the subject matter, facilitating more effective and motivating learning experiences. With these delimitations established, the present investigation follows a clearly defined structure.

The research adopts a mixed-methods, non-experimental design. Data collection employed multiple techniques, including surveys, observation protocols, in-depth interviews, and Likert-scale instruments. These tools enabled a comprehensive and nuanced understanding of student perceptions and the pedagogical impact of the Virtual Learning Environment. A non-probability sampling strategy was implemented, encompassing a significant number of student surveys that provided valuable data for analysis.

The primary objective of this research is to demonstrate how the implementation of a Virtual Learning Environment can enhance the educational process in the subject of Entrepreneurship and Management, fostering an interactive and accessible learning ecosystem. Additionally, this study seeks to underscore the significance of Information and Communication Technologies (ICT) in contemporary education and examine how their strategic integration can transform and enrich students' educational experiences.

Methods

This study was conducted during the 2023-2024 academic period, from October 2023 to March 2024, and focused on developing a Virtual Learning Environment for the subject of Entrepreneurship and Management in the first year of the Unified General Baccalaureate. This VLE offers students the opportunity to interact dynamically and engagingly with reinforcing content related to the subject matter, promoting more effective and stimulating learning experiences. With these methodological delimitations established, the present investigation follows a clearly defined organizational structure.

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Throughout the development of this research, spanning October 2023 to March 2024, the implementation of the Virtual Learning Environment was analyzed to strengthen the educational process in the subject of Entrepreneurship and Management for first-year Unified General Baccalaureate students. Both qualitative and quantitative methodologies were employed.

Cook et al. (1986) define that: "The role of qualitative methods, whether employed independently or in conjunction with quantitative methods, has attracted the attention of diverse stakeholders involved in the administration and evaluation of social intervention programs."

Qualitative methods are valuable for examining processes related to students' experiences with the Virtual Learning Environment. This includes the application of surveys to gain in-depth understanding of how users interact with the VLE and how these interactions influence their learning processes. Conversely, quantitative methods enable the measurement of implementation effectiveness.

Ángel & Brítez (2021) state that: "The media and instruments utilized must function as tools that support the data collection process and as mechanisms for bridging objectives with reality".

Therefore, the influence of qualitative instruments is emphasized, as they enable a more objective and direct understanding of respondents' behaviors in relation to the data collection topic. The instruments employed in this research include:

Qualitative Methods:

Observation: This technique enables understanding of the internal dynamics of the educational institution by participating as observers to comprehend how students and teachers interact when delivering the subject under study, using platforms, and engaging with one another.

Quantitative Methods:

Questionnaire: This instrument was designed to ensure student comprehension of each posed question, incorporating variables within the items to guarantee that the survey remains coherent, clear, and concise during completion.

Statistical Analysis: Analyses of the administered questionnaires were conducted to generate conclusions regarding student usage and management of the Virtual Learning Environment. Survey items directed at students employed a summative four-point scale: Never, Occasionally, Often, Always.

Theoretical Methods:

Literature Review: Existing literature on Virtual Learning Environments and their impact on learning was investigated to establish a theoretical foundation, including theories of online learning, motivation theories, digital learning platforms, etc.

Theoretical Modeling: A theoretical model was developed to explain the management of the Virtual Learning Environment to ensure an appropriate user experience for students, based on existing theories adapted to the context of this research project.

Empirical Methods:

Data Collection: A 10-item survey was administered to first-year Unified General Baccalaureate students, based on their experience with gamified platforms and the utility of ICT, which pave the way for the application of Technology-Enhanced Learning (TEL).

Data Processing: Data obtained for this research were collected via Google Forms, which provides information for data processing. Using Microsoft Office programs such as Excel, statistical graphs were generated for data analysis. This process enabled a clear understanding of trends regarding the use of gamified activities in learning the subject of Entrepreneurship and Management.

Population and Sample: The study population is crucial, as it represents the context where the research is conducted and where primary data are obtained to understand and address the research problem. According to Ojeda, P. (2020), the population is defined as: "Accessible elements or units of analysis belonging to the specific scope where the study is developed." In this research, first-year UGB students constitute the target population.

The sample enables the selection of a specific subgroup from the population to understand the general interpretation of the existing problem. In this exploration, with a population smaller than 150 individuals, a non-probability sampling approach was employed, administering the research instrument to the entire population without requiring additional sampling procedures.

Research Design Statement: Learning methodologies have undergone constant evolution in recent years due to circumstances such as the COVID-19 pandemic, which shifted education from face-to-face to virtual modalities in teaching-learning processes, alongside technological innovations that have introduced significant variations to traditional content delivery. Virtual Learning Environments are indispensable in contemporary education, strengthening knowledge and competencies in the area of Entrepreneurship and Management, a discipline essential for citizen formation and a tool for innovation and entrepreneurial initiative.

Significance, Social Relevance, Novelty, and Scientific Currency: Virtual Learning Environments provide students with educational content accessible from any location without temporal constraints, offering flexibility in study schedules, as evidenced during the 2019-2020 pandemic when face-to-face instruction became a health-risky endeavor. Thus, creativity and innovation are fostered through personalized and dynamic gamification tools.

Society requires citizens equipped with entrepreneurship and management competencies, capable of addressing social needs in the labor market, generating communities that contribute innovative ideas supported by digital technological tools, and promoting economic and social development.

Research on Virtual Learning Environments and their impact on entrepreneurship and management education is highly relevant, as it proposes innovation in the teaching-learning process, aligning with the emerging knowledge society and the digitalized world, not only in education but also in business innovation and administration through technological resources.

Results

The research conducted during the 2023-2024 academic period, from October 2023 to March 2024, focused on implementing a Virtual Learning Environment for the subject of Entrepreneurship and Management among first-year Unified General Baccalaureate students. Findings obtained through qualitative and quantitative methods reveal several significant insights.

Qualitative Methods: Observation enabled understanding of the internal classroom dynamics, illustrating how students and teachers interact when utilizing the virtual platform. Increased student participation and collaboration were observed, suggesting that the Virtual Learning Environment fosters a more interactive and engaging learning ecosystem.

Quantitative Methods: Surveys administered to students via Google Forms indicated improved comprehension and retention of subject content. Collected data revealed that 85% of students found the Virtual Learning Environment useful and motivating. Statistical analysis of the questionnaires, using a four-point summative scale (Never, Occasionally, Often, Always), reflected that 70% of students frequently use the Virtual Learning Environment to reinforce their knowledge.

Literature Review and Theoretical Modeling: The literature review on the use of Virtual Learning Environments and their impact on learning confirmed the significance of ICT in contemporary education. The theoretical model developed for this research provided a clear framework for the implementation and utilization of the Virtual Learning Environment, adapted to the specific needs of students.

Data Collection and Processing: The 10-item survey administered to students revealed that 90% consider gamified platforms and ICT essential for their learning. Data processed via Excel enabled the generation of statistical graphs illustrating the positive trend in the use of gamified activities for learning the subject of Entrepreneurship and Management.

Population and Sample: The study population included first-year UGB students, with a non-probability sample due to the relatively small population size (fewer than 150 individuals). This enabled administration of the research instrument to the entire population without requiring additional sampling procedures.

Survey Results

Do you consider that the activities employed by the teacher during classes, such as project-based learning (collaborative), active learning, participatory learning, and self-directed learning, are motivating?

Table 1

Motivation Through Instructional Models Implemented by the Teacher

Ítem	Category	Frequency	Percentage
1	Never	8	11 %
2	Occasionally	36	51 %
3	Often	14	20 %
4	Always	13	18 %
TOTAL		71	100 %

Source: Author's own elaboration based on the survey administered to General Unified Baccalaureate students (2024).

Analysis reveals that approximately 36% of students express a lack of motivation when engaging in regular classroom academic activities. This lack of motivation may stem from various factors, including the repetitiveness of conventional pedagogical methodologies, limited opportunities for active interaction, and insufficient integration of technological resources capable of capturing student attention.

To address this issue, it is essential to implement creative strategies that foster a more engaging and motivating learning environment. The integration of Information and Communication Technologies (ICT) and the utilization of Virtual Learning Environments may constitute an effective alternative for enhancing student motivation and engagement. These tools enable the development of interactive and personalized activities that not only support content comprehension but also promote active participation and interest in learning.

Furthermore, ongoing professional development for educators in the utilization of these technologies is essential, enabling them to design and implement pedagogical methodologies that address student needs and preferences. In this manner, the educational process can be transformed, rendering it more dynamic and meaningful for students, thereby contributing to the optimization of academic performance and holistic development.

Considering that a Virtual Learning Environment is a space where multimedia content can be published, do you consider a VLE with pedagogical content appropriate for implementation in contemporary education?

Tabla 2

Virtual Learning Environment with Pedagogical Content

Ítem	Category	Frequency	Percentage
1	Never	0	0 %
2	Occasionally	2	3 %
3	Often	22	31 %
4	Always	47	66 %
TOTAL		71	100 %

Source: Author's own elaboration based on the survey administered to General Unified Baccalaureate students (2024).

The presented data demonstrate the effectiveness of integrating Virtual Learning Environments with appropriate pedagogical materials, as they have become fundamental resources in contemporary education. The incorporation of these digital classrooms has facilitated student access to educational resources in a more flexible and adaptive manner, significantly enhancing their learning processes.

Furthermore, digital classrooms foster communication between students and educators, promoting a collaborative and active learning environment. This not only elevates student motivation and engagement but also provides opportunities to develop technological competencies and self-directed learning skills that are essential in today's context.

The capacity of Virtual Learning Environments to deliver interactive and multimedia content—such as videos, simulations, and discussion forums—enhances the educational experience and renders learning more engaging and efficient. Students can progress at their own pace, review content as needed, and participate in exercises that reinforce their understanding of key concepts.

In conclusion, the development of Virtual Learning Environments with appropriate pedagogical materials not only addresses current educational demands but also equips students to confront future challenges, providing them with the tools and competencies necessary to succeed in an increasingly digital and globalized world.

Would you utilize a Virtual Learning Environment to acquire knowledge related to the subject of Entrepreneurship and Management?

Tabla 3
Virtual Learning Environment as a Learning Ecosystem

Ítem	Category	Frequency	Percentage
1	Never	1	1 %
2	Occasionally	3	4 %
3	Often	11	16 %
4	Always	56	79 %
TOTAL		71	100 %

Source: Author's own elaboration based on the survey administered to General Unified Baccalaureate students (2024).

Resources available on these platforms encompass supporting materials, collaborative workspaces, interactive digital resources, and multimedia elements, which promote autonomous and meaningful learning. The utilization of Virtual Learning Environments provides students with access to diverse supporting resources, such as documents, slide presentations, and supplementary readings, which complement and reinforce topics addressed in face-to-face sessions. These resources are accessible anytime and anywhere, facilitating study and review at the student's own pace.

Collaborative workspaces within online classrooms promote cooperation and teamwork among students. Through discussion forums, synchronous conversations, and group assignments, students have the opportunity to exchange ideas, clarify doubts, and collaborate on task completion, thereby enhancing their educational process and fostering interpersonal and communicative competencies.

Interactive digital resources, including simulations, educational games, and online quizzes, render learning more dynamic and engaging. These components enable students to apply acquired knowledge in enjoyable and practical ways, supporting comprehension and retention of information.

Multimedia resources, such as videos, podcasts, and animated presentations, provide visual and auditory modes of knowledge acquisition, which may be particularly beneficial for students with diverse learning styles. These multimedia resources not only capture student attention but also facilitate exploration of topics from

multiple perspectives. These tools and materials accessible through Virtual Learning Environments promote more autonomous and meaningful education, wherein students assume protagonism in their own learning processes.

The accessibility and flexibility of Virtual Learning Environments facilitate the development of critical and creative competencies, more effectively preparing students to confront challenges in professional and academic contexts.

Figure 1

Proposed Intervention



Note. Screenshot of the home interface of the developed virtual environment (2024).

Figure 2

Secondary module of the developed virtual platform.



Note. Screenshot of the academic activities management section (2024).

It is important to consider that students require effective tools to support their learning. Therefore, the Virtual Learning Environment must be designed with attention to the specific needs of learners to ensure successful implementation. When asked about the utility of employing a Virtual Learning Environment for the subject of Entrepreneurship and Management, results indicated that the majority of students consider it very useful or useful. These findings underscore the necessity of developing appropriate strategies to integrate the Virtual Learning Environment into the educational process, ensuring that its impact is significant and beneficial for students, and that it does not go unnoticed in their academic formation.

Discussion

The present research, "Implementation of a Virtual Learning Environment for the Subject of Entrepreneurship and Management in the First Year of Unified General Baccalaureate," addresses the need to enhance the educational process through the utilization of digital technologies. It acknowledges the limitations inherent in traditional pedagogical methodologies and emphasizes the importance of developing innovative strategies that integrate Information and Communication Technologies (ICT) and Technology-Enhanced Learning (TEL) into instructional practice.

Identifying deficiencies in the use of traditional methodologies should be viewed as an opportunity to implement technological tools that improve educational quality. This research focuses on how a Virtual Learning Environment can transform learning, rendering it more interactive and engaging for students, and on how these tools can be adapted to satisfy the specific needs of learners.

Surveys revealed that students consider the use of a Virtual Learning Environment highly useful for the subject of Entrepreneurship and Management. They prefer accessing interactive and multimedia educational resources that enable autonomous and meaningful learning. These findings underscore the necessity of designing and implementing Virtual Learning Environments that respond to student expectations and needs, ensuring that the impact of these tools is positive and significant in their academic formation.

Only through the effective integration of ICT and TEL into the educational process can the objectives proposed in this research be achieved, thereby improving academic performance and student motivation, and preparing learners to confront challenges in professional and academic contexts.

Conclusions

The implementation of a Virtual Learning Environment for the subject of Entrepreneurship and Management has proven to be an effective tool for enhancing the educational process. Students have demonstrated increased motivation and engagement when interacting with the digital and multimedia resources available on the platform. This instructional modality not only facilitates access to supporting materials but also promotes autonomous and meaningful learning, adapted to the individual needs of each student.

The integration of Information and Communication Technologies (ICT) and Technology-Enhanced Learning (TEL) within the Virtual Learning Environment has enabled the creation of a more dynamic and interactive learning ecosystem. Students have been able to collaborate and participate actively in their educational process, resulting in improved comprehension and retention of content. Furthermore, the use of tools such as videoconferencing, discussion forums, and online quizzes has enriched the educational experience, rendering learning more engaging and effective.

The findings of this research underscore the importance of adapting pedagogical methodologies to the demands of the modern world. Education must evolve to incorporate digital technologies that facilitate learning and prepare students to confront future challenges. The creation of Virtual Learning Environments with appropriate pedagogical content not only improves academic performance but also develops critical and creative competencies in students, contributing to their holistic formation and success in professional and academic domains.

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Translation Note: Special thanks to professor Gabriela Melo Hanna (University of Guayaquil) for the academic translation of this manuscript into English.

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Poor girls, boys, and adolescents. A social reality

Niñas, niños y adolescentes pobres. Una realidad social

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Received date: 26/03/2026

Acceptance date: 26/04/2026

Abstract

This article focuses on a social reality that has occurred, is occurring, and will continue to occur in South America, and indeed, in almost the entire world: the despair and anguish that characterize the lives of minors who endure cruel hardships considered a form of modern-day slavery, without the rights guaranteed to them by most laws worldwide. This research, presented using an analytical and hermeneutic approach, highlights the grave situation of this societal group, which is hindering the achievement of the Millennium Development Goals because this delicate and crucial issue has not been addressed with due seriousness. This equates, according to some assumptions regarding this unfinished delineation of integration, to the increasing weakening of the family institution as its members are forced to find ways to alleviate their situation, including children and adolescents who are pressured to contribute some income instead of attending school and "wasting time" there, thus childishly juggling the disruption of their childhood or youthful future.

Keywords: rights, minors, extreme poverty.

Resumen

El propósito del artículo es el enfoque de una realidad social que ha ocurrido, ocurre y seguirá ocurriendo en Suramérica y por no decir, en casi todo el mundo, es el desconsuelo y la angustia por la cual transcurre "la vida" de las personas minoriles que soportan las crueles vicisitudes que se considera como una "moderna" esclavitud sin que priven los Derechos que la mayoría de las leyes en el mundo están dictadas para protegerles. Esta investigación se presenta en la modalidad Documental, Analítica y Hermenéutica donde se evidencia la grave situación de este grupo societal que se aleja del cumplimiento de los objetivos planteados en la Cumbre del Milenio por no haberse tomado con la debida seriedad este delicado y transcendental contenido. Lo que equivale, a algunos supuestos referidos a este inacabado deslinde de integración, a que cada vez más se debilita la institución familiar al tener sus miembros que rebuscarse un medio para aminorar la situación, incluyendo a las niñas, niños y adolescentes que se les inculca la obligación de colaborar con algún ingreso en vez de asistir a la escuela y "perder el tiempo" en ella puerilizando en malabarismos la ruptura de su infantil o juvenil futuro.

Palabras clave: derechos, personas minoriles, pobreza extrema.

Introduction

Taking into account the intricate context of the redefinition of power and the immoral concentration of wealth among certain individuals, in contradiction with an expansion and spread of poverty and, with it, hunger, as a consideration of the secular individual-society dilemma, always trusting in the expectations of a well-being that never arrives, perpetually evocative of great human sensitivity—it is for this reason that this minority group, composed of girls, boys, and adolescents, needs the necessary assistance to escape or change this situation. And if such assistance is not provided appropriately, this societal group will not ‘learn to fish while being given the fish,’ which will, paradoxically, lead them to remain poor.

From this perspective, economic misfortune and insufficiency must be approached from a myriad of coincidences or as an emotional disorder that can cause psychosocial failure or decline marked by deprivation, as a result of the cause-effect relationship. Therefore, it must be considered a multidisciplinary and complex circumstance from the moment the process of impoverishment begins until, through certain procedures, it is transformed through the evolution, progress, and development of the groups involved in this economic situation. Otherwise, these societal collectives will remain in the same situation indefinitely, excluded from the trappings of progress, from the erosion of institutional frameworks to the fragmentation of the social fabric and the influence of external factors. Hence, according to Guerra Velásquez (2009:143), who states: ‘Numerous are the evaluations and discussions that include historical, economic, cultural, and social analyses among the causes of poverty in the world.

This situation, which leaves very little to address the sectoral needs of its immense demand, increases the number of ‘boys and girls of and on the street’ as future unemployed individuals, thus perpetuating the culture of hunger and, with it, life in unhealthy, disorderly shantytowns—yet marked by complexity and chaos—simultaneously plagued by major disruptions in their changing reality, subject to the contingencies of time and space in which ‘one lives,’ and further enveloped in uncertainties and dreams of changes concerning the inequalities and differences that arouse the fears awakened by their altruistic side.

These stereotypes have reached proportions insufficiently addressed by the social sciences. Therefore, each governmental system, with the expediency that circumstances demand, must assume the inescapable commitment to promote concrete political actions to combat hunger and extreme poverty in this part of the continent—one as a consequence of the other—and to consolidate comprehensive educational, economic, and health systems that include and incorporate these individuals into a genuine democratic system of freedom, so that they may have a future different from the dark present they are currently experiencing.

It is public and well-known that these individuals who survive under conditions of extreme poverty, yet seek a formulation to build an identity based on facts of which there are thousands of pieces of evidence in this part of the continent—where it is noted that they sleep on cardboard boxes that the night provides them—have no hope that their situation will change, nor do they have confidence in themselves or in the authorities to change it, thereby becoming a harsh, undeniable, and unavoidable reality. This leads to one of the most dramatic situations in Latin America: ‘boys and girls of and on the street.’

These minors in situations of extreme poverty do not have a suitable place to spend the night; and if they do, it is an unhealthy shantytown lacking the necessary means of coexistence that the complexity, multidimensionality, and decline of reality demand. Consequently, they spend their lives on the street searching for sustenance, even if it comes from garbage. Because most have broken their family ties or these ties are very weak, they develop street survival strategies such as begging and certain marginal ‘jobs’ like ‘watching cars’ or selling some product in the informal economy—without this improving their conditions to enrich their reality or constructing a perspective of ‘family’ integration.

The particularity of these special societal groups is that they lack formal education, do not surpass the first grades of primary school, or are illiterate; and because they live on the street, they have no fixed place to situate themselves, simultaneously facing the inherent demands of a premise of openness in the sense of opening a theory to reality. Likewise, they suffer from inadequate nutrition, and their health is highly deficient, without achieving a fertile integration of one with the other. Following Mandry Llano (2009:163), who states: 'Health and poverty constitute two terms that are associated and closely related; almost always, this relationship is inversely proportional, that is, the less poverty, the greater the health; an increase in poverty corresponds to a deterioration in health.' To that extent, they do not find a congruent course of action, where reality remains perpetually postponed; any attempt to elucidate it is an exercise that cannot be allowed to succumb to the power of trivializations.

Furthermore, they lack family affection due to not having a nucleus in which to gather, so morality is not a privilege to be followed; and if it is necessary to beg or steal for sustenance, it must be done in order to survive. Another point to consider is that, just as they break relations with their family members as a factor of growth, they also do so with their community or neighborhood, forming street groups through forms of action, interaction, or contacts aligned with their same interests and subjected to similar risks, maintaining the same level of poverty and the losses of an aspiration within the warp of reality and the possibilities of the extension between the real and life itself, in a perpetual closure without openness.

Unfortunately, there is no exact number of how many minors are in this situation of extreme poverty in Latin America, a response that cannot be constructed because each country has a different rate, in addition to the individual growth of its population amid the effects of today's societies—which do not overlook the crucial nature of the ephemeral but exercise the confluences of the different and the unequal as a force field where the precariousness of the human condition, unjust distances, and pertinent ones continue to coexist as a construction of differences without possibilities for renewal, change, or ruptures in favor of freedom.

However, what is constant is that the number of people and families in this situation of extreme poverty is increasingly growing, due to the economic contraction generated post-COVID-19 and the political and economic situation of most countries in the region. Another consequence to consider is the abandonment of the father from the family nucleus, possibly due to domestic violence, leaving the mother and the rest of the offspring without corresponding sustenance, forcing the woman to go out to work or to send the minor children to the street to obtain some food to survive, she and the rest of her siblings—a situation not exempt from the apprehension between the implacable game of life to survive and the new searches for certainties that will not be, nor can be, accessible.

These human groups in critical poverty come from overcrowded households in slums and deprived areas, bounded by apprehension and need, unable to enter into the concept of a social structure. They are mostly found in nearby urban centers where formal or informal commerce is generated, where there is greater vehicular and pedestrian traffic to counteract the limitations of possibilities as a perpetual dynamic with an illusion of singularity.

This gives them guarantees of obtaining some sustenance from pious individuals who collaborate with them by offering some food or clothing upon seeing their condition of begging, as they are unkempt and wearing dirty, deteriorated clothes within the sphere of immediacy. In this sense, within this group remain minors who, due to not possessing an adequate education—that is, being illiterate—will join the ranks of the unemployed or underpaid workers with no expectations of improvement. Therefore, it is most likely that they will possibly increase the ranks of juvenile delinquents.

Hunger in the yotuh sector

The dehumanization of poverty and its dramatic expressions is a practice created to justify segregation and ethnic stereotypes, accepting an alleged tolerance of economic inequality, produced in its fully constitutive dynamism without exteriority, since the economically poor have always been linked to delinquency and violence by criminal justice, in addition to being associated with criminality in a denigrating manner. This signifies transversal referents and structural dimensions of complexity within the general conceptualization.

Another of the serious complications manifested by youth unemployment is the deployment of violence, crime, and the consumption and trafficking of prohibited substances, because they are recruited by criminal groups to join and increase criminal gangs, since they have no other means of survival in a society that discriminates against them for the mere fact of being poor and belonging to a humble family. This leads to, according to Alvarado Chacín (2003:433).

Corruption of various kinds that became widespread (...) along with economic recession, the constant decline of economic and social indicators, the deterioration of living conditions for the majority, and exclusion that even generated processes of social violence and anomie, sharpened contradictions, inequalities, and discontent, and led the collective to demand from the powers that be not only an end to poverty and exclusion but also the restoration of their hope through the construction of an inclusive political project, in which they would be taken into account and recognized as human beings and as citizens.

This impact, both at a personal and family level, notably affects Latin American countries, both individually and collectively, due to the absence of borders caused by human trafficking that occurs between different States, as populations seek to cover their basic needs by any means necessary, regardless of where they might achieve or obtain them.

Under these parameters, unemployment—as a worrying priority for this sector of the population—has increased even further, subsequently compounded by the health factor as a consequence of COVID-19, also being considered as the lack of jobs. This has been severely estimated among young citizens who have already completed their secondary education, causing a disincentive to achieve higher levels of education and better remuneration in the future, taking into account the daily processing of lived experience from the past and that which is constructed in the present.

This, without taking into consideration the extensive elucidation of the large percentage of young people who abandon their studies upon reasoning that it is useless to study if later they cannot escape poverty in the future or if they must dramatize it, because they cannot know what the immediacy of the next day holds for them or their final destiny, although always with the illusion that each one, in their diminutive solipsism, harbors a favorable change in their life—which almost mostly leads them to commit crimes to achieve, or at least momentarily, cover their primary need: 'hunger.'

Therefore, it is the limited access to the goods and services necessary for survival that causes the absence of minimum standards of well-being, such as health, education, housing, and full employment, which gives rise to—without this conduct being justified—their members committing crimes and being imprisoned with greater force than other social groups, with girls, boys, and adolescents being the most affected by 'inhabiting' an environment of poverty, delinquency, and misery.

The Latin American societal group comprised of persons under twenty years of age suffers the same or worse consequences as the rest of the low-income population, with the additional problems of unemployment, lack of education, and criminalization by authorities and the rest of the 'decent' population, who view the increase in juvenile delinquency with concern without addressing the main causes that provoke it. This problem of youth unemployment presents itself as a catastrophe for the economies of most countries in this part of the continent, due to the social and economic repercussions both for these individuals and for their families, aside from the consequences for the different governments, which will see an increase in violence due to the desperation of not being able to obtain sustenance for their maintenance, leading to regional political instability.

Another of the main problems presented by hunger in the youth population is the lack of capacity for them to access the educational system in their respective countries, because they cannot be incorporated due to 'budgetary constraints,' which notably affects future economies due to the lack of training of the workforce that will be required for the implementation of new technologies. Therefore, these particular societal groups are discriminated against and categorized as 'evil-doers and delinquents' by the rest of society without any general reason or due to particular and individual responsibilities, additionally suffering extreme and discriminatory mistreatment, which exacerbates confusion and distorts the original meaning of poverty, which is considered to be categorized and composed of outcast and incorrigible persons, regardless of whether each individual, alone or separately, and even within the participatory axis, is considered to form part of the shared foundation of poverty. Consequently, this generalized attitude generates fertile ground for stigmatization.

In this sense, the forgetfulness, disinterest, and neglect of the phenomenon called 'hunger' as a consequence of extreme poverty must not be accepted as an unsolvable social and economic situation for this segment of the population. Therefore, it is necessary for these groups to demand the attainment of Collective Rights in order to overcome once and for all, or at least minimize, the social and political discrimination and exclusion to which this sector of society is subjugated and subordinated. Thus, this cultural denigration to which this mistreated and invisibilized societal group is subjected by its own kind can be eliminated or at least attenuated through structural policies of improvement.

This, without taking into consideration the large percentage of young people who abandon their studies upon reasoning that it is useless to study in this useless and maladaptive system if later they cannot escape poverty, which leads them to perform precarious and underpaid jobs, or worse yet, to commit crimes to achieve, at least momentarily, covering their primary need, which is to satisfy or at least mitigate the suffering of hunger. The perspective of each of these beings is fundamentally a non-trans-situational subsistence, in the same proportions in which survival in all its forms manifests itself as 'their way of life.'

Although the family institution is considered a group united by consanguinity or law, in addition to mutually providing affection, love, and protection among its members, unfortunately the critical economic situation has almost made this bond disappear in these societal groups that are in critical poverty, which means that the entity of the family is increasingly weakened because all its members must scrutinize even garbage as a means to alleviate the lamentable situation of an uncertain and ungraspable future, given the extension of its factual fabric.

Under these parameters, girls and boys who participate in obtaining some sustenance are included, as they are instilled with the obligation to collaborate with some income instead of attending school and 'wasting time' there, according to their parents, which accentuates their condition of vagrancy—a condition that carries the particular significance for understanding the multiple effects of the radical differentiation and

distance between individuals and society. This situation and its forms of concretization increase the behavior of 'boys and girls of and on the street' as future unemployed individuals, perpetuating the culture of hunger and need that rests upon a relationship of immediate belief that leads them not to believe in nor accept 'another comfortable world,' and thus to maintain survival in unhealthy shantytowns.

Indeed, it is public and well-known that these individuals who survive under conditions of extreme poverty and with the notion of an admittedly imperfect society—facts of which there are thousands of pieces of evidence in this part of the continent, where it is stipulated that these people sleep outdoors on sidewalks, wherever the night finds them, lying on cardboard boxes—have no hope that their situation will change, nor do they have confidence in themselves or in the authorities to change it, in a kind of diffuse generalization of realities integrated into the processes of connection with the context, thereby becoming a harsh, undeniable, and unavoidable reality. This leads to one of the most dramatic situations in Latin America: the formation of boys and girls of and on the street.

This situation of helplessness of minors in critical circumstances is due, for the most part, to the absence of public policies that authorities and systems must dictate to control this scourge, regardless of the fact that governments are created for the improvement of countries. Although legal regulations in almost the entire world establish the duty to respect the right to security and protection of these minors as special subjects corresponding to their superior well-being precisely because they are boys, girls, and adolescents, in addition to human flourishing and the duty to maximize their prosperity and satisfaction as a deliberate end, the increase in extreme child and youth poverty and the change in the profile of the affected population are alarming. This is a relationship of complementarity between individual identity and collective identity.

In this regard, unfortunately, at present, the extreme situation of these minors means that more boys and girls from urban areas, previously middle class, now live in a considerable and relative poverty. It is public and well-known, as already noted, that these groups of minors in situations of excessive scarcity and destitution do not have an adequate, appropriate, or suitable place to spend the night; and if by chance they 'coexist with their family'—probably fragmented—they do so in an unhealthy shantytown without the necessary means of coexistence and under an identical sameness.

Therefore, most of 'their lives' are spent on the street searching for some sustenance, even if it is from garbage to satisfy their hunger. Most of them 'survive' alone or with a similar group, since most have broken their family ties or these ties are very weak; therefore, they develop street survival strategies such as begging and certain marginal 'jobs' like 'watching cars' or selling some product in the informal economy—a situation that escapes the order of its problematization, and most of these little beings suppose that 'this happens to others and not to them,' as a multiple consciousness in the lifeworld.

The particularity and intelligibility of the real and the social is that these child and youth societal groups lack formal education, do not surpass the first grades of primary school, or are illiterate; and because they live on the street, they have no fixed place to situate themselves. Likewise, they suffer from inadequate nutrition, and their health is highly deficient, which means a problem whose questions and answers are devised but not resolved by governmental spheres.

Furthermore, most lack family affection and love due to not having a nucleus in which to gather, so morality is not a privilege to be followed; and if it is necessary to beg or steal for daily sustenance, it must be done in order to survive.

Another point to consider is that, just as they break relations with their family members as a forced factor of involution, they also definitively separate themselves from their community or neighborhood where they were born or raised, forming street groups through forms of action, interaction, or contacts aligned with their same interests and subjected to similar risks, maintaining the same level of poverty. However, what is constant is that the number of people and families—not only boys, girls, and adolescents—in this situation of extreme poverty is increasingly growing, due to the economic contraction generated by the political situation of most countries in the region.

Another consequence to consider is the abandonment of the father from the family nucleus and, on some occasions, the mother as well—though not always—possibly due to domestic violence, which means leaving, in that case, the mother and the rest of the offspring without corresponding sustenance, forcing the woman to go out to work or to send the minor children to the street to obtain some food to survive, she and the rest of her siblings. This situation becomes a *Matiscentrada*, that is, a society centered around the mother. This quality does not guarantee possibilities for solving the problem, nor does it culminate the rupture that derives from an awareness of its partial condition.

These groups in critical poverty, without intentionality or awareness of their situation, come from overcrowded households in slums and deprived areas, and are cyclically and mostly found in nearby urban centers where formal or informal commerce is generated, where there is greater vehicular and pedestrian traffic, forming a natural relationship that immediacy implies. This gives them guarantees of obtaining some sustenance from pious individuals who collaborate with them by offering some food or clothing upon seeing their condition of begging, as they are unkempt and wearing dirty, deteriorated clothes given their objectified condition that is neither transferable nor transmissible.

In this sense, within this societal group remain minors who, due to not possessing an adequate education—that is, being illiterate—join the ranks of the unemployed or underpaid workers with no expectations of improvement. Therefore, it is most likely that they will increase the ranks of juvenile delinquents, having no glimmer of hope for change due to that experiential transit, with a consciousness permeated in representation of their own limits in an inadequate economic situation, with the condition of subjects who assume the problematization of the world in which they live under expectations that do not consist of a particular rationality.

The group comprised of persons, most of the time under twenty years of age, likewise suffers the same or worse consequences as the rest of the low-income population, with the additional problems of unemployment and underemployment due to lack of education and training, in addition to criminalization by authorities and the rest of the 'decent' population, who view the increase in juvenile delinquency with concern without addressing the main causes that provoke it, and without taking into account any adequate analytical reflection, but rather taking into consideration the representations of immediate experiences of the social world in which they dwell.

This problem of youth unemployment presents itself as a catastrophe for the economies of most countries in this part of the continent, due to the social and economic repercussions both for this societal group individually and for their families, aside from the consequences for the different governments, which will see an increase in internal violence due to the desperation of not being able to obtain adequate sustenance for their maintenance, leading to regional political instability. This affirmation corresponds to the order of representations that do not transcend the political order nor the possibility of structural change from an economic-social point of view.

Another of the main and serious problems presented by the despair in the youth population as a consequence of hunger and lack of capacity are the limitations in accessing the educational system in their respective countries—without falling into absolute limitation—in that it is almost always due to ‘budgetary constraints’ that they cannot be incorporated, which notably affects their future economies due to the lack of training of the adequate workforce required for the implementation of new technologies, as a finite and circumscribed starting point to solve a project with a futuristic vision as a conception of a multifactorial society in coexistence with one another.

However, even though education constitutes a factor of vital importance for individual and general personal development of each country, each young person must make the decision to study or not, with knowledge of the monetary costs that represent a significant portion of the meager income they may earn, which means: if they study, they do not eat; and if they eat, they cannot study—a secular issue of the question of the genesis of the social that cannot be resolved outside the consideration of the individual-society bipolarity. This school dropout is notably and negatively reflected in the skilled workforce, as the labor market increasingly demands greater and better knowledge.

Another factor, which is not a random indicator to consider, is that most educational systems in the southern part of the American continent do not train students ‘for work’—a forging constructed within the territory that each person fashions as a vital action from their own condition of the possibility of their existence, which barely transcends the boundaries of the family. Unfortunately, without implying a clear delimitation of boundaries or distancing from reality, neither a university degree nor a higher technical degree offers guarantees of access to employment; moreover, a young person who is illiterate has a greater probability of working than one who has completed primary or secondary education. This is due to the type of work that can be performed and the economic income to be received.

Another of the serious complications manifested by youth unemployment is the deployment of violence, crime, and the consumption and trafficking of prohibited substances, because young people are recruited by criminal gangs to join and increase criminal groups, since they have no other means of survival in a society that discriminates against them for the mere fact of being poor and belonging to humble families. This primary stage of this relationship is articulated from different sides and through different forms that begin in the most immediate exteriority, which barely transcends the residential boundaries where the family ‘dwells.’

This social impact, both at a personal and family level, notably affects Latin American countries, both individually and collectively, due to the absence of borders caused by human trafficking that occurs between different States, as populations seek to cover their basic needs by any means necessary, regardless of where they might achieve or obtain them, through the various forms in which the surrounding world and its referential contexts intervene in family spaces. This irregular situation leads to regional political instability because no government in the world is prepared to exercise control over such formidable immigration in a state of desperation.

According to the International Labour Organization (ILO), young people must choose between working in any lawful activity to somehow overcome extreme poverty—most of the time earning a meager wage, working long hours—or joining the informal economy by selling any dry goods or fruits, suffering climatic calamities and those caused by other people, or simply deciding not to work and dedicating themselves to criminal activities.

This panorama is the exclusion and poverty suffered by this population segment not only in this region of the continent but worldwide, which condescends to new structures as some substantial changes take place. This situation reflects the enormous magnitude of the intense crisis and uncertainty expressed in this sector of society. This youth behavior is intimately related to the rest of the Latin American population.

The poor who live in a human relationality where fear and hope converge with dignity have apparently become a governmental concern, having as a common denominator the desperate expression of this societal group, expressly singled out in electoral speeches as the most disadvantaged, but always promising social and economic well-being for all, without these programs being fulfilled or fully satisfying social demands.

This uncertainty translates into an impertinence to an imposition of adverse forces and to the increase of complexity as a despotic metaphor of the future. Therefore, these programs do not constitute a state policy to definitively end poverty but rather to somehow increase the country's economy, hoping that some devastated and helpless areas classified as extremely poor can develop economically.

It is necessary to have higher educational levels and less human deterioration due to nutritional and health problems so that youth groups can enter the labor market and try to escape poverty, although each individual refers to a unique and unrepeatably yet manifestly plural sociability when considering all these individual beings as a whole. However, education alone does not solve poverty; it certainly helps greatly if adequate economic conditions exist in the country. Therefore, one of the main problems in solving poverty—not the only one—is the training and job preparation of these youthful persons, because the uncertainty of youth unemployment as a consequence of their inexperience is assuming dangerous proportions in many countries, where their economies and educational systems cannot incorporate the number of young people who should annually enter the labor market.

Youth unemployment is an urgent issue that has demographic, economic, social, health, environmental, political, and legal repercussions, both for the State and for the individuals involved, and especially for families, if not properly addressed, given the referential entry point to possible security within the limits of daily life—a context in which a network of situations involved in generally changing particular and global relations is totalized. Additionally, gender gaps in labor inclusion, determined by the unequal distribution of the workload that falls on young women or not, must be taken into consideration.

With the lack of employment, the youth societal group, feeling psychically and emotionally unstable, being rejected and socially expelled, will increase crime, violence, and everything that entails toward the margins of the law, both to survive and to express their discontent and abandonment. Consequently, it is imperative that the young sector of society be incorporated into governmental policies, providing them with employment opportunities and sustainable, dignified, and decent means of livelihood to overcome poverty through honest work.

In these countries, young people must choose between working in the informal sector or not working at all. Due to various factors, they are not trained to perform the tasks demanded by employers; therefore, they must study and prepare for them, or perform long workdays for a meager income precisely because of their lack of knowledge. Labor inclusion is key to combating poverty, reducing informality and inequality, and advancing toward inclusive individual or general social development. Another factor excluding young people from employment is that, due to their economic situation, they find themselves outside the Formal Educational System; therefore, only a minimal number manage to complete basic or primary education due to dropout rates and survive in the informal economy, always carrying need on their shoulders.

Moreover, the system does not educate for work, as it does not teach the use of technical tools, technological equipment, and instruments that adequately train and empower individuals to perform special functions or specific trades. Likewise, very few—without being exclusive—due to their capacity, intelligence, and skill, and also being competitive, manage to establish themselves as independent workers or set up their own prosperous business, thereby demonstrating their own transcendence and self-improvement.

'Boys and girls of and on the street' are those under 18 years of age who do not maintain contact with their family members or these ties are very weak; they have broken all relations with their community and take the street as a natural habitat, displacing the family as an essential factor of growth and socialization. To this end, they develop diverse survival strategies that expose them to various types of risks and degradations, assuming their life as 'an established or imposed reality.' The population of this youth and child group does not remain static as partisans of certain forms of relativization that presuppose imbrications and mediations, because due to socioeconomic factors, it grows increasingly larger, which increases the deterioration of the quality of life of this societal sector, further advancing the progression of poverty and violence in these countries. According to what was established in the 'National Forum: Poverty' (2003:31): 'All Venezuelans share the conviction that the crisis we are going through today is deep, complex, and of enormous magnitude. It is expressed to us daily and in different ways, intensity, and faces, above all, youthful faces.'

Most of this social group is not on the street by their own initiative; rather, circumstances have led them to abandon 'their homes,' constituted on the basis of a destitute situation, suffering intra-family and extra-family violence and extreme poverty, with traditional domestic overcrowding, in addition to enduring hunger and helplessness. This results in deficient health, without being able to undertake a path of reconstruction due to their complex experiential environment—although this does not imply assuming the notion of society except as an aggregate of individuals. This group comes from slums and hamlets depressed by need, which, due to their reality, form around urban centers where the economy and commerce flow. Furthermore, there are no public or private schools in the sector nor health centers to care for them.

The survival strategies of these minors in poverty are based above all on begging, informal street vending, occupation in marginal activities, committing petty thefts and robberies, and accepting donations of food, clothing, and other belongings offered by charitable individuals or passersby in the environment where they 'dwell,' without assuming the notion of community. Poverty reduction requires time, effort, and political disposition from governmental authorities and civil society to combat it and minimize it to its greatest extent. Meanwhile, hunger requires immediate solution to prevent malnutrition in this population segment.

Conclusions

Children, girls, boys, and adolescents in situations of poverty—which could be described as begging with its dramatic expressions—represent an extreme situation of weakness and vulnerability that requires priority and urgent attention oriented toward confronting a multiple social challenge due to its complexity. They are found everywhere, but especially in urban centers, notwithstanding the questions and doubts regarding their own paradigms if their problems are considered within the indeterminacy of Chaos Theory.

This group maintains precarious and minimal health due to the lack of adequate food and the mistreatment of all kinds they receive daily from the rest of the general population, as well as from members of their own groups. Unfortunately, the impact of poverty results in the creation of a trauma from which recovery is almost impossible and which increases as time passes if there are no significant changes, becoming a psychosocial syndrome whose origin is based on having been raised in a destitute environment under conditions of extreme poverty.

Under these principles, España, L. (2004:29) states that 'from the cultural point of view, human behavior is not biologically determined. What we do, think, say, and feel is not brought with us at birth, but rather is constructed throughout life.'

This new generation of poor individuals—composed of girls, boys, and youth of or on the street—will find themselves enveloped in a situation of hatred and resentment against the rest of the population that is 'not so poor,' due to the absence of goods and services that 'others' possess but that are denied to them. This may be the most stimulating example that can be found in the imaginary of childhood regarding child and youth rebellion, as a way to release the conflict that may harbor within them from an early age.

This is without considering the 'rights' that members of the middle and upper social classes possess, which 'they do not share with the poor,' forcing the latter to live in mediocre conditions of inferiority. This transmission of poverty from generation to generation leads to its perpetuation in *saecula saeculorum* [forever and ever], without any possibility of glimpsing social change in the future.

Therefore, no explanation is needed for the predisposition of younger members to follow the example of their progenitors, as well as the environment where their initial life unfolds. And if the observed model is the conformity of being poor, along with 'getting by day to day by any means necessary'—whether by asking for help, performing 'street work,' rummaging through garbage, or committing minor illicit acts—that 'tradition will be followed' without significant changes, which will increase even more with each family cycle as 'the family' grows but does not evolve.

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Translation Note: Special thanks to professor Fabricio Rodríguez Cazón (University of Guayaquil) for the academic translation of this manuscript into English.
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The academy and its interaction with communities through society engagement programs

La academia y su interacción con las comunidades a través de los programas de vinculación con la sociedad

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Received date: 26/03/2026

Acceptance date: 26/04/2026

Abstract

Academia plays a crucial role in connecting higher education with the real demands of communities through social engagement programs. These programs aim to apply knowledge acquired in the classroom to specific social, economic, and cultural contexts, thus promoting local problem-solving and sustainable development. Collaboration between universities and communities enables comprehensive education for students, promoting values such as social responsibility, solidarity, and civic engagement. Communities, in turn, benefit from the technical, scientific, and human support provided by higher education institutions, generating a reciprocal learning process. Overall, university engagement is established as a strategic pillar for social development, knowledge transfer, and the positive transformation of the community environment. The methodology applied was mixed, as it allowed for the analysis and measurement of the relationship between academic institutions and communities. The paper concludes by demonstrating that engagement with society is established as a crucial foundation of university work, combining teaching, research, and community service.

Keywords: local communities, educational management, higher education institutions, problem solving, know-how transfer.

Resumen

La academia desempeña un rol crucial en la conexión entre la educación superior y las demandas reales de las comunidades a través de programas de vinculación social. Estos programas tienen como objetivo aplicar los conocimientos adquiridos en el aula a contextos sociales, económicos y culturales específicos, fomentando así la resolución de problemas locales y el desarrollo sostenible. La colaboración entre universidades y comunidades permite una formación integral para los estudiantes, promoviendo valores como la responsabilidad social, la solidaridad y el compromiso cívico. A su vez, las comunidades se benefician del respaldo técnico, científico y humano que brindan las instituciones de educación superior, lo que genera un proceso de aprendizaje recíproco. En conjunto, la vinculación universitaria se establece como un pilar estratégico para el desarrollo social, la transferencia de conocimiento y la transformación positiva del entorno comunitario. La metodología que se aplicó fue mixta, ya que permitió el análisis y la medición de la relación entre las instituciones académicas y las comunidades. Se concluye el trabajo demostrando que la conexión con la sociedad se establece como un fundamento crucial de la labor universitaria, al combinar la enseñanza, la investigación y el servicio a la comunidad.

Palabras clave: acción comunitaria, gestión académica, instituto de enseñanza superior, solución de problemas, transferencia de conocimiento.

Introduction

Universities are social institutions whose mission is carried out through three core functions: the education and training of professionals and researchers, the creation and dissemination of knowledge, and engagement with the community. These elements have been present since the earliest universities, although the ways in which they are implemented have evolved over time.

The university stands as an institution that serves society as a whole; it influences and helps shape social dynamics while also acting as an educational reference point for students, faculty, and the broader community. For these institutions, development should focus on improving the quality of their services and strengthening their connections with society, businesses, and the external environment. In this sense, both professional and academic education should become more accessible and more closely integrated with business and institutional contexts (Paleari et al., 2015).

“The university is committed to society; it is an agent of change capable of generating both theoretical and practical knowledge that enriches the growth and development of individuals. This is essential for solving problems through projects that foster reciprocal interaction between the university and the community, contributing to national development in all its dimensions” (Zea, 1981).

Community engagement is one of the core functions of higher education in Ecuador, as established by the Organic Law of Higher Education (LOES) and the Academic Regime Regulations (RRA). According to Article 117 of the LOES, engagement is considered a fundamental function of universities, while Article 4 of the RRA defines it as a function that builds capacity and promotes knowledge exchange based on the academic strengths of higher education institutions. Its purpose is to ensure effective responses to the needs and challenges of their surrounding environment (Flor, 2020).

Community engagement in Higher Education Institutions (HEIs) is one of their core functions, serving as a key link between academia and both public and private sectors. Its purpose is to strengthen teaching and research through the active interaction of faculty and students in its implementation. Each initiative establishes its own specific goals; however, most aim to enhance social development and improve citizens' quality of life, while also enriching the experiential learning process for the students involved (Vásquez & Bermeo, 2021).

Academia plays a crucial role in carrying out community engagement, as it participates in, observes, and experiences the changes that occur in both beneficiaries and students. This positions it as a generator of knowledge and a source of solutions to social challenges across different disciplines and sectors where they are needed. In this sense, it seeks to integrate community engagement with the core pillars of education—teaching and research—as illustrated in Figure 1.

Figure 1

Mission Triptych of Higher Education Institutions



Resource: Flor (2020). Prepared by: Ochoa et al. (2025).

Universities are responsible for fulfilling their mission through three fundamental pillars: teaching, research, and engagement with society. These elements are closely interconnected, fostering a two-way flow of communication among them. Teaching should be grounded in research findings, while research, in turn, should be guided by the needs of society. However, a common criticism of universities is their disconnect from the real world, often conducting research in isolated settings and overlooking the genuine needs of communities. Therefore, it is essential for universities to adopt an approach that enables them to play an active role in economic development (Soleimani et al., 2016).

Universities not only generate knowledge but also have the responsibility to transfer it to society. The mere production of knowledge does not guarantee its dissemination or its ability to drive innovation and economic growth. In fact, knowledge becomes a key engine for economic development only when universities share it and stakeholders put it into practice (Audretsch, 2014).

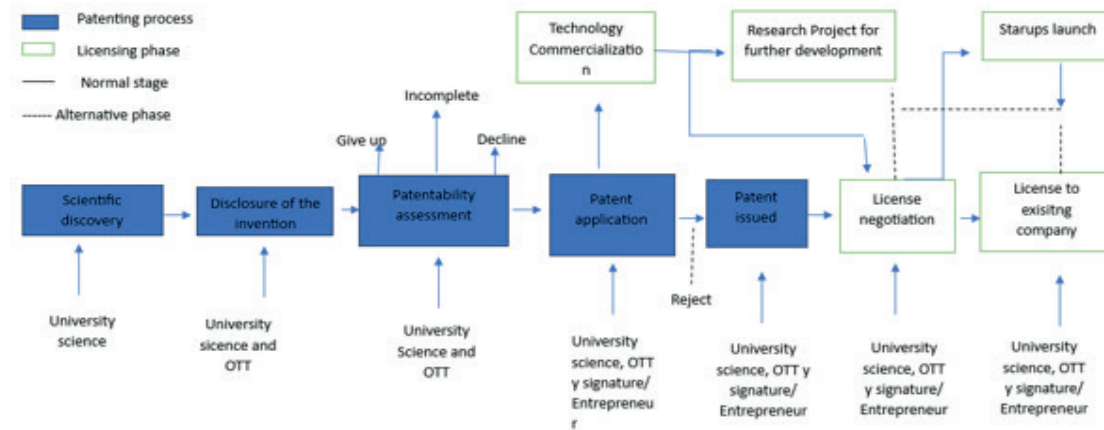
Technology transfer (TT) between universities and industry represents a form of collaboration aimed at achieving a range of specific objectives. Beyond producing knowledge, universities support businesses in developing practical applications, positioning themselves as key partners in the knowledge economy. From a knowledge perspective, TT can be understood as a process through which knowledge, experience, and information are shared or acquired between entities. In this context, TT programs are essential to the core functions of universities—teaching, research, and community engagement—by providing: a mechanism for transferring relevant research outcomes to society; guidance for researchers on managing relationships with industry; a framework for promoting and facilitating applied research; a source of flexible funding for additional projects; and expertise in licensing and contract negotiation (Feng, Chen, Wang, & Chian, 2012).

As noted by Valverde and Soto (2007), this process can begin with the provision of specialized services and training programs. It can then evolve into consultancy agreements and technical assistance in areas where the university has strong expertise, eventually progressing to more advanced stages linked to research. Figure 2 illustrates the technology transfer process in universities. For an institution to successfully carry out effective

technology transfer, it is essential to have a strong research base and a highly qualified team of researchers with international-level competitiveness, as research and development (R&D) outputs are the key resource that drives technology transfer (Valverde & Soto, 2007).

Figure 2

Technology Transfer Process in Universities



Resource: Tseng & Raudensky (2014). Prepared by: Ochoa et al. (2025).

From this perspective, research plays a crucial role in enabling technology transfer (TT), and without TT, it is difficult to build a meaningful connection with society. In other words, technology transfer allows universities to engage with their communities in a reliable and impactful way. Therefore, it is essential for universities to recognize that the knowledge they generate and share should be aligned with social, economic, and political needs, contributing to the development of sustainable, long-term solutions.

Universities occupy a unique position in society by bringing together experts in research and development and by treating knowledge creation as a socially distributed process (Necoechea-Mondragón & Pineda-Domínguez, 2013). Likewise, Barreno Salinas, Barreno Salinas, and Olmedo Valencia (2018, p. 41) argue that higher education should be a transformative and meaningful learning process.

For this reason, it is important to promote values-based education across society, as well as training in diverse areas of knowledge. Strengthening the sense of social responsibility that connects academia with society is key, so that professionals are better prepared to address real-world needs and challenges in different contexts. The ultimate goal is to provide solutions to concrete problems, creating a strong link between academic training—both theoretical and practical—and its application in the labor market.

When outreach and community engagement are carried out, theory is not only put into practice; research and science are also advanced. More importantly, comprehensive solutions are created for the most vulnerable communities. All of these outcomes are generated by the students of the University of Guayaquil. However, this impact is lost when the results achieved are not communicated in a visible, clear, simple, efficient, and effective way.

Methods

This study was conducted using a qualitative approach, specifically through a documentary or bibliographic method. The work was developed by reviewing, analyzing, interpreting, and synthesizing information from both written and digital sources, including books, scientific articles, and technical reports.

In addition, the expertise and professional experience of the contributors were incorporated to enrich the study. As educators, we have actively participated in the various community engagement programs developed by the university. It is important to not only build commitment within the classroom but also to bring that commitment into real-world contexts through interaction with the community. These initiatives address a range of local challenges, contributing to social development through academic and research-based activities.

This is supported by a structured Community Engagement Plan, through which Higher Education Institutions commit to working responsibly in accordance with the guidelines established by the Organic Law of Higher Education (LOES, 2010).

Results

This documentary research presents and discusses findings reported by Schindler et al. (2015), who identified a Quality Framework and a set of indicators based on the involvement of four stakeholder groups. The outcomes of this work are summarized in Figure 3.

Each of the approaches analyzed contributes to fulfilling the mission of higher education institutions. The first approach focuses on meeting the requirements established by regulatory bodies, using institutional indicators as a means of assessment and evidence. The second approach examines the changes observed in students, particularly in terms of affective development.

The exceptional and responsible approaches fall within the scope of higher education institutions themselves. Meeting these criteria and indicators is essential to ensure compliance with the standards required by governing bodies.

Figure 3

Quality approach and indicators

Quality Approach	Indicators
Intentional approach: specifications, requirements, or standards defined by accreditation and/or regulatory bodies. Transformational approach: institutional products and services produce a positive change in students' learning (domains: affective, cognitive, and psychomotor) and in their personal and professional potential. Exceptional approach: institutional products and services achieve distinction and exclusivity through compliance with high standards. Responsible approach: institutions are accountable to stakeholders for the optimal use of resources and the delivery of precise educational products and services with zero defects.	• Fulfillment of the mission and vision • Transparent objectives and processes • Compliance with standards • Achievement of institutional objectives • Student-centered approach • Competent teachers • Clarity of results • Development of critical thinking • Student commitment to content • Credibility • Legitimacy • Reputation • Category • Preparation of students for the labor market • Acquisition of quality resources • Sufficient infrastructure • Focus on continuous improvement

Resource: Schindler, Puls-Elvidge, Welzant, & Crawford, (2015). Prepared by: Ochoa et al (2025)

Discussion

Community engagement has become a key component of the higher education system, as it fosters meaningful interaction between universities and society. This process is not only aimed at complying with the legal requirements established by the Organic Law of Higher Education (LOES), but also at strengthening the social commitment of educational institutions by addressing real needs within their surrounding environments.

In recent years, Ecuadorian universities have developed community engagement projects that tackle a wide range of issues, including community development, health, education, entrepreneurship, and environmental sustainability. These initiatives have provided both students and faculty with valuable opportunities to apply their knowledge in real-world settings, creating a positive impact on communities while also contributing to the holistic development of students.

Conclusions

Community engagement strengthens the social role of Higher Education Institutions by connecting academic knowledge with the real needs of the country.

It contributes to the country's sustainable development by addressing social, economic, and environmental challenges.

It helps shape professionals who are ethically aware and socially committed, capable of using their knowledge to benefit the community.

It is both an academic and regulatory requirement, recognized by governing bodies (CES and CACES) as an indicator of quality in higher education.

It promotes meaningful learning and innovation by enabling students and faculty to engage directly with the community and learn from real-world experiences.

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Translation Note: Special thanks to professor Jorge Cañizares Stay (University of Guayaquil) for the academic translation of this manuscript into English.

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